

ELECTRICAL SWIVEL CONNECTER

Original Filed April 17, 1931 2 Sheets-Sheet 1

FIG. 1

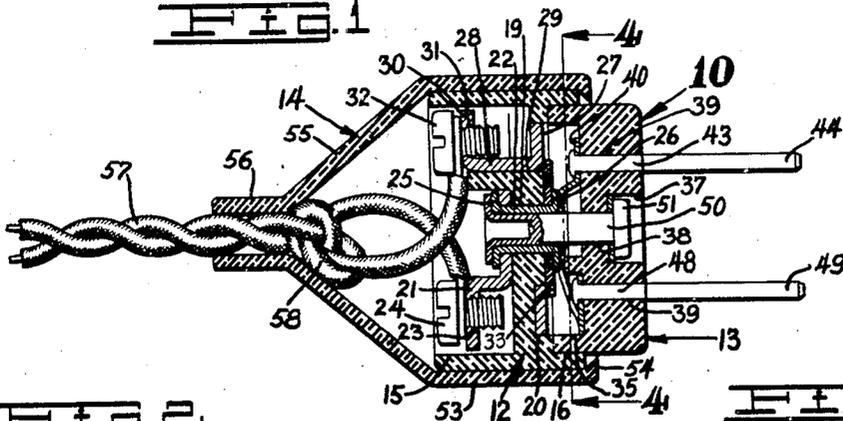


FIG. 2

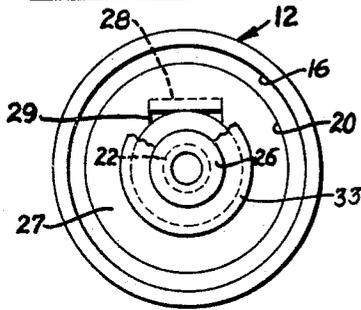


FIG. 3

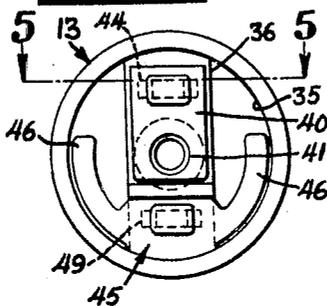


FIG. 4

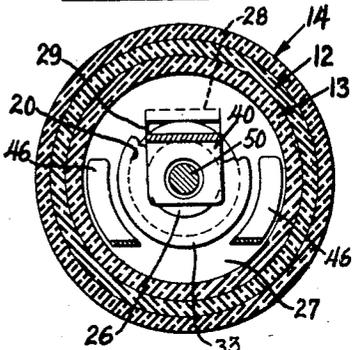


FIG. 7

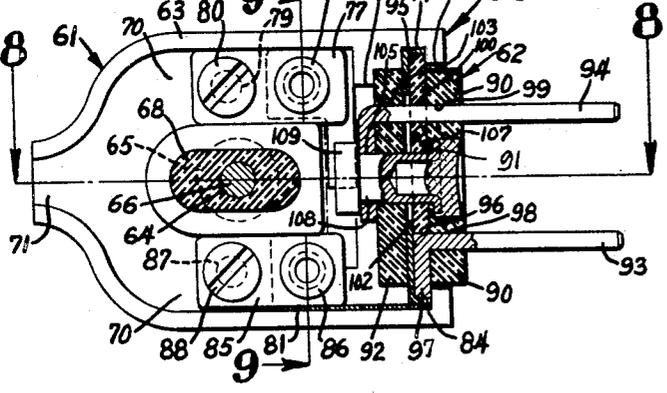


FIG. 5

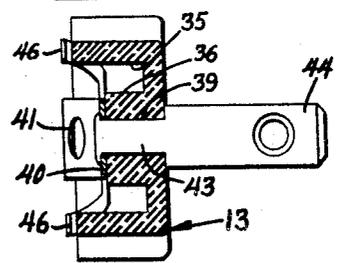


FIG. 6

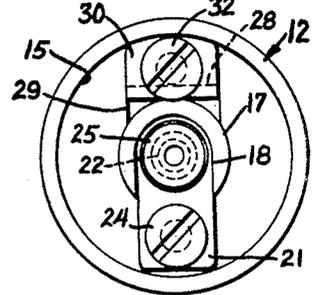
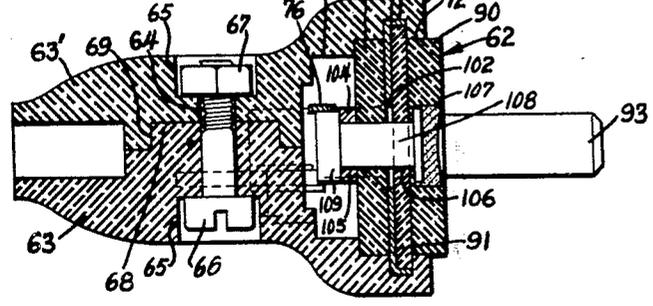


FIG. 8



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ELECTRICAL SWIVEL CONNECTER

Original Filed April 17, 1931 2 Sheets-Sheet 2

Fig. 9

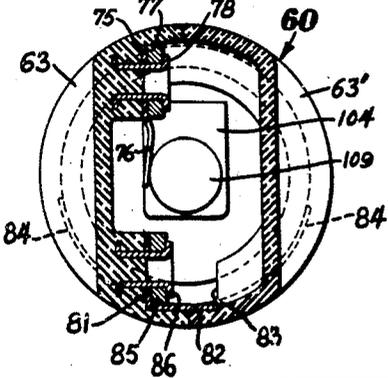


Fig. 11

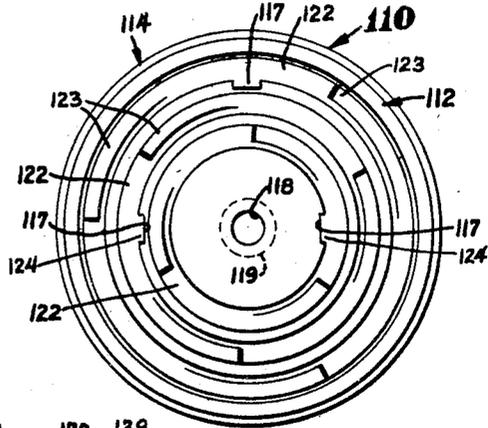


Fig. 10

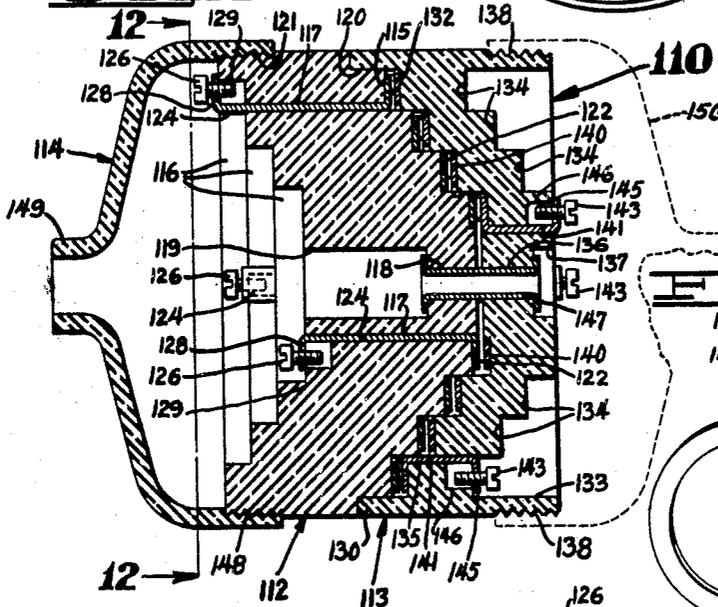


Fig. 14

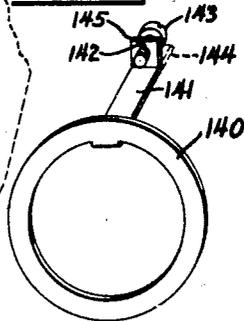


Fig. 12

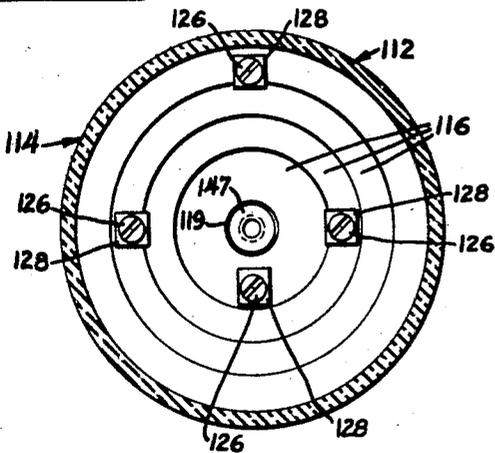
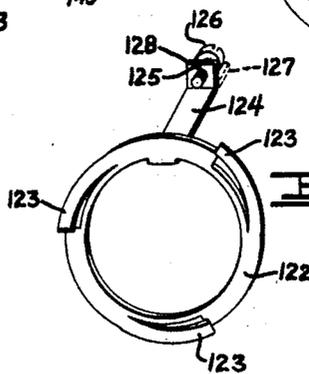


Fig. 13



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ELECTRICAL SWIVEL CONNECTER

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Renewed February 21, 1934

4 Claims. (Cl. 173—324)

This invention relates to improvements in electrical connecting devices.

The general object of the invention is to provide an improved electrical swivel connecter.

Another object of the invention is to provide an electrical swivel connecter which is simple in construction, sure in operation and by which the ends of a plurality of electrical conducting wires may be connected.

Other objects and the advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

Fig. 1 is a central sectional view through my improved swivel connecter.

Fig. 2 is a face view of the body portion of the connecter with the plug portion removed.

Fig. 3 is a rear view of the plug portion of the connecter removed from the body portion.

Fig. 4 is a section taken on line 4—4 of Fig. 1.

Fig. 5 is a section taken on line 5—5 of Fig. 3.

Fig. 6 is a rear view of the connecter with the cover member removed.

Fig. 7 is a central sectional view through a modified form of swivel connecter.

Fig. 8 is a section taken on line 8—8 of Fig. 7.

Fig. 9 is a section taken on line 9—9 of Fig. 7.

Fig. 10 is a central sectional view through another modified form of swivel connecter.

Fig. 11 is a face view of the connecter shown in Fig. 10, with the cap removed.

Fig. 12 is a section taken on line 12—12 of Fig. 10.

Fig. 13 is a perspective view of one of the contact rings used in the device shown in Fig. 10, and

Fig. 14 is a similar view of another one of the contact rings.

Referring to the drawings by reference characters I have indicated my improved swivel connecter generally at 10. As shown the connecter 10 comprises a body portion 12, a plug portion 13, and a cover member 14. The body portion 12 is made of an electrical insulating material such as "Bakelite" and includes a rear recess 15 and a front recess 16. In the rear recess 15 I provide a boss 17 in which I provide a slot 18 which extends through one side of the boss 17 and opens into the recess 15. Communicating with the front recess 16 and the slot 18 in the boss 17 I provide an aperture 19. In the rear wall of the front recess 16 I provide a reduced annular recess 20.

Positioned in the slot 18 of the boss 17 I provide a metal terminal member 21 which is

secured in position by a hollow metal rivet 22 positioned in the aperture 19. The terminal member 21 is provided with a threaded recess 23 in which a screw 24 is positioned. The rivet 22 is spun over at one end to form a head 25 which engages the contact member 21 and at the opposite end the rivet is spun over to form a contact ring 26.

Positioned in the reduced annular front recess 20 I provide a metal contact ring 27 which includes a rearwardly extending arm 28 which is positioned in an aperture 29 in the body and extends into the rear recess 15 where it is provided with a terminal portion 30 having a threaded aperture 31 therein in which a screw 32 is positioned. This ring 27 as will be seen is in one piece with the arm 28 and terminal 30 so that cheap manufacture of this portion and quick assembly is secured.

The contact ring 27 is retained in the recess 16 by a fiber washer 33 which engages a portion of the face of the ring 27 adjacent its inner periphery and is retained in position by the spun contact ring 26 of the rivet 22.

The plug portion 13 of the connecter like the body 12 is made of an electrical insulating material such as "Bakelite." The rear portion of the plug 13 is positioned in the front recess 16 of the body 12 and includes a rear cavity 35 having a transverse boss 36 therein. In the front of the plug 13 I provide a reduced recess 37 and extending from the recess 37 through the boss 36 and opening into the recess 35 I provide an aperture 38. On opposite sides of the recess 37 I provide polygonal apertures 39 which extend through the boss 36 and open into the rear recess 35.

Positioned on the boss 36 in the rear recess 35 I provide a metal spring finger member 40 which includes an aperture 41 coaxial with the aperture 38. The member 40 is also apertured to receive a portion of a reduced shank 43 of an electrode 44 shown as rectangular (see Fig. 5). The reduced shank 43 of the electrode 44 is positioned in one of the polygonal apertures 39 and the end thereof is riveted over the member 40 to retain the member 40 in position.

Also positioned on the boss 36 in the rear recess 35 I provide a contact member 45 which is made of a spring metal and includes a pair of resilient outwardly bent contact fingers 46. The member 45, like the member 40, is apertured to receive a portion of a reduced shank 48 of an electrode 49. The reduced shank 48 of the electrode 49 is positioned in one of the polygonal

apertures 39 of the plug and the end thereof is riveted over the member 45 to retain the member 45 in position.

To pivotally connect the body portion 12 and the plug portion 13 I provide a rivet 50 which is positioned in the hollow rivet 22 of the body 12 and in the aperture 38 of the plug 13, and extends through the apertures 41 in the contact member 40. Any suitable type of rivet may be used but as shown the rivet 50 includes an enlarged head 51 at one end which is positioned in the front recess 37 of the plug 13. Adjacent the end opposite the head 51 the rivet is hollow and the end thereof is spun over the head of the rivet 22, thereby firmly connecting the plug 13 to the body 12.

When the plug 13 is thus secured to the body 12 the contact member 40 engages the head 26 of the rivet 22, thus forming an electrical circuit from the terminal 21 to the electrode 48; and the contact fingers 46 of the member 45 engage the contact ring 27, thereby forming an electrical circuit from the terminal 30 to the electrode 49.

The cover 14 is made of relatively soft rubber and includes a hollow body portion 53 having an inwardly projecting bevelled flange 54 adjacent one end, a conical portion 55 and a reduced neck 56. The normal diameter of the body portion 53 of the cover 14 is smaller than the outside diameter of the body 12 so that the cover body 53 is expanded when it is placed on the body 12 whereupon it tightly grips the body 12 and the inturred flange 54 is positioned over the front of the body 12 as shown in Fig. 1.

Electrical conductive wires 57 are adapted to pass through the neck 56 of the cover and are connected to the terminals 21 and 30 by screws 24 and 32. The wires 57 may pass under the lug 21 and around the screws 32 and 24 to effect a half hitch if desired. The wires 57 are preferably knotted as indicated at 58 and the knot 58 is adapted to engage the conical portion 55 of the cover 14 adjacent the neck 56 so that any pull on the wires 57 will be exerted on the cover 14 by the knot 58 instead of on the ends of the wires where they are secured to the terminals.

In Figs. 7, 8 and 9 I have indicated a modified form of swivel connector generally at 60. As shown this connector includes a body portion 61 and a plug member 62. The body portion 61 is made of an electrical insulating material such as bakelite and includes two sections 63 and 63'. Each of the sections 63 and 63' are provided with an aperture 64 and a counter bore 65. A bolt 66 is positioned in the apertures 64 with the head thereof positioned in one of the counter bores 65 and a nut 67 is positioned on the bolt 66 in the other counter bore 65.

The section 63 is provided with a polygonal boss 68 which is positioned in a recess 69 in the section 63' to prevent movement of the sections 63 and 63' about the axis of the bolt 66.

The body 61 is provided with a channelway 70 adjacent each side thereof which merges into a single outlet 71 adjacent the rear of the body. At the end of the body 61 opposite the outlet 71 I provide a recess 72 and a bore 73 which communicates with the recess 72 and the channelways 70. Intermediate the length of the recess 72 I provide a counter bored groove 74.

In one of the channelways 70 I provide a contact member 75 which is made of spring metal and includes a contact finger 76. The contact

member 76 is clamped to the body portion by a metal terminal plate 77 which is secured in position by a rivet 78 which is shown as moulded in the body portion (see Figs. 7 and 9). The plate 77 is provided with a threaded aperture 79 in which a terminal screw 80 is positioned.

In the other of the channelways 70 I provide a contact member 81 which is made of spring metal and includes a portion 82 which is positioned in a recess 83 in the body and extends into the groove 74 where it is provided with a pair of oppositely extending arcuate contact fingers 84. The contact member 81 is clamped to the body portion by a metal terminal plate 85 which is secured in position by a rivet 86 which is shown as moulded in the body portion (see Figs. 7 and 9.) The terminal plate 85 is provided with a threaded aperture 87 in which a terminal screw 88 is positioned.

The plug portion 62 of the connector 60 is shown as including three disks 90, 91, and 92, which are made of an electrical insulating material such as bakelite, and a pair of electrodes 93 and 94. Positioned on the disk 91 I provide a metal cup member 95 which engages one face of the disk 91 and overlays the edges thereof. The disk 91 is provided with a recess 96 in which an angularly bent arm 97 of the electrode 93 is positioned. The electrode 93 extends through an aperture 98 in the disk 90 and the arm 97 of the electrode 93 engages the cup member 95.

The electrode 94 extends through an aperture 99 in the disk 90, through an aperture 100 in the disk 91, through an aperture 102 in the cup member 95 and through an aperture 103 in the disk 92. The electrode 94 includes an angularly bent arm 104 which engages the inner face of the disk 92 and is provided with an aperture 105. The disks 90, 91 and 92 are each provided with an aperture 106 and the disk 90 is provided with a counter bored recess 107.

For securing the various parts of the plug 62 together I provide a rivet 108 which includes an enlarged head 109 and is hollow adjacent the end opposite the head. The rivet 108 is positioned in the apertures 106 of the disks 90, 91 and 92 and in the apertures 105 of the arm 104 of the electrode with the head 109 engaging the face of the arm 104. The end of the rivet 108 opposite the head 109 is spun outwardly to form a head which engages the bottom of the recess 107 in the disk 90 thereby clamping all the portions of the plug together.

The disks 90 and 92 are of a size to fit in the recess 72 of the body 61 and the disk 91, together with the cup member 95, is positioned in the groove 74 of the body. When thus positioned the contact finger 76 of the contact plate 75 engages the periphery of the head 109 of the rivet 108 thereby forming a complete electrical conductive circuit from the terminal plate 77 to the electrode 94. The contact fingers 84 engage the periphery of the cup member 95 thereby forming a complete electrical conductive circuit from the contact plate 85 to the electrode 93.

In Fig. 10 I have indicated another modification of swivel connector generally at 110. As shown this connector includes an annular body portion 112, an annular cap member 113 and a cover 114, all of which may be made of an electrical insulating material such as "Bakelite."

The front of the body portion 112 is formed into a plurality of shoulders 115 which are arranged in stepped formation and in the rear of

the body I provide a plurality of recesses 116 which are also arranged in stepped formation. In the body 112 adjacent each of the shoulders 115 I provide an aperture 117 which forms a communicating passageway from its associated shoulder 115 to the associated rear recess 116.

Within the body portion 112 I provide a bore 118 which communicates with a recess 119 opening into the smaller of the recesses 116. Adjacent the front of the body 112 I provide a peripheral notched portion 120 and adjacent the rear of the body I provide threads 121.

Positioned on each of the shoulders 115 I provide a contact ring 122 which is made of spring metal and is provided with a plurality of contact fingers 123 which are stamped therefrom and inclined outwardly as clearly shown in Fig. 13. Extending from the ring 122 I provide an aperture 125 in which a terminal screw 126 is positioned. Before the contact ring 122 is positioned in the body portion 112 the arm 124 extends straight as indicated by the dotted lines 127 in Fig. 13. When the contact ring is positioned on the body portion the arm 124 is positioned in the correct aperture 117 of the body and then the end of the arm is bent at an angle to form a terminal portion 128. Adjacent each of the apertures 117 towards the rear of the body, the body portion is notched as indicated at 129 to provide a space for the shank of the terminal screw 126.

The rear of the cap 113 is provided with an annular flange 130 and a plurality of recesses which are arranged in stepped formation to provide a plurality of shoulders 132 which correspond in number and size to the shoulders 115 of the body portion 126.

At the front of the cap 113 I provide a recess 133 in which I provide a plurality of shoulders 134 which are arranged in stepped formation to correspond to the shoulders 132. In the cap 113 adjacent each of the shoulders 132 I provide an aperture 135 which forms a communicating passageway from its associated shoulder 132 to the associated shoulder 134.

Within the cap 113 I provide a coaxial bore 136 which communicates with a recess 137 adjacent the front of the cap. Adjacent the front of the cap 113 I provide threads 138 similar to the threads 121 of the body 112.

Positioned on each of the shoulders 132 I provide a contact ring 140 which is made of spring metal and includes an angularly projecting arm 141 having a threaded aperture 142 therein in which a terminal screw 143 is adapted to be positioned. Before the contact ring 140 is positioned on the cap 113 the arm 141 continues straight as indicated by the dotted lines 144 in Fig. 14. When the contact ring 140 is positioned on the correct shoulder 132 of the cap 113 the arm 141 is positioned in the associated apertures 135 and then the end of the arm is bent at an angle to form a terminal portion 145. Adjacent each of the apertures 135 towards the front of the cap I provide a notch 146 to provide space for the shank of the terminal screw 143.

When the cap 113 and the body 112 are in operative relationship the flange 130 of the cap is positioned in the notched portion 120 of the body 112 and the contact rings 123 of the rings 122 engage the contact rings 140 thus forming complete electrical conductive circuits from the terminal portions 128 of the rings 122 to the terminal portions 145 of the rings 140.

For operatively connecting the body 112 and

the cap 113 I provide a rivet 147 which is positioned in the aperture 118 of the body and in the aperture 136 of the cap 113. The rivet 147 is shown as hollow and one end thereof is spun over to provide an enlarged head which is positioned in the recess 119 of the body 112 and the opposite end of the rivet is spun over to provide an enlarged head which is positioned in the recess 137 of the cap 113.

When the body and cap are thus assembled the contact fingers 123 of the contact ring 122 are under compression and resiliently urge the cap 113 away from the body 112.

The cover 114 is hollow and is provided with a threaded portion 148 and a reduced neck 140. The cover 114 may be secured to the body portion 112 by engagement of the cover threads 148 with the threads 121 of the body or the cover may be secured to the cap 113 as indicated by the dotted lines 150, by the engagement of the cover threads 148 with the threads 138 of the cap. Furthermore, either the body 112 or the cap 113 may be secured to any desired device having suitable threads thereon to correspond to the threads 121 or 148 or a cover 114 may be positioned on the body 112 and a similar cover on the cap 113.

From the foregoing description it will be apparent that I have provided a novel electrical swivel connector which is simple in construction and highly efficient in use.

Having thus described my invention, I claim:

1. In an electric swivel connector, a body portion and a plug portion, said body and said plug being made of an electrical insulating material, said body having an aperture therein, a hollow rivet in said aperture, said hollow rivet including an enlarged head engaging said body at the front end to form a contact ring, a terminal member adjacent the rear of said body, said hollow rivet including a second head engaging said terminal, a second contact ring adjacent the front of said body and spaced from said first contact ring, said body having a second aperture therein spaced from said first aperture, an arm contacting with said second contact ring, said arm being positioned in said second aperture and extending to the rear of said body and including a terminal portion, a resilient contact member on said plug adjacent the rear thereof, an electrode mounted on said plug and extending outwardly from the front thereof, means connecting said contact member with said electrode, a second contact member on said plug adjacent the rear thereof and spaced from said first contact member, a second electrode mounted on said plug and extending outwardly from the front thereof, means connecting said second contact member with said second electrode, said second contact member including a resilient finger, said plug having an aperture therein, means in said hollow rivet of said body to rotatably connect said body and said plug, said first contact member of said plug engaging said first contact ring of said body and said resilient finger engaging said second contact ring of said body, said first resilient contact member and said resilient finger of said second contact member resiliently urging said body and said plug away from each other.

2. In a connector, a body portion made of insulating material and having a partition extending thereacross, a contact ring engaging said partition, an arm connected to said ring and

passing through said partition, an insulating washer engaging said ring, a rivet passing through said partition and washer, a second arm engaging said rivet, said second arm being spaced from said first arm, a plug on said body, said plug having a central contact member engaging one end of said rivet and having a pair of spaced lateral contact members thereon engaging said ring, and means to rotatably mount said plug on said body.

3. In a connector, a body portion made of insulating material and having a partition extending thereacross, said partition having an aperture therein, a contact ring engaging said partition and having an aperture therein, said ring including an arm passing through said partition, an insulating washer engaging said ring, said washer having an aperture in alignment with said partition aperture, a rivet passing through said aligned apertures, a second arm engaging said rivet, said second arm being spaced from said first arm, a plug on said body, said plug having a central contact member engaging one end of said rivet and having a pair of lateral contact members thereon engaging said ring, and a second rivet passing through said first rivet and serving to rotatably mount said plug on said body.

4. In a connector, a body portion made of insulating material and having a partition extending thereacross, said partition having an aperture therein, a contact ring engaging said partition and having an aperture therein, said ring including an arm passing through said partition, an insulating washer engaging said ring, said washer having an aperture in alignment with said partition aperture, a hollow rivet passing through said aligned apertures, a second arm engaging said rivet, said second arm being spaced from said first arm, a plug on said body, said plug having a central contact member engaging one end of said rivet and having a pair of lateral contact members thereon engaging said ring, and a second rivet passing through said first rivet and serving to rotatably mount said plug on said body.

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35	110
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