April 29, 1958 O. P. FURPAHS 2,832,940

SWIVEL JOINT COUPLER FOR ELECTRIC CORDS

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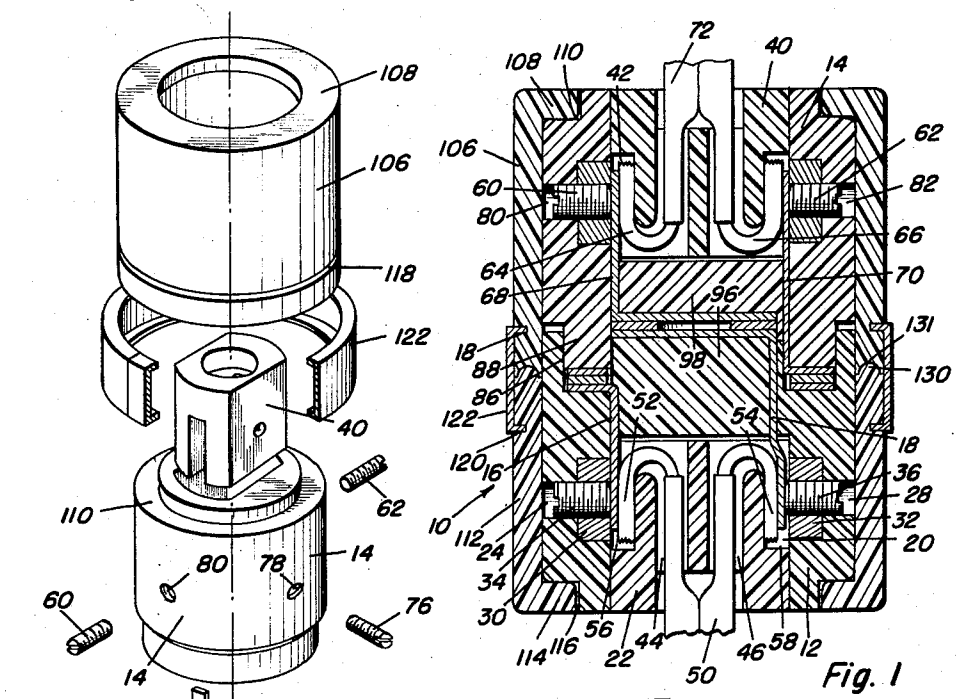
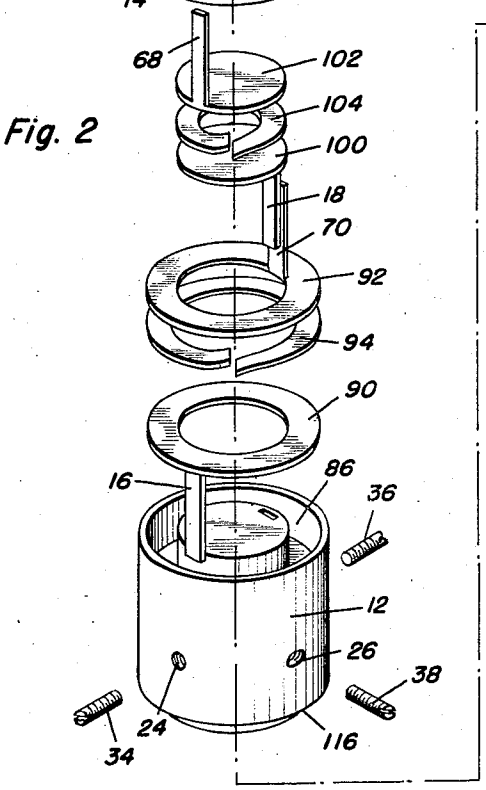
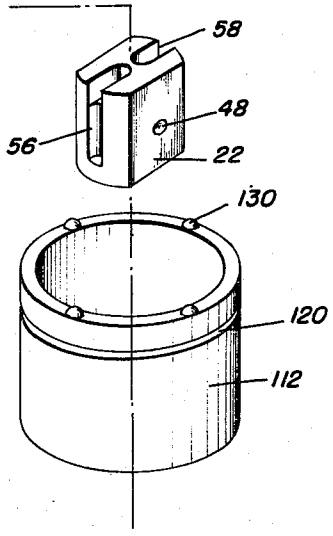


Fig. 1

Fig. 2





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Fig. 3

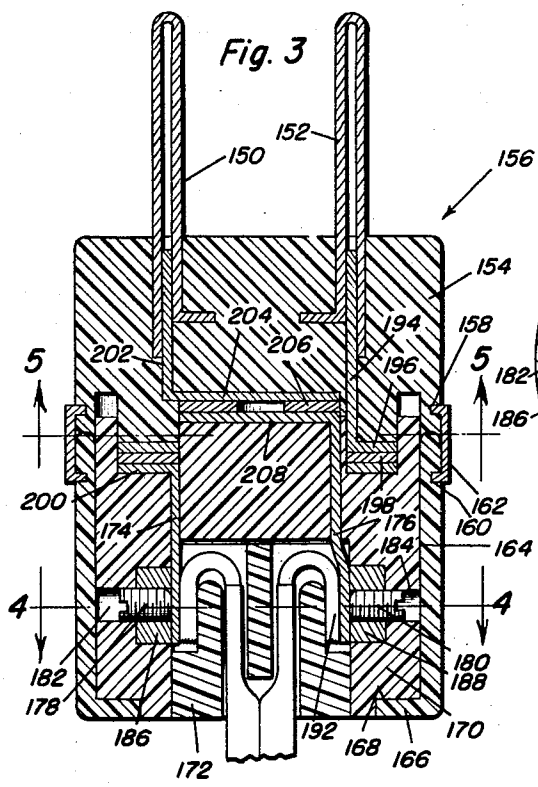


Fig. 4

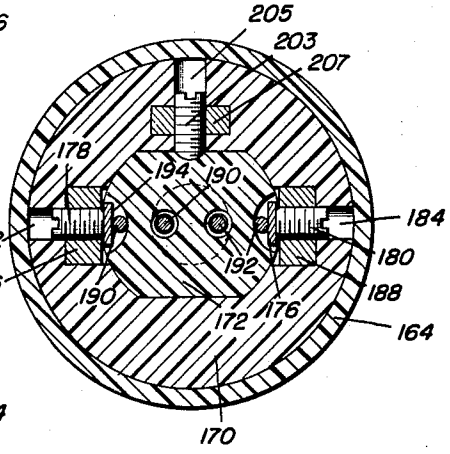
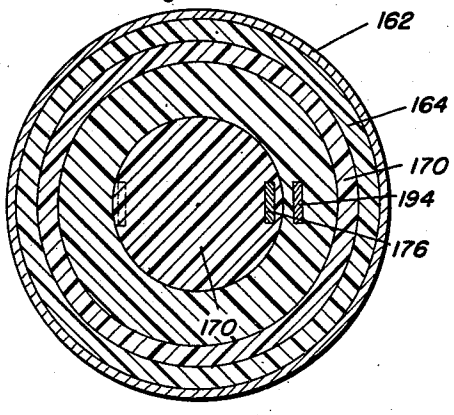


Fig. 5



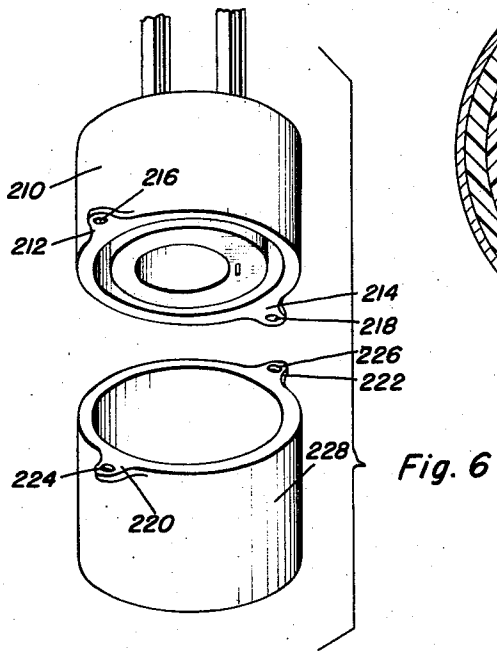


Fig. 6

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SWIVEL JOINT COUPLER FOR ELECTRIC CORDS

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4 Claims. (Cl. 339—8)

This invention relates to the class of electrical connectors, and more particularly to a novel swivel joint coupler.

The primary object of the present invention resides in the provision of a swivel joint coupler for preventing twisting, coiling and breaking of elements of multiconductor electrical cords, such as telephone cords, ironing cords, extension cords, lamp cords, rotating antennas and similar devices (radar) and other multiconductor electrical cords used on industrial machinery which are constantly rotating when in operation.

Another object of the invention resides in the provision of a swivel join coupler for coupling electrical cords requiring coaxial motion to thus prevent twisting, coiling and breaking which is strong and durable, simple in construction and which can be economically manufactured so as to permit wide distribution and utilization.

The construction of this invention features the utilization of male and female members which are assembled within a housing for retaining the internal portions of the invention. The male and female members carry contacts and are of insulating material and are swivelly joined to define a plurality of stepped and enclosed contact means arranged between annular contact elements. The male and female members provide cylindrical extensions carrying a plurality of longitudinal recesses each capable of receiving an individual annular contact element. Each annular contact element is provided with a perpendicular tongue extension which is electrically connected to the wires of the cable.

A further object of the invention resides in the provision of a swivel joint coupler which eliminates the necessity for a soldered joint by the utilization of set screws which exert pressure on the perpendicular tongues of the individual annular contact carrying elements.

An additional important object of the invention resides in the stepped arrangement utilized in the swivel joint coupler which provides a dielectric chamber wall protecting each individual contact member.

An additional important feature of the swivel joint coupler is the removable core portion utilized in conjunction with the male and female members which serve as a retaining member for firmly holding in place the individual cables along its length and when inserted into the male and female members.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this electrical connector, preferred embodiments of which have been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a longitudinal sectional view of the electrical connector as taken along the plane of a line extending through the longitudinal axis thereof;

Figure 2 is an exploded perspective view of the various components of the present invention;

Figure 3 is a longitudinal sectional detail view of a modified form of the invention;

Figure 4 is a horizontal sectional view as taken along the plane of line 4—4 in Figure 3;

Figure 5 is a horizontal sectional view as taken along the plane of line 5—5 in Figure 3; and

Figure 6 is an exploded perspective view of a further modification of the invention.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, and with initial attention directed to the embodiment of the invention as is shown in Figures 1 and 2, reference numeral 10 is used to generally designate the swivel joint coupler comprising the present invention. This swivel joint coupler includes a female contact carrying member 12 and a male contact carrying member 14 of any suitable insulating material and of generally cylindrical shape. The female contact carrying member 12 has a face adapted to receive a nonferrous annular contact element 16 as well as a nonferrous contact member 18. Contacts 16 and 18 are molded into the female contact carrying member 12 during the manufacture thereof.

A recess 20 is also formed in the female contact carrying member 12 for reception of a core 22. The transverse bores 24, 26 and 28 are formed in the female contact carrying member 12 and threaded inserts indicated at 30 and 32 are molded into the female contact carrying element 12 for threaded reception of the screws 34, 36 and 38. The core 22 which fits into the recess 20 is similar in configuration to the core 40 which fits into the recess 42 in the male contact carrying member 14. The core 22 includes a pair of bores 44 and 46 which extend longitudinally through the core, as well as a transverse bore 48 for reception of the screw 38 utilized to hold the core in place. The ends of the multiconductor cable 50 extend through the bores 44 and 46 and have their ends 52 and 54 clampingly held in position by means of the screws 34 and 36 which hold the ends 52 and 54 within the recesses 56 and 58 of the core 22 between the contact elements 16 and 18 and the core 22.

The core 40 is adapted to be utilized in conjunction with screws 60 and 62 to hold the ends of wires 64 and 66 in position against non-ferrous metal contact members 68 and 70. Wires having the ends 64 and 66 form the multiconductor 72. A further screw 76 is provided and extends through the aperture 78 in the male contact carrying member 14 to hold the core 40 in position. The screws 60 and 62 extend through apertures 80 and 82 in the male carrying member 14.

The female carrying member 12 has a peripheral groove 86 therein adapted to receive the tongue 88 of the male carrying member 14. Received in the space between the tongue 88 and the groove 86 are the ring portions 90 of the contact 16, the ring portion 92 of the contact 70 as well as the split ring 94. Received between the central portions 96 and 98 of the female and male carrying members 12 and 14, respectively, are the disk portions 100 of the contact 18, the disk portion 102 of the contact 68, and the split ring 104. Obviously, a split disk in lieu of the split ring 104 can be utilized if such as found desirable.

An upper covering member of generally cylindrical shape, as at 108, is provided and includes a flanged portion 108 adapted to seat in the shoulder 110 extending around the periphery of the male carrying member 14. A further cover member 112 has a flanged portion 114 capable of seating in the shoulder 116 extending about the periphery of the female carrying member 12. The covering member 106 is provided with an annular groove 118 therein, and the covering member 112 is provided with a groove 120 therein. Received in the grooves 118 and 120 is a peripheral locking ring 122. Of course, other

types and shapes of locking rings **122** may be utilized as desired.

The expansion and contraction of the peripheral locking ring **122** allows for the easy assembly and disassembly of this invention. The large split ring 94 which is formed of a non-ferrous metal is slightly opened, giving it a lock washer shape to present the necessary elasticity when inserted between the contact elements **90** and **92**, and the split ring **104** is also slightly open insert between contact elements **100** and **102**.

The covering member **112** may be provided with a series of bosses, as at **130**, adapted to seat in recesses **131**.

Referring now to the embodiment of the invention as is shown in Figures 3 through 5, when it is desired to utilize prongs or blades, as at **150** and **152**, in conjunction with the invention so as to provide a swivel type plug, the male body portion **154** of this plug which is generally indicated by reference numeral **156** has the prongs **150** and **152** embedded therein. Further, the male carrying member **154** is provided with a peripheral groove **158** adapted to cooperate with the covering member generally indicated by reference numeral **164** which includes a peripheral lower flange **166** engageable within a peripheral groove **168** in the female carrying member **170**. The female carrying member **170** is of identical configuration and shape as the female carrying member **12** and receives a core **172** therein to which the contacts **174** and **176** are urged. The contacts **174** and **176** are held in place by means of setscrews **178** and **180** which extend through bores **182** and **184** in the carrying member **170** and in the inserts **186** and **188** to hold the contacts **174** and **176** against the ends of the wires **190** and **192**. A contact **194** extends from the prong or blade **152** and terminates in a ring **196** which bears against a split ring **198** which bears against the ring portion **200** of the contact **174**.

A contact **202** having an annular disk portion **204** is provided and a split ring **206** is inserted between the disk portion **204** of the contact **202** and the disk portion **208** of the contact **176**. A further screw **203** extends through bore **205** and through insert **207** to hold the core **172** in position.

As can be readily understood, the female carrying member **170** can swivel within the casing as may be desired, and thus can swivel relative to the male plug portion **154**. Therefore, in lieu of the locking ring **162**, a connection as is shown in Figure 6 may be utilized, and it will be seen herein that male plug portion **210** may be provided with ears as at **212** and **214** apertured at **216** and **218** which cooperate with ears **220** and **222** also apertured, as at **224** and **226**, of the cover of the female carrying member **228** to receive suitable fasteners, such as bolts or screws to thus secure these two mating parts together.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A swivel joint coupler for multiconductor electric cables comprising a male carrying member rotatably interengaged with a female carrying member, a first flat contact partially embedded in said male carrying member and terminating in a first disk, a second flat contact partially embedded in said female carrying member and terminating in a second disk, electrically conductive spring means between said first and second disks, a third flat contact partially embedded in said male carrying member and terminating in a first ring, a fourth flat contact partially embedded in said female carrying member and terminating in a second ring, electrically conductive spring means disposed between said first and second rings, and covering means rotatably holding said male and female carrying members together, said female carrying member having a recess therein, a core receiving the ends of the wires of a multiconductor cable disposed in said recess, and fastening means holding said ends of said wires against said second and fourth contacts, said fastening means including threaded apertures in said female member and screws cooperating with said apertures to apply pressure to said wires to hold them against said contacts.

2. A swivel joint coupler for multiconductor electric cables comprising a male carrying member rotatably interengaged with a female carrying member, a first flat contact partially embedded in said male carrying member and terminating in a first disk, a second flat contact partially embedded in said female carrying member and terminating in a second disk, electrically conductive spring means between said first and second disks, a third flat contact partially embedded in said male carrying member and terminating in a first ring, a fourth flat contact partially embedded in said female carrying member and terminating in a second ring, electrically conductive spring means disposed between said first and second rings, and covering means rotatably holding said male and female carrying members together, said female carrying member having a recess therein, a core receiving the ends of the wires of a multiconductor cable disposed in said recess, and fastening means holding said ends of said wires against said second and fourth contacts, said male carrying member having a recess therein, another core receiving the ends of other wires of another multiconductor cable disposed in said recess in said male carrying member, and other fastening means holding said ends of said other wires against said first and fourth contacts, said fastening means including threaded apertures in said male and female members and screws cooperating with said apertures to apply pressure to said wires to hold them against said contacts.

3. A swivel joint coupler for multiconductor electric cables comprising a male carrying member rotatably interengaged with a female carrying member, a first flat contact partially embedded in said male carrying member and terminating in a first disk, a second flat contact partially embedded in said female carrying member and terminating in a second disk, electrically conductive spring means between said first and second disks, a third flat contact partially embedded in said male carrying member and terminating in a first ring, a fourth flat contact partially embedded in said female carrying member and terminating in a second ring, electrically conductive spring means disposed between said first and second rings, and covering means rotatably holding said male and female carrying members together, a pair of prongs extending outwardly from said male member, said first and third contacts engaging said prongs, said female carrying member having a recess therein, a core receiving the ends of the wires of a multiconductor cable disposed in said recess, and fastening means holding said ends of said wires against said second and fourth contacts, said fastening means including threaded apertures in said female member and screws cooperating with said apertures to apply pressure to said wires to hold them against said contacts.

4. The structure of claim 3 wherein said covering means include an upper covering member and a lower covering member, and a channel-shaped locking ring engaging and lockingly holding said upper covering member and said lower covering member.

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