Jan. 17, 1956 U. G. ABERLE 2,731,618

CONNECTOR

Filed Sept. 22, 1952

Fig. 1.

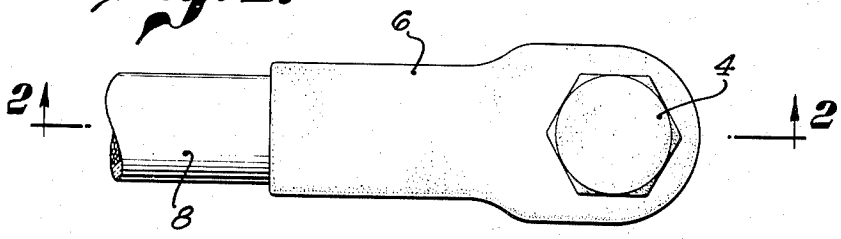


Fig. 2.

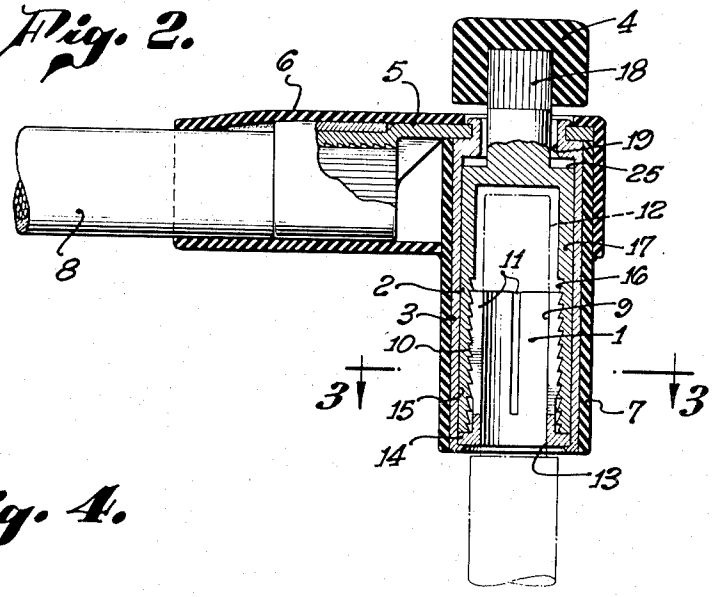


Fig. 4.

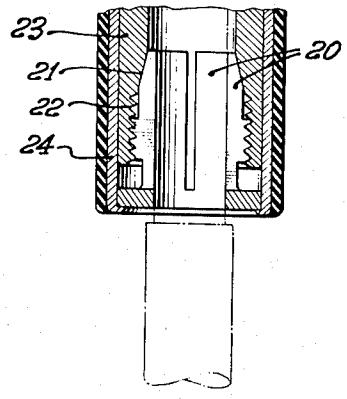
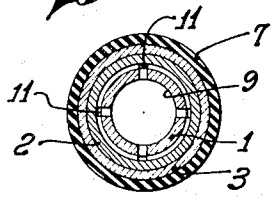


Fig. 3.



ULYSSES GRANT ABERLE,
INVENTOR.

BY John H. T. Wallace

United States Patent Office 2,731,618 Patented Jan. 17, 1956

2,731,618

CONNECTOR

Ulysses Grant Aberle, Los Angeles, Calif., assignor to The Garrett Corporation, Los Angeles, Calif., a corporation of California

Application September 22, 1952, Serial No. 310,793

2 Claims. (Cl. 339—268)

This invention relates to a connector and more particularly to a conductor connector for removably connecting various electrical conductors and terminals or the like.

Terminal junction boxes or panels such as those in aircraft require electrical connectors which are readily and easily connected or disconnected in a limited space, due to the close proximity of adjacent terminals, conductors and structure when economy of space is important. In some installations adjacent terminals are so close together that they cannot accommodate connectors requiring the application of a wrench or other tool to the body of the connector between terminals.

Electrical installations may incorporate several closely spaced terminals which are also recessed. Heretofore such installations have imposed considerable difficulty in the operations of connecting and disconnecting electrical conductors with terminals. In addition to the installation problems encountered with such compact electrical connections, it has been found necessary to employ a connector having very intimate and secure engagement with the terminal in order to maintain maximum current carrying capacity and to avoid possible arcing due to looseness and vibration.

It is an object of the invention to provide a connector having an actuating nut axially disposed at one end thereof promoting facility in the operations of connecting and disconnecting the same with a terminal disposed limited space where another terminal or structure is near the side of said first mentioned terminal.

Another object of the invention is to provide a connector which is very simple and easy to operate when making a secure intimate connection with a terminal recessed among other closely spaced terminals, or with a terminal which is close to adjacent structure.

Another object of the invention is to provide a connector having an actuating member spaced from the end of a terminal engaged by the connector, whereby a socket wrench or other convenient tool may be easily and quickly used in the connecting and disconnecting operations of said connector relative to said terminal.

A further object of the invention is to provide a connector combining facility of operation in confined space with very secure terminal engaging characteristics which prevent turning or movement of the connector on a terminal to thereby eliminate arcing at the connection and afford maximum current carrying capacity.

Further objects and advantages will be apparent from the following specification and appended claims.

Reference is directed to the accompanying drawing in which:

Figure 1 is an end view of the connector showing the head of the actuating nut thereof;

Figure 2 is an axial sectional view of the connector taken on the line 2—2 of Figure 1, showing the connector applied to a terminal which is indicated by broken lines;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is a fragmentary sectional view on the same plane as Figure 2, showing a modified form of the thread and cam means interengaging the segments and the nut of the connector.

The sleeve 1 is a hollow tubular member having a terminal engaging bore 9 and external screw threads 10. These threads are commonly known as buttress threads and have a face disposed substantially at right angles to the axis of the sleeve 1, while the adjacent face of each thread convolution is at an acute angle to the axis of the sleeve 1 and forms a cam surface, as shown best in Fig. 2 of the drawing. The sleeve 1 is provided with slots 11 in its side wall which separate one end of the sleeve into a plurality of externally threaded segments which are yieldable inwardly to effectively reduce the diameter of the bore 9 into engagement with the terminal as shown by broken lines 12 in Fig. 2 of the drawing. The terminal receiving end 13 of the sleeve 1 is provided with an enlarged diameter flange 14 around which the conductor member 3 is fixed preferably by fusion such as brazing. As shown in Fig. 2 of the drawing the conductor member 3 is a hollow cylindrical structure having its inner wall 15 concentrically spaced from the external threads 10 of the sleeve 1, providing for the disposition of the internally threaded side wall of the nut 2 between the periphery of the sleeve 1 and the conductor member 3. The nut 2 is provided with screw threads 16 conforming with the threads 10 of the sleeve 1.

Integral with the hollow tubular internally threaded portion 17 of the nut 12 is an externally serrated concentric stub 18 on which the insulated nut head 4 is fixed. The stub 18 of the nut 2 is reduced in diameter and projects through a reduced in diameter opening 19 in the conductor member 3. This stub extends beyond the end of said conductor member 3 opposite to the other end thereof which is connected with the sleeve 1. The shoulder 25 at the transition of the stub 18 provides a longitudinal stop for the nut 2 relative to the conductor member 3. The nut 2 is thus retained in the conductor member 3 preventing it from becoming displaced. It will be noted that the nut head 4 on the stub 16 of the nut 2 is in axial alignment with the sleeve 1 and that the nut 2 and conductor member 3 extend a considerable distance from the nut head 4 to the region of the sleeve 1, permitting connection with remotely mounted terminals which are in close proximity to other terminals or structure, and which may also be quite remote from the nut head 4.

The conductor connection member 5 is preferably fused to the conductor member 3 as shown in Fig. 2 of the drawing, and supports the cable 8 near the nut head 4. The conductor connection member 5 is thus considerably spaced from the terminal receiving end 13 of the sleeve 1.

The insulation sleeve 7 surrounds the conductor member 3 and overlapping one end of the sleeve is the insulation sheath 6 which extends over and covers the conductor connection member 5, all as shown best in Fig. 2 of the drawings.

In operation of my connector, the terminal shown by broken lines 12 in Fig. 2 of the drawing may be intimately and securely engaged by the segments of the sleeve 1 when the nut 2 is rotated by means of the head 4. When the nut 2 is advanced toward the flange 14 and is engaged therewith, further rotation of the nut 2 causes the inclined portions of the conforming threads of the sleeve 1 and nut 2 to act as cam surfaces, forcing the segmented portions of the sleeve 1 inwardly against the outer surface of said terminal. The terminal is thereby gripped by the sleeve 1 preventing any movement of the connector on the terminal and providing a connection substantially immune to vibration and having maximum current-carrying capacity.

The insulated nut head **4** prevents the passage of electrical current to the operator of a tool engaging the head during the operation of the connector.

In the modified structure shown in Fig. 4 of the drawing, the segments **20** are similar to the segments of the sleeve **1** shown in Fig. 2 of the drawing except for the thread and cam means thereof. These segments are provided with cam surfaces **21** adjacent threads **22** which conform to similar cam and thread structures on the nut **23**, the latter being otherwise similar to the nut **2** shown in Fig. 2 of the drawing. The conductor member **24** is similar to the hereinbefore described conductor member **3**.

Although my invention has been disclosed as related more particularly to electrical connectors, variations may be effected in the structure and use thereof without departing from the spirit of the appended claims.

I claim:

1. A connector structure comprising: a plurality of segments having inner terminal engaging surfaces, a nut surrounding said segments, thread and cam means interengaging said segments and said nut for forcing said segments inwardly during relative rotation of said nut and segments, a conductor member connected with said segments and disposed outwardly of said nut and extending longitudinally of said segments, said segments being adapted to receive a terminal therebetween at one end thereof, said nut extending beyond the opposite ends of said segments, said conductor member being tubular and surrounding said nut.

2. A connector structure comprising: a plurality of segments having inner terminal engaging surfaces, a nut surrounding said segments, thread and cam means interengaging said segments and said nut for forcing said segments inwardly during relative rotation of said nut and segments, a conductor member connected with said segments and disposed outwardly of said nut and extending longitudinally of said segments, said conductor member having means forming a longitudinal stop for each end of said nut and serving to prevent misplacement of the nut from said conductor member.

References Cited in the file of this patent

UNITED STATES PATENTS

1,912,980	Hoogendorn	June 6, 1933
2,231,310	Williams	Feb. 11, 1941
2,571,145	Lord	Oct. 16, 1951