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2,693,586

TERMINAL CONNECTOR

Filed April 30, 1952

Fig. 1.

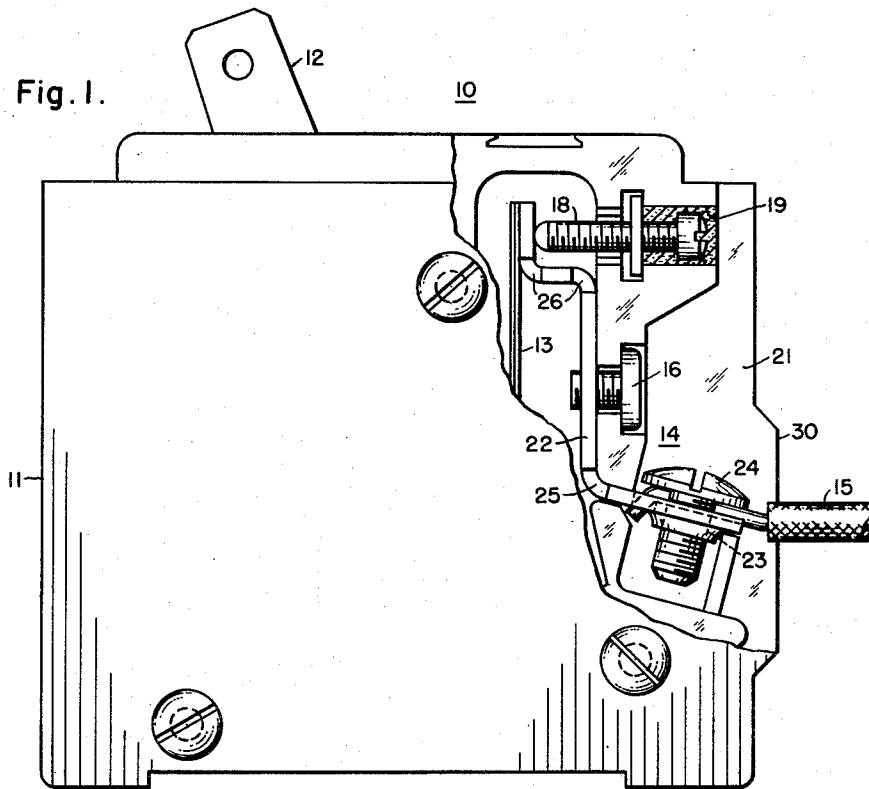


Fig. 2.

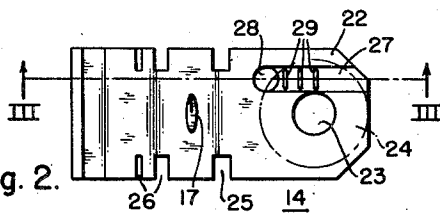


Fig. 3.

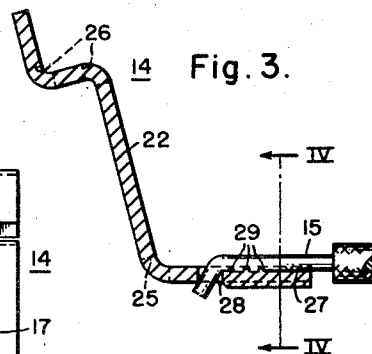


Fig. 5.

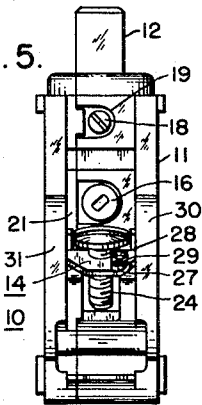
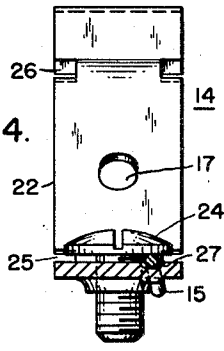


Fig. 4.



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TERMINAL CONNECTOR

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2 Claims. (Cl. 339—263)

Our invention relates, generally, to terminal connectors and, more particularly, to connectors for connecting electrical conductors to switches or automatic circuit breakers and the like.

In the construction of automatic circuit breakers, particularly the smaller sizes, the terminal connectors are frequently located in recesses in the breaker housings where it is difficult to make the wiring connections to the terminals.

An object of our invention, generally stated, is to provide a terminal connector which shall be simple and efficient in operation and which may be economically manufactured and installed.

A more specific object of our invention is to provide a terminal connector which may be installed in a relatively narrow recess in a circuit breaker or switch housing.

Another object of our invention is to provide a terminal connector to which a conductor wire may be easily and quickly attached.

A further object of our invention is to provide a terminal connector which will firmly hold a conductor wire connected thereto.

Other objects of our invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of our invention, a hole is provided in a terminal plate at one end of a groove or slot formed in the plate adjacent to the edge of the threaded opening for the terminal screw which has a head that extends outwardly over the slot. A plurality of ridges are provided in part of the slot to aid in holding the wire when the head of the screw is tightened against the wire. The end of the wire may be bent to form a hook which is inserted into the hole at the end of the slot and the wire then laid into the slot prior to the tightening of the screw.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is an enlarged view, in side elevation of a circuit breaker having a terminal connector embodying the principal features of the invention, a portion of the breaker housing being broken away;

Fig. 2 is an enlarged plan view, of the terminal plate, the wire being removed;

Fig. 3 is an enlarged view, in section, taken along the line III—III in Fig. 2, the wire being in position in the slot;

Fig. 4 is an enlarged view, partly in section and partly in end elevation, the section being taken along the line IV—IV in Fig. 3 and the terminal screw being tightened against the wire, and

Fig. 5 is a view, in end elevation, of the circuit breaker.

Referring to the drawing, and particularly to Fig. 1, the structure shown therein comprises an automatic circuit breaker 10 having a casing 11 and an operating handle 12. The circuit breaker 10 may be of a type having a thermal tripping device 13 of bimetal, only a portion of which is shown. The device 13 is secured to one end of a terminal connector 14 to which an electrical conductor 15 may be attached in a manner which will be more fully described hereinafter. The terminal connector 14 is secured in the housing 11 by means of a screw 16 which is threaded into an opening 17 in the connector 14. The tripping device 13 may be adjusted by means of a screw 18 which is preferably sealed in an opening 19 after the proper adjustment has been made.

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As shown in Fig. 5, the terminal connector 14 is disposed in a recess 21 in one end of the breaker housing 11. Since the breaker housing is relatively narrow in width, there is only a limited amount of space available for the connector 14 between the side walls of the housing 11 which form barriers 30 and 31 of insulating material between the terminals of adjacent breakers when they are positioned side by side. The narrow space between the barriers 30 and 31 makes it difficult to attach a wire to any one of previously known connectors.

As shown most clearly in Figs. 2, 3 and 4, the terminal connector 14 comprises a plate 22 which may be stamped from hard-drawn copper or other suitable material and has a threaded aperture or opening 23 therein for a terminal screw 24. As shown, the plate 22 may be notched at 25 and 26 in order to facilitate the bending of the connector into the desired shape.

In order to facilitate the connecting of the conductor 15 to the terminal plate 22, a straight generally rectangular groove or slot 27 is provided longitudinally of the plate 22 adjacent to the opening 23 between the opening 23 and one edge of the plate 22. A hole 28 is provided in the plate 22 at one end of, and in line with, the slot 27 and spaced ridges 29 are provided in the bottom of the slot 27 in the portion of the slot nearest the hole 28. As shown most clearly in Figs. 3 and 4, the depth of the slot 27 is less than the diameter of the conductor 15 and the height of the ridges 29 is less than the depth of the slot 27. The groove or slot 27 is parallel to the barriers 30 and 31 so that the wire may be slid into the groove from the end of the breaker.

As shown in Figs. 3 and 4, the end of the wire 15 may be bent downwardly to form a hook which is inserted into the hole 28 and the wire then laid into the slot 27. The screw 24 may then be tightened against the wire 15. For applications where there is more room, the straight end of the wire 15 may be inserted first in the hole 28 and then the wire may be bent downwardly into the slot 27. As shown most clearly in Figs. 2 and 4, the head of the screw 24 extends over the slot 27, thereby engaging the conductor 15 to press it against the ridges 29.

Since the plate 22 is preferably composed of a harder material than the usual copper conductor wire, the ridges 29 will be forced into the wire 15, thereby securely holding the wire. The bending of the wire 15 over the edge of the hole 28 also helps to secure the wire to the plate 22. It will be noted that the ridges 29 are disposed in approximately half the slot 27, thereby leaving the other half smooth for good contact between the wire and the plate 22.

It will be seen that the slot 27 and the hole 28 are so located that it is not necessary to bend the wire 15 around the shank of the screw 24, as is the case with some prior connectors. The end of the wire 15 may be readily inserted into the hole 28 in spite of the fact that the recess 21 in the breaker housing is relatively narrow.

When the underside of the head of the screw 24 is spaced from the plate 22 a sufficient distance the hooked end of the wire may be moved along the slot 27 past the shank of the screw 24 and then inserted into the hole 28 underneath the head of the screw 24. The screw may then be tightened against the wire to secure it in the manner previously described. Thus, it is not necessary to remove the screw 24 entirely from the opening 23 in order to connect the wire 15 to the terminal.

From the foregoing description, it is apparent that we have provided a terminal connector to which an electrical conductor may be readily attached and which will securely hold the conductor after it is attached. The present connector is particularly suitable for utilization in relatively narrow spaces such as those available in small automatic circuit breakers or other electrical switches or devices in which a limited amount of space is available for the terminal connectors. The present connector may be readily manufactured since it may be formed by simple well-known stamping and bending operations.

Since numerous changes may be made in the above-described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the ac-

companying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim as our invention:

1. A terminal connector for an electrical conductor comprising, a terminal plate portion having a threaded aperture therein, a straight groove disposed in the upper side of the plate parallel to one side edge of the plate between said threaded aperture and said side edge of the plate, said straight groove extending from the outer end edge of the plate and having at the inner end thereof a hole extending through the plate for receiving a bent-over end of the conductor, said terminal portion of the plate being flat except for said groove and lying in a single plane, said straight groove having a depth less than the diameter of the conductor, and a screw threaded into the threaded aperture, said screw having a head of a diameter extending over substantially the entire width of the straight groove, the under side of the head of said screw being exposed to and immediately over the mid portion of said straight groove for directly engaging the upper side of the conductor to press the conductor into contact with the surface of the straight groove and prevent the bent-over end of the conductor from moving out of the hole at the inner end of the straight groove.

2. In electrical apparatus, in combination, a housing having a recess between spaced parallel side walls there-

of, a terminal plate disposed in said recess, said plate being of substantially the same width as the space between said side walls and having a threaded opening therein, a straight groove formed in said plate adjacent to said opening and disposed substantially parallel to said side walls, said groove extending from one end of the plate and terminating in a hole in the plate for receiving one end of a conductor, a plurality of ridges formed integrally with the plate transversely of the groove, said ridges being disposed in the portion of the groove nearest said hole, the other portion of the groove having a smooth surface, and a screw threaded into the opening, said screw having a head of sufficient diameter to extend over the groove for engaging the conductor to press the ridges into the portion of the conductor disposed over the ridges when the screw is tightened against the conductor, the other portion of the conductor disposed underneath the screw head being pressed into contact with the smooth surface of the groove.

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