Nov. 2, 1954 P. DAVIDSON 2,693,587

WIRE AND CABLE CONNECTOR AND TERMINAL

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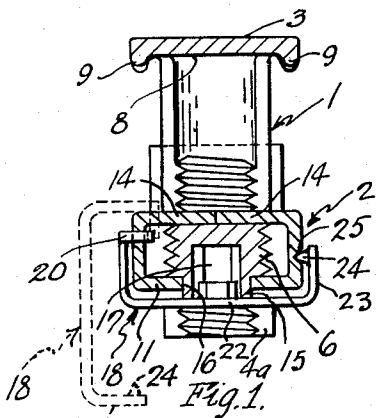


Fig. 1.

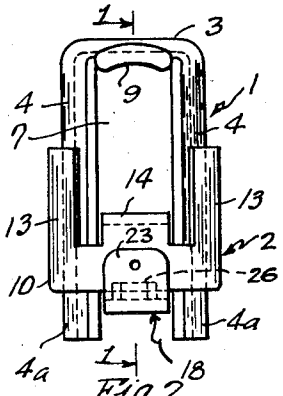


Fig. 2

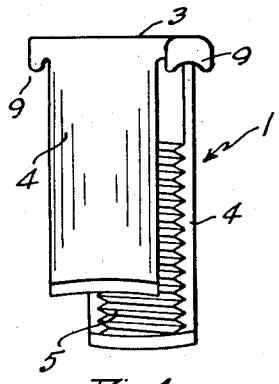


Fig. 4.

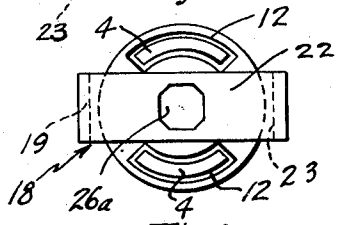


Fig. 3.

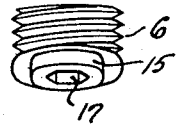


Fig. 5.

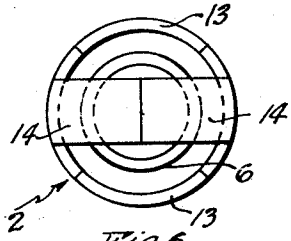


Fig. 6.

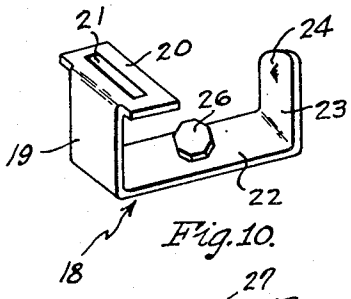


Fig. 10.

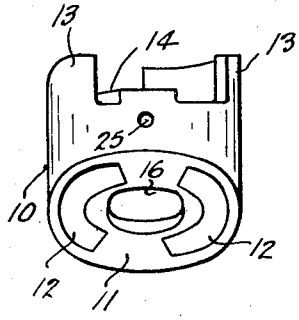


Fig. 9.

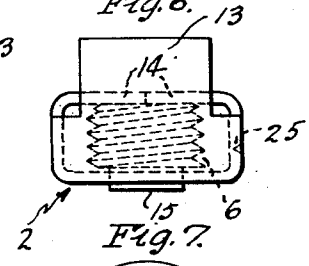


Fig. 7.

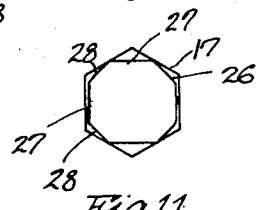


Fig. 11.

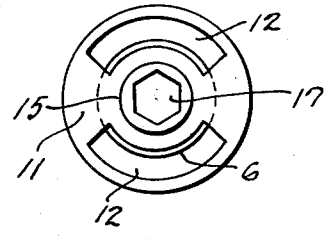


Fig. 8.

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WIRE AND CABLE CONNECTOR AND TERMINAL

Philip Davidson, Shelton, Conn.

Application September 6, 1951, Serial No. 245,345

5 Claims. (Cl. 339—272)

This invention relates to a wire and cable connector and terminal, and has for an object to provide an improved wire and terminal connector in which the connector device or terminal is of a solderless type connection, and comprises wire and terminal clamping elements connected by screw thread connections whereby they may be adjusted relative to each other for clamping or releasing the conductor wires or cables, and a primary object is to provide a means for locking these elements when they have been adjusted to the clamping position, to prevent their loosening up from vibration, shock or other effects incident to use after the wires or conductors have been clamped.

A further object is to provide a terminal or connector of this type which presents a substantially smooth unbroken outer surface for easy taping of the entire connector with insulating tape and also to reduce corona loss.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In this drawing:

Fig. 1 is a vertical central section through the device substantially on line 1—1 of Fig. 2, except that the locking element is shown in side elevation;

Fig. 2 is a side elevation of the device looking from the right of Fig. 1;

Fig. 3 is an end view of the device looking toward the bottom of Fig. 1;

Fig. 4 is a perspective view of one of the clamping elements;

Fig. 5 is a perspective view of the adjusting nut;

Fig. 6 is a top plan view of the other or cooperating clamping element;

Fig. 7 is a side view of the element of Fig. 6;

Fig. 8 is an end view looking toward the bottom of Fig. 7;

Fig. 9 is a perspective of the outer element of Fig. 7 with the adjusting nut removed;

Fig. 10 is a perspective view of the nut locking element, and

Fig. 11 is a diagrammatic view on an enlarged scale illustrating the functioning of the locking means.

A clamping device or connector for conductor wires or cables loses its value if it becomes loosened when in use. It is therefore a particular object of this invention to provide a positive lock for the clamping elements after they have been clamped to the tight or clamping position on the conductor wires or cables to prevent their loosening up under vibration, shock or other effects incident to use of the device.

The connector comprises two clamping elements 1 and 2 connected by a threaded connection for adjustment toward and from each other to clamp the conductor wires or cables between them, or to release them, as desired. The clamping element 1 comprises a frame including a head 3 and spaced parallel side legs 4 which are curved or concavo-convex in cross section and are threaded on their inner or opposed surfaces 5, at least for a portion of their length, for threaded engagement with an adjusting nut 6 carried by the member 2 to thus shift the two members relative to each other for clamping on opposite sides of two or more conductor wires or cables inserted in or through the space 7 between the legs 4.

The two members 1 and 2 are provided with clamping surfaces to clamp on opposite sides of these conductors or cables, the surface on the member 1 being shown at 8 on the under side of the head 3, and to increase the grip on the cables this head may be provided with an inwardly extending curved gripping flange or rib 9 on opposite sides of the head and the legs 4. The other gripping member 2 comprises a hollow cylindrical body 10 having a closed end wall 11 provided with arcuate slots 12 for passage of and sliding engagement with the legs 4 of the member 1, and the opposite side walls of the body 10 are provided with transversely curved extensions 13 located at the outer sides of the curved legs 4 of the member 1 and thus provide guide means to prevent relative rocking of the two members 1 and 2 out of alignment and also to prevent spreading of the legs 4 by lateral pressures in the locking operation. The side portions of the body between the guide members 12 are bent over and inwardly, as shown at 14, to provide a clamping surface opposite clamping surfaces 8 and 9 of the member 1, and thus the lead wires when inserted in the cross opening 7 are clamped between these surfaces on the two elements 1 and 2. These bent-over cross walls 14 also extend over the nut 6 within the body 10 and retain this nut in position in the body between these walls 14 and the end wall 11. To also keep the nut in proper central alignment, it is provided with a reduced circular neck 15 in an opening 16 in the end wall 11, and for the purpose of operating this nut to relatively adjust the members 1 and 2 and clamp them on or release them from the conductor wires or cables the lower or outer end of the nut is provided with noncircular means to receive or cooperate with a similarly shaped wrench or other tool for operating the nut. In the present construction it is preferred to provide tthis as a noncircular recess or socket 17, and although it may be of any shape desired, it is preferable to make it of hexagonal cross section opening through the outer end of the neck 15 of the nut.

It will be clear that with this construction after the conductor wires or cables are inserted in or through the transverse space 7 the nut may be turned to draw the elements 1 and 2 toward each other and securely clamp the clamping surfaces 9 and 14 on the opposite sides of these wires or cables, to thus effectively connect them against separation and also to provide the proper electrical contact. However, it has been found that similar devices will work loose after a while in operation due to vibration, shock or other effects incident to their use, thus nullifying the connection. To prevent this the present device is provided with means for locking the nut 6 against loosening or turning after it has been set up tight in the clamping position. To effect this, in the present construction a very simple means comprises a locking bar 18 of substantially U shape provided at the end of one of its side legs 19 with an inwardly bent ear or lug 20 having an elongated slot 21 to receive and embrace one of the bent-in end wall sections 14 to thus provide a pivotal connection between the bar 18 and the adjustable clamping member 2. The connecting bar portion 22 may pass over the outer end of the neck 15 of the nut 6 between the projecting end portions 4*a* of legs 4 of member 1 below the member 2, as shown in Figs. 1 and 2, and the opposite or other leg 23 of the bar 18 extends on the opposite side of the body 10 and is provided with a securing lug 24 pressed inwardly from this leg to seat in a similar recess or depression 25 formed in the outer wall of the member 10. This bar 18 is resilient and has sufficient spring action so that, when it is swung to this cross position as shown in full lines in Fig. 1, lug 24 will snap into the recess 25 and retain this bar in the locking position. To lock the nut against turning cooperating locking means is provided on the bar 18 and in the present case it comprises an inwardly extending lug or projection 26 pressed or struck laterally inward from the bar 22 (leaving a depression 26*a* on the opposite side) so that when this member 18 is in the locking position shown in full lines in Fig. 1, this protrusion or lug is seated in the noncircular socket or recess 17 in the adjusting nut 6. It may be of the same shape as the socket 17 or any shape which will cooperate with it to prevent turning move-

ments of the nut, but it is preferably of an octagonal shape, as shown in the outline **26**, Fig. 11, the outline of the socket being shown at **17**. That is, alternate sides **27** are wider than its intermediate sides **28** and the lug has a few thousandths clearance in the socket **17**, so that the lug will enter this socket in practically all positions of the nut, so that when the nut is set up tight this lug **26** will enter the socket and hold the nut against loosening. When it is desired to release the clamp or for any other reason to adjust the nut, the locking member **18** may be released and swung away from the locking position, as shown in dotted lines Fig. 1, thus releasing the nut and exposing it for operating by a wrench or other tool.

It will be clear from the above that this locking bar or element provides a positive locking means, which prevents the conveyor or adjusting screw from turning or loosening after the wires or cables are tightly clamped. In other words, the connector cannot loosen up from vibration or other causes because it is locked in position, and once tightened is positively locked and prevents the device from loosening up under vibration or shock or other effects. The locking bar also covers the exposed end portion of the nut and protects it against corrosion and dirt. This construction of connector further provides a substantially smooth and unbroken outer surface for easy taping of the entire connector with insulating tape, and this smooth outer surface greatly reduces corona loss. This device also permits manufacturing of the essential parts, that is, all except the nut **6**, from strip metal by stamping and forming operations, with maximum strength and most effective use of materials, with minimum scrap. The device also provides a compact construction which permits maximum torque pressure between the compressor elements with least possible distortion of the U section. This permits a very firm. positive contact between the overlapped conductor wires or cables and with maximum electrical contact and conductivity.

Having thus set forth the nature of my invention, I claim:

1. A wire and cable connector comprising a substantially U-shaped clamping member including laterally spaced transversely curved legs and a connecting head provided with a clamping surface, a second clamping member and screw assembly including a body member provided with an end wall having curved slots through which the legs pass for sliding connection between said members, said body member being provided with walls at its inner end extending between the legs providing a clamping surface opposed to that of the first member, a screw member mounted in the body between said inwardly extending walls and the end wall and having threaded engagement with said legs, said screw member being provided with a noncircular portion exposed at said end wall for cooperation with a similarly shaped tool for operating the screw member, a locking bar comprising a connecting bar portion and a leg portion at one end thereof at substantially right angles to the connecting bar portion provided with an elongated transverse slot embracing one of said inner end walls on the body member pivotally connecting the locking bar to the body member for movement to and from a position in which the connecting bar portion lies across the slotted end wall of the body member between the curved legs of the first clamping member and the leg portion lies at the outer side of the side walls of the body member, said connecting bar portion being provided with noncircular means cooperating with that of the screw when in the latter position to lock the screw against turning, and cooperating means on the body member and the other end of the connecting bar portion releasably retaining said bar in locking position.

2. A wire and cable connector comprising a clamping member including laterally spaced transversely curved leg members threaded on their inner surfaces and a connecting head providing a clamping surface, a second clamping member including a body comprising side and end walls, the end wall having curved slots for sliding connection with said legs, said body having inner end walls extending transversely between the legs providing a second clamping surface opposed to that of the first member, a threaded member rotatably mounted in the body between said end walls and having screw thread connection with said legs, said threaded member being provided with a noncircular socket exposed at the outer end wall of the body to receive a noncircular tool for operating said member, and a locking bar pivotally mounted on said body comprising a connecting bar portion movable to and from a position extending across the slotted end wall of the body between the leg members of the first clamping member and over and covering said socket, said connecting bar portion provided with a noncircular lug seating in the socket and locking the threaded member against turning, said bar including an ear at one end provided with an elongated slot embracing one of said inner end walls of the body for pivotal and sliding connection therewith, and cooperating means on the body and the other end of the locking bar releasably retaining this bar in locking position.

3. A wire and cable connector comprising two opposed clamping members connected for relative sliding movement and provided with opposed clamping surfaces for the wires, one of said members including a rotatable screw element having threaded engagement with the other member for clamping them on the wires, said screw element being provided with a noncircular polygonally shaped socket to receive a similarly shaped tool for operating said element, a locking bar pivotally mounted on the screw mounting member and provided with a polygonally shaped lug of a size to enter the socket and lock the screw element against turning, said lug having a different number of sides from that of the socket so as to be capable of entering the socket in a greater number of angular positions of the screw element than the number of sides on the socket, and means for releasably securing the locking bar in locking position.

4. A wire and cable connector comprising a clamping member including laterally spaced legs and a connecting head providing a clamping surface, a second clamping member comprising a body including side walls and spaced inner and outer end walls, the outer end wall being provided with openings having sliding connection with said legs and the inner end wall extending between the legs to provide a clamping surface opposed to that of the first member, a screw threaded member rotatably mounted in the body between the end walls and having threaded connection with said legs, said threaded member having a neck portion extending through an opening in the outer end wall, and provided with a noncircular portion to cooperate with a similarly shaped tool for operating said member, a resilient locking bar comprising a substantially U-shaped member including a connecting bar portion and spaced legs at the opposite ends thereof one of which is provided with an elongated slot embracing the inner end wall of the body pivotally mounting the locking bar thereon for movement of the connecting bar portion to and from a position extending across the outer end wall of the body and between the legs of the first clamping member, said connecting bar portion being provided with noncircular means cooperating with that of the threaded member to lock it against turning, and cooperating means on the body and the other leg of the locking bar operating by resilient action of the U-shaped member to releasably retain the bar in locking position.

5. A wire and cable connector comprising two opposed clamping members connected for relative sliding movement and provided with opposed clamping surfaces for the wires, one of said members comprising a body member including side walls and end walls one of which is an inwardly extending cross wall forming its clamping surface, said clamping member also including a rotatable screw element mounted in the body member having threaded engagement with the other clamping member for clamping these members on the wires, said screw element being provided with a noncircular portion for cooperation with a similarly shaped tool for operating said element, a locking member comprising a substantially U-shaped member including spaced substantially parallel legs and a connecting bar between them, said connecting bar provided with a similar noncircular portion to that on the screw element to cooperate therewith to lock the element in clamping position, one of said legs being provided with an elongated slot embracing the said inwardly extending cross wall of the body member providing a pivotal connection between the locking member and the body member for movement of the connecting bar to and from a position across the other end wall to shift the noncircular portion on the locking member to

and from cooperative position with that on the screw element to lock and release said element, and cooperating means on the body member and the other leg of the locking member for releasably securing the locking member in locking position.

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