

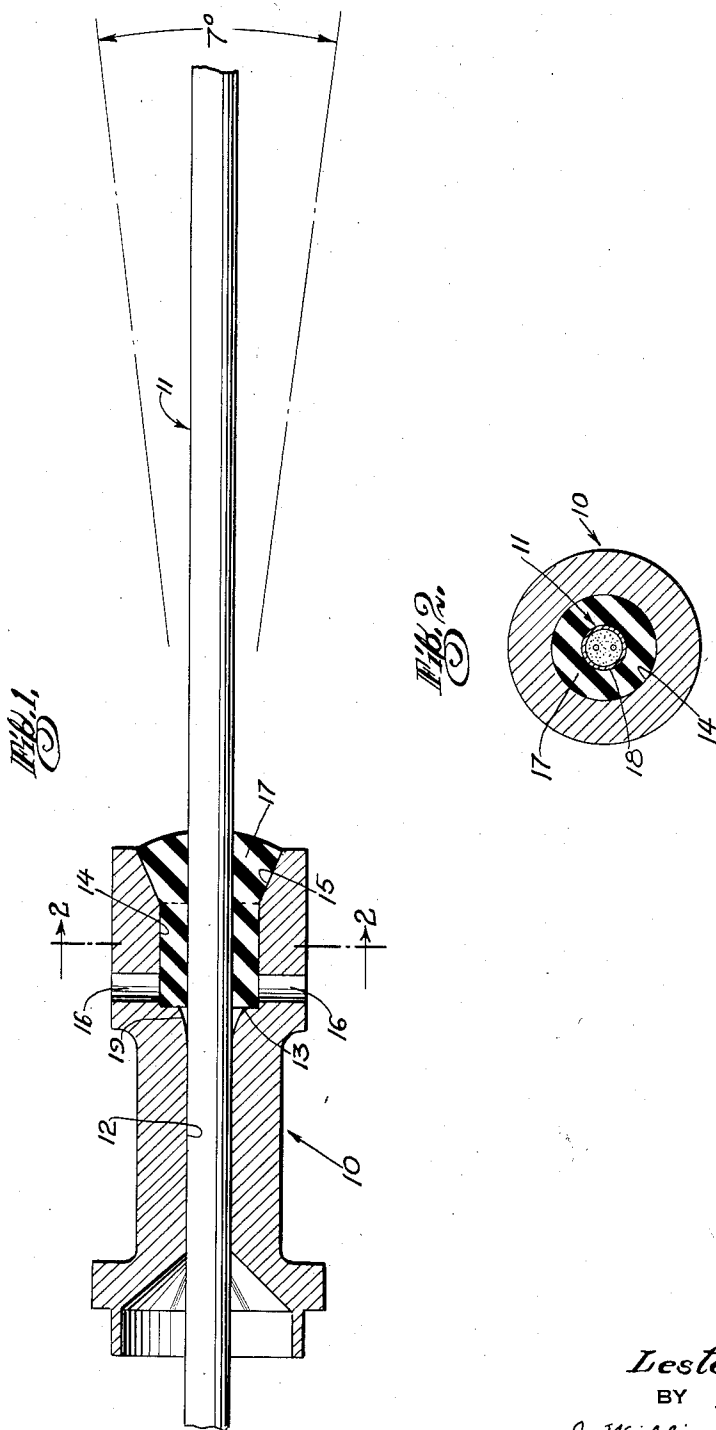
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CONNECTOR ASSEMBLY FOR HEAT DETECTORS

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CONNECTOR ASSEMBLY FOR HEAT DETECTORS

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4 Claims. (Cl. 201—63)

The present invention relates to connector assemblies for heat detectors, and, more particularly, is concerned with improving the heat detector and connector assembly disclosed in my copending application for Letters Patent of the United States of America, Serial No. 255,483, filed November 8, 1951, now Patent No. 2,678,366.

In the aforementioned application, a heat detector and connector assembly is shown and described which includes a closure or end member and a thin relatively rigid, metallic tube extending through this member. The tube is of considerable length and contains a pair of electrically conductive wires which are surrounded and separated by a mass of material acting as an insulator at normal temperature and as conductor of electricity at abnormal temperatures.

Such heat detector and connector assemblies generally are installed on aircraft or other craft or vehicles subject to considerable vibration during the normal operation thereof. As a result of such vibration, the metallic tube is vibrated at an amplitude tending to bend the same about the point where fixed support by the end member of the connector ceases. It has been found that such bending of the tube will cause breakage thereof at or adjacent the aforementioned point in an unusually short time or will cause the same to crack, thereby exposing the mass of material to atmospheric moisture and altering the resistance characteristics thereof.

Accordingly, an object of the present invention is to overcome the foregoing difficulty.

Another object is to provide an improved connector assembly which is not subject to the foregoing disadvantages.

A further object is to provide such an assembly which is simple, economical and durable in construction.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects are generally accomplished by providing an end member or closure for a connector having a bore extending therethrough which is formed with an enlarged section at the free end thereof, a metallic tube extending through the bore, and a sleeve of heat resistant cushioning material, such as silicone rubber, fitted into the enlarged bore section through which the tube extends in contact therewith.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

Fig. 1 is a longitudinal sectional view of the connector end member and the cushioning sleeve with the metallic tube of the heat detector extending therethrough and shown in elevation.

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Fig. 2 is a sectional view taken along the line 2—2 on Fig. 1.

Referring to the drawing in detail, there is shown an end member or closure 10 adapted for use in connection with the assembly disclosed in the aforementioned application, and a heat-detector element including a metallic tube 11 which extends through a bore 12 of the end member and is rigidly supported therein.

The bore of the member 10 is provided with a shoulder 13 defined by an enlarged section 14 at the free end of the member 10. The bore section 14 has a diameter about twice as great as the diameter of the tube 11, and has a length about three times as great as the diameter of the tube.

The outer or open end portion 15 of this bore section may be flared or rounded at the equivalent of an included angle of about 45°. Aperture means 16 extend from the enlarged bore section 14 to the exterior of the member 10. These means may be one or more small holes extending in a generally radial direction.

A sleeve 17 formed of heat resistant material is fitted into the enlarged bore section 14 and conforms thereto. This sleeve has a central opening 18 through which the tube 11 extends, preferably in snug contact therewith. This sleeve preferably is formed of silicone rubber which can withstand temperatures as high as about 600° F., and which has excellent vibration damping properties even after being exposed to such temperatures.

Ordinarily, without the provision of the sleeve 17, vibrations would tend to bend the tube 11 at or adjacent the point where it enters the bore 12 from the enlarged section 14. It has been found that fracture of the tube could be induced in about four hours by moving the tube back and forth ten times a second through an arc of about 7°, that is, through an arc having a length of about one inch at a distance about four inches from the outer end of bore portion 15.

However, by utilizing the sleeve 17 in the manner disclosed herein, it was found that, upon subjecting the tube to the same test conditions for as long as twenty hours, the tube was not impaired. It was found that the sleeve, when baked from twenty minutes to twenty hours at 350° to 600° F., functions better than when the same is not baked.

This is due to the fact that the sleeve 17 is of a length and diameter to effectively cushion the tube 11 within the bore section 14. The sleeve gradually damps vibration of the tube from the open end of the bore section towards the shoulder 13, so that vibration is practically eliminated at the shoulder where the tube is rigidly supported by the bore 12. The tube tends to bend in the zone defined by the forward portion of the sleeve and with diminishing amplitude in the zone approaching the shoulder. Any bending stresses exerted on the tube are distributed over a length of tube and stress concentration effects at a fixed point are relieved.

As shown herein, the bore 12 is flared or rounded at 19 to eliminate sharp edges at the junction of the bore and the shoulder and thereby further relieve stress concentrations.

The flared forward or outer end portion 15 of the bore section 14 allows for slightly greater flexibility of the sleeve 17 in this zone than in the bore section in back of this zone, whereby the damping action in the manner just described is assured. The holes 16 prevent entrapment and compression of air in the bore section 14 to facilitate insertion and retention of the sleeve 17 in the bore section.

From the foregoing description, it will be seen that the present invention provides an improved connector for thin metallic tubes, particularly tubes containing heat- or flame-detecting elements.

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As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the function and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. In a connector assembly of the class described, a tubular closure member having a bore extending there-through and having an enlarged bore section at the free end of said bore of a diameter about twice that of said bore, a bendable metallic tube extending through said bore and being rigidly supported therein and extending outwardly beyond said enlarged bore section more than ten diameters thereof, and a sleeve of heat-resistant cushioning material fitted into said enlarged bore section

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in snug engagement with said tube for a distance about equal to three diameters of said tube.

2. Structure according to claim 1, wherein said enlarged bore section is flared at its open end and said sleeve conforms thereto.

3. Structure according to claim 1, wherein said member has aperture means extending from said enlarged bore section to the exterior in a generally radial direction.

4. Structure according to claim 3, wherein said enlarged bore section provides a shoulder and said aperture means are adjacent said shoulder.

References Cited in the file of this patent

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