

Nov. 2, 1943.

J. B. MILLER

2,333,266

EMERGENCY WIRE CONNECTOR

Filed June 30, 1941

FIG. 1.

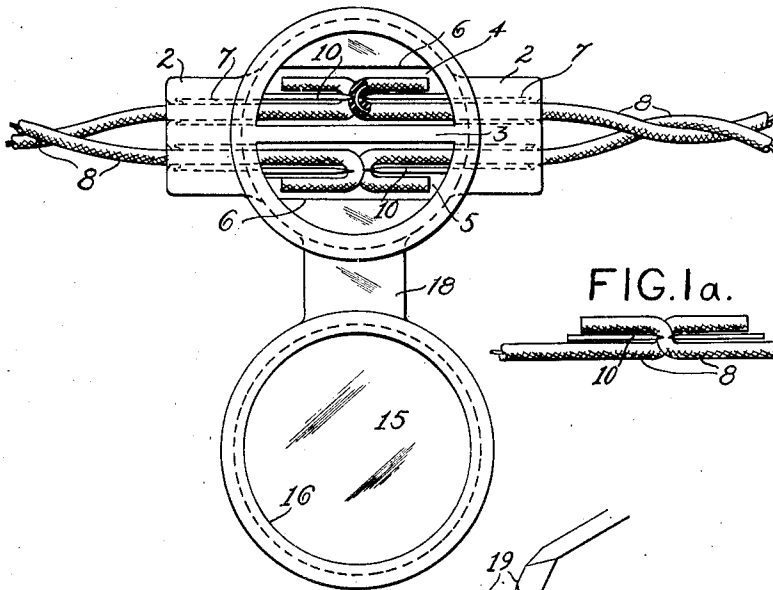


FIG. 2.

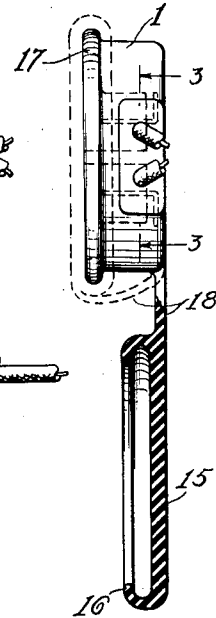


FIG. 1a.

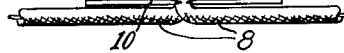


FIG. 4.

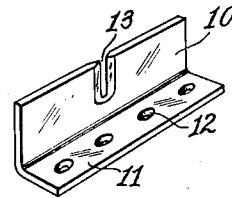


FIG. 3.

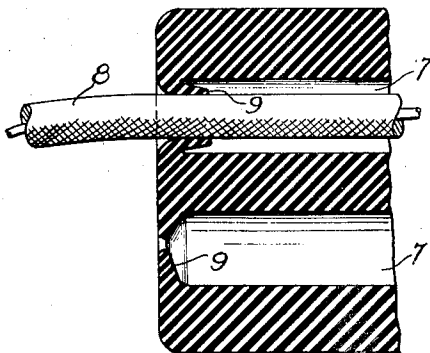


FIG. 4a.

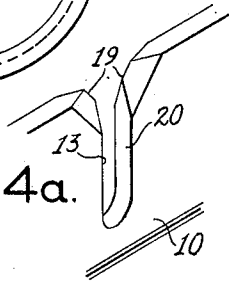
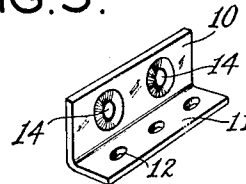


FIG. 5.



INVENTOR;
JAMES B. MILLER

BY *Brimmings & Sutherland,*
HIS ATTORNEYS

UNITED STATES PATENT OFFICE

2,333,266

EMERGENCY WIRE CONNECTOR

James B. Miller, Webster Groves, Mo.

Application June 30, 1941, Serial No. 400,365

5 Claims. (Cl. 173-340)

This invention pertains to electrical connectors and more particularly to a connector adapted for use in emergencies to reconnect the wires of a circuit broken by accident or otherwise.

The invention has particular application in connection with military telephones in which the telephone wires are strung across territory which may at any time become a scene of action, in which case the telephone circuits are frequently broken and, of course, the need for reestablishing the circuit is usually very urgent.

One of the objects of this invention, therefore, is to provide an emergency connector which may be used in the field to reconnect the wires of a broken circuit, and by means of which this purpose may be accomplished without the use of special tools.

Another object is to provide such a connecting unit which is completely self-contained, having all the necessary parts in one assembly and unseparable.

Another object is to provide such a connector which will be capable of making good electrical connection between the wires of a circuit without the necessity of stripping insulation.

Another object is to provide such a connecting unit which may be rendered completely watertight after the connection has been made.

Further objects will appear from the following description taken in connection with the accompanying drawing, in which:

Figure 1 is a plan view of a connecting unit embodying this invention;

Figure 1a is a detail illustrating another way of arranging the connected wires in the device of Figure 1;

Figure 2 is a side view of Figure 1, partly in section;

Figure 3 is an enlarged sectional detail taken about on line 3-3 of Figure 2;

Figure 4 is a perspective detail of the blade by which the two ends of a wire are connected;

Figure 4a is an enlarged detail showing another form of wire opening; and

Figure 5 is a similar view illustrating another form of such blade.

Referring now to the drawing, 1 designates a housing for enclosing the connected wires at their connections. This housing, in the embodiment illustrated, is generally of cup-shaped form and circular in plan view, as shown in Figure 1, having oppositely extending bosses 2 projecting from its outer periphery. The housing 1 may be made of any suitable insulating compound which has sufficient strength to withstand the hard use

to which the device is likely to be subjected. It has been found that this housing is very effective when made of molded soft rubber. This material is comparatively easy to mold and is tough and long-wearing, and on account of its resiliency will stand a great deal of abuse without injury.

The housing in the form illustrated is formed as a hollow cup divided centrally by a partition 3 into two side compartments 4 and 5. These compartments may be semi-circular or they may be made elongated, as shown in Figure 1, by molding the outer side wall to extend chordally across the circle, as indicated at 6. This provides a relatively narrow compartment, the advantage of which will appear presently. Entrance passages 7 for the wires 8 of the circuit are formed in the bosses 2. One of these passages 7 leads into each compartment 4 and 5 from each end thereof so that the broken ends of a wire which are to be reconnected may be passed into the compartment through these passages, as shown in Figure 1. At the outer ends of the passages 7 the rubber may be formed into inwardly extending resilient sealing lips 9. In the enlarged view in Figure 3 these lips are shown in normal position in the lower passage 7. However, when a wire 8 is passed into the compartment through this passage, the lips 9 are flexed inwardly, as shown in the upper passage in Figure 3, and by their resiliency embrace the wire tightly so as to form a water seal. The lips 9 may be located at any point of the passage 7.

Mounted in each compartment 4 and 5 to extend longitudinally thereof, as shown in Figure 1, is a metallic blade 10. This blade may be provided with a lower anchoring flange 11, which may be provided with holes 12 for better anchorage. Any other suitable anchorage may, however, be provided. The blade may then be mounted in the housing by molding the flange 11 into the rubber, as indicated in dotted lines in Figure 2, the rubber flowing through the perforations 12 so as to provide a secure anchorage. The blade 10 is provided with a wire-receiving opening 13. In the arrangement of Figure 4 the opening 13 is shown as a slot, the opposite sides of which are provided with sharpened edges. Figure 4a shows another form in which the slot 13 may be made. In this case the upper end of the slot is flared slightly and only the flared portion is provided with sharpened edges 19. The remaining portion of the slot has flat or blunt edges 20. In the arrangement of Figure 5, instead of a single slot, two openings in the form of circu-

lar holes 14 are shown. These holes are also countersunk so as to provide sharp inner edges.

With the blades 10 mounted in the compartments the wires 8 may be passed into said compartments via the passages 7, as already pointed out. The portion of the wire within the compartment is then bent so that it may be passed through the opening 13 or 14. In the case of the opening 13, the insulated wire is simply forced into the opening and the sharpened edges cut through the insulating covering of the wire and engage the metallic core so as to make electrical contact. When the first wire has been forced in, second one is forced into the same opening on top of the first and similarly bent, and the sharp edges of the opening 13 work through the insulating covering and make contact with the wire therewithin. In the arrangement of Figure 4a the body of the slot at the blunt edges 20 is made just wide enough to take the bare wire with a tight fit. When the wire is forced into the slot the sharpened edges 19 work through the insulating covering of the wire down to the bare wire. As the wire is forced down into the slot, the insulation is forced aside by the tapered upper edge of the slot and the bare wire is then forced into the slot to the bottom and engages the blunt edges 20 with a tight fit. This arrangement reduces the chances of cutting or injuring the wire itself. In the arrangement of Figure 1 the ends of the wire beyond the connection are shown bent back upon the entering portion of the wire so as to form a U-bend. They may, however, be arranged as indicated in Figure 1a, which shows a bend having a point of inflection in the opening 13. When the blade of the form shown in Figure 5 is used, one of the ends of the wire to be joined is passed through each of the openings 14 and then enough tension is placed upon it to cause the sharp edge of the opening to work through the insulation and contact the wire. The blades 10 thus provide connectors in the several compartments, insulated from each other, and each contacting two wires inserted through the entrance and exit passages 7, so as to connect the two wires together.

A closure or cover 15 is provided to close the compartments 4 and 5. This closure is preferably provided with a flexible rim flange 16 and the housing 1 is provided with a corresponding outwardly extending rim flange 17. The flange 16 is stretched over the flange 17 in putting the cover in place, as indicated in dotted lines in Figure 2. The flange 16, being resilient, engages the rim 17 of the housing with a resilient pressure so as to provide a water-tight seal against the entrance of moisture. In order to provide against the loss of the cover 15, the same may be attached to the housing 1 by an integral web 18. This may be all molded in one, so that the housing and the cover provide together a unit, the cover being always kept with the housing by the web 18, which is flexible to permit the cover to be placed on the housing.

It will be seen, therefore, that this invention provides a connecting unit which is complete and self-contained in one assembly. All the parts being molded into a unitary structure, the device is immediately available for use without requiring the addition of any accessories. The operator requires no tools except, perhaps, a wire cutter, by which the ends of the wires may be cut to the same length. In repairing a circuit,

it is only necessary to pass the ends of the wires to be joined into one of the compartments 4 or 5 from opposite ends, bend the wires, and pass them into the openings 13 or 14. The free end is then bent into either of the positions shown in Figures 1 or 1a. When both wires have thus been engaged with the blade 10, they may be pressed down into the compartment 4. Since that compartment may be made just wide enough to accommodate the bent end of the wire, it will serve to retain the same in bent form and prevent the possibility of these ends straightening out and permitting the wire to pull out of the opening in the blade 10. Accordingly, the device is capable of withstanding considerable tension on the connected wires without permitting them to separate.

The device is provided for effectively sealing the same against the entrance of moisture. The lips 9 form a water-tight seal around the wire at the entrance to the passage 7, and the cover 15 forms a water-tight seal with the rim of the housing. Thus, all entrances to the interior of the housing are effectively sealed against the entrance of moisture. In fact, one of these connectors when properly constructed can be dropped into the water without affecting the security of the electrical connection or without danger of short-circuiting by the water.

It is obvious that various changes may be made in the details of construction within the scope of the appended claims without departing from the spirit of this invention, and, accordingly, the invention is not limited to the specific details shown and described.

The invention having thus been described, what is claimed is:

1. An electrical connector of the character described, comprising, a resilient housing, a blade having one or more wire-receiving openings, each provided with a sharp edge adapted to work through the insulating covering on a wire, a compartment formed in said housing in which said blade is mounted and which is formed to retain one or more wires in any of said openings, an entrance passage for a wire formed in said housing and leading to said compartment, resilient sealing means in said passage engageable with a wire inserted therein to form a seal around the wire, and a closure having a resilient rim portion engageable with said housing with resilient pressure to form a water-tight seal.

2. An electrical connector of the character described, comprising, a resilient housing, a blade having one or more wire-receiving openings each provided with a sharp edge adapted to work through the insulating covering on a wire, a compartment formed in said housing in which said blade is mounted and which is formed to retain one or more wires in any of said openings, an entrance passage for a wire formed in said housing and leading to said compartment, resilient sealing means in said passage engageable with a wire inserted therein to form a seal around the wire, a closure having a resilient rim portion engageable with said housing with resilient pressure to form a water-tight seal, and flexible means permanently connecting said closure with said housing.

3. An electrical connector of the character described, comprising, a cup-shaped housing of resilient rubber having one or more wire-receiving compartments formed therein and entrance passages leading to opposite ends of each compartment, resilient sealing lips engageable with the

entering wires in said passages, a blade in each compartment having an anchoring portion molded in said housing and formed with one or more wire-receiving openings each provided with a sharp edge adapted to work through the insulating covering on a wire, and a closure of molded rubber having a flexible rim portion formed to embrace said body with resilient pressure to form a water-tight seal, said closure being connected with said housing by an integral rubber web.

4. An electrical connector for connecting wires together, comprising, a connecting element adapted for electrically connecting electric conductors, a resilient housing having a compartment to receive said element and conductor passages leading into said compartment each provided with sealing means engageable with a conductor therein, said housing having a rim around said compartment, and a closure having

a flange fitted to said rim for engagement therewith under resilient pressure to form a water-tight seal.

5. An electrical connector of the character described, comprising, a hollow body providing a housing, entrance and exit passages formed in said housing, resilient sealing means in said passages engageable with a wire inserted into each passage to form a seal around the wire, means providing a partition to divide said housing into compartments, connectors located in said compartments and insulated from each other each having one or more sharp-edged openings adapted to work through the insulating coverings on two wires in said passages to make electrical contact with both wires in order to connect them together, and means for sealing said housing against moisture.

JAMES B. MILLER.