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CONNECTOR ASSEMBLY, THERMOCOUPLE LEAD

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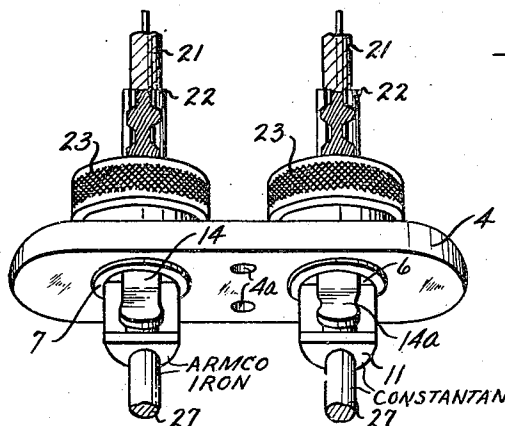
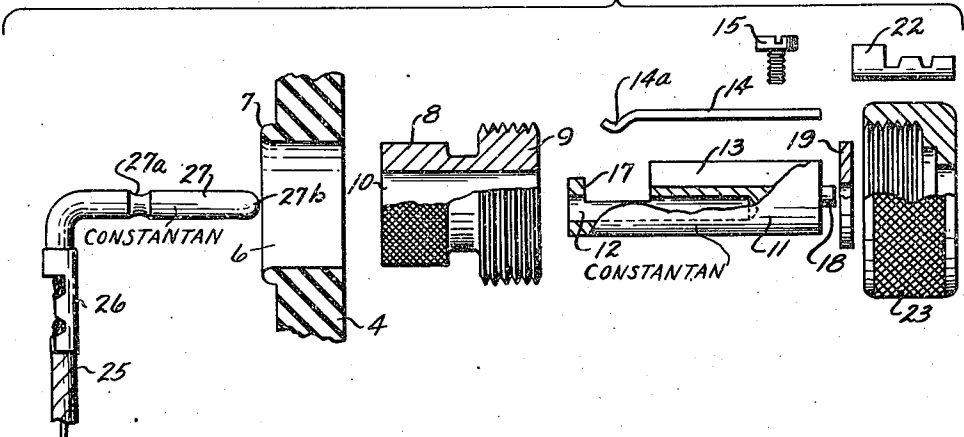
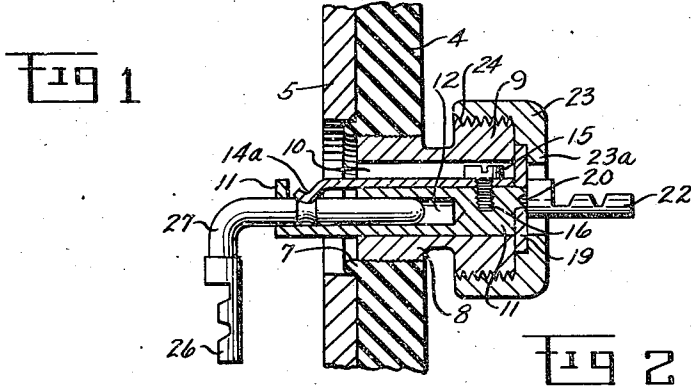


Fig 3

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CONNECTOR ASSEMBLY, THERMOCOUPLE LEAD

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2 Claims. (Cl. 173—328)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to thermocouple lead connector assemblies, such as are useful for making connections through a firewall of an airplane or bulkhead of a ship. Objects of the invention are to provide an improved connector assembly which permits quick connection and disconnection from either side of the firewall or bulkhead; which has a very low resistance, one that is substantially unchanging over a long period of time; which is easy to fabricate and easy to install and remove; and which makes a pressure-tight joint, so that it may be used in so-called "super-charged" airplane cabins. A further object is to provide a connector assembly employing attachment springs which are not in the thermocouple lead circuit. Other objects will be apparent from the following description of a preferred embodiment of the invention shown in the accompanying drawing, wherein—

Fig. 1 is an assembly shown in diametric section;

Fig. 2 is an exploded view, partly in section and partly in elevation;

Fig. 3 is a perspective view of the connector assembly with leads connected.

Referring particularly to the drawing, the connector assembly comprises a generally flat body or plate 4 preferably of phenolic molded material or other insulator, with drilled perforations 4a for studs or screws (not shown) adapted to secure it to one side of a firewall, bulkhead or the like designated at 5. Body 4 has two bores 6 and two annular shoulders or bosses 7 surrounding the bores. Permanently molded in each bore 6 is a bushing or thimble 8, each bushing having an enlarged externally threaded head 9 and a longitudinal axial bore 10. These bushings or thimbles are preferably made of cadmium plated brass. Shoulders 7 obviate a short circuit through firewall 5 between the bushings.

Removably inserted in each bore 10 is a socket member 11, having a drilled hole 12 extending longitudinally for about half of its total length and adapted to receive a plug or pin as will be described. If the thermocouple leads (to be described) are of constantan and Armco iron, as is preferred, then socket members 11 are also respectively of those metals, preferably cadmium plated, in order to preserve continuity of materials in the thermocouple leads. Each socket 11 also has a longitudinal groove 13 for receiving

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ing a flat spring 14, one end of which is secured by a screw 15 threaded into a tapped bore 16 in the solid portion of the socket. The spring may be of beryllium copper alloy. The free end of spring 14 is bent as at 14a and terminates somewhat short of the end of the socket, entering a slot 17 which is open to drilled hole 12, thus permitting spring end 14a to enter the drilled hole 12 and to be moved outwardly against the tension of the spring. At the opposite end each socket 11 has a reduced co-axial neck 18 on which a washer 19 is carried, said washer abutting the end of bushing 8 when the parts are assembled. Extending inwardly from the free end of the neck is a small drilled bore 20 adapted to receive the end of a lead 21, also soldered. A brass soldering lug 22, to which washer 19 is soldered, may complete the connection between each lead 21 and the socket 11. In all solder connections silver solder is preferably used. A nut 23 is threaded as at 24 upon each head 8 and has a flange 23a which engages washer 19 to secure each lead 21 yet permit quick detachment thereof. Leads 21 may be connected to an instrument on the panel board.

The other leads 25 (which extend to the engine or other object whose temperature is to be observed) are soldered to brass soldering lugs 26 each in turn soldered to the end of a pin or plug 27 which may be bent, as shown, or straight. Each pin or plug has a small machined groove 27a near its rounded extremity 27b and of the proper size to receive the bent spring end 14a. One of the pins 27 is of cadmium plated constantan, the other is of cadmium plated Armco iron, when the same metals are employed for the thermocouple. Both pins are readily insertable in the bores 12 of socket members 11, and when inserted fit the bores snugly and are held by frictional engagement of spring end 14a with groove 27a. Disconnection is effected by merely pulling the pins 27 out of the sockets. The dimensions of the two pins and of their respective sockets differ slightly so that it is impossible to couple the leads improperly through the assembly.

When the assembly is to be dismantled, plugs or pins 27 are pulled out at one side of the firewall or bulkhead and the bushings or thimbles are unscrewed from the other side. However, to disconnect the thermocouple lead it is unnecessary to work from both sides of the firewall, although it is quite advantageous to be able to disconnect from either side. The thermocouple lead circuit does not include the springs, which

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is desirable because a more efficient and more durable electrical connection is thereby insured; furthermore the readings on the instrument are more accurate. This is especially true when the temperature differential on opposite sides of the firewall is considerable.

Because of the design of the assembly, the contact resistance is very low and does not appreciably change over a long period of time, which is important from the standpoint of dependable instrument readings. Since there are no threads to be cut in the constantan and since machining operations are reduced to a minimum, the various parts of the assembly are easily made, and as already indicated, installation is readily accomplished. When the airplane cabins are sealed for high altitudes (so-called "supercharged" cabins), no leak will occur through the connector assembly because of the manner in which the described parts are made and fitted together.

Obviously the invention may have many forms neither described nor shown. Instead of constantan and iron two other dissimilar metals or alloys, if effective in a thermocouple, may be used. Many other changes in details of construction, within the scope of the appended claims, may occur to those skilled in the art.

What is claimed is:

1. An assembly of the character described comprising, in combination, an insulating body having a perforation therein and adapted to be secured to one side of a firewall or bulkhead having an opening, with the perforation and opening registering; a bushing or thimble secured to the

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insulating body within the perforation and having a longitudinal axial bore; a socket member made of conductive material and adapted to be loosely received in said axial bore, with one end thereof extending beyond the end of the bushing or thimble, so that said socket member end is exposed on the side of the firewall or bulkhead opposite to that on which said insulating body lies; said socket member having a central hole; a spring secured to said socket member and partially entering said hole; means secured to said socket member at the extreme end thereof and providing an abutment for the adjacent end of the bushing or thimble; a nut threaded on said bushing or thimble and engaging said means to secure the socket member immovably within the bushing or thimble; means to electrically connect a lead to the end of the socket member carrying said abutment-providing means; a conducting pin adapted to be manually insertable in the central hole in the socket member to make good electrical connection therewith, and then being frictionally engaged by said spring; and means to electrically connect a lead to said pin.

2. The invention according to claim 1 wherein the insulating body has a boss surrounding the perforation and entering the opening in the firewall or bulkhead to aid in obviating short circuits; the nut being the sole means to hold the socket member and being readily removable from the bushing or thimble to permit manual assembly and disassembly of the conducting parts with and from the parts which support them.

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