Jan. 8, 1957 W. H. EDMUNDS 2,777,119

TERMINAL AND TERMINAL WIRE CONNECTOR

Filed May 25, 1953 2 Sheets-Sheet 1

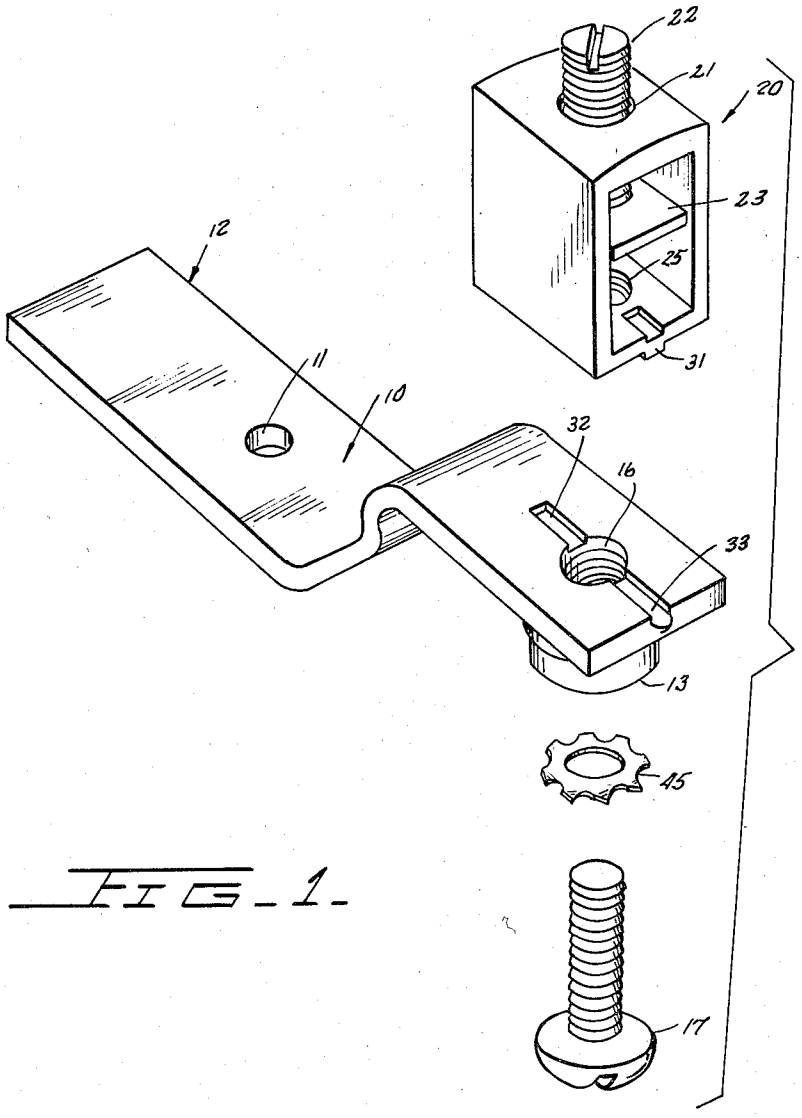


FIG. 1.

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FIG. 4

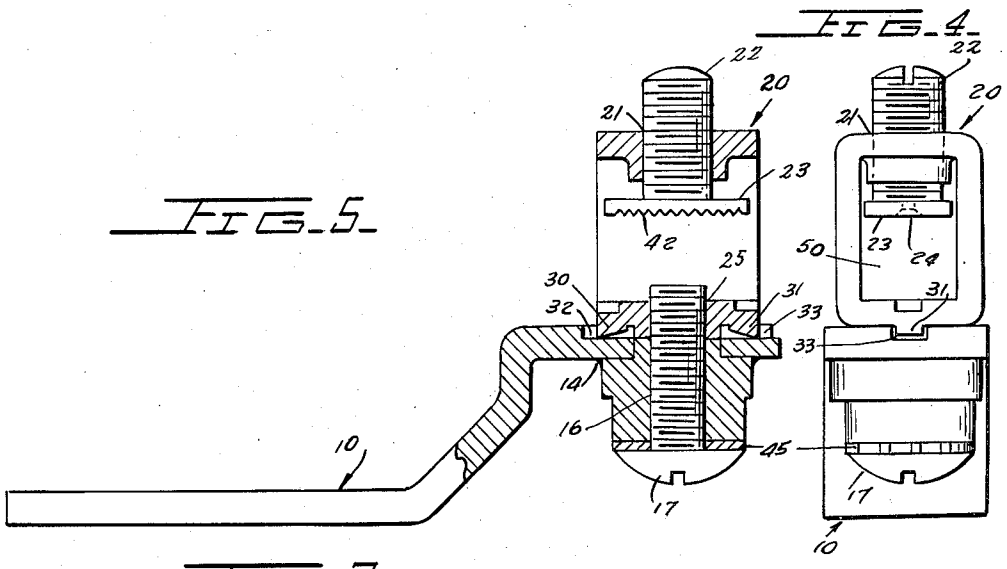


FIG. 5

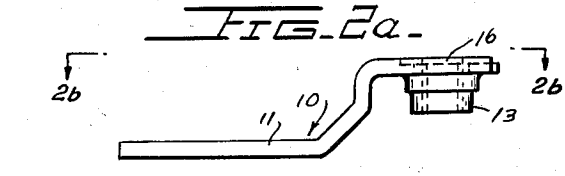


FIG. 2a

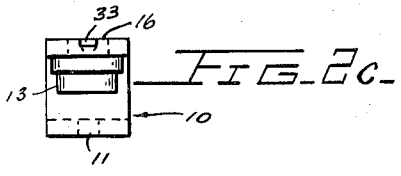


FIG. 2c

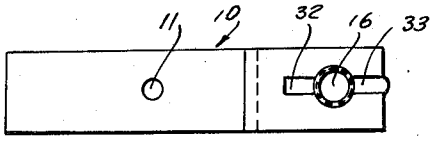


FIG. 2b

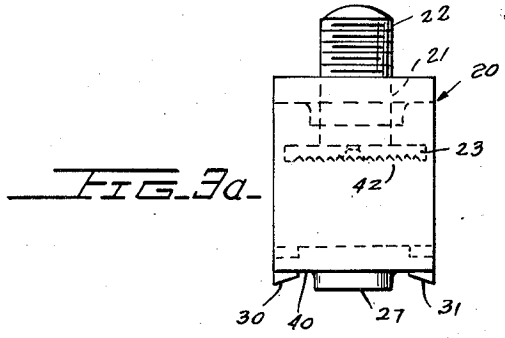


FIG. 3a

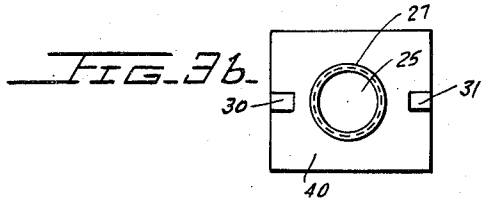


FIG. 3b

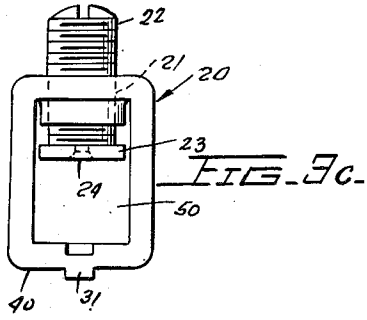


FIG. 3c

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TERMINAL AND TERMINAL WIRE CONNECTOR

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Application May 25, 1953, Serial No. 356,931

1 Claim. (Cl. 339—272)

This invention relates to terminal and terminal wire connector arrangements and is more particularly directed to a solderless connector which is keyed to its terminal member.

The standards set forth for the minimum requirements of molded case circuit breakers require that the predetermined distance exist between the terminal connectors of adjacent poles. The minimum standards which are prescribed for example by the Underwriters Laboratory Inc. insure that sufficient insulation exist between adjacent terminals so as to prevent leakage between.

Thus, the molding and positioning of the terminal members are properly preselected so that a predetermined minimum creepage and leakage distance will be achieved. However, if the rotation of the terminal connectors is not controlled, adjacent terminal blocks may twist towards each other thereby substantially reducing leakage and creepage distance from the predetermined value and the circuit breakers may not pass the rigid test requirements. Thus, it is of utmost importance that the terminal connectors be securely positioned in their predesigned location to maintain proper distance between between adjacent units.

Thus, it is not only necessary to provide the recesses for seating the terminal and terminal connectors in the molding at a predetermined distance from each other but it is also necessary to insure that the terminal connector, once positioned on the terminal bar, remains in its predetermined position.

In the prior art arrangement, terminal connectors were constructed with protruding sections from one end thereof which extended over the terminal bar. However, this arrangement, although initially designed to prevent rotation or turning of the terminal connector when installed or in operation, has been ineffective in many applications to prevent rotation. Thus, even though the recesses within the molding of the circuit breaker are appropriately spaced, the rotation of adjacent terminal connectors toward each other materially reduces the leakage distance therebetween.

One primary reason for the failure of the prior art terminal connector resulted from the fact that the protrusions from the edge of the terminal connector serve only to prevent rotation thereof in one direction. Hence, it was necessary to provide two protrusions which respectively prevented clockwise and counterclockwise rotation. However, in the event of damage or failure of one of the protruding units, the terminal connector was free to rotate in the direction which the damaged protrusion was designed to restrict.

In my novel terminal and terminal connector, I provide two protruding sections from the bottom surface of the terminal which extend from the central portion thereof into complementary recesses of the terminal bar. Thus, each of the mating sections will prevent both clockwise and counterclockwise rotation thereof. Thus, in the event of failure or damage to either one of the protruding sections, the remaining unit will be effective to prevent clockwise and counterclockwise rotation.

Accordingly, a primary object of my invention is to provide a novel terminal and terminal wire connector arrangement having two keyed sections each of which is effective to prevent both clockwise and counterclockwise rotation of the units.

Another object of my invention is to provide a novel solderless terminal arrangement in which the protruding section of the terminal connector extends from the bottom surface and mates with a corresponding groove in the terminal to thereby prevent both clockwise and counterclockwise rotation at the terminal connector.

These and other objects of my invention will be apparent from the following description when taken in connection with the drawings in which:

Figure 1 is an exploded perspective view of my novel terminal and terminal wire connector.

Figures 2*a*, 2*b* and 2*c* are detailed views of the terminal wherein Figure 2*a* shows a side view of the terminal; Figure 2*b* a top view of the terminal and Figure 2*c* an end view of the terminal.

Figures 3*a*, 3*b* and 3*c* are detailed views of the terminal wire connector wherein Figure 3*a* is a side view illustrated with one wall transparent; Figure 3*b* is a bottom view and Figure 3*c* is an end view.

Figure 4 is an end view of the terminal and terminal wire connector showing the key engagement therebetween.

Figure 5 is a cross-sectional view illustrating the engagement and attachment of the terminal wire connector to the terminal.

Referring now to Figures 1 through 5, the terminal **10** is a cup unit which will be secured to a molded housing of a circuit breaker by a nut or bolt passing through the opening **11**. The conductors for one pole of the circuit breaker will be brazed or soldered to the left end of the terminal connector at the area generally indicated at **12**. The right hand end of the terminal **10** is provided with a hollow cylindrical section **13** which may be permanently secured to the terminal **10** in any desirable manner such as by soldering as indicated by the numeral **14** in Figure 5. The hollow opening of the cylindrical section **13** is in alignment with the opening **16** of the terminal connector which is adapted to receive the terminal connector holding screw **17**.

The terminal connector **20** is a rectangular shaped metallic unit which may be made of any desirable conducting material such as copper. A threaded opening **21** in the upper surface thereof receives the screw **22** which will be used to hold and maintain a conductor within the terminal connector **20**.

A rider **23** is positioned on the reduced non-threaded bottom section of the screw **22** and a rivet **24** is passed through the bottom of the rider into the screw **22**. As best seen in Figures 3*c* and 4, the rivet is peened over the bottom surface of **23** to permit the rider **23** to float on the bottom of the screw **22**. The head of the rivet **24** may be flush with or positioned below the surface of the rider **23**. The bottom surface of the terminal connector **20** has a threaded opening **25** to receive the terminal connector holding screw **17**.

As will hereinafter be apparent, a lock washer **35** is provided for the screw **17** to insure that it will be maintained in position after it has secured the terminal connector **20** to the terminal **10**.

The terminal connector **20** may be provided with a protruding cylindrical section **27** which surrounds the threaded opening **25** to mate with the opening **16** of the terminal **10**. Two protruding sections **30** extend from the bottom surface of the terminal connector **20**. The

protrusions 30 and 31 may either be the result of either an extruding or stamping operation.

The terminal 10 is provided with recessed sections 32 and 33 to receive the protruding sections 30 and 31 of the terminal connector 20. Thus, the recessed sections 32 and 33 in the terminal 10 may also be made from an extruding or stamping operation.

As best seen in Figures 4 and 5, when the terminal connector 20 is positioned on the terminal 10, the protruding sections 30 and 31, respectively, will mate with the recessed portions 32 and 33 of the terminal 10.

Thus, it will be noted that after the screw 17 has been positioned through the opening 16 of the terminal 10 and into engagement with the opening 25 of the terminal connector 20, this latter unit can be tightened firmly to the terminal 10 so that its bottom surface 40 is flush with the top surface of the terminal. That is, since the protruding sections 30 and 31 key into the recessed sections 32 and 33, the terminal connector 20 can be flush on the terminal 10.

With this arrangement, both the cooperation of protrusion 30 with the recess 32 and the cooperation of the protrusion 31 with the recess 33 will prevent both clockwise and counterclockwise rotation of the terminal connector 20, and also insure proper alignment of the terminal connector 20 with the terminal 10. Hence, when either one of the protruding sections 30 or 31 is damaged or removed, the remaining protruding section will prevent both clockwise and counterclockwise rotation.

After the terminal connector 20 is securely positioned on top of the terminal 10 by means of the screw 17, the wire may be inserted within the opening between the rider 23 and the bottom surface of the terminal connector. This area is indicated generally as 50 in Figures 3c and 4. The screw 22 may then be rotated so that it will move in a desired direction thereby bringing the rider 23 into engagement with the conductor so that it will be sandwiched between the rider 23 and the bottom surface of the terminal connector. It will be noted that the rider 23 is preferably provided with a transverse serrated section 42 at its bottom to insure that the wire will be firmly held in position and not permitted to slip out of the conductor.

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 claim.

I claim:

A solderless terminal arrangement comprising a terminal wire connector; said terminal and said terminal wire connector made of electrically conducting material and arranged for high pressure electrical contact; said terminal wire connector having an opening at one end thereof to receive an external electrical connection to said terminal arrangement; said terminal wire connector having a threaded opening in the bottom surface thereof; said terminal having an opening extending therethrough and positioned in alignment with the threaded opening in said terminal connector; stamped protrusions surrounding said threaded opening in said terminal connector and extending from the bottom surface thereof; stamped recesses in the upper surface of said terminal and positioned around the periphery of the opening therein; said threaded opening adapted to receive securing means which passes through said opening in said terminal, and by threaded engagement with said opening in said terminal connector secures said terminal connector to said terminal; said protrusions seated in said recesses when aid terminal connector is secured to said terminal by means of said securing means; said seating engagement between said protrusions and said recesses effective to align said terminal connector with said terminal and prevent both clockwise and counterclockwise rotation of said terminal connector.

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