United States Patent

Merry

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[54] **ELECTRICAL CONNECTOR**

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[21] Appl. No.: **80,180**

Related U.S. Application Data

[63] Continuation of Ser. No. 802,807, Feb. 27, 1969, abandoned.

[52] **U.S. Cl.** .....**339/217 S,** 339/258 R

[51] **Int. Cl.** **H01r 9/08,** H01r 11/22

[58] **Field of Search**.....339/217, 198, 256, 258, 259; 24/230

[56] **References Cited**

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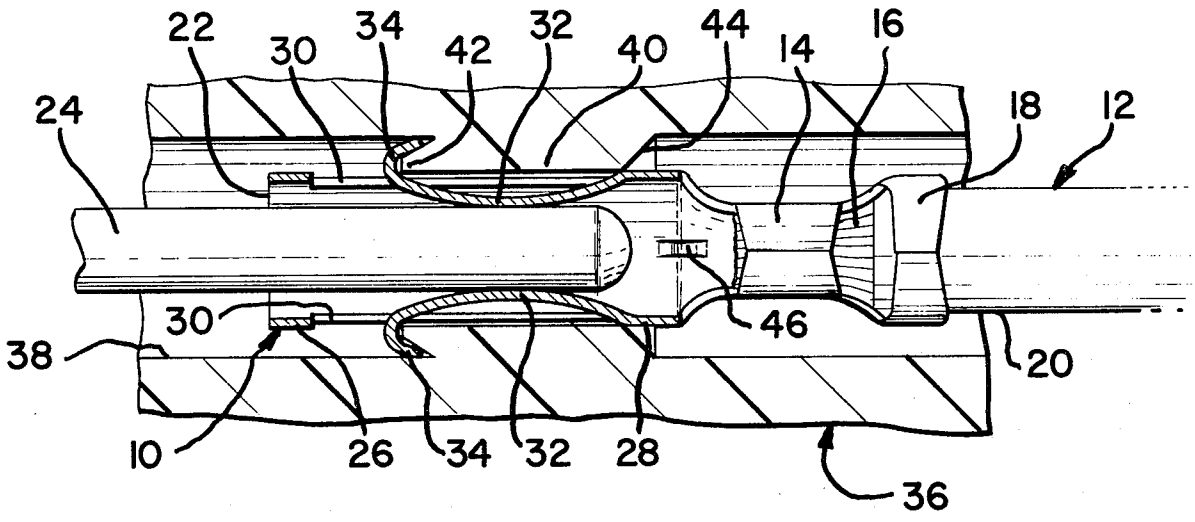
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[57] **ABSTRACT**

An electrical connector comprising an insulating housing and a contact receptacle disposed within a cavity in the housing. The contact receptacle is provided with a pair of contact arms having hook-like portions at the free ends thereof for retaining the contact receptacle within the housing cavity and for increasing the available contact force between the receptacle and a male pin member.

7 Claims, 5 Drawing Figures



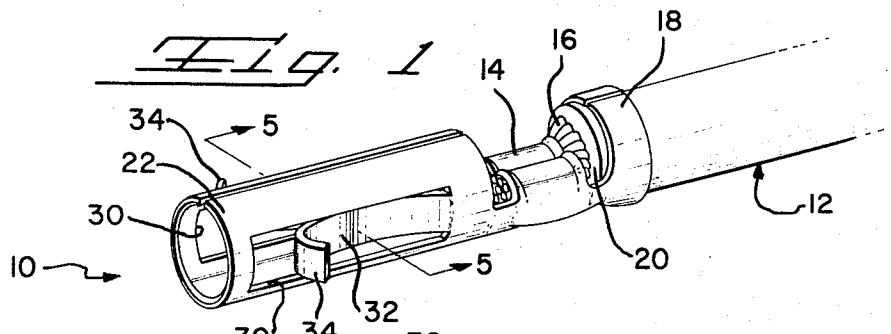


FIG. 1

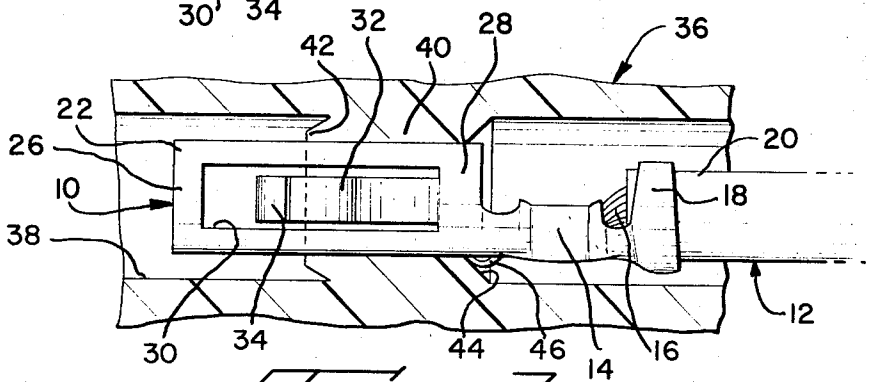


FIG. 2

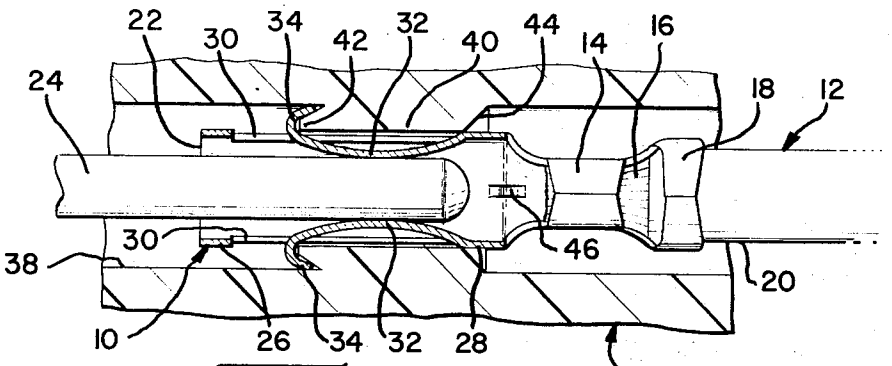


FIG. 3

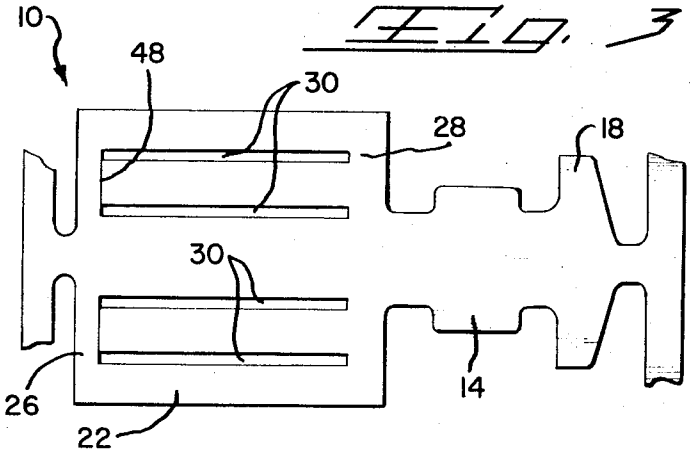


FIG. 4

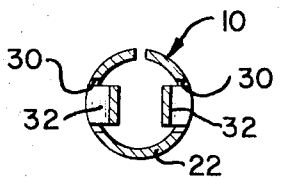


FIG. 5

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ELECTRICAL CONNECTOR

This application is a continuation of Ser. No. 802,807, filed Feb. 27, 1969, now abandoned.

This invention relates to electrical connectors and more particularly to an electrical connector comprising an insulating housing and an electrical contact receptacle. The unique configuration of the contact receptacle permits the contact arms to perform the dual function of engaging the male pin member and also retaining the receptacle within the housing. Entry of the male pin member with the receptacle serves to increase both the retaining force and the contact force of the receptacle.

It is therefore the principle object of this invention to provide an electrical connector having improved means for retaining a contact receptacle within an insulating housing and for developing high contact force between the receptacle and a mating pin member.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, in which like reference numerals refer to like parts:

FIG. 1 is a perspective view showing the electrical contact receptacle of this invention;

FIG. 2 is a side elevational view partly in section showing the receptacle of FIG. 1 located within the cavity of a housing;

FIG. 3 is a top plan view partly in section showing the electrical connector as it receives a mating pin member;

FIG. 4 is a top plan view of a blank from which the contact receptacle is formed; and

FIG. 5 is a cross-sectional view taken along the line 5—5 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purpose of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

With reference now to the drawings there is shown in FIG. 1 an electrical contact receptacle designated generally at **10**, the receptacle being stamped and formed from suitable metallic material such as brass or the like. The receptacle **10** is adapted to be secured to the end of an electrical conductor **12** by means of a ferrule portion **14** which is crimped to the wire **16** of the conductor and by means of a ferrule **18** which is crimped to the outer insulation **20** of the conductor **12**. The means of securing the receptacle to the electrical conductor is conventional and well known in the art. The receptacle **10** has a forward portion **22** of generally cylindrical configuration for receiving a male pin member or the like **24** (see FIG. 3). The cylindrical portion **22** of the receptacle has a pair of strap portions **26** and **28** located at each of opposite ends of the cylindrical portion and these straps are separated by cut out areas **30** located along opposite sides of the receptacle.

Disposed within the cut out areas **30** of the receptacle are a pair of contact arms **32** which extend integrally from the strap **28** and have their free ends disposed towards the forward contact receiving portion of the receptacle. The arms are of generally elliptical configuration and are normally spaced apart a distance which is less than the diameter of the pin member **24** to be received within the receptacle. The free ends of contact arms **32** are provided with retaining means in the form of hook-like portions **34** which extend laterally outwardly from the contact arms. These portions **34** cooperate with the insulating housing in a manner to be described.

The contact receptacle **10** is adapted to fit within an insulating housing **36**. The housing is provided with a cavity **38** for receiving the receptacle and in a typical electrical connector there would be a plurality of apertures such as **38** for receiving a plurality of receptacles in a regular array. Within each cavity **38** there is formed a portion **40** of reduced diameter, which diameter is approximately equal to the external diameter of the contact receptacle. The forward edge of the reduced diameter portion constitutes an annular flange **42** and the rearward section of the reduced diameter portion is provided with a shoulder **44**.

When receptacle **10** is placed within the housing aperture or cavity **38** the hook-like portions **34** of the contact arms are cammed inwardly by the reduced diameter portion **40** to permit the receptacle to pass through the reduced area. Movement of the receptacle in the insertion direction is limited by a stop member **46** which extends outwardly from the receptacle and cooperates with the shoulder **44**, the stop means being located on the receptacle at the rearward portion of the cylindrical member **22** and at the forward portion of the ferrule **14**. When the receptacle is fully seated within the housing cavity the hooks **34** will spring outwardly and engage the cavity surface forwardly of the flange **42**. When a male pin member is inserted within the receptacle the entire receptacle will shift slightly to the right into the position shown in FIG. 3 to permit the hooks **34** to engage the flange **42** to positively retain the receptacle in position within the housing. Since the hooks are in engagement with the cavity surface they are capable of transmitting forces from the cavity surface to the contact arms to thus yield a high contact force between the contact arms and the pin member. If the contact arms were merely cantilevered members a much lower force could be developed upon insertion of the pin member.

In FIG. 4 a blank is shown from which the contact receptacle is formed. The blank would normally be carried as part of a strip and it can be seen that the receptacle is capable of being formed from a blank of relatively simple design. The contact arms **32** are formed by punching out the open areas **30** and by severing the arms from the strap **26** along the line **48**. After the blanking and stamping operation is performed the strip is passed through a forming process consisting of several stages to achieve a receptacle such as shown in FIG. 1.

Changes in construction will occur to those skilled in the art and various apparently different modifications

and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only.

What is claimed is:

1. A stamped and formed sheet metal electrical contact receptacle for receiving a male pin member or the like, said receptacle comprising a first portion and a second portion, said first portion having means for securing said receptacle to an electrical conductor, said second portion providing means for contacting a pin member and comprising an elongated generally cylindrical member, said cylindrical member having circumferentially extending strap portions at each end thereof, a pair of contact arms stamped from said cylindrical member on opposite sides thereof, said arms being integral with one said strap portion and extending generally towards the other said strap portion, the free ends of each of said contact arms being bent outwardly and rearwardly towards said one strap portion to define a hook-like portion projecting laterally outwardly of said receptacle, said hook-like portion adapted to transmit contact forces from an inserted pin member to walls of a cavity in an insulating housing containing said receptacle.

2. An electrical contact receptacle as set forth in claim 1 wherein said hook-like portion is adapted to cooperate with an annular flange of said insulating housing to prohibit extraction of said receptacle from said housing.

3. An electrical connector comprising an insulating housing, a cavity formed in said housing, said cavity having a reduced diameter portion located therein, a stamped and formed sheet metal electrical contact receptacle disposed within said cavity for receiving a male pin member or the like, said receptacle comprising a first portion and a second portion, said first portion having means for securing said receptacle to an electrical conductor, said second portion providing means for contacting a pin member and comprising an elongated generally cylindrical member, said cylindrical member having circumferentially extending strap portions at each end thereof, a pair of contact arms stamped from said cylindrical member on opposite sides thereof, said arms being integral with one said strap portion and extending generally towards the other strap portion, the free ends of each of said contact arms being bent outwardly and rearwardly towards said one strap portion to define a hook-like portion projecting laterally outwardly of said receptacle, said hook-like portion being adapted to transmit contact forces from said pin member to wall portions of said cavity when said pin member is received by said receptacle to thereby increase the contact force between said contact arms and said pin member.

4. An electrical connector as set forth in claim 3 wherein one end of said reduced diameter portion forms an annular flange with the wall of said cavity.

5. An electrical connector as set forth in claim 4 wherein said hook-like portion interferingly engages said annular flange thereby retaining said receptacle in said housing.

6. A stamped and formed electrical contact receptacle for receiving a male pin member or the like, said receptacle comprising a wire conductor engaging portion at one end thereof and a pin contact engaging portion at the other end thereof, said pin contact engaging portion comprising an elongated generally cylindrical member defining therein a longitudinal axis, said cylindrical member having first and second circumferentially extending strap portions at each end thereof, said second strap portion adjoining said wire conductor engaging portion, a pair of contact arms stamped from said cylindrical member on opposite sides thereof, said arms being integral with, and extending from, said second strap portion and extending generally toward said first strap portion with intermediate portions of each arm being bowed inwardly toward said longitudinal axis, a portion of the free end of each contact arm being offset from said arm and extending generally normally outwardly from the longitudinal axis of the cylindrical member, the interior surface of each contact arm at said intermediate portions adapted to electrically engage a contact pin inserted into said cylindrical member from the direction of said first strap portion, and the exterior surface of each contact arm at said offset portion adapted to engage an annular flange of a cavity in a housing adapted to carry said receptacle to resist axial extraction forces exerted in the direction of contact pin insertion.

7. An electrical contact as set forth in claim 4 wherein the free end portions of said contact arms transmit contact forces from an inserted contact pin to sidewalls of said cavity.

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