Oct. 31, 1939. W. H. KITTO 2,177,989

ELECTRIC CONNECTOR AND METHOD OF ASSEMBLY

Filed June 5, 1937

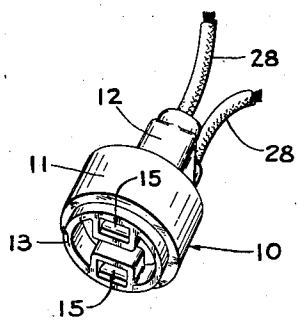


Fig. 1

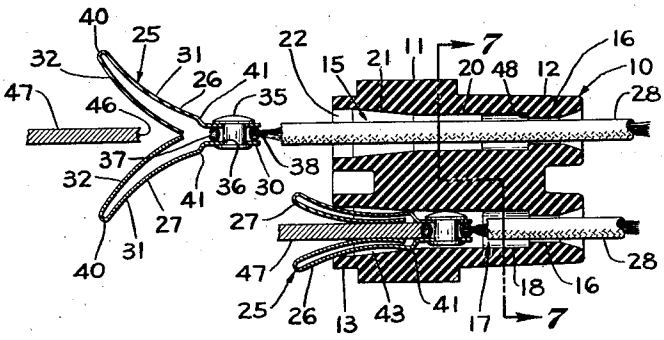


Fig. 2

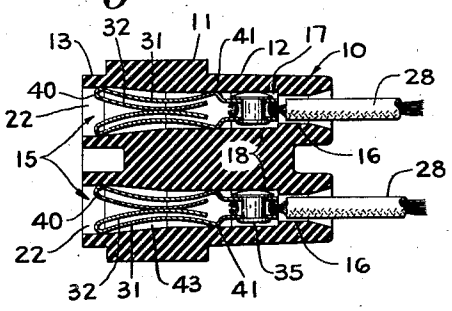


Fig. 3

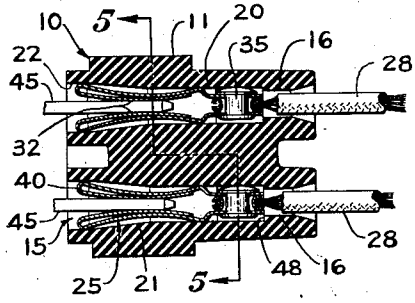


Fig. 4

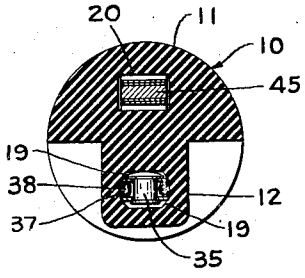


Fig. 5

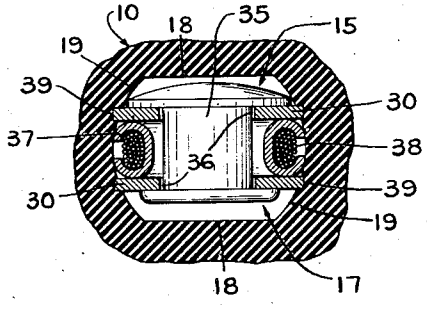


Fig. 6

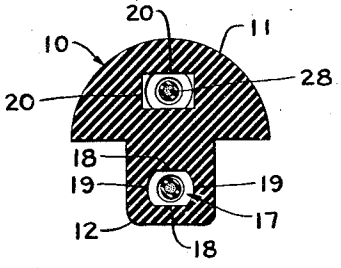


Fig. 7

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ELECTRIC CONNECTOR AND METHOD OF ASSEMBLY

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Application June 5, 1937, Serial No. 146,601

3 Claims. (Cl. 173—332)

The present invention relates to new and useful improvements in electric contacts and receptacles therefor and a method of assembling the same.

An object of the invention is to provide a female contact composed of spring metal curved substantially throughout its longitudinal length when in inoperative position, and movable longitudinally of its length to reduce its degree of curvature upon engagement with a male contact so as to engage the latter over a considerable flat area and to exert considerable retaining pressure upon the male contact. Another object is to provide a female contact formed from a pair of reversely bent spring metal members, each having a free end movable longitudinally along the receptacle to receive a male contact therebetween. A still further object is to provide a relatively rigid connector body in which the female contact and conductor cord can be quickly assembled and frictionally anchored without the use of screws, pins or other securities. Still further objects of the invention, and the novel details of structure by which such objects are attained, will be apparent from the following specification and consideration of the accompanying drawing in which:

Fig. 1 is a perspective view of the electric connector;

Fig. 2 is a longitudinal section illustrating the method of assembling the female contact into the body of the connector;

Fig. 3 is a longitudinal section of the assembled connector;

Fig. 4 is a longitudinal section showing male contacts in engagement with the female contacts;

Fig. 5 is a section taken along the lines 5—5 of Fig. 4;

Fig. 6 is a fragmentary section showing a female contact assembled in the connector, and

Fig. 7 is a section taken along the line 7—7 of Fig. 2.

The embodiment of the invention shown in the drawing comprises a body member 10, molded in one piece from insulating material such as, "Bakelite." In exterior configuration the body member 10 has an annular mid section 11, a rectangular section 12 at one end and a circular flange 13 at the opposite end. Extending longitudinally through the body member 10 is a pair of parallel openings 15, each having an end portion 16 of circular cross section, connected to a portion 17 provided with parallel flat walls 18 and opposed arcuate walls 19, the portion 17 in turn connected to a portion 20 of rectangular section merging into a flared portion 21 terminating in an enlarged entrance opening 22 of rectangular cross section.

Disposed in each opening 15 is a female contact 25 composed of paired contact forming elements 26 and 27 connected to an electric conductor 28. Each contact forming element is made from spring metal and consists of a terminal 30, curved shank 31 and a curved male prong engaging portion 32 doubled back along the curved shank 31. A rivet 35 extends through openings 36 in the paired terminal ends 30, and an eyelet 37 embraces a loop 38 of the conductor 28, to rigidly secure the parts together. The eyelet 37 serves to permanently space the terminal ends 30 a predetermined distance apart. In order to prevent bodily movement of the contact forming elements in each opening 15, the paired terminal ends 30 thereof are slightly larger than the space between the curved walls 19 of the opening 15 and are driven into the surface thereof, as indicated at 39 in Figure 6, to frictionally retain the contact 25 in proper position.

As shown in Figure 2, when the contact 25 is free of the body member 10 each pair of contact forming elements 26 and 27 normally tend to separate from each other due to the springy nature of the metal and the longitudinal curvature of the latter. However, when the contacts are arranged in the body member 10 as shown in Figure 3, the contact forming elements 26 and 27 are squeezed together in the openings 15 so as to bring the prong engaging surfaces 32 in contact with each other. The free ends 40 of the contact forming elements rest on the enlarged portion 22 of each opening 15 and the offset portions 41 of the shanks 31 bear against the walls of the portion 20 of the opening 15 to thereby support the curved shank 31 in spaced relation with respect to the walls of the opening 15, as indicated at 43.

Upon inserting a male contact or prong 45 between each pair of contact elements 26 and 27, as shown in Figure 4, the free ends 40 thereof slide along the portion 22 of the opening 15, whereby the degree of curvature of the contact forming members 26 and 27 is decreased to engage the male contact 45 over a considerable area. The tapered portion 21 of each opening 15 accommodates the longitudinal movement of the free ends and the decrease in curvature of the contact forming elements 26 and 27 upon separation of the latter when the male prong is inserted therebetween.

The method of assembling each contact in the

body member is illustrated in Figure 2. The cord 28 and the terminal end 30 of each contact 25 is initially inserted in the large end of each opening 15. An assembling tool 47 having an arcuate end 46 is placed between the opposing surfaces of the prong engaging members 32 until the end of the tool abuts the eyelet 37. Pressure is then applied at the outer end of the tool to drive the contact into the reduced portion 17 of the opening 15 until the terminal ends 30 bear against the shoulder 48. The assembling tool 47 is then removed. In this position the unyielding walls of the reduced opening 17 frictionally engage the terminal ends 30, as indicated at 39 in Figure 6, to prevent bodily movement of the contact 25, but the free ends 40 of each pair of contact forming elements are free to flex and move longitudinally of the opening 15 to receive the male contact 45 therebetween.

From the foregoing it will be perceived that when the receptacle 10 is disconnected from the male contacts 45, the prong engaging surfaces 32 are in contact with each other due to the curvature thereof and the springy nature of the metal employed. When the male prongs 45 are inserted between the prong engaging members 32, the free ends 40 thereof are forced outwardly of the openings 15 and the curvature of each contact forming member is reduced and the latter lies substantially parallel to the adjacent tapered walls 21 of the openings 15. Due to the curvature of the contact forming elements, the latter engage the male contacts over considerable area to provide an electrical connection between substantially flat surfaces which reduces the electrical density at the point of contact engagement. The curvature of the contact forming elements and the springy nature of the metal, also provide an exceptionally long frictional spring grip between the male and female contacts.

I claim:

1. In an electric socket, a unitary body of substantially rigid insulating material having an opening therethrough, contact means comprising a pair of spring fingers each provided with an extension, an electric conductor disposed between said extensions, means for securing said spaced extensions and conductor together, said contact means and conductor securing means being disposed completely within said body, and said contact means being rigidly connected by a drive fit to said substantially rigid insulating material.

2. In an electric socket, a unitary body of substantially rigid insulating material having an opening therethrough, contact means comprising a pair of fingers each doubled upon itself and provided with an extension, said doubled portions being curved longitudinally and having a free end movable longitudinally in said opening upon inserting a plug between said curved fingers, said opening being unrestricted to permit said longitudinal movement of said free ends of said fingers, an electric conductor disposed between said extensions, and means for securing said spaced extensions and conductor together, said contact means and conductor securing means being disposed completely within said body.

3. A device of the character described, comprising an insulating body having an opening therein, female contact means in said opening and having a shank and a male contact engaging portion, the walls of said opening being arranged with respect to said male contact engaging portion to permit flexing of the same upon engagement with a male contact, the walls of said opening embracing said shank and frictionally engaging the same to prevent bodily movement of said contact means upon the removable engagement of said male contact with respect to said female contact means.

WILLIAM H. KITTO.