June 25, 1940. R. A. GOELLER 2,205,474

CONNECTOR

Filed June 22, 1937 2 Sheets-Sheet 1

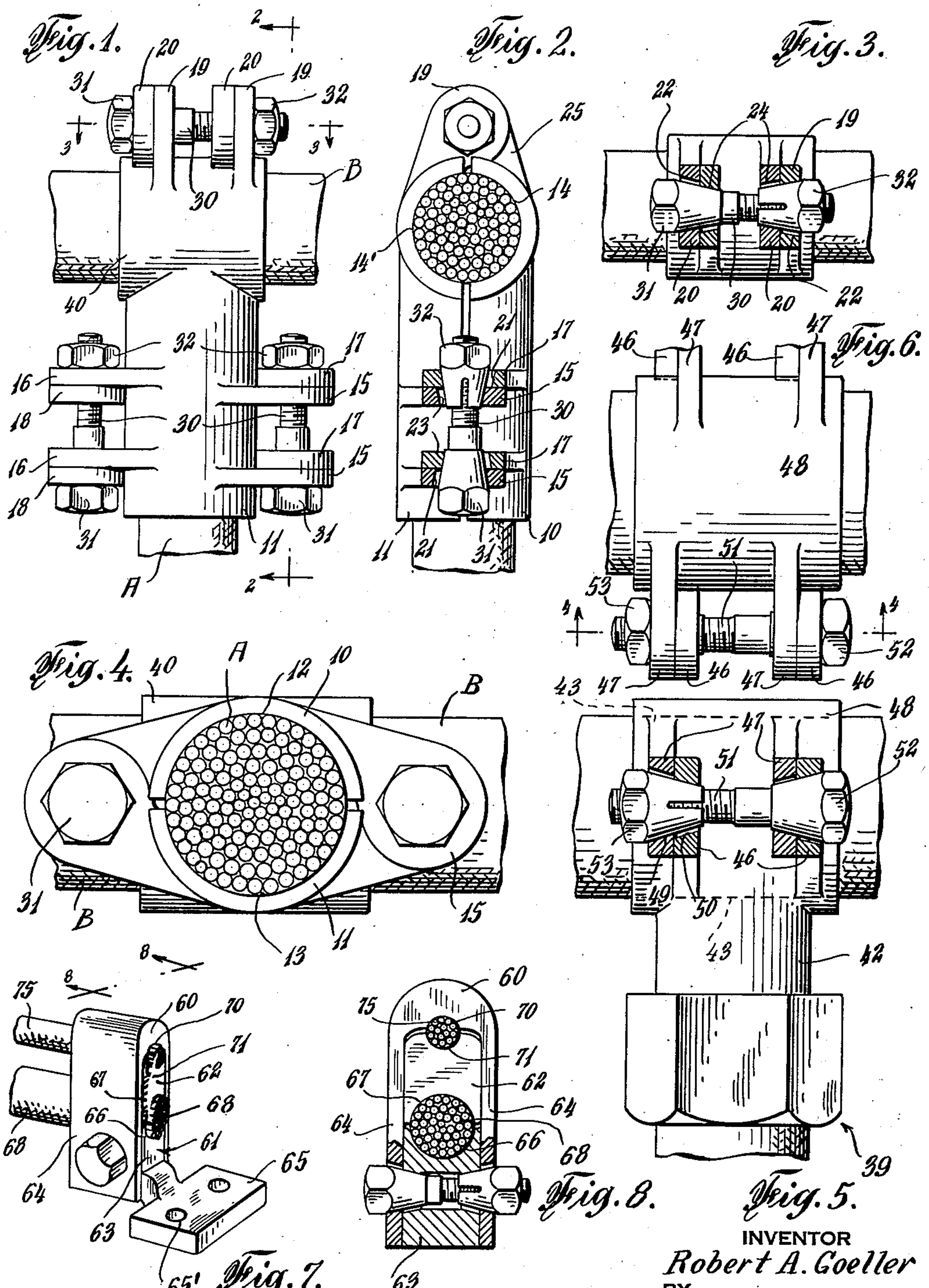

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Fig. 9.

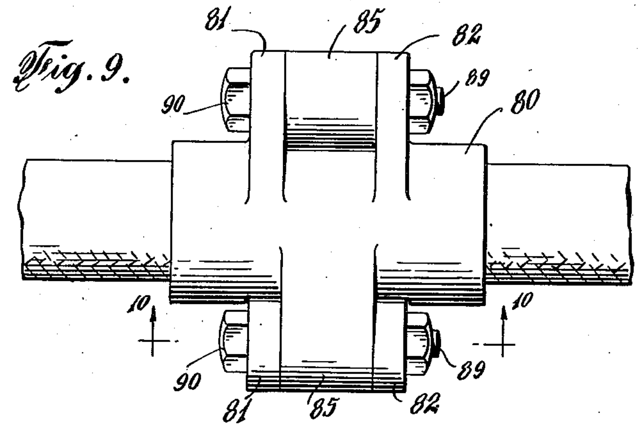


Fig. 10.

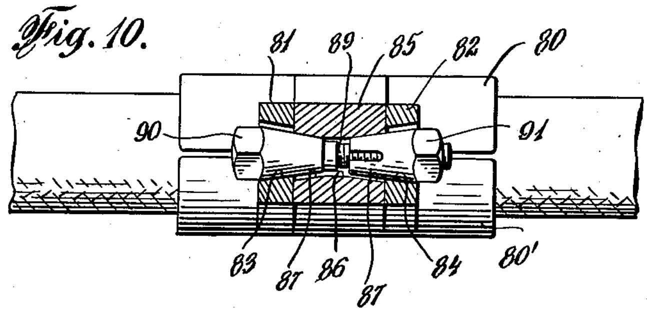


Fig. 11.

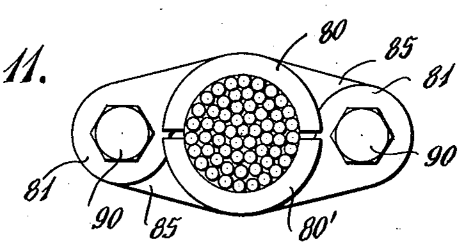
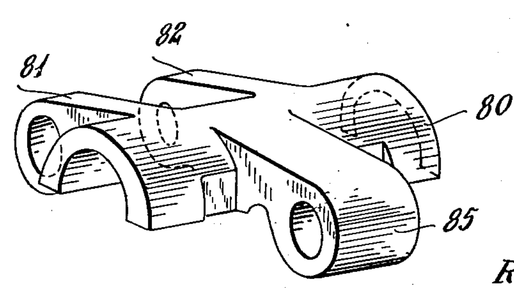


Fig. 12.



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Patented June 25, 1940

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UNITED STATES PATENT OFFICE

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CONNECTOR

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Application June 22, 1937, Serial No. 149,777

8 Claims. (Cl. 24—125)

This invention relates broadly to connecting means for pipes, rods, cables and the like and more particularly to devices for forming a firm electrical connection between cables or other conductors.

In my United States Patent No. 2,046,942, granted July 7, 1936, I diclose a novel form of connector of this character wherein two members, each provided with a clamping jaw, are adapted to be drawn into clamping engagement by means of a tapered bolt and nut, which engage tapered openings in the respective members. In the particular embodiment of the invention therein disclosed, the members are respectively a yoke and a body member.

In one form of the present invention, I provide two or more body members adapted to cooperate with a single yoke, to clamp a plurality of conductors.

In another form of the present invention, instead of employing a body and yoke member, I employ tubular or partly tubular members.

Among the objects of my invention is to provide a device of this character which is composed of but few parts, all of which are simple in construction and are economical to manufacture, one which may be easily applied to and removed from the conductor, one wherein the clamping forces are so equalized throughout the structure that a very uniform clamping pressure may be obtained with a minimum of effort without danger of injury to the parts, and one which is durable in use and will withstand the severest climatic condition.

Other objects and advantages of my invention will appear from the following description taken in connection with the accompanying drawings, wherein:

Figure 1 is a side elevation of a device adapted to form a T connection between two conductors;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged bottom plan view of the structure shown in Figure 1;

Figure 5 is a side elevation, partly in section, showing a modification;

Figure 6 is a top plan view, partly broken away, of the structure shown in Figure 5;

Figure 7 is a perspective view showing a modification;

Figure 8 is an end elevation of the structure, certain of the parts shown in section, on the line 8—8 of Figure 7;

Figure 9 is a top plan view of a connector, adapted to join two conductors or other similar members positioned in alignment with one another;

Figure 10 is a sectional view taken on the line 10—10 of Figure 9;

Figure 11 is an end elevation of the structure shown in Figure 9; and

Figure 12 is a perspective view of one of the two coupling members of the connector of Figure 9.

Referring more particularly to Figures 1 to 4, the device is adapted to connect a cable or conductor A, there shown to be vertical, with a second cable or conductor B, shown to be horizontal, thus forming a T connection between the two.

The connector proper comprises two body or semi-tubular members 10 and 11, which when used as an electrical connector, is formed of copper or other suitable conducting metal. The inner or concave faces 12 and 13 of the members 10 and 11 respectively, form opposed clamping jaws for the vertical conductor A, and the concave or channeled faces 14 and 14', which extend at right angles to the faces 12 and 13, form clamping jaws for the horizontal conductor B. These faces in the preferred form of my invention are preferably serrated so as to insure a firm grip on the conductor.

The member 11 is formed with oppositely extending pairs of lugs or flanges 15 and 16, the respective members of the pair 16 being spaced above the members of the pair 15 by the width of the lug. Similarly, the member 10 is formed with spaced oppositely extending pairs of lugs 17 and 18 respectively which are spaced in the same manner relative to one another as the lugs 15 and 16 of the member 11. The lugs are located adjacent the edges of the members and extend beyond the members so that adjacent lugs of the respective members lie in overlapping relationship. Also, the member 11 at its top is formed with upwardly projecting lugs 19 and the member 10 with corresponding lugs 20.

As will be seen from Figure 1, the lugs 18 are not disposed symmetrically of the vertical axis of the connector, the lugs 19 being disposed toward the right and the lugs 20 toward the left, as viewed in that figure. As may be readily perceived, the members 10 and 11, as shown, are of identical construction. Of the lugs 15, 16, 17 and 18, the lower lugs 15 and 19 and the upper lugs 16 and 17 are formed with inwardly tapered openings 21 and similarly the outer lugs 19 and 20 are formed with inwardly tapered openings

22. The intermediate lugs 15, 16, 17 and 18 are formed with inwardly tapered openings 23 and the intermediate lugs 19 and 20 are also formed with inwardly tapered openings 24. (See Fig. 3.) The tapered openings in adjacent lugs are substantially in alignment and the taper is uniform throughout.

The lugs are preferably formed integral with their respective members, and the material of the lug is built up at one side as indicated, say at 25 in Figure 2, so that the lug surface extends approximately tangential to the outer surface of the tubular mmeber, thus adapting the lug to withstand a great tensile strain in clamping position.

Extending through each pair of lugs on the member 11 and also its corresponding pair on the member 10, is a bolt 30 having an inwardly tapered head 31 and an inwardly tapered nut 32, the tapers being the same as the tapers of the openings.

To apply the device to the conductors, the members 10 and 11 are placed over the conductors, the bolts 30 are inserted each through partly aligned openings and the nuts 32 applied and tightened. It will, of course, be understood that the openings are somewhat eccentric to one another, as the condition is necessary for the creation of the clamping pressure.

As is plainly seen in the lower part of Figure 2, for example, which shows the device in clamping position, the head 31 of the bolt 30 bears on the righthand wall of the tapered openings 21 and on the lefthand wall of the tapered opening 23, thus holding the members 10 and 11 closely clamped against the conductor, while the nut 32 of the bolt 30 bears on the lefthand wall of the upper recess 21 and on the righthand wall of the lower recess 23, likewise holding the members 10 and 11 in clamped position.

It will be seen that the lower contacting lugs 15 and 17 are spaced substantially from the upper contacting lugs 15 and 17, and it is obvious that in designing the connector, these lugs may be spaced at considerably greater distance apart and a longer bolt used, or if desired, the bolt may have a plurality of tapered nuts, each of which is adapted to be received in similar tapered openings in other contacting lugs, thus permitting the application of a clamping force over a considerable distance.

Figure 3 shows the construction of the upper bolt 30 and lugs 22 and 24, which is in all respects similar to that of the lower bolt and lugs.

Due to the fact that the cylindrical surfaces 40 of the members 10 and 11 may give slightly, the material being sufficiently thin it is possible to clamp the two conductors firmly even if one of them is slightly under or over size. This is largely because the horizontal channels cross the vertical channels and the metal of the horizontal portion is not confined at the edges.

In the form of invention shown in Figures 5 and 6, inclusive, the vertical conductor is connected to the connector at 39 in any appropriate manner, but preferably in accordance with the constructions disclosed and claimed in one or another of my Patents Nos. 1,710,416 and 2,046,942. The upper portion of the tubular or body member 42 is formed with a semi-cylindrical recess, the bottom of which is shown by a dotted line at 43 in Figure 5 and this body member is formed on opposite sides with projecting pairs of lugs 46 adapted to rest in contact and to cooperate with lugs 47, formed on a semi-cylindrical top or cap member 48, said lugs 47 extending from opposite sides thereof as indicated in Figure 6. All lugs are formed with inwardly tapered openings indicated at 49 and 50 in Figure 5 and the bolt 51, with its tapered head 52 and tapered split nut 53 is adapted to cooperate with the lugs in drawing the cap 48 down toward the body member and clamping the conductor between the jaw formed by the cap and by the upper end of the body member.

While I have disclosed semi-cylindrical members 10 and 11, it should be stated that such members need not be semi-circular, but may subtend any desired arc and in such case, I may employ three or more members for clamping on to a single conductor. The use of more than two equivalent members to form clamping jaws is particularly desirable in massive constructions such as large gas mains.

It will, of course, be apparent that while I have disclosed cylindrical conductors, rods or other members in the drawings, other than circular cross section may be employed, thus, for example, the rod or other member rectangular in section, in which case the clamping jaws will have a sectional outline generally in conformity with the section of the conductor. This may be applied, for example, in an interleaved busbar connection of rectangular cross section.

Referring to the construction shown in Figures 7 and 8, reference character 60 represents a yoke member adapted to embrace a body or lug member 61 and an intermediate body member 62. The body member 61 is substantially L shaped in cross section and comprises an upper right portion 63 adapted to be received between the sides 64 of the yoke member 60 and an extended portion 65, formed with openings 65′ for the reception of bolts or other means for attachment thereto of a conducting bar, such as a busbar. The body member 61 is formed with a recess or jaw 66 approximately semi-cylindrical in section between which and the corresponding recess or jaw 67 formed at the bottom of the second body member 62, a conductor 68 is clamped.

The bend of the U of the yoke member 60 forms a jaw 70, between which and the jaw 71 along the top of the body 62, a second conductor 75 is clamped.

In the construction shown in Figures 9 to 12, inclusive, two coupling members 80 and 80′ are employed, which are of identical construction. The member 80, for example, is formed with two spaced lugs 81 and 82, which are formed with inwardly tapered openings 83 and 84. As will be seen from Figure 9, the central lug 85 of one member extends between the spaced pair of lugs on the other member, so that the openings 83 and 84 are slightly eccentric to the bore 87 in the central lug 85. Extending through these openings is a bolt 89, having a tapered head 90 and a tapered nut 91. I have shown the same construction of lugs and bolt at both sides of the semi-tubular clamping members, as is plainly indicated in Figures 9 and 11. I may, however, in certain cases, provide the clamping lugs at one side with straight or non-tapered openings and employ an ordinary bolt which extends through the three lugs at that side, employing the tapered bolt and nut construction at the opposite side.

In this latter construction, the drawing together of the semi-tubular clamping jaws will be effected by the tapered bolt and nut construction, as shown, for example, in Figure 10, and the straight bolt at the opposite side will simply act as a hinge during the operation of drawing the parts toward one another. In the action, the motion within the lugs, as will be apparent from inspection of Figure 10, is similar to that of the body and yoke members in my Patent No. 2,046,942. Where the members to be clamped are of considerable length, there may be employed in alignment or otherwise a plurality of these groups of three cooperating lugs.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. A pair of semi-tubular members, the concave faces of which form clamping jaws, a pair of spaced lugs on each member, lugs of the respective pairs being closely adjacent and extending into overlapping relationship, adjacent lugs being formed with inwardly and uniformly tapered openings initially eccentric to one another, a wedge extending through the openings of each two lugs in a direction parallel to a tube axis and means connecting the wedges for drawing the wedges toward one another so as to move said members to clamping action.

2. A pair of semi-tubular members with concave faces forming clamping jaws, a pair of spaced lugs on each member, each lug of one pair being closely adjacent to and extending into overlapping relationship with a corresponding lug of the other pair, adjacent lugs being formed with inwardly uniformly tapered openings initially eccentric to one another, a bolt having a tapered head extending into the openings of two adjacent lugs in a direction parallel to the jaws and having a tapered nut extending into the openings of the other two adjacent lugs.

3. A tubular member formed with a transverse concave face at one end, a member having a concave face adapted to cooperate with said first named face to clamp a conductor, a pair of lugs on each of said members, each lug of one pair being closely adjacent to and extending into overlapping relationship with a corresponding lug of the other pair, adjacent lugs being formed with inwardly uniformly tapered openings initially eccentric to one another, rotary wedge means extending into the openings of adjacent lugs in a direction parallel to the axis of a concave face for drawing members toward one another and means for securing a conductor in the tubular opening in said first named member.

4. In a clamping device, a plurality of semi-tubular clamping members, each member having at one side a pair of projecting lugs and at the opposite side a single projecting lug, the single projecting lug of each member extending between the pair of lugs of the other member, the single lug being provided with an opening extending therethrough, the ends of which are slightly tapered inwardly and the pair of lugs each being provided with openings therethrough having inward tapers corresponding to the tapers of the opening in said single lug and a bolt extending, in a direction of the axis of a tubular member through the openings in the pair and single lugs, said bolt having a tapered head which bears on the wall of the opening in one of said pairs of lugs and the tapered wall in one end of the opening of said single lug, and having a tapered nut which bears against the tapered wall of the opening in the other lug of said pair and against the tapered wall at the opposite end of the opening in said single lug, and the shank of said bolt being free from the walls of the openings.

5. In a device of the character described, a plurality of members having concave faces forming clamping jaws and adapted to receive a substantially cylindrical body therebetween, said members having overlapping lugs with tapered openings initially eccentric to one another, wedge means in said openings for drawing said members toward one another to effect a clamping action, at least one of said members between said lugs being substantially cylindrical and of uniform thickness for its entire length, the cylindrical portion being sufficiently thin to permit said wedge means to bend said portion into firm gripping contact with an object to be clamped.

6. In a device of the character described, a plurality of members having concave faces forming clamping jaws and adapted to receive a substantially cylindrical body therebetween, said members having overlapping lugs with tapered openings initially eccentric to one another, screw wedge means in said openings extending parallel to the axis of a concave face for drawing said members toward one another to effect a clamping action, at least one of said members between said lugs being substantially cylindrical and of uniform thickness for its entire length, the cylindrical portion being sufficiently thin to permit said wedge means to bend said portion into firm gripping contact with an object to be clamped.

7. A tubular structure the inner surface of which is adapted to be clamped against an object, said structure having two free edges extending parallel to the axis of the tube, said structure being formed with adjacent overlapping lugs extending from opposite edges, said lugs being formed with tapered openings initially eccentric to each other and wedge means in said openings extending parallel to the tube axis for drawing said edges toward one another, said tubular structure between said lugs being of substantially the same thickness throughout its length and being sufficiently thin to permit said wedge means to bend the material between the lugs into firm gripping contact with said object.

8. A tubular structure the inner surface of which is adapted to be clamped against an object, said structure having two free edges extending parallel to the axis of the tube, said structure being formed with adjacent overlapping lugs extending from opposite edges, said lugs being formed with tapered openings initially eccentric to each other and screw wedge means in said openings extending parallel to the tube axis for drawing said edges toward one another, said tubular structure between said lugs being of substantially the same thickness throughout its length and being sufficiently thin to permit said wedge means to bend the material between the lugs into firm gripping contact with said object.

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