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J. TOTH ET AL
CIRCUIT BREAKER

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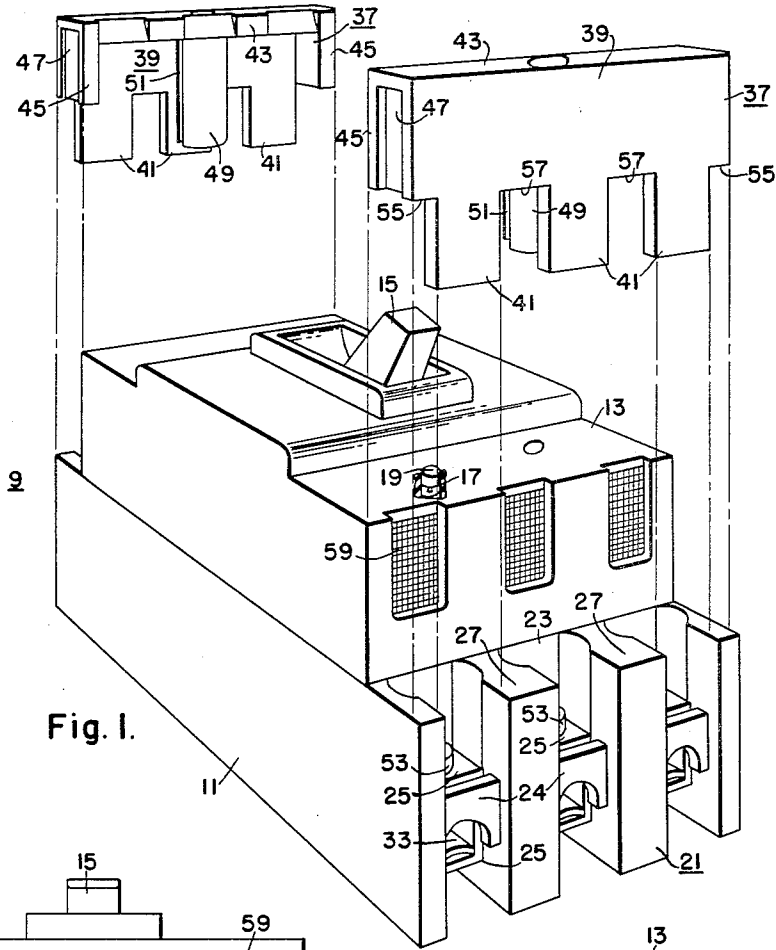


Fig. 1.

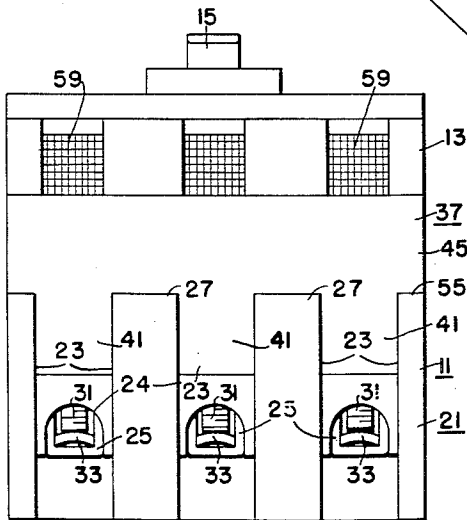


Fig. 2.

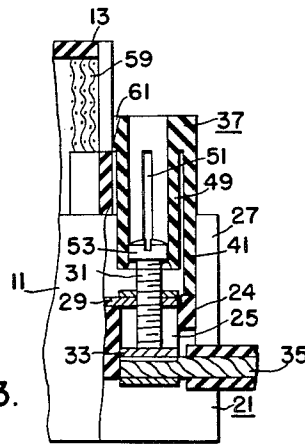


Fig. 3.

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2,727,965

CIRCUIT BREAKER

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11 Claims. (Cl. 200—168)

This invention relates to electrical devices in general and more particularly to terminal constructions for electrical devices such as circuit breakers.

Certain types of circuit breakers are mounted in insulating housings comprising a base and a cover which are secured together and sealed to prevent tampering with the breaker mechanism and changing the calibration of the breakers. The base of the breaker is longer than the cover to provide projecting end portions for supporting the breaker terminals to permit connecting the breaker in an external circuit after the cover has been sealed and without breaking the seal. It is sometimes necessary to make connections to the breaker from an energized bus and because of the exposed terminals, accidental contact with a live terminal may be made, or one might be working on adjacent apparatus when accidental contact may be made with one of the breaker terminals or simultaneously with adjacent breaker terminals. This might result in serious or even fatal injury to the person working on or adjacent to the breaker.

It is, therefore, an object of the invention to provide a circuit breaker embodying a protective cover for the breaker terminals for preventing accidental contact with a live terminal.

Another object of the invention is to provide a circuit breaker embodying a protective cover for the breaker terminals which is readily removable and easily inserted in protective position without the use of separate fastening means.

Another object of the invention is to provide a circuit interrupter having exposed terminals mounted on the housing of the interrupter with a protective cover for the terminals made of one piece molded insulating material and having retaining means molded integral therewith.

Another object of the invention is to provide a circuit interrupter having a housing on which is mounted exposed terminals with a protective cover for the terminals which requires no separate means for fastening the terminal cover to the housing of the interrupter.

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 connection with the accompanying drawing.

In said drawing:

Figure 1 is a perspective view of a circuit breaker showing the protective terminal covers raised from the breaker,

Figure 2 is an end elevational view of the circuit breaker with the terminal cover in place,

Figure 3 is a side elevational view of the end portion of the breaker partly in section showing the means for holding the protective cover in place.

Referring to the drawing, the circuit breaker indicated generally at 9 comprises a base 11 and a cover 13 through which extends an operating handle 15 for operating the breaker mechanism which, if desired, can be of the type disclosed in Dorfman and Freese Patent No. 2,419,125,

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issued April 15, 1947. The cover 13 is secured to the base 11 by means of screws 17 (only one being shown) and the cover may be sealed to the base by a sealing compound 19 poured over the heads of the screws 17 to prevent tampering with the breaker mechanism and changing the calibration of the breaker.

The base 11 of the breaker is longer than the cover 13, providing projecting end portions 21 for supporting the breaker terminals. The projecting end portions 21 of the base 11 have three recesses 23 therein, in each of which is mounted a terminal 25. The raised or projecting portions 27 on the projecting end portions 21 of the base 11 between the terminals 25 and at the sides of the center terminals form insulating barriers between adjacent terminals.

The terminals 25 are rectangular in shape and are mounted on the projecting ends 21 of the base 11 in the recesses 23 and are secured to conducting terminal strips 29 (Fig. 3) for connecting the breaker in an electrical circuit. The terminals 25 are provided with terminal screws 31 which threadedly engage an opening through the terminal strip 29 and the upper portion of the terminal 25. Pivotaly mounted on the lower ends of each of the screws 31 is a clamping member 33 so that upon rotation of the screw 31 the clamping member will move up and down in the terminal, thus providing means whereby the end of a conducting cable 35 (Fig. 3) may be securely clamped to the terminal 25. By having the electrical terminals 25 on the end portions 21 of the base 11 which project beyond the ends of the cover, the electrical connections may be made to the terminals without breaking the seal and removing the cover 13. It is, at times, necessary to make connections to the breaker terminals from an energized bus. Under such conditions, particularly when the breakers are mounted end to end in a panelboard or switchboard, and because of the exposed terminals of the breakers, accidental contact may be made simultaneously with adjacent terminals. To prevent such accidents and possible serious or even fatal injury to the person working on the job, there is provided a protective cover or guard for the terminals of the breaker.

The protective cover 37 is preferably made of molded insulating material in substantially the shape shown in Fig. 1. Extending downwardly from the main body portion 39 of the protective cover are three projections 41 adapted to fit into and close the part of the recesses 23 above the terminals in the end portions 21 of the base 11. The lower ends of the downwardly extending projections 41 engage the top of bridging portions 24 of the insulating material of the base 11 behind which the terminals 25 are positioned. A top portion 43 of the protective cover 37 extends across the top of the end portion 21 of the base 11 and is adapted to rest against the breaker cover 13 when the protective cover is in place. End portions 45 of the cover 37 are provided with finger recesses 47 which facilitate installation and removal of the protective cover.

The protective cover 37 is removably fastened to the base of the breaker by means of a resilient gripping device shown as a tubular retaining member 49 molded integral with the top portion 43 of the protective cover. The retaining member 49 is divided into two or more parts by longitudinal slots 51 therein which permit the lower end of the parts of the retaining member to flex slightly. The bore of the retaining member 49 is slightly smaller than the diameter of the head 53 of the terminal screw 31. To install the protective cover on the circuit breaker, it is held above the projecting end 21 of the base 11 with the projections 41 in line with the recesses 23 and then moved downwardly inserting the projections 41 into the recesses 23 until shoulders 55 at the

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ends of the protective cover engage the outer barriers or raised portions 27 of the base 11. As the protective cover 37 is lowered into position, the lower end of the retaining member 49 engages the head 53 of the terminal screw 31 for the center terminal. Further movement of the protective cover forces the parts of the retainer 49 to spread apart and pass down over the head 53 of the screw 31 to the position shown in Fig. 3, the frictional engagement of the retainer 49 with the head 53 holding the cover in place. In this position (Fig. 2) the shoulders 55 rest on the outer barriers 27, the surfaces 57 between the projections 41 rest on the inner barriers 27 and the top portions 43 and end portions 45 rest against the breaker cover 13, thus completely enclosing the breaker terminals at the front of the breaker except for a small space at the bottom for the wire 35. The breaker cover 13 at the contact end or line end is provided with openings 59 for venting the hot arc gases and the protective cover 37 is provided with recesses 61 in line with the openings 59 to permit free venting of the arc gases.

The protective cover is readily removable by grasping it between the fingers on the recessed ends and pulling upwardly or towards the front of the breaker. The provision of the protective cover eliminates or greatly reduces the possibility of a person's hand accidentally touching a live terminal, or of bringing a tool into simultaneous contact with the terminals of adjacent phases of the circuit, thus providing a safe terminal structure for the circuit breaker. The protective cover is held in place on the base of the breaker housing without the use of separate fastening means such as screws or springs.

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 and arrangement of parts thereof without departing from some of the essential features of the invention.

We claim as our invention:

1. In a circuit interrupter comprising a housing of insulating material including a base and a cover sealed to said base, barriers at the end of said housing forming a recess therebetween, a terminal mounted in said recess for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of insulating material removably mounted on said barriers, and a portion on said terminal cover extending into said recess and frictionally engaging said terminal to hold said terminal cover in place.

2. In a circuit interrupter comprising an insulating housing, barriers at the end of said housing forming a recess therebetween, a terminal mounted in said recess for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of insulating material mounted on said barriers enclosing said recess, and a portion integral with said terminal extending into said recess and engaging means in said recess at the end of said housing to hold said terminal cover in place without the use of any separate fastening means.

3. In a circuit interrupter comprising an insulating housing including a base and a cover, the ends of said base extending beyond the upper portion of said cover, at least one end of said housing having a recess therein, a terminal mounted in said recess for connecting said interrupter in an electrical circuit, a connector on said terminal, a separate terminal cover of insulating material mounted on said housing and disposed to close said recess, and a portion of said terminal cover extending into said recess frictionally engaging said connector to retain said cover in place.

4. In a circuit interrupter comprising a housing including a base and a cover of insulating material sealed to said base, barriers at the ends of said housing forming a recess, a terminal mounted in said recess provided with a terminal connector for connecting said circuit inter-

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rupter in an electrical circuit, a separate terminal cover of insulating material mounted on said barriers, a portion of said terminal cover extending into said recess to cover the end thereof, an integral portion of said terminal cover extending into said recess and coacting with said terminal connector to removably hold said terminal cover in place.

5. In a circuit interrupter comprising a housing including a base and a cover of insulating material, the ends of said base extending beyond the upper portion of said cover, barriers at the ends of said housing forming one or more recesses therebetween, a terminal strip mounted in said recess and provided with a terminal connector for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of insulating material mounted on said barriers, said terminal cover having a projecting portion extending into said recess for closing the end of said recess, and means for holding said terminal cover in place on the end of the circuit interrupter.

6. In a circuit interrupter comprising a housing including a base and a cover of insulating material, the ends of said base extending beyond the upper portion of said cover, barriers at the ends of said housing forming one or more recesses therebetween, a terminal strip mounted in said recess and provided with a terminal connector for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of insulating material mounted on said barriers, said terminal cover of insulating material having a top portion extending across said barriers and having a plurality of projecting portions extending downwardly in a plane substantially at a right angle to the top portion, said downwardly projecting portions extending into said recesses and closing the end portions thereof above said terminal strips, and portions on said terminal cover engaging means at the end portion of the circuit interrupter to hold the terminal cover in place thereon.

7. In a circuit interrupter comprising a housing including a base and a cover of insulating material, barriers at the end of said housing forming one or more recesses therebetween, a terminal strip mounted in said recess and provided with a terminal connector for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of insulating material mounted on said barriers, said terminal cover of insulating material having a top portion extending across said barriers and having a plurality of projecting portions extending downwardly in a plane substantially at a right angle to the top portion, said downwardly projecting portions extending into said recesses and closing the end portions thereof above said terminal strips, and integral portions of the insulating material of said terminal cover frictionally engaging means at the end portion of the circuit interrupter and utilizing the inherent resiliency of the insulating material of the terminal cover for holding it in place on the end portion of the circuit interrupter.

8. In a circuit interrupter comprising a housing including a base and a cover of insulating material, said base being longer than said cover, barriers on the end of said base extending beyond said cover, said barriers having recesses between them, terminals mounted in said recesses for connecting said circuit interrupter in an electrical circuit, a separate terminal cover of molded insulating material mounted on said base and resting on said barriers, projections molded integral with said terminal cover extending into said recesses for closing said recesses, and a part molded integral with said terminal cover frictionally engaging one of said terminals to hold said terminal cover in place.

9. In a circuit interrupter comprising a housing of insulating material including a base and a cover, a plurality of spaced barriers at the end of said housing, said barriers having recesses between them, a terminal mounted in each of said recesses for connecting said circuit interrupter in an electrical circuit, a separate terminal guard of one piece of molded insulating material mounted on said barriers,

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said terminal guard being substantially the width of said housing and covering all of said recesses, and retaining means molded integral with said terminal guard frictionally engaging at least one of said terminals to retain said terminal guard in position.

10. In a circuit interrupter comprising a housing of insulating material including a base and a cover, barriers at the end of said housing extending beyond said cover, said barriers having recesses between them, terminals mounted in said recesses for connecting said circuit interrupter in an electrical circuit, a separate terminal guard of one piece of molded insulating material mounted on said barriers and resting on said barriers, and split retaining means molded integral with said terminal guard frictionally engaging at least one of said terminals to retain said terminal guard in position without using any separate fastening device.

11. In a circuit interrupter comprising a housing of

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insulating material including a base and a cover, said base being longer than said cover, barriers on the end of said base extending beyond said cover, said barriers having recesses between them, terminals mounted in said recesses and having a headed screw for connecting a conductor to one of said terminals, a separate terminal guard of one piece of molded insulating material mounted on said barriers, and a split tubular portion molded integrally with said terminal guard frictionally engaging the sides of the head of said screw in the terminal and retaining said terminal guard in position on the end of the circuit interrupter.

References Cited in the file of this patent

UNITED STATES PATENTS

1,667,617	Zelt	Apr. 24, 1928
2,636,065	Fiske	Apr. 21, 1953