United States Patent

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[45] Mar. 28, 1972

[54] THERMOCOUPLE CONNECTOR CONSTRUCTION

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[52] **U.S. Cl.** .....**339/184 R**, 339/191 A, 339/259 R

[51] **Int. Cl.**.....**H01r 13/64**, H01r 11/22

[58] **Field of Search** .....339/176 T, 184, 191 R, 191 A, 339/200, 208, 255 R, 255 A, 259

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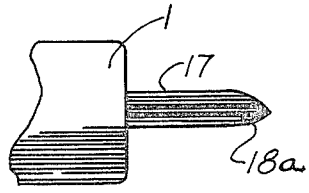
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Assistant Examiner—Lawrence J. Staab
Attorney—Robb & Robb

[57] **ABSTRACT**

The disclosure hereof is that of thermocouple connector construction, wherein it is desired to maintain the differentiation between positive and negative contacts, which are included in the usual pair of connector members, designated male and female, so that it will be impossible to reverse the contacts and thus connection of positive and negative contacts improperly made, and in addition to effectuate a much more complete area of contact between the respective contact members so that accurate readings in thermocouple meters will be provided since the area of contact is maintained to a much greater extent than would otherwise be the case by reason of the fact that uniform pressure is exerted upon such contacts substantially over the length thereof.

5 Claims, 9 Drawing Figures



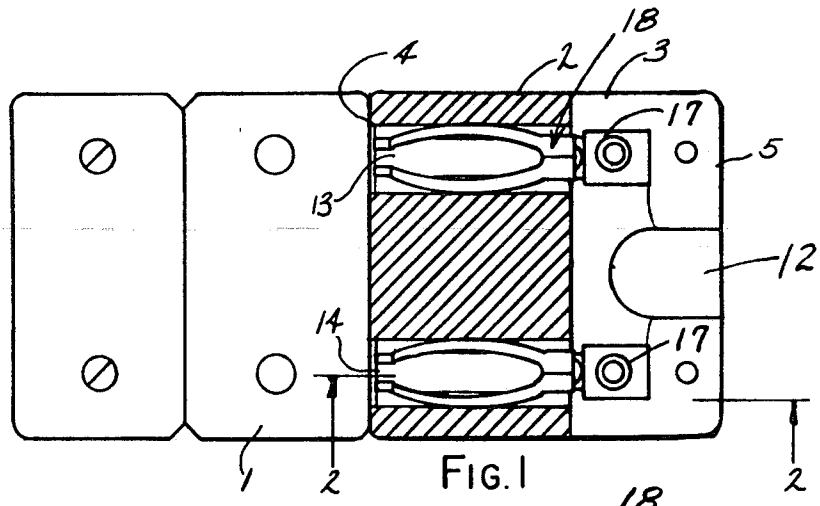


FIG. 1

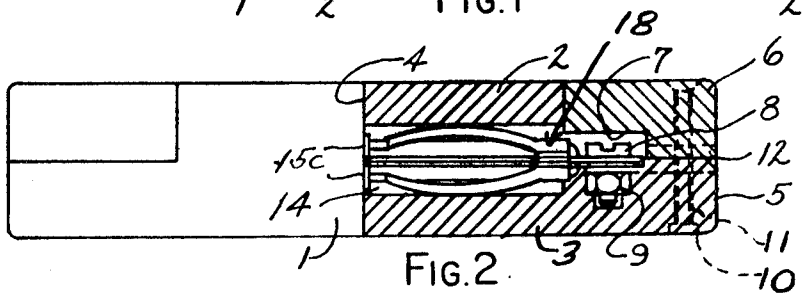


FIG. 2

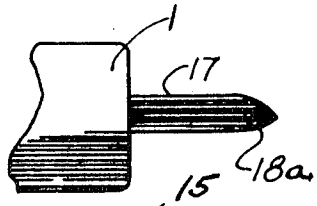
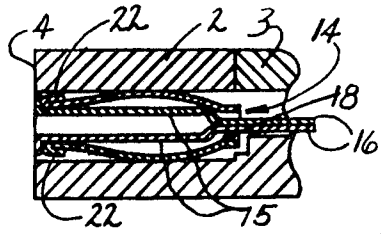


FIG. 3



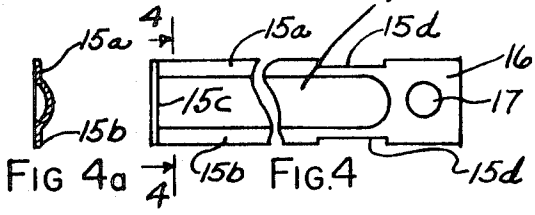


FIG 4a 4 FIG. 4

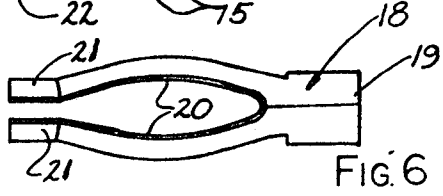


FIG. 6

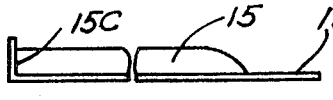


FIG. 5

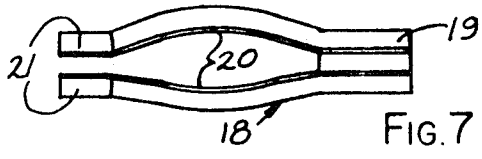


FIG. 7

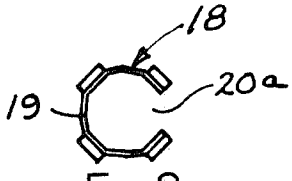


FIG. 8

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THERMOCOUPLE CONNECTOR CONSTRUCTION

OBJECTS OF THE INVENTION

It is a principal object of this invention to provide novel contact construction which will effectuate a self centering of the male and female contacts with a floating action being effectuated by reason of the formation of the female contacts and the construction thereof, which construction incorporates therein means to prevent the connection of a positive with a negative contact under any condition.

A further object of the invention is to provide female contact units which are of novel construction involving what are in effect duplicate parts which when used in the combination are in turn maintained in spring-pressed condition by a novel spring arrangement which transmits pressure substantially uniformly throughout the length of such members and thereby insures greater accuracy of indication.

A further object of the invention is to provide body members for use in the connector construction which are in themselves substantially identical, and particularly in the body of the female unit so that interchangeability of the respective contacts therein may be effected if desired, and assembly of the respective parts is facilitated in a connector of this general configuration.

Other and further objects of the invention will be understood from a consideration of the specification appended hereto and disclosed in the drawing wherein:

FIG. 1 is a plan view, partly in section, illustrating a pair of the connectors in connecting engagement.

FIG. 2 is a side view, likewise partly in section, illustrating further the details of the parts provided to effect the connection desired.

FIG. 3 is a composite view, likewise partly in section, indicating the female contact unit in condition to receive the contact member and showing in detail the limiting means to prevent insertion of a larger contact member as would provide for incorrect readings.

FIGS. 4 and 4A are of one of the individual contact shell members in plan and in end elevation respectively to particularly disclose the configuration thereof.

FIG. 5 is a side view of the shell member of FIG. 4.

FIG. 6 is a top plan view of one of the spring pressure parts illustrating the configuration thereof.

FIG. 7 is a side view of the pressure part shown in FIG. 6, to show more particularly certain aspects of the construction.

FIG. 8 is an end view, looking from the right-hand end of FIG. 7 to further disclose the configuration of the pressure part.

Referring now to FIG. 1 initially, the connectors of this invention are provided with a male unit indicated at 1, and a female unit indicated at 2, which are of generally substantially similar constructions, involving a body generally designated 3, and for purposes of this disclosure from here on, the female unit will be described; the body 3 having a contact end indicated at 4, and a conductor end indicated at 5.

As will be apparent, this body is of generally rectilinear configuration and is equipped with a removable cover member designated 6 which is itself of substantially rectilinear configuration, having suitable cavity provisions 7 therein to enclose at least partially the fasteners such as 8 which in turn engage a fastener insert 9 placed in the lower portion of the body 3.

Suitable nuts and bolts such as indicated in dotted lines at 10 and 11 respectively, are provided to maintain the cover member 6 in position as indicated in FIG. 2 particularly.

The conductor end of the body 3 is provided with a suitable opening such as 12 through which the usual conductors may be inserted or positioned and connected with the fasteners 8 in a fairly conventional manner.

Extending from the contact end 4 is a pair of passages designated 13 and 14, these being substantially cylindrical and terminating as indicated in FIG. 2 at the cover member 6, these passages being of substantially the same diameter.

The passages are intended to receive therein, as indicated particularly in reference to FIG. 3, and the passage 14 shown therein, with female contact units positioned therein.

The female contact units are generally identical in each case, and consist of a pair of shell members such as indicated in FIGS. 4, 4A and 5, and designated 15, being substantially arcuate in cross section as suggested in FIG. 4A with suitable flange areas 15*a* and 15*b* extending therealong, these flange areas 15*a* and 15*b* terminating at the right-hand end of the shell member in a flattened fastener section 16, this section including therein the opening 17 to receive a fastener as will be noted from consideration of FIG. 2.

The flanges 15*a* and 15*b* include the lip portion 15*c* at the left-hand end as indicated in FIG. 5 which when the shell members 15 are used in pairs will assist in the entering position of a contact member such as suggested at 17 in FIG. 3 being a male contact member extending from the male connector 1 in accordance with generally conventional practice, the contact member being formed at its free end as indicated at 18*a* so as to effectuate positioning of the same for entrance into the mating contact unit provided therefor.

For each pair of contact shell members 15, a spring pressure part generally designated 18 is provided, this part indicated and described in reference to FIGS. 6, 7 and 8, including a base section designated 19 which, as indicated in FIG. 8, is substantially rectangular and of generally C-shaped cross section, providing an opening at 20*a* between the free ends of the base 19 for purposes which will be subsequently explained.

Extending from the base 19 are the spring arms 20 which are substantially identical and of relatively narrow width, and arcuately arranged in elevation as suggested by FIGS. 6 and 7, to extend along but spaced from a pair of contact shell members 15 when positioned therearound.

The spring arms 20 terminate at their free ends in pressure areas suggested at 21, which pressure areas will engage with the exterior surface of the female contact shell member positioned therewithin so as to exert closing pressure on the shell members 15 to provide the desired contact with the contact member such as 17 previously mentioned.

Since it is contemplated that contact member such as 17 will be of one diameter for the positive contact and of a slightly larger diameter for the negative contact in accordance with usual practice, it is desirable to prevent the positioning of the improper contact member within the female contact unit, and to this end provisions are made in the spring arm configuration of the spring pressure part to prevent such eventuality.

As will be noted from FIG. 3, the free ends 21 of the spring pressure part 18 disclosed therein, are in this instance reversely bent so as to provide the portions 22 which are in effect thickened thereby.

It will be apparent that the outward movement of the portions 22 will be limited by the diameter of the passage 14, and thus in a given passage, will permit only a limited expansion of the contact shell member 15 to receive the contact member such as 17.

Thus, if the wrong contact member is attempted to be inserted in the contact unit disclosed in FIG. 3, it will be prevented by reason of the larger diameter from entering thereinto by the limiting means heretofore described.

It is pointed out that the spring pressure parts 18 are preferably of some suitable spring metal such as phosphor bronze or the like suitably tempered so they will exert the desired spring pressure.

Since the base 19 of the spring pressure parts 18 is itself a sort of spring, it can expand within limits if necessary to permit the opposite end of the contact shell members positioned therewithin to expand likewise when the contact member 17 is inserted.

The flanges 15*a* and 15*b* are arranged to be positioned so that the flanges 15*b* will be positioned in the opening 20*a* in the base, and thereby prevent relative rotation between the respective parts so the spring pressure is constantly maintained in the same condition.

It will be further understood that since the spring pressure is exerted as indicated in FIG. 3, for example, at the outer or left-hand end of the base 3, that is the contact end so called designated 4, that the shell members 15 will engage substantially over a greater area of the surface of the contact member such as 17 inserted therein and thus the electrical contact provided thereby will be greatly improved.

It will be further understood that the spring arms 20 engage the wall of the passage 14 and thereby provide for this uniform pressure to be exerted by resisting the expansion of the spring arms 20 beyond the limits of the passage wall.

It will be noted that the contact shell members 15 are of course identical in configuration and are in the form of the formation of the flanges 15*a* and 15*b* provided with notches at 15*d* in which the base 19 of the spring pressure parts 18 will be located so that the same is prevented from longitudinal movement along the contact shell members, both by this arrangement and the lip 15*c* previously described.

Thus, the contacts are clearly arranged to float and thereby be positioned to accommodate for various methods of making the connection in the ultimate analysis.

It will of course be recognized that suitable conductors may be connected to the fasteners which are in turn entered in the opening 17 in the contact shell members so that the circuit will be completed properly thereby.

I claim:

1. In connector construction of the class described, in combination, a generally rectilinear body having a contact end and a conductor end, a removable cover member at the said conductor end, to provide access to fastener members mounted therebeneath, a pair of passages extending from the said contact end to the cover member, one passage having a female contact unit therein and the other passage having a somewhat smaller contact unit therein, said units each comprising a pair of complementary shell members of arcuate cross section arranged to receive a male contact member therein, one of such male members being larger than the other; said shell members

having flattened sections to position the said shell members to receive the fastener members aforesaid, and each pair of shell members having a spring pressure part surrounding the same to exert uniform pressure on the shell members and thereby such male contact members when the latter are positioned therein, limiting means being provided for the smaller contact unit to prevent insertion of the larger male contact member therein.

2. The combination as claimed in claim 1, wherein each spring pressure part comprises a base formed to receive a pair of the shell members therein, a series of spring arms extending from said section and along the said members, said arms having pressure portions to engage the shell members near the contact end of the body to apply uniform contact pressure on a male contact member positioned in said unit, said arms further having portions intermediate their ends arranged to coact with the wall of the passage in the body in which the contact unit is positioned to produce the pressure described.

3. The combination as claimed in claim 2, wherein the base consists of an expandible member substantially surrounding the shell members, and having portions to centralize the base in the passage, and the free ends of the arms of one of the contact units are provided with thickened areas to limit their outward movement within the passage and thereby prevent the insertion of the larger male contact member therein.

4. The combination as claimed in claim 3, wherein the ends of the arms are reversely bent to provide the thickened areas described.

5. The combination as claimed in claim 1, wherein the shell members are formed with flanges along their edges in the plane of the flattened section, and the spring pressure part includes a base of a nearly closed C-shaped cross section, certain of the flanges of the shell members being positioned between the open ends thereof, and maintained in this position thereby.

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