Feb. 11, 1958 F. S. WALTER 2,823,364

THERMOCOUPLE CONNECTOR PANEL

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Fig. 1.

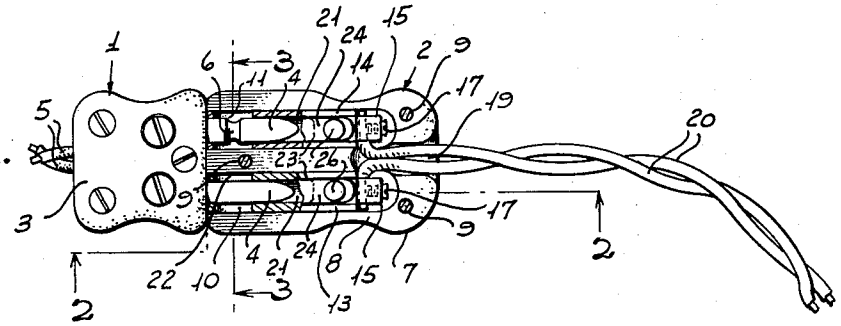


Fig. 2.

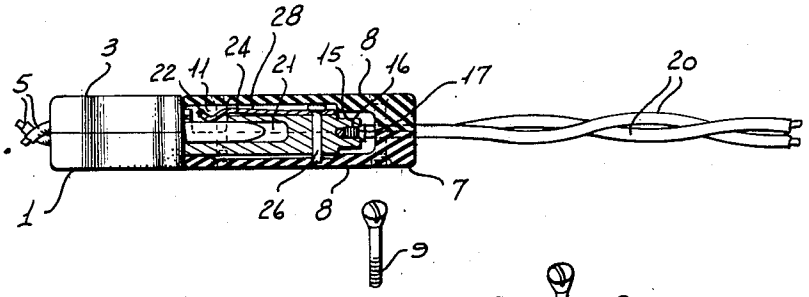


Fig. 3.

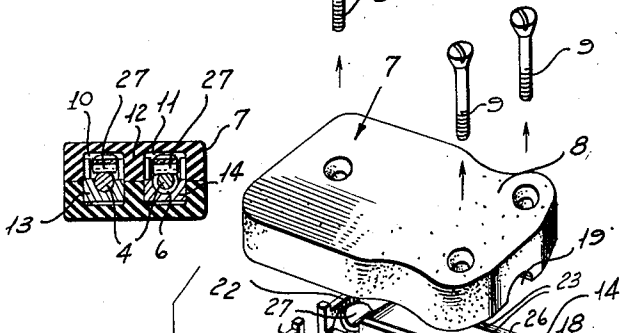
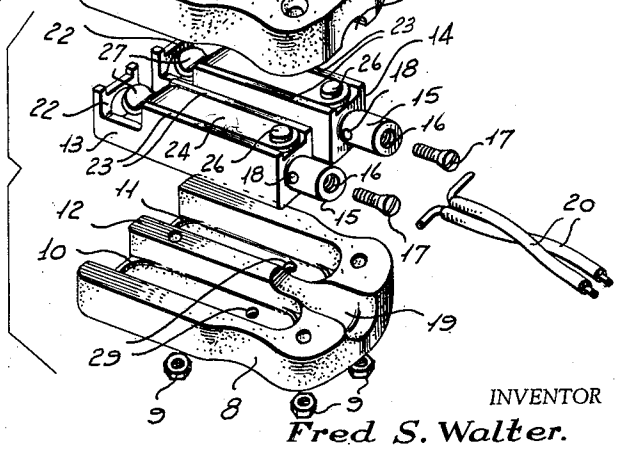


Fig. 4.



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Fig. 5.

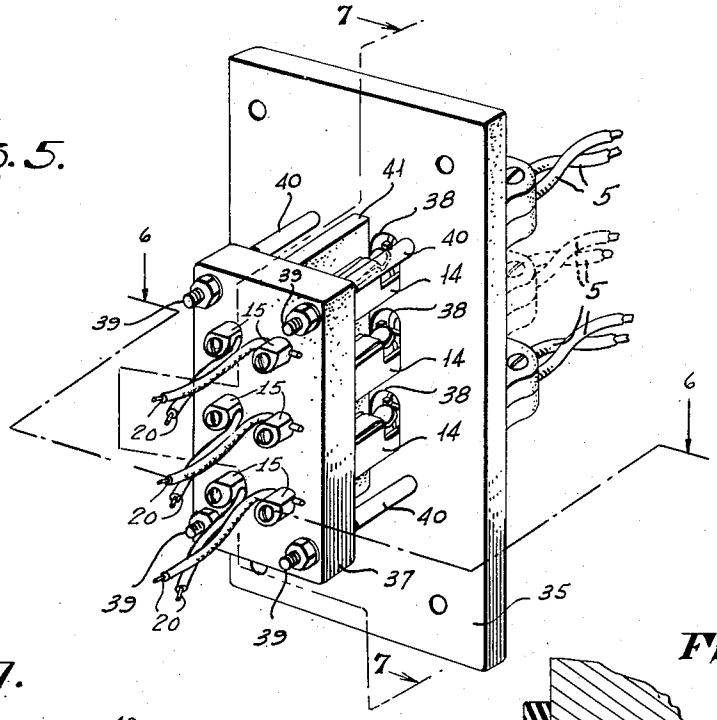



Fig. 7.

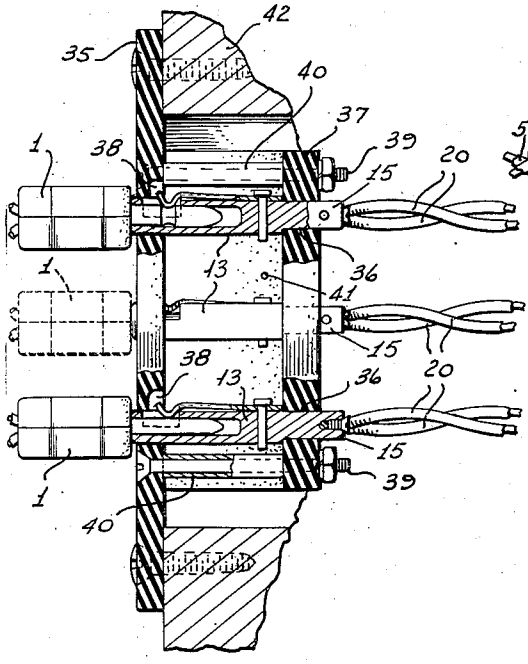
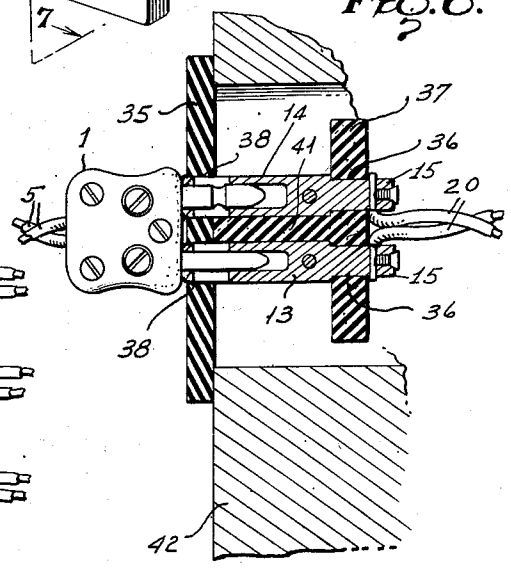



Fig. 6.




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Fig. 8.

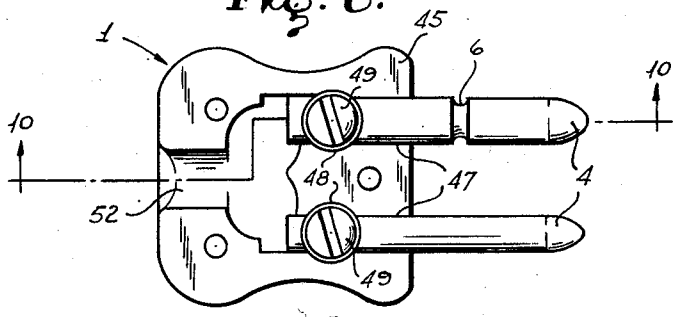



Fig. 9.

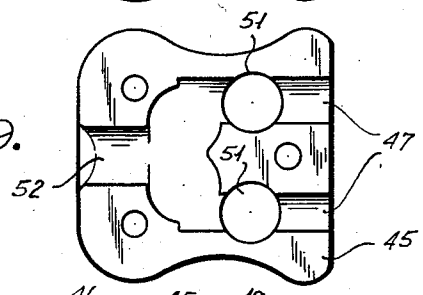



Fig. 10.

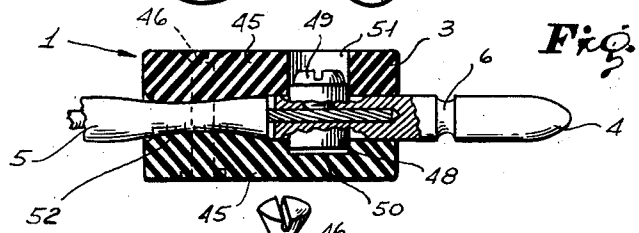
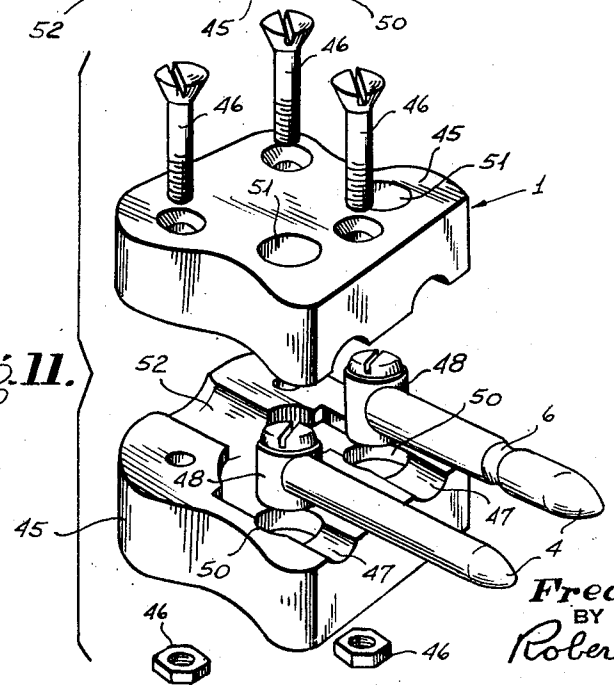



Fig. 11.




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# THERMOCOUPLE CONNECTOR PANEL

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Application December 16, 1950, Serial No. 201,110

2 Claims. (Cl. 339—191)

My invention relates to connectors and more particularly to plug and jack connectors employed in thermocouple leads, an example of a prior art single lead type of connector being disclosed in U. S. Patent No. 2,410,098.

It is well known that where temperature differences occur across the connections between thermocouples and leads, only connectors of matched thermocouple materials will eliminate the errors produced by using unmatched materials. Furthermore, where accurate temperature readings are required, it is generally recognized that, within the temperature range to which the connectors are subjected, the temperature E. M. F. characteristics of the materials used to complete the circuits must match those of the thermocouple.

One of the objects of my invention is to provide a multiplex type of plug and jack connector for employment in a plurality of thermocouple leads and which is capable of quick plug and jack assembly and disassembly for circuit making and breaking and constructed in a manner permitting the use of matched thermocouple materials.

An important object of my invention is to provide a connector of the foregoing described character which is simple in construction, durable in use, efficient in operation and economical in manufacture.

With the above and other objects in view, as will hereinafter appear, the invention consists in the combination and arrangement of parts set forth and illustrated in the accompanying drawings from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

Referring to the drawings wherein like reference characters designate like parts throughout the several views:

Figure 1 is a top plan view, partly in section, of my plug and jack connector with a housing component of the jack being removed for clarification.

Figure 2 is a sectional view, partly in elevation, taken on the line 2—2 of Figure 1.

Figure 3 is a detail transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a disassembled perspective view of the jack.

Figure 5 is a perspective view of a panel and illustrating a plurality of jacks of a modified form mounted on the rear of the panel.

Figure 6 is a detail transverse sectional view taken substantially on the line 6—6 of Figure 5.

Figure 7 is a vertical sectional view taken substantially on the line 7—7 of Figure 5, intermediate portions of the panel and rear wall being disclosed in elevation.

Figures 8 and 9 are interior plan views of the respective housing sections of the plug on an enlarged scale, the sections of Figure 8 having the prongs seated therein.

Figure 10 is a section taken on the line 10—10 of Figure 8.

Figure 11 is a disassembled perspective view of the plug.



In practicing my invention, as illustrated in Figures 1 to 4 of the drawings, I provide a connector having a plug 1 and a jack 2 with the plug 1 comprising a housing 3 of insulating material and in which is housed the inner end sections of a pair of spaced tubular contact prongs or posts 4, the inner end sections having connected thereto leads 5, respectively. The prongs 4 extend outwardly through the front face of the housing and with one of the prongs 4 being of a greater diameter than the other and formed with a transverse latching groove 6.

The jack 2 is constructed with a housing or casing 7 of insulating material and formed with a pair of lengthwise separable sections 8 normally secured together in fixed relation by screw and nut assemblies 9. The housing 7 is formed with a pair of substantially square-shaped channels 10 and 11, respectively, in cross section and which channels have coincident ends opening through the front end face of the housing. The housing 7 is provided with a centrally disposed and lengthwise extending partition 12 for isolating the channels 10 and 11 from each other and which partition 12 defines a common side wall for and between the channels.

Snugly fitted within the channels 10 and 11 are substantially square-shaped contact members 13 and 14, respectively, having cylindrical rear end sections 15 provided with axially threaded bores 16 accommodating binding screws 17 and which end sections 15 are formed with transversely disposed lead openings 18 communicating with the bores 16. The housing 7 is fashioned, between the rear end of the partition 12 and its rear end face, with a centrally disposed longitudinally extending slot 19 having its outer end opening through said rear end face and its rear end communicating laterally with the inner ends of the channels 10 and 11. Substantially intermediate its length, the slot 19 is of a somewhat flat ovate configuration in cross section whereby leads 20 extending into the slot 19 will be clamped therein by the opposed walls of the sections 8 when the latter are in assembled relation, the leads 20 having their terminals extending through the openings 18 and clamped within the bores 16 by the screws 17, thus, establishing electrical connections with the members 13 and 14, respectively. By thus clamping the leads between the sections 8, the housing serves as a strain relief.

The front faces of the contact members 13 and 14 are disposed in substantially flush relation with the front end face of the housing and are formed with longitudinally extending sockets 21 for accommodating the prongs 4, respectively. The rear ends of the sockets 21 terminate an appreciable distance from the bores while their front ends open through the front faces of the members 13 and 14, respectively, one of the sockets being of a greater diameter than the other to insure proper mating with the prongs 4.

The members 13 and 14, adjacent their front ends are formed with transverse grooves 22 providing access to the sockets 21 and have coincident faces each provided with a pair of spaced longitudinally extending ribs 23 between which is disposed a leaf spring 24. The rear ends of the leaf springs 24 are secured to the members by means of headed pins 26 having their shanks extending through the springs 24 and the members, between the sockets 21 and the bores 16, the shanks terminating an appreciable distance outwardly of the members and the heads of the pins overlying the springs 24. The front ends of the springs are formed with detents 27 extending within the grooves 22 and engaging the prongs 4 with one of the detents 27 seated within the groove 6, thus, latching the plug 1 and jack 2 together.

Coincident faces of the channels 10 and 11 are formed with furrows 28 for receiving the heads of the pins 26

while the opposed faces are provided with seats 29 in which are accommodated the outer ends of the shanks of the pins 26 whereby to preclude shifting of the members 13 and 14 relative to the housing. Inasmuch as the detents 27 are of a somewhat cuneiform construction, excellent contact with the prongs 4 is obtained while the detent 27, disposed within the groove 6, effects a positive seating therein and a resisted unseating therefrom upon insertion of the prongs 4 into and withdrawal from the sockets 21 to make and break the circuit between the leads 5 and 20, respectively.

As illustrated in Figures 5 to 7 of the drawings, a plurality of the contact members 13 and 14 are secured in paired relation to the rear face of a panel 35 constructed of insulating material in lieu of being incorporated between the sections 8 of the housing 7 as depicted in Figures 1 to 3. In this instance, the rear end sections 15 of the members 13 and 14 are somewhat elongated and extend through appropriate openings 36 provided in a wall 37 of insulating material disposed in spaced and parallel relation with the panel 35 while the front end sections of the members 13 and 14 are cylindrical and are fitted within openings 38 formed in the panel 35. The wall 37 is maintained in fixed relation with the panel 35 and the members 13 and 14 are clamped therebetween by bolts 39, which extend through the panel and the corners of the wall, spacing sleeves 40 being provided on the bolts between the panel and wall. A strip or partition 41 of insulating material is disposed between the panel and wall and each pair of the members as clearly illustrated in the drawings, thereby, insulating the members of each jack from each other. The panel may be secured to a suitable fixed supporting means 42 thus providing a stationary board equipped with a multiplicity of duplex jacks for selective use with one or more of the plugs as desired.

In more detail, with reference to the plug 1 and as shown in Figures 8 to 11 of the drawings, the housing 3 is fashioned with a pair of lengthwise separable sections 45 normally secured together in fixed relation by screw and nut assemblies 46. The housing is provided with a pair of cylindrical channels 47 of a size accommodating the prongs or posts 4 and which channels have coincident ends opening through the front end face of the housing through which the prongs project. The inner end sections of the prongs or posts 4 are provided with right angularly extending cylindrical portions 48 of an appreciable greater diameter than the prongs 4.

The inner end sections of the prongs 4 are fashioned with axially extending lead receiving openings which communicate with the inner ends of right angularly related threaded bores extending from coincident ends of the portions 48 and which bores are provided with binding screws 49 for securing the ends of the leads 5 therein, respectively. The opposite ends of the portions 48 are disposed within seats 50 formed in coincident faces of the channels 47 while the opposite opposed faces of the channels are formed with openings 51 accommodating the heads of the screws 49 and permitting ready acess thereto.

The channels 47 have their rear ends terminating an appreciable distance inwardly of the rear face of the housing and which rear ends communicate with the rear end of a centrally disposed longitudinally extending slot 52 having its outer end opening through the rear end face of the housing 3. The slot 52, substantially intermediate its length, is of a somewhat flat ovate configuration in cross section whereby the leads 5, extending therethrough, will be clamped therein by the opposed walls of the sections 45 when the latter are in assembled relation, the leads 5 having their terminii extending through the respective lead receiving openings of the prongs. The leads 5 and 20 constitute insulated wires which have their insulation removed from their terminals for effecting electrical connections.

The construction of my duplex jack and plug is such that it readily lends itself to the employment of suitable matching thermocouple metals, for example, iron and constantan or Chromel and Alumel, whereby, I am enabled to provide a connector within a circuit having incorporated therein a thermocouple and a desired instrument, for instance, a pyrometer, without attendant errors from a temperature gradient.

Furthermore, the simplicity of construction of my connector is such that it readily lends itself to easy installation within a circuit while maintaining a high degree of ruggedness to withstand rough usage to which it may, at times, be subjected.

Without further elaboration, the foregoing will so fully explain the invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service. Moreover, it is not indispensable that all the features of the invention be used conjointly since they may be employed advantageously in various combinations and subcombinations.

It is obvious that the invention is not confined to the herein described use therefore as it may be utilized for any purpose to which it is adaptable. It is therefore to be understood that the invention is not limited to the specific construction as illustrated and described, as the same is only illustrative of the principles involved which are capable of extended application in various forms, and the invention comprehends all construction within the scope of the appended claims.

What I claim is:

1. In connecting means for employment in thermocouple leads, a plug provided with a pair of spaced contact prongs adapted to be connected to a pair of lead wires, respectively, a plurality of spaced jacks each provided with a pair of spaced contact socket members having front end sections provided with apertures for receiving said prongs and formed with rear end sections adapted to be connected to a pair of lead wires, respectively, for completing a circuit between said pairs of wires, said socket members being provided with resilient elements for engaging said prongs to secure electrical connection between said prongs and said socket members, a pair of spaced front and rear panel members of insulating material provided with openings receiving said front and rear sections, respectively, for mounting said jacks in fixed relation with and between said panel members, an insulating partition disposed between said panel members and extending between the socket members of each jack for isolating the socket members of each pair from each other, said front and rear end sections of said socket members extending entirely through said openings in said panel members to permit insertion of said prongs within said socket members through said apertures and to facilitate attachment of wires to said end sections.

2. In connecting means for employment in thermocouple leads, a pair of spaced contact members each having a front end section fashioned with a socket for receiving a contact prong connected to a lead wire and a solid rear end section formed with a transverse aperture for receiving a lead wire for completing a circuit between the wires, resilient elements carried by said members for engaging the prongs to secure electrical connection between the prongs and said members, respectively, and with said members and said elements being constructed of matching thermocouple metals, a pair of spaced front and rear panel members of insulating material provided with openings receiving said front and rear sections, respectively, and thus mounting said contact members between said panel members, an insulating partition disposed between said panel members and said contact members and coacting with said panel members for isolating said contact members from each other.

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