Sept. 28, 1948. F. PENNELL 2,450,158

CONNECTOR BOLT

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FIG.1

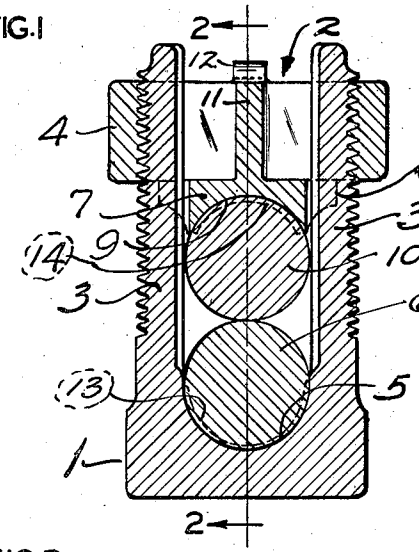


FIG.2.

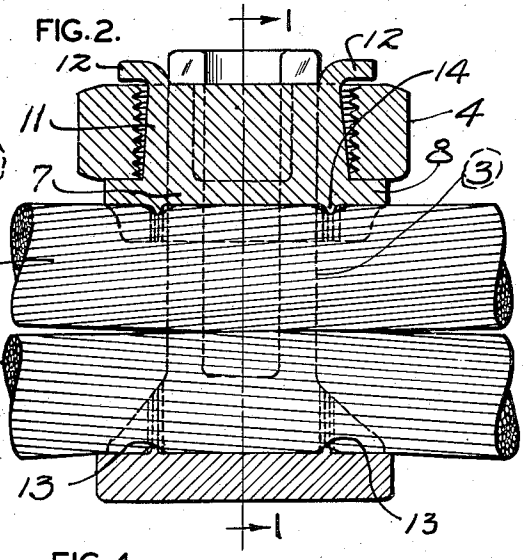


FIG.3

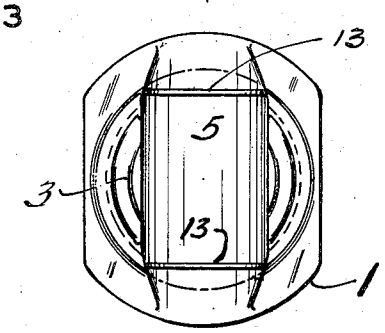


FIG.4.

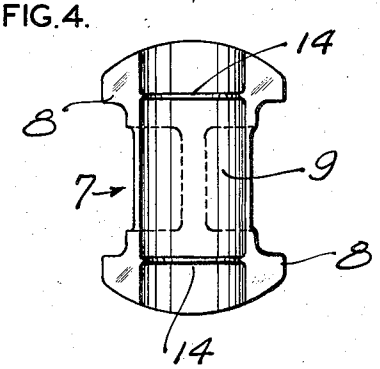
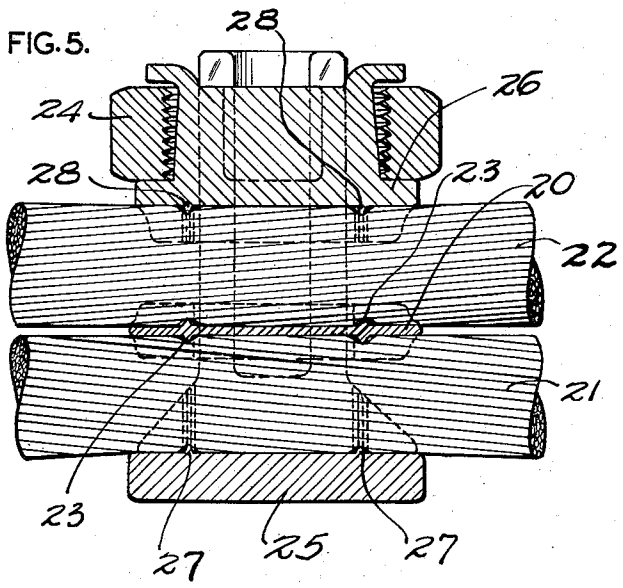


FIG.5.



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CONNECTOR BOLT

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11 Claims. (Cl. 287—77)

1

The invention relates to connector bolts of the type used to clamp together wires, cables or the like serving as conductors of electricity, in which it is important that tight contact be effected so as to facilitate the flow of current from one wire to the other.

Such bolts may be used under conditions in which the diameters and weight of the wires and the manner in which they are supported at points spaced from the bolt may tend to pull the wires lengthwise out of the bolt. The main objects of the present invention are to resist such endwise relative movement of the wires from the bolt and to maintain a tight contact between the wires irrespective of endwise pull to which the wires may be subjected.

In the accompanying drawings,

Figure 1 is a longitudinal section through a connector bolt embodying the invention and including a pressure bar and nut. Two wires clamped together by the bolt are shown in cross section. The section is taken on the line 1—1 of Figure 2.

Figure 2 is a section through the bolt taken on the line 2—2 of Figure 1 and shows the wires in elevation.

Figure 3 is a top end view of the bolt shown in Figures 1 and 2, the wires, nut and pressure bar being omitted.

Figure 4 is a bottom view of the pressure bar.

Figure 5 is a view corresponding generally to Figure 2 but illustrating the use of a washer associated with the bolt shown in Figures 1 and 2 and placed between the wires.

The bolt proper shown in Figures 1-3 includes a head member 1, the bolt shank being slotted at 2 to provide spaced legs 3, which are threaded for an annular nut 4. The head member is provided with a concave recess 5, adapted to receive and seat a wire or cable 6. A pressure bar 7 is slidably received between legs 3 and has ears 8 disposed to engage the edges of leg 3 and prevent movement of the pressure bar transversely of the bolt slot 2. Bar 7 is provided with a concave recess 9 opposing the bolt head recess 5 and adapted to receive a wire 10 disposed above wire 6. Bar 7 includes a boss 11 projecting upwardly through nut 4 and provided with lugs 12 which may be bent over the top of the nut to maintain the assembly of the bar and nut. All of the above described structure is well known in bolts of this type.

The wire receiving recess 5 in head member 1 is provided with projections 13 preferably in the form of widely-spaced, narrow ribs extending transversely of the length of the recess so as to

2

engage the lower portion of the periphery of wire 6. Pressure bar 7 is similarly provided with projections 14 in its wire-engaging recess 9 so as to engage the upper portion of the periphery of wire 10.

When nut 4 is rotated to move bar 7 towards the bolt head, projections or ribs 13 and 14 will engage wires 6 and 10, indenting the surface of the latter as the nut is tightened so as to securely hold the wires against lengthwise movement relative to each other and to the bolt. To insure this result, the wire-engaging elements should be of material which is harder and stronger than the wires. If the latter are of the material generally used in wires of this type, i. e. commercial copper, they will have a hardness less than 90 points in the Brinell scale and a tensile strength of 50,000 or 55,000 pounds per square inch. The bolt and pressure bar may be formed of a hard and strong bronze alloy which has a Brinell hardness of at least 90 points and a tensile strength of at least 65,000 pounds per square inch. Usually the copper cable has a Brinell hardness of 75 to 85 points and the bolt and pressure bar Brinell hardness of 100 to 140 points.

Preferably, projections 13 are aligned, longitudinally of the bolt, with each other and with the annulus of nut 4 so that the thrust between the latter and the head is in a substantially straight line through the projections, thus forcing the projections into the wire more effectively than would be the case if the opposing projections were offset from each other and from the nut annulus, lengthwise of the wires, so that the wires could distort and transfer the nut thrust direct to each other, and to bolt parts, at points spaced from the projections transversely of the bolt axis.

In the arrangement shown in Figure 5, a washer 20 is shown between wires 21 and 22. Preferably, this washer is concave on its upper and lower faces to receive and seat around portions of the wire peripheries. Projections 23 extend transversely of the concavities of the washer to contact the adjacent wires and to be forced into the same when the nut 24 is tightened. Preferably the bolt head 25 and pressure bar 26 also have projections 27 and 28 respectively, as previously described. Corresponding projections 23, 27 and 28 should be in substantial alignment longitudinally of the bolt so as to insure the transmission of thrusts to the wires through the projections for the reasons explained above.

It will be understood that the wire-engaging projections may be varied in extent and contour

and that some of the projections shown may be omitted in whole or in part without departing from the spirit of the invention, and the exclusive use of such modifications of the structure as come within the scope of the claims is contemplated.

What is claimed is:

1. In a connector bolt, a bolt head member, spaced legs extending therefrom and arranged to receive between them wires one above the other, a member slidable along said legs towards said head member, there being means for thrusting said members towards each other, at least one of said members having projections constructed and arranged to be forced into the peripheries of the adjacent wire to better hold the wire against being pulled endwise from the bolt, said projections being aligned with said means at points of thrust so that thrust between said means and said bolt head is in a substantially straight line longitudinally of said bolt through the projections.

2. In a connector bolt, a bolt head member having a wire-receiving recess, spaced legs extending from the head member at opposite sides of said recess, a member slidable on said legs and having a wire-receiving recess opposing said head member recess, there being means for thrusting said members toward each other, the recesses in said members being provided with opposing projections which are in substantial alignment longitudinally of the bolt, and with said means at points of thrust, so that thrust between said means and said bolt head is in a substantially straight line longitudinally of said bolt through the projections.

3. In a connector bolt, a bolt head member having a wire-receiving recess, spaced legs extending from the head member at opposite sides of said recess, a member slidable on said legs and having a wire-receiving recess opposing said head member recess, there being means for thrusting said members towards each other, the recess in each of the members having a pair of widely spaced ridges extending transversely of the recess and the ridges in the recess of one member being disposed in substantial alignment, longitudinally of the bolt, with the corresponding ridges in the opposing recess in the other member.

4. In a connector bolt, a bolt head member, spaced legs extending therefrom, an annular nut threaded on said legs, a pressure bar member extending between said legs and slidable longitudinally of the same and movable by the nut towards the head member, said members having opposed concave faces for seating a pair of wires, one above the other, said members having narrow ridges extending transversely of the concave faces and substantially aligned longitudinally of the bolt with the nut annulus so as to be forced into the periphery of wires between the members when the nut is tightened to resist in pulling of the ridge engaged wires out of the bolt.

5. In a connector bolt, a bolt head having a wire-receiving recess, a pressure bar having a wire-receiving recess, a washer between the head and pressure bar having wire-receiving recesses at its opposite sides opposing the wire-receiving recesses in the head and pressure bar respectively, each of said recesses having a pair of widely spaced projections, and means for thrusting the pressure bar towards the head.

6. A bolt as described in claim 5 in which the material of the washer is harder by approximately 50 points or more in the Brinell scale than the material of the wires to be connected by the bolt.

7. In a connector bolt, a bolt head member, spaced legs extending therefrom, an annular nut threaded on said legs, a pressure bar member extending between said legs and slidable longitudinally of the same and movable by the nut towards the head member, said members having opposed concave faces for respectively seating a pair of wires, one above the other, a washer between the head and pressure bar having wire-receiving recesses at its opposite sides opposing the wire-receiving recesses in the head and pressure bar respectively and adapted to be inserted between said wires, each of said recesses having a pair of widely spaced, narrow ridges extending transversely of the concave faces and substantially aligned longitudinally of the bolt with the nut annulus so as to be formed into the surfaces of wires seated in the recesses when the nut is tightened and thereby resist pulling of the ridge engaged wires out of the bolt.

8. In a connector bolt, a shank, a bolt head at one end thereof having a wire-receiving recess, a pressure bar having a wire-receiving recess, a nut threaded on the other end of the shank and bearing against the pressure bar, a washer between the head and pressure bar having wire-receiving recesses at its opposite sides opposing the wire-receiving recesses in the head and pressure bar respectively, the washer having widely spaced portions projecting from its wire-receiving recesses so as to be forced into the periphery of the wires when the nut is screwed towards the bolt head to better hold the wires against being moved lengthwise relative to each other.

9. In a connector bolt, a bolt head member, spaced legs extending therefrom and arranged to receive between them wires one above the other, a member slidable along said legs towards said head member, there being means for thrusting said members towards each other, at least one of said members having projections constructed and arranged to be forced into the peripheries of the adjacent wire to better hold the wire against being pulled endwise from the bolt, the material forming the wire-engaging projections being harder by at least 50 points on the Brinell scale than the material of the wires to be connected by the bolt.

10. In a connector bolt, a bolt head member, spaced legs extending therefrom and arranged to receive between them wires one above the other, a member slidable along said legs towards said head member, there being means for thrusting said members towards each other, at least one of said members having projections constructed and arranged to be forced into the peripheries of the adjacent wire to better hold the wire against being pulled endwise from the bolt, the material forming the wire-engaging projections being characterized by a hardness of at least 90 points on the Brinell scale.

11. In a connector bolt, a bolt head member having a wire-receiving recess, spaced legs extending from the head member at opposite sides of said recess, a member slidable on said legs and having a wire-receiving recess opposing said head member recess, there being means for thrusting said members toward each other, the recesses in said members being provided with opposing projections which are in substantial alignment longitudinally of the bolt, said mem-

bers being of a material characterized by a hardness of at least 90 points on the Brinell scale and having a tensile strength of at least 65,000 pounds per square inch.

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