

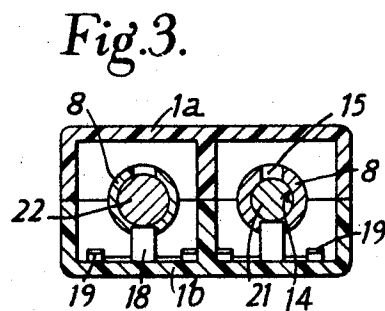
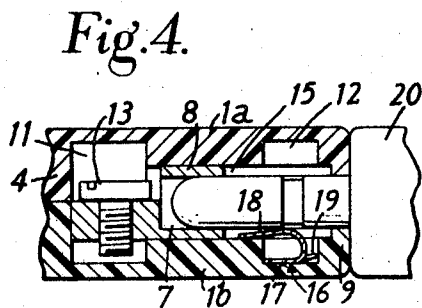
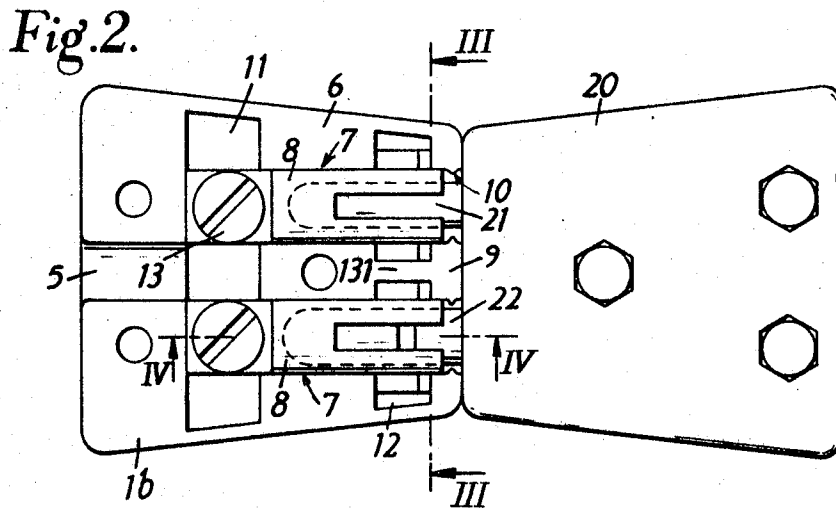
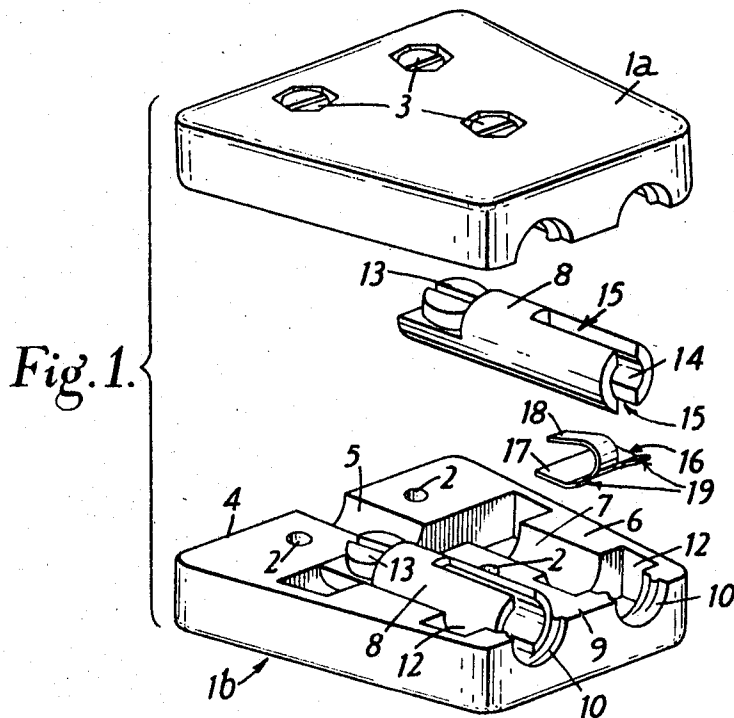
May 26, 1970

B. R. HOLLANDER
ELECTRICAL CONNECTOR

3,514,744

Filed Aug. 23, 1967

3 Sheets-Sheet 1



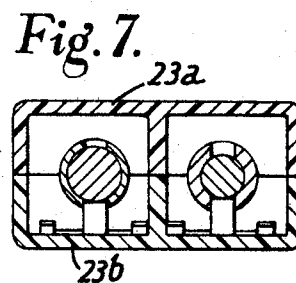
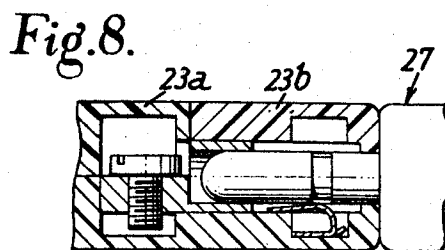
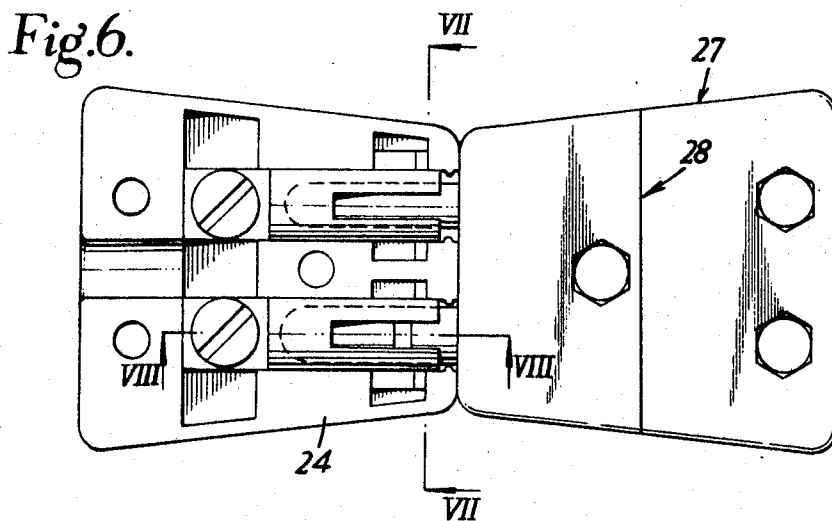
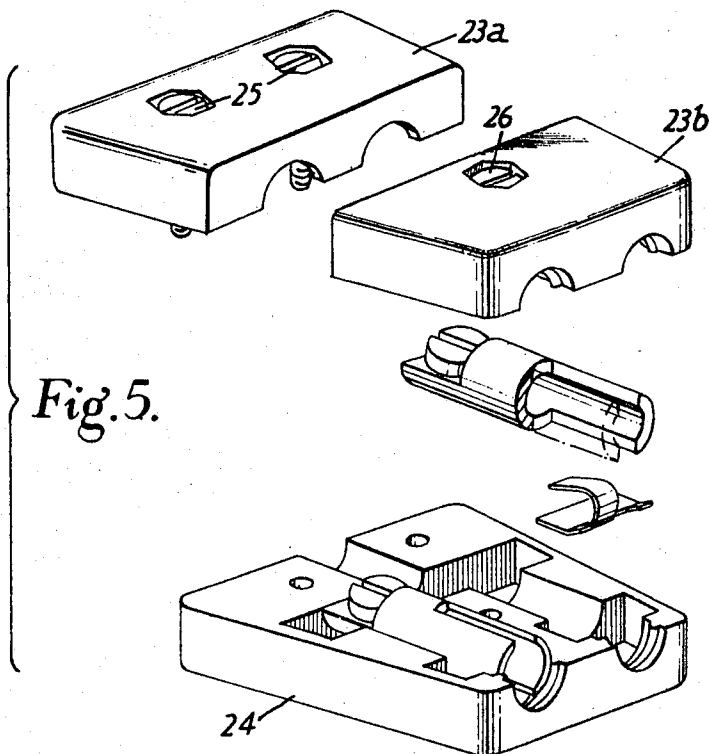
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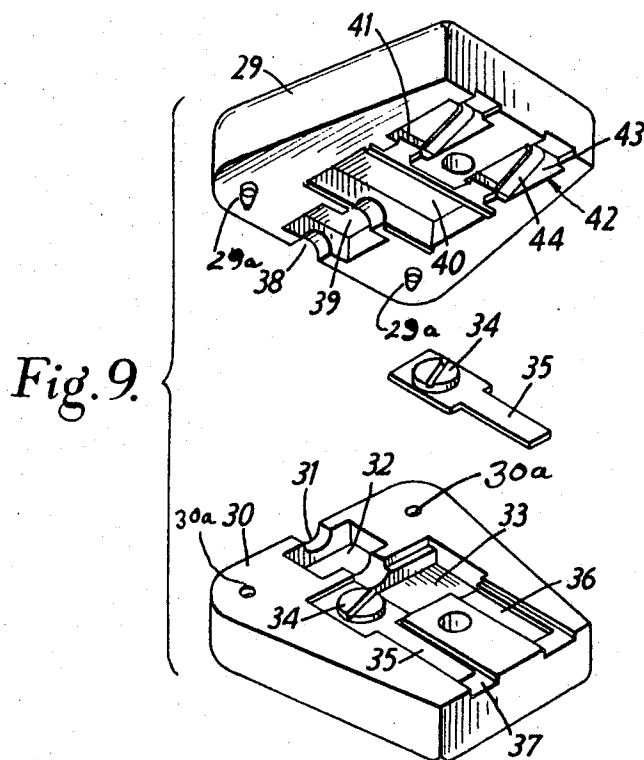


Fig. 10.

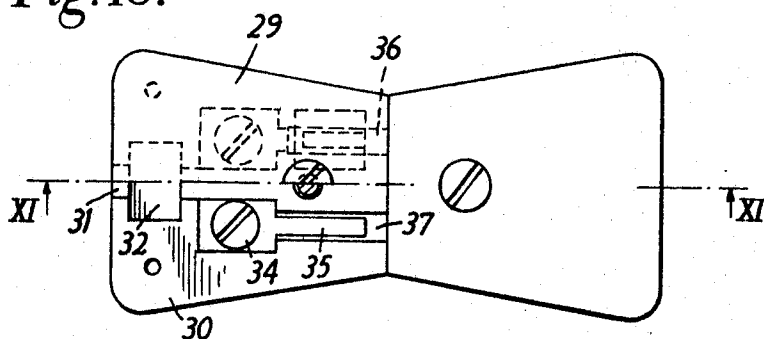
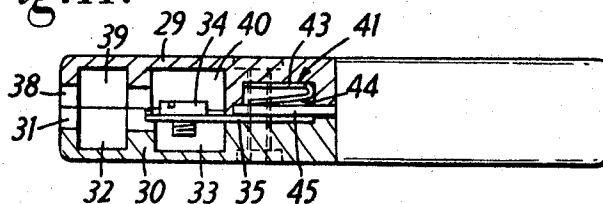


Fig. 11.



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3,514,744

ELECTRICAL CONNECTOR

Betty Ruth Hollander, Stamford, Conn., assignor to Omega Engineering, Inc., a corporation of New Jersey

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Int. Cl. H01r 13/12

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1 Claim

ABSTRACT OF THE DISCLOSURE

There is disclosed an electrical connector having, in combination, a socket assembly including a body housing, female socket elements and a plug assembly, including respective male pin elements for engagement in said socket elements, characterized in that said female socket elements comprise the combination of a first contact, and an opposed second resilient contact which is separate from said first contact and wherein the second resilient contact comprises an arm carried on a base and lying along the direction of introduction and withdrawal of the male pin element, said base serving to align and to secure the first and second contacts with respect to each other and to the body, said first and second contacts being supported by the body against movement away from each other, whereby a male pin element introduced between said first and second contacts is gripped as a result of resilient deformation of the second contact.

This invention relates to an electrical connector, of that general nature having in combination a socket assembly including a body housing female socket element and a plug assembly including respective male pin elements for engagement in said socket elements.

The object of the present invention is to provide improvements in the construction of the female socket elements whereby the male pin elements are firmly gripped between separate female contact elements which are located in the socket body.

According to the present invention an electrical connector having in combination a socket assembly including a body housing female socket elements and a plug assembly including respective male pin elements for engagement in said socket elements is characterized in that said female socket elements comprise a first contact and an opposed second resilient contact which is separate from said first contact, said first and second contacts being supported by the body against movement away from each other, whereby a male pin element introduced between said first and second contacts is gripped as a result of resilient deformation of the second contact.

In a preferred form, the second resilient contact comprises an arm carried on a base and lying axially along the direction of introduction and withdrawal of the male pin element.

In a first embodiment of electrical connector in accordance with the invention, the first contact is a socket having a longitudinal channel through which the second contact protrudes into the path of entry of the male pin element into the socket. In such a connector the socket body may include a recess to receive each base, and the base has lug means to abut against the body and retain the base in the recess. Such a socket may conveniently comprise a body composed of two identical opposed halves made of insulating material and housing two female socket elements. In another embodiment, one of those two opposed halves of the body is made as two separable portions, whereby one or the other portion may be re-

moved without thereby dismantling the entire socket assembly.

In a further embodiment of electrical connector in accordance with the invention, the first contact is a strip lying along the direction of introduction and withdrawal of the male pin element. The body therefor may conveniently be composed of two opposed halves made of insulating material and housing two female socket elements, one of said halves of the body having lugs to enter recesses in the other half of the body for the purpose of locating said halves in position one with respect to the other.

In order that the nature of the invention may be readily ascertained, three embodiments of connector in accordance therewith are hereinafter particularly described with references to the figures of the accompanying drawings, wherein:

FIG. 1 is a perspective elevation of a socket assembly of a first embodiment of connector, the parts thereof being shown in separated position;

FIG. 2 is a plan view of the socket assembly and a plug assembly of the first embodiment of connector, seen in engaged position and with the socket assembly having an upper body portion removed to reveal internal details;

FIG. 3 is a transverse section taken on the line III—III of FIG. 2;

FIG. 4 is a partial longitudinal section taken on the line IV—IV of FIG. 2;

FIGS. 5, 6, 7 and 8 are, taken in that order, similar views to FIGS. 1, 2, 3 and 4, respectively, of a second embodiment of connector in which similar socket and plug assemblies each have a two-part upper body portion;

FIG. 9 is a perspective view of a socket assembly of a third embodiment of connector, the parts thereof being shown in separated position;

FIG. 10 is a plan view of the socket assembly and a plug assembly of the third embodiment of connector, seen in engaged position and with the socket assembly having an upper body portion shown partially broken away to reveal internal details;

FIG. 11 is an edge elevation of the embodiment of connector of FIG. 10, the socket assembly being shown in longitudinal section taken on line XI—XI of FIG. 10.

Referring to FIGS. 1 to 4, the socket assembly comprises a body consisting of an upper half portion 1a and an identical half portion 1b made of an electrically insulating material such as a synthetic resinous plastics material or ceramic. These portions have holes 2 for the passage of fasteners such as metal screws 3 which receive nuts (not shown) and serve to retain the body portions in assembled condition.

Each body portion comprises a shoulder 4 having a semi-cylindrical recess 5, and the two recesses 5 together constitute a bore for the passage of a wire or cable lead to be secured in the socket assembly. Each body portion also comprises an intermediate shoulder 6 having two semi-cylindrical recesses 7, and the opposed pairs of recesses 7 together constitute cylindrical seatings for each of a pair of female socket contacts 8. A still further shoulder 9 in each body portion has a pair of semi-cylindrical apertures 10, and the respective opposed pairs of apertures 10 together constitute seatings for one end of the respective socket contacts 8 and openings for passage of male connector pin elements into the socket contacts. In each body portion there is provided, between the shoulders 4 and 6 a trough 11 for reception of individual wire leads. Between the shoulder 6 and the shoulder 9 of each body portion there are defined respective recesses 12 separated by an intermediate wall 13.

Each female socket contact 8 consists of a generally cylindrical body cut away axially and radially at one

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end to receive a wire clamping screw 34 threaded into the socket contact. Along approximately half of its length from the other end, the socket contact has a bore 14 adapted to receive a pin of a male connector element described hereinbelow. The wall of the bored portion of the socket contact is also cut away longitudinally to provide a pair of opposed channels 15.

To provide a scraping or wiping contact and to urge the inserted male connector pin element firmly into electrical connection with the female socket contact, there is provided a second contact 16. This consists of a piece of resilient metal including a base 17 and a curved upstanding contact arm 19, the latter being of suitable shape and size to pass upwardly through the adjacent channel 15 and to project into the bore of the female socket contact so as to be in a position in which it will be in the part of entry and engaged and resiliently deformed by the inserted male pin element. The arm lies along the direction of introduction and withdrawal of the male pin element.

For retention of each contact 16 firmly in position in its recess 12, the base 17 is provided with two forwardly projecting upwardly inclined lugs 19 which are adapted to abut against the front wall of the recess 12 and to serve to retain the base 17 frictionally in position therein.

The particular connector illustrated is polarized and accordingly has the bore 14 of one female socket contact of a different diameter from that of the other female socket contact, whereby the socket and plug assemblies can be connected together in only one relative position.

The plug assembly (see FIG. 2) comprises a body 20 with two projecting male pins 21 and 22 of respectively different diameters to permit them to enter the female socket contacts 8. A pin may be circumferentially recessed, as at 22a, to provide identification and act as a catch action with the arm 18.

Referring now to FIGS. 5 to 8 inclusive, the entire construction of the socket assembly is identical with that described in relation to FIGS. 1 to 4 inclusive, with the exception that the upper body portion is composed of two separable half body portions 23a and 23b which together are of the same shape and size as the single piece upper body portion 1a of FIGS. 1 to 4 inclusive. The portion 23a is adapted to be engaged and held on the lower body portion 24 by the two screws 25, and the portion 23b is adapted to be engaged and held on the lower body portion 24 by the screw 26.

As in practice the male plug assembly 27 may also be constructed utilizing identical moulded body portions, the plug assembly is shown as having a corresponding line of division at 28 in the upper part of its body.

Referring now to FIGS. 9 to 11 inclusive, there is shown a third embodiment of connector in which the socket assembly (FIG. 9) comprises an upper half body portion 29 and a lower half body portion 30 made of insulating material. The lower body portion 30 has recesses 31, 32 and 33 for accommodating wires to be connected by screws 34 to contact strips 35 seated in channels 36 and lying along the direction of entry and withdrawal of a male contact pin, the exposed upper surface

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of each strip 35 projecting slightly above the surface of a channel 37 forming part of a recess for entry of the male pin. The strip 35 may be polarized in size or position, e.g., in parallel or tandem or obliquely.

The upper body portion has recesses 38, 39 and 40 which are complementary respectively to the recesses 31, 32 and 33 of the lower body portion. In the upper body portion 29 there are also provided recesses 41 in which are seated respective resilient second contacts 42 each comprising a base 43 and an upstanding resilient arm 44. Each arm 44 is situated opposite a respective strip 35 and when a male plug pin element 45 is inserted it is wipingly engaged between the pin 35 and the arm 44, which together constitute a female socket element, by resilient deformation of the arm 44 (see FIG. 11), thereby forcing the plug pin against the strip 35 for good electrical connection thereto. One half of the body has lugs 29a to enter recesses 30a in the other half for the purpose of locating said halves in register position one with respect to the other.

The within described connectors are particularly useful for thermocouple and other instrument wiring requiring very good repeatable electrical connections.

What we claim is:

1. An electrical connector having, in combination, a socket assembly including a body housing, female socket elements and a plug assembly, including respective male pin elements for engagement in said socket elements, characterized in that said female socket elements comprise the combination of a first contact which is a socket having a longitudinal channel, and an opposed second resilient contact which is separate from said first contact and protrudes through said channel and into the entry path of a male pin element and wherein the second resilient contact comprises an arm carried on a base and lying along the direction of introduction and withdrawal of the male pin element, said base serving to align and to secure the first and second contacts with respect to each other and to the body, said first and second contacts being supported by the body against movement away from each other, whereby a male pin element introduced between said first and second contacts is gripped as a result of resilient deformation of the second contact.

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MARVIN A. CHAMPION, Primary Examiner

J. H. MCGLYNN, Assistant Examiner

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