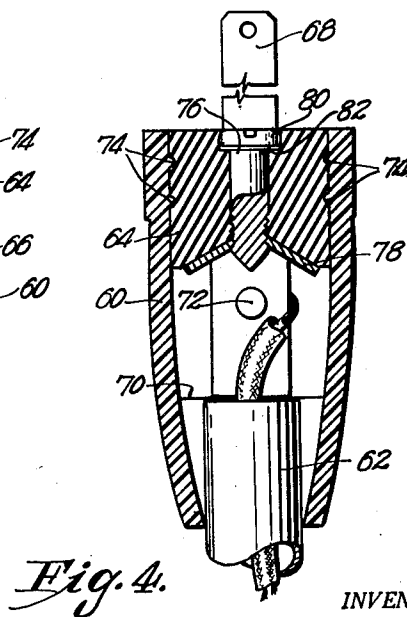
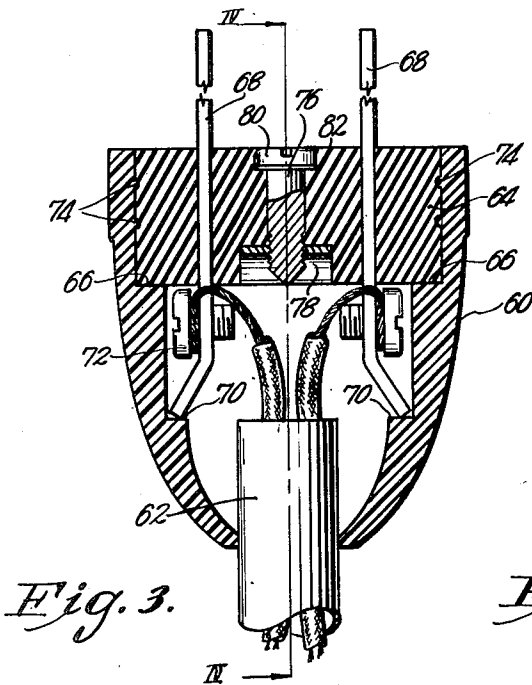
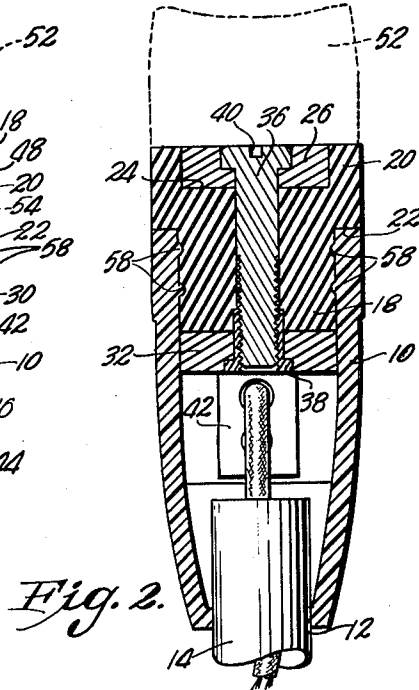
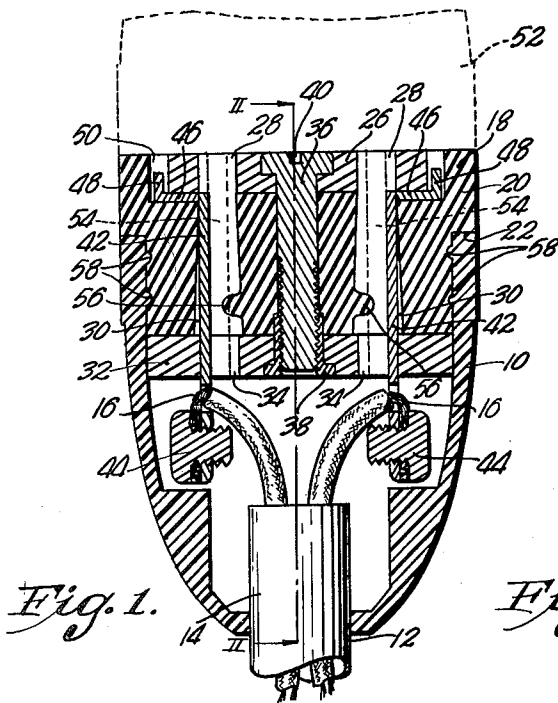


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ELECTRICAL PLUG WITH COMPRESSIBLE
MEANS TO RETAIN CONTACTS THEREIN
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ELECTRICAL PLUG WITH COMPRESSIBLE
MEANS TO RETAIN CONTACTS THEREIN

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This invention relates to electrical connections or fittings in the nature of terminals for extension cords or other cables having electrical conductors as a part thereof, the primary object being to provide a sectional fitting so formed as to permit interconnecting and release in a simple, efficient and fully satisfactory manner.

It is the most important object of the present invention to provide an electrical terminal that includes a hollow body for receiving a cable, together with an insert that closes one end of the body and engages the inner side walls thereof, the insert being of a compressible nature and there being provided structure accessible exterior of the body and the plug for compressing the insert and wedge tightly against the inner walls of the body.

A further object of this invention is the provision of an electrical fitting of the kind above set forth wherein the compressible member is also adapted to receive one or more prongs or contactors that extends into the body and are adapted therein to connect with the conductor of the electrical cable or extension cord.

It is a further object of this invention to provide an electrical plug wherein the aforesaid compressible member is provided with a pair of opposed elements that move toward and away from each other to impart compression thereto, one of which is in turn adapted to hold the contactor prongs in place within the body.

Other objects include the way in which the interengaging walls of the compressible insert and the body are serrated to further assure against relative displacement; the way in which the insert is provided with prong-receiving openings that have lateral extensions to provide a tight connection between interengaging prongs when the plug is placed in use; and the particular manner of forming the means for compressing the insert so as to assure a rigid mounting therefor within the hollow body.

Many more minor objects will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a substantially central, longitudinal cross-sectional view through an electric plug made pursuant to one form of my present invention.

Fig. 2 is a cross-sectional view taken at right angles to Fig. 1 on line II—II thereof.

Fig. 3 is a view similar to Fig. 1 showing a modified form of electrical plug embodying the present invention; and

Fig. 4 is a sectional view taken on line IV—IV of Fig. 3 looking in the direction of the arrows.

As will hereinafter appear, the broad concepts of this invention are included both in the forms of my invention, and in the female-type illustrated in Figs. 1 and 2 of the drawing there is provided a hollow body of relatively rigid ma-

terial broadly designated by the numeral 10. It is to be preferred that the body 10 be relatively non-conducting of electricity and capable of standing considerable use and therefore, Bakelite or even more preferably, a suitable plastic material, is contemplated for body 10.

While body 10 is elliptical in cross-section as indicated by Figs. 1 and 2, the shape thereof is of no particular significance. One end of body 10 is provided with a cable-receiving opening 12 adapted to pass a cable 14, which in the present instance, includes a pair of electrical conductors 16 that are separately insulated and also covered as a unit with an outermost layer of insulation in the usual manner. That end of the body 10 opposite to the cable-receiving opening 12, is initially fully open and adapted to receive a compressible member or insert 18 having the same general cross-sectional contour as the innermost face of body 10 adjacent the open end thereof.

Insert 18 is formed from any suitable flexible pliable material such as rubber or other rubber-like material and one end thereof is enlarged as at 20, presenting a continuous shoulder 22 that bears against the proximal end of body 10 when insert 18 is in place within the body 10. A cavity 24 preferably rectangular, is formed in the insert 18 at the outermost end thereof adapted to receive a plate 26 having the same configuration as cavity 24 and provided with a pair of openings 28 that register with substantially parallel openings formed in the plug 18. There is also provided a similar plate 32 that bears against the innermost end of the insert 18 and having a pair of openings 34 that register with the openings 30 at the innermost ends thereof. The two plates 26 and 32 are interconnected with the insert 18 therebetween by means of a bolt 36 receiving a tubular nut 38. Nut 38 is embedded centrally within the plate 32 and extends a short distance into the plug 18 as illustrated in the drawing.

The bolt 36 is provided with a kerf 40 at the outermost end thereof in the usual manner for receiving a suitable tool and consequently, as bolt 36 is rotated in one direction, the plates 26 and 32 will be moved together. As shown, the head of the bolt 36 is preferably embedded partially in plate 26 to present a smooth outermost surface in the completed plug. The openings 30 and 34 are each adapted to receive an elongated metallic contact blade or prong 42, each having a fastening element 44 within the body 10 for receiving a corresponding conductor 16, and releasably joining the same with the prong 42. That end of each prong 42 opposite to the fastening element 44 is offset laterally as at 46 in overlying relationship to the bottom wall of cavity 24 and thence upwardly as at 48 for disposition within an opening 50 formed in the plate 26.

When placed in use to receive a male plug 52,

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the openings 28, 30 and 34 are adapted to receive the corresponding electrical prongs 54 of the plug 52 as illustrated in Fig. 1. It is of course, necessary that a good electrical contact be established and maintained between the prongs 54 and 42 and accordingly, the insert 18 is provided with an extension or ear 56 within each opening 30 respectively in opposed relationship to the prong 42.

In assembling the parts just above described, it is preferable to first extend the cable 14 entirely through the body 10 to a point exteriorly thereof opposite to opening 12 where the conductors 16 can be easily and quickly attached to the prongs 42 by means of the elements 44. The prongs 42 are initially mounted in place within the openings 30 of insert 18 and the plate 26 is thereupon inserted in the cavity 24 in overlying relationship to the offset portions 46. Plates 26 and 32 are thereupon interconnected by means of the bolt 36 and the nut 38 and the entire assembly including the cable 14, the prongs 42, the insert 18 and the plates 26 and 32 are moved into place to the condition illustrated in Figs. 1 and 2.

The operator thereupon rotates the bolt 36 to draw the plates 26 and 32 together, thereby automatically compressing that part of the insert 18 between cavity 24 and the plate 32. Such compression upon the insert 18 forces the outer face thereof below shoulder 22, tightly against the proximal innermost walls of the body 10. The frictional interengagement between the proximal faces of insert 18 and the body 10 holds the insert 18 in place and such holding action is enhanced by the provision of a number of serrations or rib-groove formations 58 on the interengaging walls of insert 18 and body 10. Such drawing together of the plates 26 and 32 additionally serves to clamp the offset portions 46 of the prongs 42 tightly in place between the plate 26 and the bottom of cavity 24.

The acute angle between prongs 42 and the offset portion 46 thereof is less than 90° so that as portions 46 are forced tightly against insert 18 by plate 26, prongs 42 will be forced apart. However, to further assure that the prongs 42 will be maintained apart within body 10, ears 56 are provided in openings 30.

Another equally important feature of the plug made possible by insert 18 lies in the way in which prongs 54 are held in place thereby flatly against prongs 42 and throughout the lengths thereof. After insert 18 commences to bear tightly against body 10 by compression thereof through manipulation of bolt 36, openings 30 of insert 18 start to close.

It is possible therefore, to reduce the size of openings 30 to a point where prongs 54 must be inserted with force. Once in place the prongs 54 are held tightly against prongs 42 along the entire proximal surfaces thereof, and by virtue of the tight frictional contact of insert 18 on the opposite face of prongs 54 the latter cannot be easily removed from openings 30. With prongs 42 and 54 thus held tightly together along a relatively long surface, good, non-arcng, electrical contact is presented.

If however, the plug 52 and the female terminal of Figs. 1 and 2 are used together under conditions where accidental separation is not likely, and it is desired that the plugs be rendered more easily separated, then bolt 36 need only be turned to lessen the compression on insert 18. The frictional contact of the insert 18 on prongs 54 will

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still hold the same in place but permit removal without difficulty.

There is presented therefore, an adjustment feature which may be easily, quickly and minutely regulated to suit the particular desires of the user and the conditions under which the plug must operate.

In the form of my invention shown in Figs. 3 and 4 of the drawing, there is illustrated a male-type of terminal connection embodying the principles above set forth and including a hollow body 60 of relatively rigid material precisely as above explained with respect to body 10. Here again, body 60 is adapted to receive an electrical cable 62 and there is provided an insert member of compressible material 64 adapted for fitting within the body 60. Body 60 is provided with an outwardly facing internal continuous shoulder 66 against which the insert 64 rests when the same is in body 60.

A pair of electrical prongs or contactors 68 of metallic material pass through the insert 64 and are held in substantial parallelism thereby. The lowermost end of each prong 68 is offset as shown in Fig. 3 and normally rests upon an inward boss 70 formed within the body 60. As above set forth, the prongs 68 are provided with fastening elements 72 within body 60 adapted to connect the conductors of cable 62. The inter-engaging walls of compressible member 64 and body 60 have serrations 74 thereon in the same manner as at 52 in Figs. 1 and 2 and compression of the member 64 is through the medium of an externally threaded body 76 passing through the insert 64 centrally thereof between the prongs 68 and a nut member 78 threadably connected with the bolt 76.

The bolt 76 is provided with a head 80 presenting a shoulder 82 that bears against the member 64 opposite to the nut element 78. As in the case of the head of the bolt 76, the head 80 is partially embedded within the insert 64.

The nut member 78 is formed from an initially flat, preferably metallic element that is bent in the form of a V as shown in Fig. 4 and perforated at the apex thereof for receiving the external threads of bolt 76. The compression member 64 may be initially provided with a cavity in the normally innermost face thereof for receiving the nut element 78, but such is not necessary and when the bolt 76 is rotated to move the element 78 toward the head 80, it will partially embed itself within the insert 64 as shown in Figs. 3 and 4. In any event, as member 64 is compressed by movement of the nut 78 toward the shoulder 82, the insert 64 will be forced tightly against the proximal inner walls of body 70. Similarly, such compression of the member 64 will increase the frictional holding action of the insert 64 upon the prongs 68.

The assembling of the device illustrated in Figs. 3 and 4 is substantially the same as above outlined with respect to the female member of Figs. 1 and 2. After all of the parts are fully assembled exteriorly of the body 60, a pulling action upon the cable 62 while insert 64 is pushed into the body 60, will preliminarily assemble the parts for the final step of compressing insert 64 by means of the slotted bolt 76.

It is clear that the male terminal of Figs. 3 and 4 may be used with the female plug shown in Figs. 1 and 2 and that when the prongs 68 are inserted in openings 28, 30 and 34, the inwardly projecting tabs 56 will yieldably bear against the

prongs 68 and hold the same tightly against the prongs 42.

Details of construction may be varied within the spirit of this invention and therefore, it is desired to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material provided with a bore having a central axis; a compression device of elastic material in the bore of said body, said device being expandable perpendicularly to said axis of the bore when the device is compressed in a direction parallel to said axis; a contact element carried by the device and having means for electrically connecting the conductor of a cable thereto; and means carried by the device and separate from the body for compressing said device to expand the same into tight gripping relationship with said body, said device being freely removable from the body when not compressed and being held in the body only by said gripping relationship when compressed.

2. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material provided with a bore having a central axis; a compression device of elastic material in the bore of said body, said device being expandable perpendicularly to said axis of the bore when the device is compressed in a direction parallel to said axis; a contact element carried by the device and having means for electrically connecting the conductor of a cable thereto; and means carried by the device and separate from the body and including a pair of members engaging opposite faces of the device and movable toward each other for compressing said device to expand the same into tight gripping relationship with said body, said device being freely removable from the body when not compressed and being held in the body only by said gripping relationship when compressed.

3. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material provided with a bore having a central axis; a compression device of elastic material in the bore of said body, said device being expandable perpendicularly to said axis of the bore when the device is compressed in a direction parallel to said axis; a contact element carried by the device and having means for electrically connecting the conductor of a cable thereto; and means carried by the device and including a pair of members engaging opposite faces of the device, and structure extending through the device and joining the members to move the same toward each other for compressing said device to expand the same into tight gripping relationship with said body, said device being freely removable from the body when not compressed and being held in the body only by said gripping relationship when compressed.

4. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material; a compression device in said body; an elongated contact element removably carried by the device and having means for electrically connecting the conductor of a cable thereto; and means including a pair of releasably interconnected members engaging opposite faces of the device and movable toward each other for compressing said device to force the

same into tight gripping relationship with said body, said contact element having a laterally extending portion partially interposed between and in engagement with the device and one of the members when the members are moved toward each other to compress the device, whereby the contact element is held in place on the device, said one member being removable from the device when released from interconnection with the other member, whereby to permit removal of the element from the device.

5. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material provided with a bore having a central axis; a compression device of elastic material in the bore of said body, said device being expandable perpendicularly to said axis of the bore when the device is compressed in a direction parallel to said axis; a contact element carried by the device and having means for electrically connecting the conductor of a cable thereto, there being serrated interengaging surfaces between the body and said device; and means carried by the device and separate from the body for compressing the device to force said surfaces of the device into tightly gripping relationship against said surfaces of the body, said device being freely removable from the body when not compressed and being held in the body only by said gripping relationship when compressed.

6. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material; a compression device in said body; an elongated contact element carried by the device and having means for electrically connecting the conductor of a cable thereto; means for compressing said device to force the same into tight gripping relationship with said body, there being an elongated opening through the device for receiving said element; and a lateral projection in the opening for yieldably holding the elongated contactor of a complementary fitting in the opening and in tight lateral engagement with said element, the lateral dimension of the opening being greater than the combined, corresponding lateral dimensions of the element and said contactor.

7. A terminal contact fitting for an electric conductor cable, said fitting comprising a tubular body of rigid material; a compression device in the body and having an opening therethrough; an elongated contact element in said opening and having means for electrically connecting the conductor of a cable thereto, said element being disposed in the opening for lateral engagement with the elongated contactor of a complementary fitting; and means separate from the body for compressing said device to reduce the size of said opening, whereby to force said contactor into tight, positive interengagement with the element.

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