Aug. 8, 1967 T. J. RYS 3,335,399

MEANS FOR ELECTRICALLY INTERCONNECTING CONDUCTORS OF WIRE AND BLADE TYPES

Filed June 16, 1965

Fig. 1.

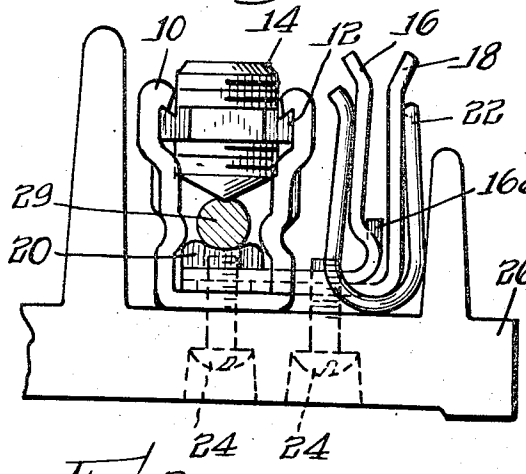


Fig. 3.

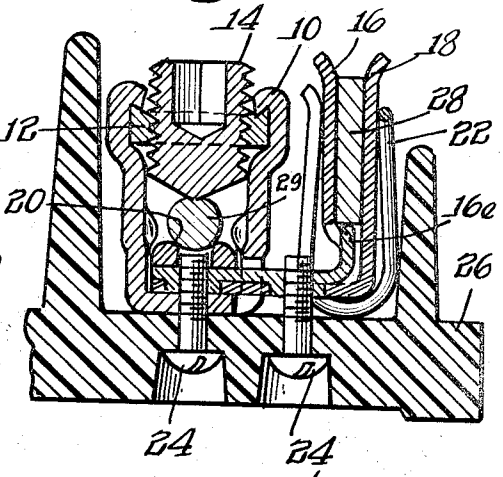


Fig. 2.

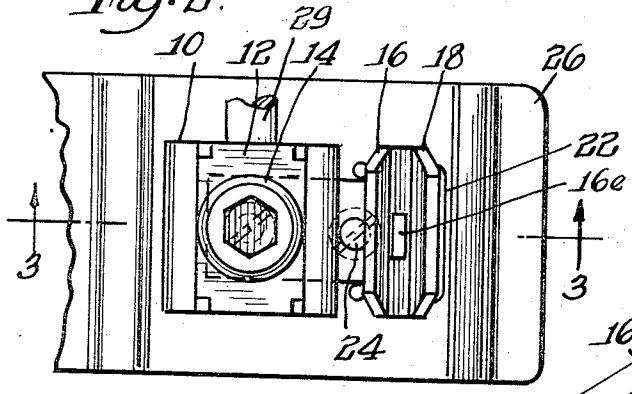


Fig. 4.

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MEANS FOR ELECTRICALLY INTERCONNECTING CONDUCTORS OF WIRE AND BLADE TYPES

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7 Claims. (Cl. 339—219)

This invention relates to an electrical connector for electrically interconnecting a wire-type electrical conductor and a blade-type electrical conductor, the connector being particularly adapted for use in fusible safety switches. In accordance with the invention, a pair of such connectors may be used for each pole of a multiple safety switch, the blade-receiving portions of one receiving a movable switch blade in an ON position of the switch, and the blade-receiving portions of the other receiving a blade-shaped terminal of a cartridge fuse.

An object of the invention is to provide an improved electrical connector for electrically interconnecting a wire-type electrical conductor and a blade-type electrical conductor.

Another object is to provide an electrical connector having a body member with an opening therethrough for receiving a wire-type electrical conductor, a clamping screw for clamping a wire-type electrical conductor, and a pair of generally L-shaped blade-receiving members each having a first leg portion extending through a slot in a side wall portion of the body member and a second leg portion spaced from the second leg portion of the other L-shaped member for the reception of a blade-type electrical conductor therebetween.

In the drawings:

FIG. 1 is a fragmentary side elevational view of an insulating base having an electrical connector constructed in accordance with the invention mounted thereon;

FIG. 2 is a front view of the insulating base and electrical connector of FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2; and

FIG. 4 is an exploded perspective view of the electrical connector of FIG. 1.

An electrical connector constructed in accordance with the invention includes a generally U-shaped body member **10**, a sliding crosshead member **12**, a clamping screw **14**, a pair of correspondingly positioned generally L-shaped blade-receiving members **16** and **18**, an intermediate clamping plate member **20**, a reinforcing spring member **22**, and a pair of fastening screws **24** for securing the combination device to an insulating base member **26**.

The body member **10** includes a pair of spaced leg portions **10***a* and **10***b* the free end portions of which are grooved to slidingly receive the crosshead member **12** therebetween in a direction parallel to a bight portion **10***c* of the body member **10**. The bight portion **10***c* is provided centrally with an unthreaded circular hole **10***d* for receiving one of the screws **24**. The leg portion **10***b* is provided with a generally rectangular slot **10***e* for receiving a pair of connecting leg portions **16***a* and **18***a* respectively of the generally L-shaped blade-receiving members **16** and **18**.

The crosshead member **12** is provided centrally with a threaded hole **12***a* for receiving the clamping screw **14**, the outer end of which is provided with a hexagonal socket **14***a* for receiving a hexagonal socket wrench and the inner end of which terminates in a blunt-nosed conical portion **14***b*.

The connecting leg portion **18***a* of the member **18** is provided with a pair of holes **18***b* for respectively receiving a pair of apertured internally threaded extruded boss portions **16***b* provided on the connecting leg portion **16***a* of the member **16**. The blade-receiving members **16** and **18** also respectively include a pair of stationary contact jaw leg portions **16***c* and **18***c* which serve as a pair of stationary contact jaws for receiving either a switch blade such as that shown in my Patent No. 3,287,533, issued Nov. 22, 1966, or a blade-shaped terminal **28** (FIG. 3) of a cartridge fuse (not shown). A reversely curved portion **16***d* joins the connecting leg portion **16***a* and the stationary contact jaw leg portion **16***c* of the member **16** and is provided with a sheared tongue portion **16***e* which serves as a stop for the blade terminal **28** to enable the fuse to be readily pried out from the stationary contact jaw leg portions **16***c* and **18***c*.

The leg portions **10***a* and **10***b* of the body member **10** are provided respectively with a pair of outwardly bowed portions **10***f* and **10***g* for receiving the clamping screw **14** therebetween in partially surrounding relationship therewith on the inner side of the crosshead member **12**. On opposite sides of the bowed portion **10***f*, the leg portion **10***a* is provided with a pair of projections **10***h* extending toward the leg portion **10***b*. Similarly, on opposite sides of the bowed portion **10***g*, the leg portion **10***b* is provided with a pair of projections **10***j* extending toward the leg portion **10***a*. The intermediate clamping member **20** is slidingly received in the body member **10** between the free end portion of the connecting leg portion **16***a* on an inner side and the projections **10***h* and **10***j* on an outer side. An unthreaded hole **20***a* is provided centrally in the intermediate clamping member **20** for receiving the tip of the threaded shank portion of one of the screws **24**, which prevents the clamping member **20** from sliding relatively to the body member **10**.

In assembling, the blade-receiving members **16** and **18** are placed together with the boss portions **16***b* respectively disposed in the holes **18***b* and the reinforcing spring member **22** is inserted over the stationary contact jaw leg portions **16***c* and **18***c*. The free end portions of the connecting leg portions **16***a* and **18***a* are then inserted through the slot **10***e* in the leg portion **10***b* of the body member **10**. The intermediate clamping member **20** is then slid into place in the body member **10** between the free end portion of the leg portion **16***a* and the projections **10***h* and **10***j*. With the assembly thus far completed, the spring member **22** forces the free end portions of the stationary contact jaw leg portions **16***c* and **18***c* toward each other to pivot the free end portion of the connecting leg portion **16***a* away from the free end portion of the connecting leg portion **18***a* and thus press the intermediate clamping member **20** into frictional engagement with the projections **10***h* and **10***j* so as to retain the clamping member **20** in the body member **10**. The crosshead member **12** is then slid into position in the body member **10** and the clamping screw **14** is threaded through the crosshead member **12** sufficiently to cooperate with the bowed portions **10***f* and **10***g* and thus retain the crosshead member **12** in the body member **10**. The assembly is then placed in position on the base member **26** and the screws **24** are turned into the internally threaded boss portions **16***b* from the under or rear side of the base member **26**. The tightening of the screws **24** pulls the connecting leg portion **16***a* back into full engagement with the connecting leg portion **18***a* and releases the clamping member **20** from frictional engagement with the projections **10***h* and **10***j*, but as this occurs, the shank of the respective screw **24** enters the hole **20***a* to retain the clamping member **20** in the body member **10** against any tendency to slide out therefrom.

The base member **26** may be secured by suitable means to the inner surface of a back or rear wall portion of an enclosure (not shown) forming a part of a fusible safety switch. A wire-type electrical conductor **29** connected to an electrical power source or load may be clamped between the clamping screw **14** and the intermediate clamping member **20**, as shown schematically in FIGS. 1, 2, and

3, the crosshead member **12** being removed first for lay-in installation of the conductor **29** radially thereof if endwise feeding thereof into the body member **10** is difficult due to stiffness of the conductor and limited working space within the enclosure of the switch. For applications in which lay-in installation of conductors is not required, the body member **10** and crosshead member **12** may be integral, in which case the crosshead member **12** may be considered a top wall portion, the leg portions **10***a* and **10***b* may be considered side wall portions, and the bight portion **10***c* may be considered a bottom wall portion, the terms having directional connotations (i.e., "top," "bottom," and "side") being purely relative, it being understood that the device of the invention may be mounted in various positions.

The clamping member **20** is termed "intermediate" because when an electrical conductor such as the electrical conductor **29** is clamped thereto, the clamping member **20** is disposed electrically between the electrical conductor and the blade-receiving members **16** and **18** to which the electrical conductor is intended to be electrically connected.

Preferably the blade-receiving members **16** and **18** are formed mainly of copper and plated with a metal such as tin. The intermediate clamping member **20** is preferably formed mainly of aluminum and is homogeneous. That is, it has no separately formed inserts of other metals embedded therein or secured to any surface thereof, although it may be provided with a thin plating of a metal such as tin. The intermediate clamping member **20** is provided because it has been found to result in a good electrical connection between the copper blade-receiving members **16** and **18** and either a copper or an aluminum electrical conductor such as the conductor **29**, in accordance with the teachings of U.S. Patent No. 3,187,299.

Various modifications may be made in the structure disclosed without departing from the spirit and scope of the invention.

I claim:

1. An electrical connector for electrically interconnecting a wire-type electrical conductor and a blade-type electrical conductor, said connector comprising a body member having a top wall portion, a bottom wall portion, and a pair of opposed side wall portions defining a wire-receiving aperture extending through said body member, a clamping screw threadedly mounted in said top wall portion and extensible into said aperture, a slot through one of said side wall portions communicating with said aperture adjacent said bottom wall portion, and a pair of correspondingly positioned generally L-shaped blade-receiving members each having a connecting leg portion and a stationary contact jaw leg portion, the connecting leg portions of said blade-receiving members extending through said slot, the free end portions of said connecting leg portions being disposed in said aperture opposite said clamping screw, and the stationary contact jaw leg portions of said blade-receiving members being positioned to receive a blade-type electrical conductor therebetween in electrical contact therewith.

2. An electrical connector as claimed in claim **1**, including a spring member resiliently urging said stationary contact jaw leg portions toward each other.

3. An electrical connector as claimed in claim **1**, wherein said top wall portion is a crosshead member having opposite edge portions slidingly received respectively in said side wall portions.

4. An electrical connector as claimed in claim **1**, including an intermediate homogeneous aluminum clamping plate member disposed in said aperture between said clamping screw and the free end portion of the one of said connecting leg portions disposed closer to said clamping screw, said clamping plate member being disposed between said one of said connecting leg portions and a wire-type electrical conductor when said wire-type electrical conductor is clamped by said clamping screw.

5. For use in electrically interconnecting a wire-type electrical conductor and a blade-type electrical conductor, an electrical connector and mounting means therefor comprising a body member having a top wall portion, a bottom wall portion, and a pair of opposed side wall portions defining a wire-receiving aperture extending through said body member, a clamping screw threadedly mounted in said top wall portion and extensible into said aperture, a slot through one of said side wall portions communicating with said aperture adjacent said bottom wall portion, a pair of correspondingly positioned generally L-shaped blade-receiving members each having a connecting leg portion and a stationary contact jaw leg portion, the connecting leg portions of said blade-receiving members extending through said slot, the free end portions of said connecting leg portions being disposed in said aperture opposite said clamping screw, and the stationary contact jaw leg portions of said blade-receiving members being positioned to receive a blade-type electrical conductor therebetween in electrical contact therewith, an intermediate homogeneous aluminum clamping plate member disposed in said aperture between said clamping screw and the free end portion of the one of said connecting leg portions disposed closer to said clamping screw, an insulating base member, and a mounting screw extending through said base member from one side thereof and securing the bottom wall portion of said body member against the other side thereof, said mounting screw extending through said bottom wall portion and said connecting leg portions and into said clamping plate member to prevent sliding movement of said clamping plate member relatively to said body member, and said mounting screw being threadedly engaged with one of two members including said clamping plate member and said one connecting leg portion.

6. An electrical connector and mounting means as claimed in claim **5**, wherein said mounting screw is threadedly engaged with the free end portion of said one connecting leg portion.

7. An electrical connector and mounting means as claimed in claim **5**, including an additional mounting screw extending through said base member from said one side thereof and through the other of said connecting leg portions into threaded engagement with said one of said connecting leg portions in a portion thereof outside said body member.

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