Dec. 16, 1947. J. M. VAN VLEET 2,432,636

ELECTRICAL CONNECTOR

Filed Nov. 29, 1943

Fig. 1

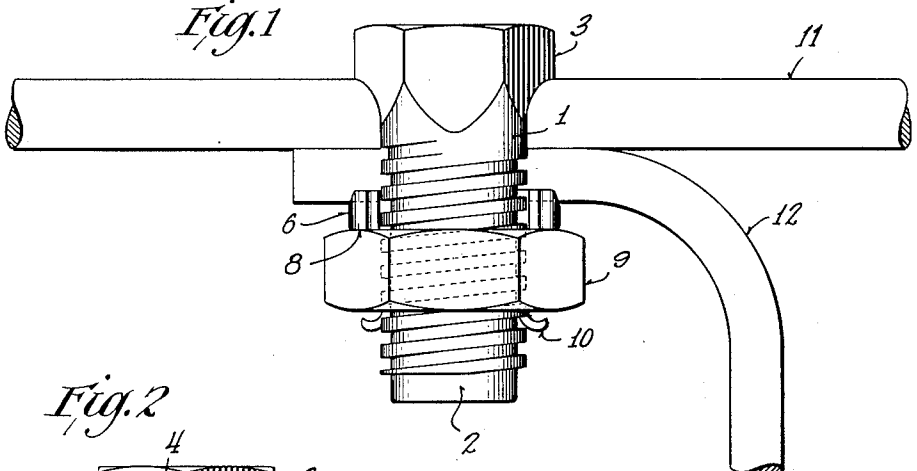


Fig. 2

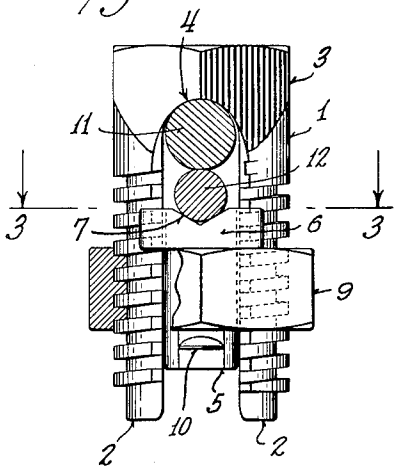


Fig. 3

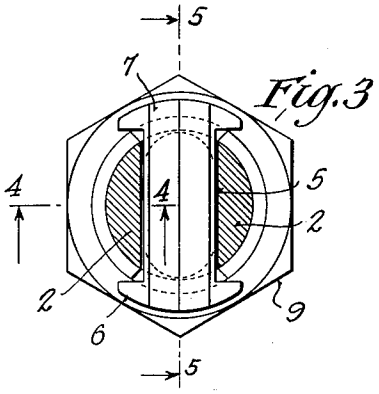


Fig. 4

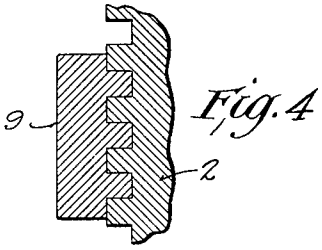


Fig. 5

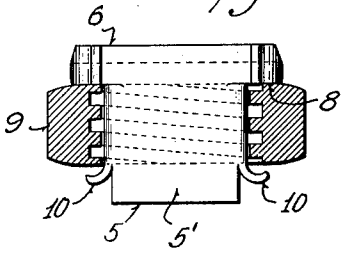
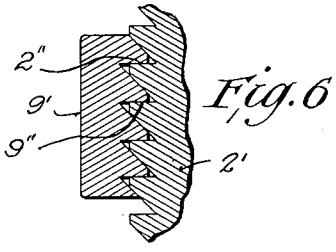


Fig. 6



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Patented Dec. 16, 1947

2,432,636

UNITED STATES PATENT OFFICE

2,432,636

ELECTRICAL CONNECTOR

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Application November 29, 1943, Serial No. 512,136

3 Claims. (Cl. 24—135)

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This invention relates to electrical connectors and is particularly directed to the type of electrical connector in which a bifurcated bolt is employed and adapted to receive the electrical conductors between the spaced arms of the bolt, and in which a sliding plunger is urged to clamp the conductors by means of a nut screwed on the bolt and coacting with the sliding plunger.

In the connectors as heretofore constructed of this general type it has been the practice to use V-threads. It has been found that with the heretofore known types of connectors the reaction between the threads of the bolt and the threads of the nut when the nut is tightened produces resultant forces which tend to move the spaced arms of the bolt towards each other into binding engagement with the sliding plunger so that a considerable portion of the force exerted by the nut was needed to overcome the enormous friction between the arms and the plunger, this friction increasing as the bolt is tightened. Additionally it was found in connectors as heretofore constructed that the effective area of contact between the threads of the nut and bolt decreased as the nut was tightened due to the inward motion of the spaced arms of the bolt and frequently the area of contact became so small that the threads stripped.

This invention is designed to overcome the above noted defects, and objects of this invention are to provide an electrical connector employing a bifurcated bolt with spaced arms and a sliding plunger therebetween and a nut threaded on the bolt and coacting with the plunger, in which the coacting faces of the threads of the nut and the bolt which transmit the force from the nut to the bolt are so arranged that no resultant forces are produced tending to force the spaced arms of the bolt into binding engagement with the sliding plunger, to thereby avoid binding between the sliding plunger and the spaced arms of the bolt and to maintain the effective area of contact between the threads of the bolt and the threads of the nut the same as it was before the nut was tightened.

Embodiments of the invention are shown in the accompanying drawings, in which:

Figure 1 is a view of the connector in clamping position.

Figure 2 is a side view of the connector with the conductors in section.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view drawn to an enlarged scale on the line 4—4 of Figure 3.

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Figure 5 is a view showing the nut and sliding plunger removed from the bifurcated bolt, the nut being shown in section corresponding to a section on the line 5—5 of Figure 3.

Figure 6 is a view corresponding to Figure 4 showing a modified form of the invention.

Referring to Figures 1 through 5, it will be seen that the connector comprises a bifurcated bolt 1 having a pair of arms 2 extending from the hexagonal or other type of polygonal head 3. The arms 2 are spaced apart to provide a channel whose upper end is rounded as indicated at 4.

A sliding plunger 5 having a shank 5' normally positioned between the arms 2 is provided. The plunger includes a head 6 which has a channel 7 in its upper face. The head is provided with outwardly projecting shouldered portions 8, see Figure 5. A nut 9 bears against the shouldered portion 8 and is loosely retained against separation from the sliding plunger by means of a pair of ears 10 struck or sheared outwardly from the shank 5' of the sliding plunger. The nut 9 is threaded on the bolt and is adapted to move the plunger inwardly or outwardly.

It is to be noted particularly that the bolt and nut are provided with square threads so that there are flat faces of contact between the threads of the nut and the threads of the bolt, thereby avoiding any tendency to force the arms 2 towards each other when the nut is tightened.

In using the device the connector is slipped over a conductor such as indicated at 11 and a second conductor 12 is positioned between the arms 2. Thereafter the plunger 5 is inserted between the arms and the nut screwed onto the bolt so as to clamp the two conductors tightly together and in contact respectively with the head 3 of the bolt and the head 6 of the plunger. A very firm and excellent electrical connection is thus obtained.

Of primary importance in this invention is the fact that the surface of engagement between the threads of the bolt and the threads of the nut is a flat surface and thus there is no cam action tending to force the arms 2 towards each other, as has heretofore been the case where the usual V-type threads were employed. In connectors having V-type threads great difficulty has been encountered due to the fact that the cam action between the threads of the nut and the threads of the bolt had a resultant which forced the arms towards each other, thereby causing tight binding between the sliding plunger and the arms of the bifurcated bolt. A great deal of force was expended in merely forcing the plunger inwardly

after clamping engagement had started, and as the nut was tightened up the friction between the sliding plunger and the arms of the bifurcated bolt increased enormously and thus materially interfered with the correct functioning of the connector.

With this invention there is no tendency to force the arms 2 of the bifurcated bolt towards each other into clamping engagement with the shank of the sliding plunger. Instead the sliding plunger is freely slidable between the arms under all conditions and no matter how tightly the conductors are clamped together there is no side thrust imparted to the arms 2 which would tend to clamp the sliding plunger against free sliding motion.

The invention may take other forms provided the active engaging faces between the threads of the nut and the threads of the bolt are flat faces so that the transmission of force from the threads of the nut to the threads of the bolt is across the flat faces when the connector is tightened. For example, buttress threads may be employed as shown in Figure 6. In this form of the invention the nut is indicated by the reference character 9' and a portion of one of the arms of the bifurcated bolt is indicated by the reference character 2'. The engaging faces 9'' and 2'' between the threads of the nut and the threads of the bolt which transmit the pressure from the bolt to the nut are flat faces. By using buttress threads a slightly stronger mechanical construction is obtained than where square threads are employed as in the first form of the invention. The principle, however, is identically the same in both forms.

It is preferable to make the bolt, the plunger and the nut of material having good electrical conducting qualities.

It will be seen that a very simple and serviceable type of connector has been employed which has all of the advantages of connectors of this type and in addition has the very decided advantage of preventing binding between the arms of the bifurcated bolt and the sliding plunger. Inasmuch as there is no decrease in the effective area of contact between the threads of the bolt and the threads of the nut as the nut is tightened, there is no tendency to strip the threads due to a decrease in effective area of contact as in the prior types of connectors previously discussed.

It will be seen further that the connector is of very simple construction and is easy to produce.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A connector for connecting electric conductors comprising a bifurcated threaded bolt having a pair of spaced arms adapted to receive conductors therebetween and a head portion joining said spaced arms at one end, a sliding plunger slidable between said spaced arms, and a threaded nut coacting with said bolt and operatively engaging said sliding plunger to force said sliding plunger into clamping relation to the electrical conductors placed between the spaced arms, the threads of said bolt and the threads of said nut having flat coacting faces the elements of which lie on radial lines at right angles to the axis of said bolt, whereby when said nut is tightened there are no resultant forces tending to move the spaced arms towards each other into binding engagement against said sliding plunger.

2. A connector for connecting electric conductors comprising a bifurcated threaded bolt having a pair of spaced arms adapted to receive conductors therebetween and a head portion joining said spaced arms at one end, a sliding plunger slidable between said spaced arms, and a threaded nut coacting with said bolt and operatively engaging said sliding plunger to force said sliding plunger into clamping relation to the electrical conductors placed between the spaced arms, the threads of said nut and the threads of said bolt being square threads, whereby when said nut is tightened there are no resultant forces tending to move the spaced arms towards each other into binding engagement against said sliding plunger.

3. A connector for connecting electric conductors comprising a bifurcated threaded bolt having a pair of spaced arms adapted to receive conductors therebetween and a head portion joining said spaced arms at one end, a sliding plunger slidable between said spaced arms, and a threaded nut coacting with said bolt and operatively engaging said sliding plunger to force said sliding plunger into clamping relation to the electrical conductors placed between the spaced arms, the threads of said nut and the threads of said bolt being buttress threads having their interengaging flat faces effective in transmitting the force from the nut to the bolt when the nut is tightened, whereby when said nut is tightened there are no resultant forces tending to move the spaced arms towards each other into binding engagement against said sliding plunger.

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