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S. RICHARDS
ELECTRICAL CONNECTER
Filed Oct. 15, 1930

1,935,061

Fig. 1

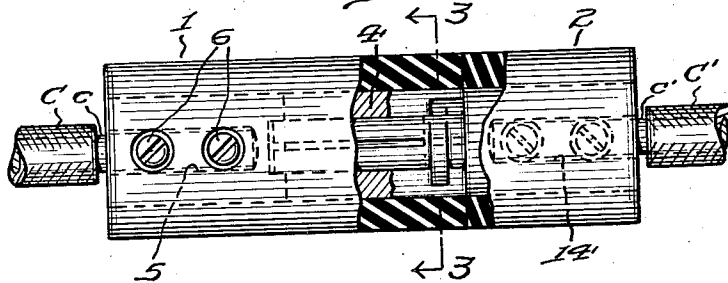


Fig. 2.

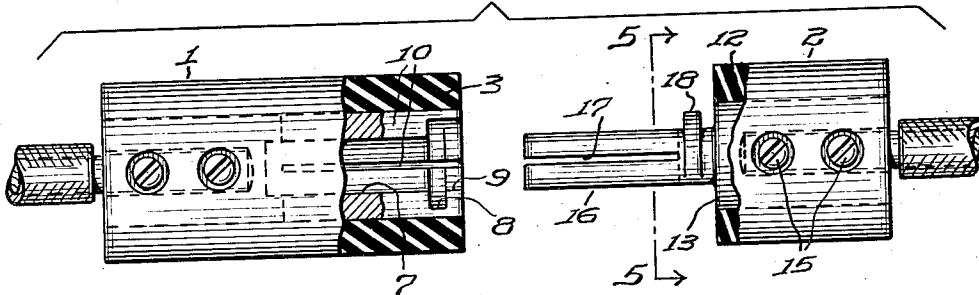


Fig. 3.



Fig. 4.

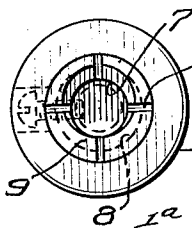


Fig. 5.

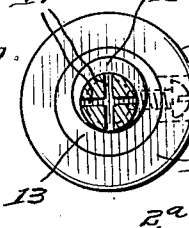


Fig. 6.

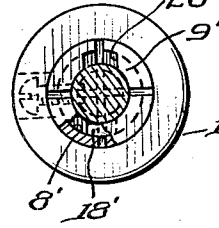
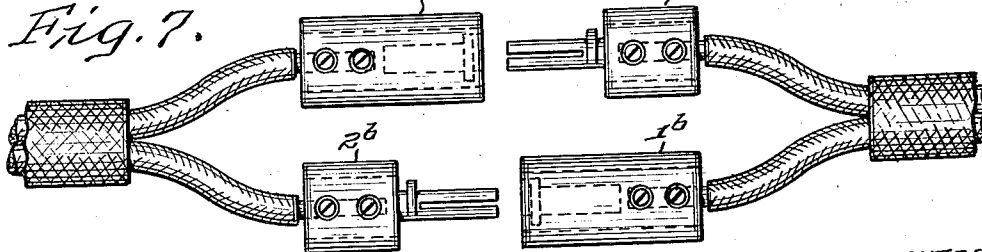


Fig. 7.



WITNESS

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1,935,061

ELECTRICAL CONNECTER

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Application October 15, 1930. Serial No. 488,797

3 Claims. (Cl. 173—363)

The present invention relates to connectors for electrical conductors, and especially to that type of connectors usually employed in association with electrical machinery such as portable drills, lifting magnets, welding apparatus and the like, requiring relatively heavy currents.

Connectors of the types heretofore employed for these purposes usually comprise a pair of interfitting parts, one of which is slidable within the other, the electrical connection being made by engagement of suitable contacts when the parts are assembled, but so far as I am aware no satisfactory locking means has been devised to prevent the parts of such connectors being separated by a pull on the cable or other conductor in which they are interposed and it has been my experience that apparatus to which current is being supplied is thus often interrupted in its operation through unintentional breaking of the circuit which results from the accidental parting of the members of the connector. Furthermore, particularly in connectors adapted for employment in a line comprising a pair of conductors which carry positive and negative currents, it frequently happens that through carelessness or inadvertence in joining the parts of the connectors, the direction of the current through the motor, magnet or other mechanism supplied therewith is reversed, so that the connector parts have to be again separated and properly reassembled in order that the current may flow in the proper direction, with resulting annoyance and delay which may be eliminated by the employment of the connectors of my invention.

A principal object of my invention, therefore, is to provide a connector adapted to carry the relatively heavy currents required for modern industrial uses, the interfitting parts of which may be securely yet removably locked together so that accidental parting of the connector, by a pull on the conductor or otherwise, and resultant interruption of the flow of current in the line in which it is interposed is rendered impossible.

A further object of my invention is to provide a connector which is of durable and substantial nature, highly resistant to breakage under normal conditions of use, and the parts of which may be readily attached to the respective ends of the conductor in which the connector is to be employed.

Another object of my invention is to provide a connector of the character aforesaid which may be easily and quickly connected to provide for the passage of current therethrough and readily

locked against inadvertent separation of its parts but which may nevertheless be readily disconnected when desired.

A still further object of the invention is to provide a connector which when employed in a line having a pair of conductors may be so arranged as to prevent the inadvertent reversal of the direction of flow of the current.

Other purposes, objects and advantages of my invention will hereinafter be more particularly indicated or will appear from the following description of certain embodiments thereof reference being had to the accompanying drawing.

In the said drawing, Fig. 1 is a side elevation of a preferred embodiment of my invention in association with a conductor comprising a single wire; Fig. 2 is a corresponding view of the connector in which the respective members are shown separated axially and partly broken away to indicate the internal construction thereof; Fig. 3 is a transverse section of the assembled connector on the line 3—3 in Fig. 1; Fig. 4 is an end elevation of the female member of the connector; Fig. 5 is a section of the male member on the line 5—5 in Fig. 2; Fig. 6 is a transverse section looking towards the female member on the plane of separation of the members of a connector constructed in accordance with my invention but having a slightly different form of locking means than the connector shown in the preceding figures, certain parts being broken away to show internal construction; and Fig. 7 is a fragmentary view of a power line comprising a pair of conductors provided with the preferred form of my improved connectors. In the several figures like characters are employed to designate corresponding parts.

Referring now more particularly to the drawing, my invention embodies, generally, a female member 1 and a male member 2, each of which is adapted for the reception of one of the bared ends *c, c'* of the conductors *C, C'* between which electrical connection is to be established. The female member comprises an external insulating sleeve 3 which is preferably cylindrical in form and which may be made of fibre, hard rubber or any other suitable insulating material and in the center of which is disposed a bronze or other electrically conductive bushing 4 having a suitable bore 5 at one end into which the bare end *c* of the conductor *C* is inserted and clamped in place by screws 6 threaded into the bushing. At its opposite end the bushing is eccentrically bored inwardly for a short distance and then axially bored or grooved out as at 8 so as to leave an eccentric locking rib 9 adjacent the end of the bushing;

from the inner end or bottom of the groove 8 the bushing is axially bored to a point adjacent the bottom or inner end of the bore 5 which is desirably a little beyond the middle of the bushing.

5 The bushing is preferably provided with a plurality of circumferentially spaced longitudinal slots 10 extending nearly to the bottom of the bore 7 and effective to impart a slight resiliency to the bushing.

10 The male member comprises an outer insulating sleeve 12 substantially similar to the sleeve 3 but somewhat shorter than the latter and surrounding a bronze or other conductive metal body portion 13 which is provided at one end with a bore 14 and screws 15 by means of which the bare end c' of the conductor C' may be secured thereto. Projecting from the opposite end of the body is a plunger 16 to which resiliency is desirably afforded by means of longitudinal radially directed slots 17, and which is of substantially the same diameter as the bore 7 and adapted to fit snugly therein under the influence of the resiliency of the respective parts. Adjacent the base of the plunger I provide an eccentric lug 18 integral therewith, of slightly less diameter than the eccentric bore in the end of the bushing 4, and adapted to slide therethrough when aligned therewith upon insertion of the plunger 16 in the bore 7. Thus, when the male member is inserted into the female member with the lug turned away from the widest part of the rib 9, the lug can be moved into the plane of the groove 8 after which a relative rotation between the respective members of approximately 180° will bring the projecting portion of the lug into that portion of the groove 8 which lies in the rear of the widest portion of the rib 9, thus securely locking the parts against axial separation.

In order to facilitate the assembling or separation of the respective members of the connector, it is desirable that some form of indicating means be provided for showing when the parts are in proper alignment to permit passage of the lug 18 axially into or out of the groove 8 and I therefore prefer to arrange the screws 6 and 15 so they will be in the same line on one side of the connector when this condition obtains. Thus the screws 6 will be disposed diametrically opposite the screws 15 when the connector is in locked position, that is, when the projecting portion of the lug 18 is in the deepest portion of the groove 8 and thus locked behind the rib 9 and will align with the screws 15 when the members of the connector are in position for assembly or separation. Other indicating means may of course be employed if desired, such, for example as score-marks on the insulating shells so arranged as to coincide when the members are in proper alignment for relative axial movement, that is, in unlocked position.

In the modified form of my invention shown in Fig. 6, instead of employing an eccentric rib and an eccentric lug, I provide a rib 9' coaxial with the bore 7 in the female member and adjacent its outer end, a portion of the rib 9' being cut away as at 20 to permit the insertion into the groove 8' beneath the rib of a suitable lug 18' projecting radially from the plunger of the male member and operative to lock the members together through engagement with the inner face of the rib 9' upon relative rotation of the members after they have been axially moved to assembled position.

My improved connector readily lends itself to employment in a line embodying two conductors as shown in Fig. 7, from which it will be apparent that when so utilized it is substantially

impossible to assemble the connectors in such way as to cross the current in the line since it is obvious to the most unskilled or careless person that the member 2a must be assembled in the member 1a and the member 2b in the member 1b when the connection is being effected; additionally, if in a given establishment it is made standard practice to connect one member or the other of the connectors to the positive side of every line from the generators or other sources of current, the connectors when unassembled afford a ready indication of the direction of flow of the current in such line.

From the above description of my invention, taken in connection with the drawing, it will be readily understood by those skilled in the art that I have devised a strong and durable connector capable of withstanding hard usage and abrasion and adapted to carry the relatively heavy currents usually employed for motors, magnets and the like, yet which is of simple and sturdy construction, relatively inexpensive to manufacture, and embodies readily releasable locking means for preventing accidental separation of parts of the connector when in use in the line. Furthermore, the slight resiliency which is imparted to the interfitting parts of the respective members by the slots 10 and 17 permits a relatively tight fit therebetween and thus effects a good electrical contact through the connector.

While I have herein described certain embodiments of my invention with considerable particularity, it will be understood nevertheless that I do not intend to confine myself specifically thereto as changes and modifications in the form and arrangement of the several parts will readily occur to those skilled in the art and may be made without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. A connector of the class described comprising male and female members each adapted to receive a conductor and each comprising a substantially cylindrical insulating shell and an electrically conductive bushing disposed therein, the bushing in said female member having an axial bore, radial slots extending longitudinally thereof, an annular groove of larger diameter than said bore adjacent the outer end thereof, and an eccentric rib forming an outer wall of said groove, and said male member comprising an axial plunger extending outwardly from the shell and having radial slots extending longitudinally thereof, and an eccentric lug having a diameter substantially equal to that of the inner edge of said rib operative to engage in the groove in the female member and contact a substantial area of an inner surface of said rib when said plunger is disposed in said axial bore therein to thereby maintain the adjacent ends of the shells in close proximity.

2. A connector of the class described comprising a pair of complementary members, one member comprising an outer shell of insulating material, a bushing of conductive material disposed therein and means for securing the end of a conductor in the outer end of the bushing, the inner end of the bushing being axially bored and provided with an eccentric locking rib adjacent the mouth of the bore and a concentric annular groove of greater diameter than the

bore disposed inwardly of the rib, and the other member comprising an outer insulating shell, a body of conductive material disposed in the shell, means for securing the end of a conductor to said body, a plunger extending from the body adapted to enter said bore, and an eccentric lug carried by the plunger and adapted to align with said groove when the plunger is fully seated in the bore, whereby relative axial rotation of the members after the plunger is so seated is operative to move the lug in the groove into such relation with the rib as to lock the members against axial separation and maintain the juxtaposed ends of said shells and bodies of conductive material respectively in close proximity.

3. A connector of the class described comprising a pair of complementary members, one of

said members comprising a conductive bushing having an axial bore, a groove of greater diameter than the bore adjacent the mouth thereof and a locking rib disposed between the groove and the end of the bushing extending partially around the groove, and the other member having a plunger adapted to snugly enter said bore and a cam carried by and extending partially around the plunger whereby the plunger may be seated in the bore and the cam aligned with the groove by relative axial movement of the members when said cam and rib are in a predetermined relative position and the members then locked against axial separation by relative rotation thereof sufficient to bring the cam into substantial axial alignment with the rib.

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