

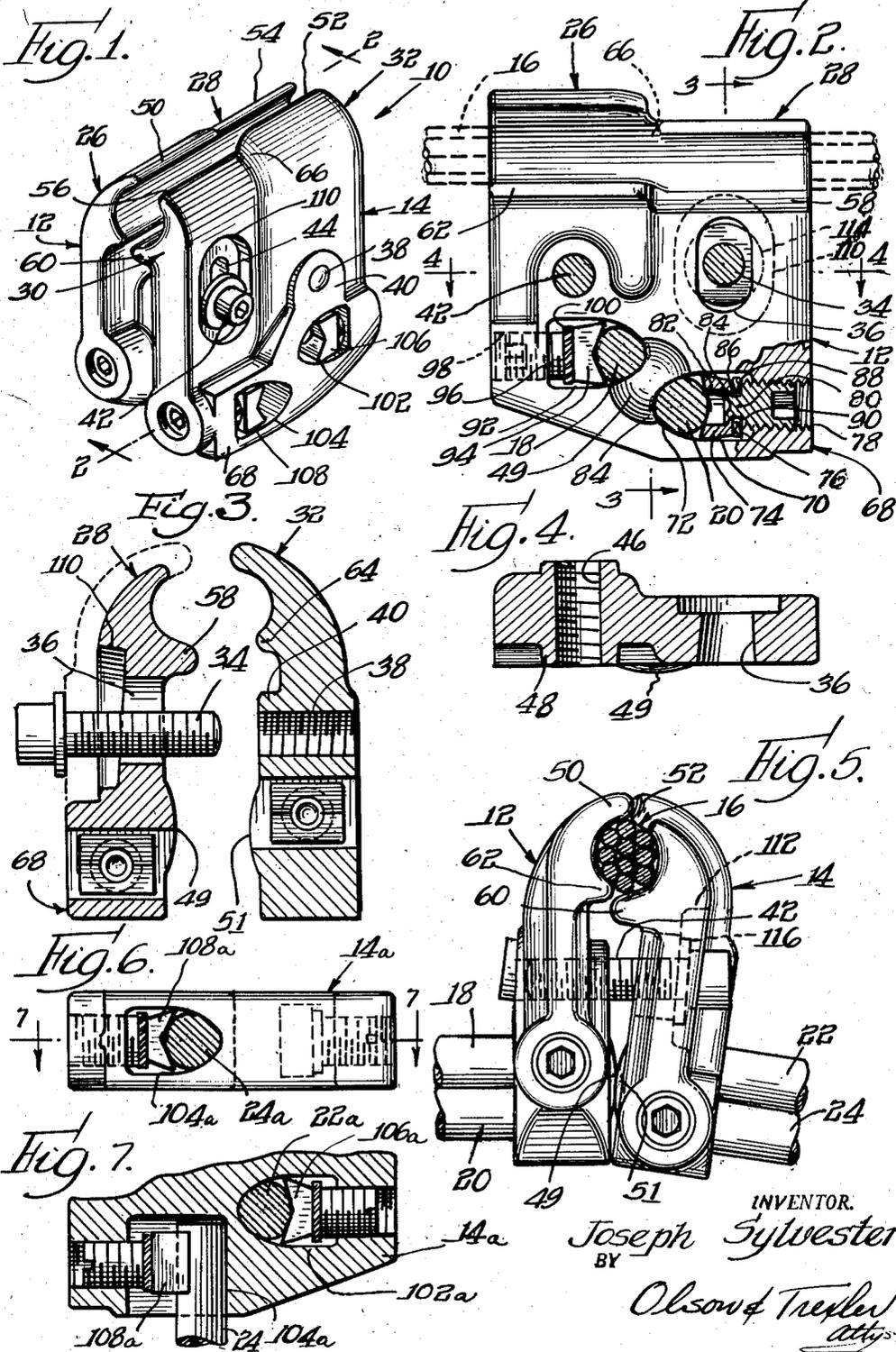
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CONNECTOR

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CONNECTOR

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The present invention relates to a novel connector, and more particularly to a novel device especially adapted for connecting a plurality of electric lines to a power cable or the like.

An important object of the present invention is to provide a novel connector including a pair of body members which may be easily and securely clamped onto an electrical power cable or the like, each of which body members is also connectable to one or more separate electrical lines or wires.

A more specific object of the present invention is to provide a novel connector of the above described type wherein the body members are provided with opposing jaw portions which prevent an electrical power cable or the like from inadvertently slipping from between the jaw portions and from being squeezed from between the jaw portions during application of the connector to the cable so that proper application to the cable may be obtained easier and faster.

A further object of the present invention is to provide a novel connector of the above described type which is constructed so that electrical wires or the like may be quickly and easily and more securely fastened to the body members of the connector.

Still another object of the present invention is to provide a novel connector of the above described type of simplified construction so that it may be easily and economically produced.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view showing a connector device embodying the principles of the present invention;

Fig. 2 is a sectional view taken along line 2-2 in Fig. 1 and is partially broken away to show a portion of the structure in greater detail;

Fig. 3 is an exploded sectional view taken along line 3-3 in Fig. 2;

Fig. 4 is a sectional view taken along line 4-4 in Fig. 2;

Fig. 5 is an end elevational view showing the novel connector fully applied to a cable;

Fig. 6 is an elevational view showing a slightly modified body member which may be used in the connector of the present invention; and

Fig. 7 is a fragmentary sectional view taken along line 7-7 in Fig. 6.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, a connector 10 incorporating the features of the present invention is shown in Figs. 1-5. This connector includes a pair of body members 12 and 14 which are adapted to be clamped onto a power cable 16 and to which separate wires 18, 20, 22 and 24 may be connected as shown in Fig. 5.

It is to be noted that the body members 12 and 14 are, identically formed so that production is simplified and made more economical. It will be appreciated that

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when the substantially identical body members are disposed in face-to-face relationship for assembly, the various elements thereof which are described in detail below will be oppositely disposed in proper cooperative relationship. The body member 12 includes a pair of axially aligned jaw portions 26 and 28, and the body member 14 includes jaw portions 30 and 32 which are respectively identical to the jaw portions 28 and 26 but are disposed in opposing relationship to the jaw portions 26 and 28 respectively. These jaw portions are provided with curved work engaging surfaces adapted to conform generally to the power cable 16 as shown in Fig. 5.

In order to draw the body members together and to clamp the jaw portions onto the cable, a screw 34 extends through an elongated slot 36 in the body member 12 beneath the jaw portion 28 and is turned into an internally threaded aperture 38 formed in an enlarged boss 40 on the body member 14 beneath the jaw portion 32. In addition, a similar screw 42 extends through an elongated slot 44 in the body member 14, which slot corresponds to the above described slot 36 and is disposed beneath the jaw portion 30 with its major axis substantially perpendicular to a plane containing the axis of the jaw portions. The body member 12 is provided with an internally threaded aperture 46 in an enlarged boss 48 for receiving the screw 42, which aperture and boss correspond to the above described aperture and boss 38 and 40.

Adjacent ends of the body members at sides of the screws opposite from the jaw portions, abutment portions 49 and 51 which are preferably rounded, are formed on the body members 12 and 14 for engagement with each other when the body members are drawn together as shown in Fig. 5. This structure substantially limits contact between the body members to the abutments so that when the screws are tightened, the members will pivot with respect to each other about the point of contact between the abutments 49 and 51 until the jaw portions are firmly clamped onto the cable.

It should be noted that jaw portions 26 and 32 of the body members 12 and 14 respectively have upper or outer end marginal extensions 50 and 52 which project substantially beyond outer marginal edges 54 and 56 of the jaw portions 28 and 30 and which are adapted substantially to overlie the power cable 16. In addition, the inner margins of the jaw portions 28 and 30 are respectively provided with extensions 58 and 60 which project beyond inner margins 62 and 64 of the jaw portions 26 and 32 and which are adapted substantially to underlie the power cable. This construction of the jaw portions in combination with the above mentioned pivotal movement of the body members enables the jaw portions to be applied to a cable from the side thereof when the body members are loosened or spread apart sufficiently so that the distance between the opposing jaw portion margins 59-56 and 52-54 is at least as great as the diameter of the cable but before the distance between the outer extensions 50 and 52 of the jaw portions 26 and 32 are spaced apart a distance as great as the diameter of the cable.

Application of the connector to the cable when the jaw portions are spread apart in the manner just described can be easily accomplished by flexing the cables slightly at the area between adjacent corners of the extensions 50 and 52 and indicated by the numeral 66 in Figs. 1 and 2, which adjacent corners are offset from each other axially of the jaw portions and rounded to permit the cable to pass therebetween. It will be appreciated that after the cable is flexed in the manner just described, a portion thereof may be easily slipped beneath the jaw portion extensions 50 and 52 which will

then retain the connector on the cable while the screws 36 and 42 are tightened. In addition, it is to be noted that the inner jaw portion extensions 58 and 60 will prevent the cable from slipping inwardly from between the jaw portions and will function along with the outer extensions 50 and 52 to prevent the cable from being squeezed from between the jaw portions during tightening of the screws.

In order to connect the above mentioned wire 20 to the body member 12, the body member is provided with a marginal portion 68 of increased cross sectional dimensions opposite from the jaw portions, which marginal portion has an opening 70 formed therein adapted to receive an end of the wire 20. The opening 70 is elongated and has one end defined by a generally V or U-shape wall section 72, and a clamping element 74 having a generally V-shape wire engaging surface is shiftably disposed in an opposite end portion of the opening 70 for clamping the wire 20 against the wall section 72 and thereby securely connecting the wire to the body member. The clamping element 74 is connected with and actuated by a socket head screw 76 which is turned into an internally threaded aperture 78 formed in the body member 12.

As shown in Fig. 2, the screw 76 has a reduced diameter portion 80 which extends into an aperture 82 in the clamping element 74 and has its terminal end 84 peened over an internal shoulder 86 of the clamping element so that the clamping element and screw are connected for relative rotation and also for slight relative axial movement. The margin of said aperture at the wire engaging surface of the clamping element provides an edge adapted to bite into the wire and mechanically interconnect the wire and clamping element. A lock washer 88 is assembled on the reduced diameter portion 80 of the screw between the clamping element 74 and a radially extending shoulder 90 of the screw. Thus, when the screw is turned to force the clamping element 74 against the wire 20, the lock washer 88 will also be clamped and compressed between the clamping element 74 and the screw shoulder 90 so as to restrain unauthorized retrograde movement of the screw. While various types of lock washers may be used, the washer 88 is preferably of the type including a plurality of circumferentially spaced radially extending teeth or prongs which are twisted about their radial axes.

The wire 18 is connected to the body member 12 in essentially the same manner as wire 20. More specifically, the body member is provided with another opening 92 which is identical to but oppositely arranged and offset with respect to the opening 70. A clamping element 94 is provided which corresponds to the above described clamping 74 and is rotatably and slightly axially shiftably carried by a socket head screw 96 which is threaded into an aperture 98 in the body member. A lock washer 100 is provided between the clamping element 94 and the screw 96 in the same manner as the above described lock washer 88.

The body member 14 is provided with means for securing the wires 22 and 24 which are identical to the above described means for securing the wires 20 and 18 and therefore need not be described in detail. It suffices to state that the body member 14 is provided with openings 102 and 104 for receiving ends of the wire members 22 and 24 in which openings clamping elements 106 and 108 are disposed and are actuated and locked by set screws and lock washer which are identical to the above described screws 76 and 96 and lock washers 88 and 100.

It is to be noted that the screws 34 and 42 are preferably socket head screws of the same size as the remaining screws in the device. This arrangement facilitates assembly of the device with a power cable and the separate wires since a workman need only have a single tool for tightening all of the screws. The body members are provided with elongated recesses 110 and 112 respec-

tively so that the head portions of the screws 34 and 42 will not project unduly, and washers 114 and 116 are provided on the screws 34 and 42 for engaging the bottom of the recesses and facilitating slipping of the screws along the recesses upon pivotal movement of the body members with respect to each other during application of the device to a power cable or the like.

Figs. 6 and 7 illustrate a slightly modified form of the present invention. This embodiment is identical to the structure described above as indicated by the application of like reference numerals with the suffix *a* added to corresponding elements except that the opening 104a, for example, is formed so that it opens at the bottom marginal edge of the body member rather than at a side surface of the body member. While the opening 102a in this embodiment is shown in the same position as the opening 102 described above, it should be understood that the opening 102a could also be formed so as to open at the bottom marginal edge of the body member, if desired. It should also be understood that both body members of the connector may be modified in the manner shown or as just described or, if desired, one of the body members could be modified while the other of the body members could have one or both of its wire receiving openings located in the manner as shown in Figs. 1-5.

While the preferred embodiments of the present invention have been shown and described herein it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A connector of the type described comprising first and second opposed body members each having first and second generally axially aligned work engageable jaw portions, the first and second jaw portions of said first body member respectively substantially opposing first and second jaw portions of said second body member, said first jaw portion of said first body member and said second jaw portion of said second body member including outer marginal extensions projecting beyond outer marginal edges of the other of said jaw portions for substantially overlying a workpiece such as a cable or the like having a predetermined diameter during application of the jaw portions to the workpiece, said marginal extensions having adjacent generally diagonally relieved inner corner portions formed so as to be spaced apart a distance at least as great as said diameter when the remainder of said marginal extensions are spaced laterally from each other less than said diameter and from said marginal edges of opposing jaw portions a distance at least as great as said diameter to facilitate application of said jaw portions to a workpiece, and means connected with said members for clamping opposing jaw portions of said members onto a workpiece.

2. A connector, as defined in claim 1, wherein the second jaw portion of said first body member and the first jaw portion of said second body member have inner marginal extensions projecting beyond inner margins of the other of said jaw portions for substantially underlying a workpiece during application of said jaw portion to the workpiece.

3. A connector, as defined in claim 1, wherein said clamping means includes screw means connected with intermediate portions of said body members, and wherein said connector includes abutment means extending between said body members at a side of the screw means opposite from said jaw portions for providing a pivot point about which said body members move with respect to each other when the screw means is turned to clamp said jaw portions onto a workpiece.

4. A connector, as defined in claim 3, wherein said screw means includes a first screw extending through an elongated slot in said first body member and threadedly engaging said second body member, and a second screw extending through an elongated slot in said second body member and threadedly engaging said first body

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member, said slots having their major axes disposed in planes substantially perpendicular to longitudinal axes of said jaw portions.

5. A connector of the type described comprising first and second opposed body members each having first and second generally axially aligned work engageable jaw portions, the first and second jaw portions of said first body member respectively substantially opposing the first and second jaw portions of said second body member, said first jaw portion of said first body member and said second jaw portion of said second body member including outer marginal extensions projecting beyond outer marginal edges of the other jaw portions for substantially overlying a workpiece such as a cable or the like during application of the jaw portions to the workpiece, means connected with said members for clamping said jaw portions of said members onto a workpiece, and separate clamping means on each of said body members for securing workpieces such as wires or the like to said body members, each of said separate clamping means including opening defining means in its associated body member, and a screw element adjustably threadedly engaging said associated body member and projecting into said opening.

6. A connector of the type described comprising first and second opposed body members each having first and second generally axially aligned work engageable jaw portions, the first and second jaw portions of said first body member respectively substantially opposing the first and second jaw portions of said second body member, said first jaw portion of said first body member and said second jaw portion of said second body member including outer marginal extensions projecting beyond outer marginal edges of the other jaw portion for substantially overlying a workpiece such as a cable or the like during application of the jaw portions to the workpiece, means connected with said members for clamping said jaw portions of said members onto a workpiece, and separate clamping means on each of said body members for securing workpieces such as wires or the like to said body members, each of said last mentioned clamping means including means defining an opening in a body member for receiving a portion of a wire or the like, a clamping element disposed in said opening for clamping a wire portion inserted into the opening against an opposing wall of the opening, a screw member threadedly engaging said last mentioned body member and rotatably and slightly axially shiftably connected with said clamping element for actuating said clamping element, and a resilient locking member disposed between said clamping element and shoulder means on said screw member for locking said screw member against unauthorized retrograde movement after the screw member has been turned to force the clamping element against a wire or the like and to clamp the locking means between the clamping element and said shoulder means.

7. In a connector of the type described, a body member connectable with a first workpiece, means defining an opening in said body member for receiving a portion

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of a second workpiece such as a wire or the like, means providing an internally threaded aperture in said body member extending from an outer surface of said body member to said opening, a screw member threaded into said aperture and having shoulder means facing generally towards said opening, a clamping element shiftably disposed in said opening and slightly axially shiftably connected with said screw member for clamping a portion of a wire or the like inserted into said opening against an opposing wall of the opening, and a lock washer disposed between said clamping element and said shoulder means of the screw member for restraining retrograde movement of the screw member after the screw member has been turned so that a workpiece is clamped within said opening and said lock washer is clamped between said clamping element and said shoulder means.

8. A connector, as defined in claim 7, wherein said clamping element includes a generally V-shape work engageable surface, and wherein said opposing wall of said opening is generally V-shape.

9. A connector, as defined in claim 7, wherein said clamping element includes means defining a recess in a work engageable surface thereof so that upon tightening of said clamping element against a workpiece such as a wire or the like, a portion of the wire may be forced into the recess mechanically to interlock the clamping element and the workpiece.

10. A connector, as defined in claim 7, wherein said screw member includes a reduced diameter portion extending from said shoulder means through said lock washer and into an aperture in said clamping element, said clamping element including internal annular flange means defining a mouth of said aperture, and said screw element including an enlargement at a terminal end of said reduced diameter portion overlying said annular flange means for interconnecting said screw member and said clamping element.

11. A connector, as defined in claim 1, which includes separate clamping means on at least one of said body members for securing an additional workpiece such as a wire or the like to said one body member, said separate clamping means including opening defining means in said one body member for accommodating said last mentioned workpiece, and a screw element adjustably threadedly engaging said one body member and projecting into said opening.

12. A connector, as defined in claim 11, which includes a plurality of said additional clamping means on said one body member.

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