Nov. 20, 1934. C. H. BISSELL 1,981,796

ELECTRIC GROUNDING CONNECTER

Filed Feb. 6, 1933 3 Sheets-Sheet 1

FIG. 1.

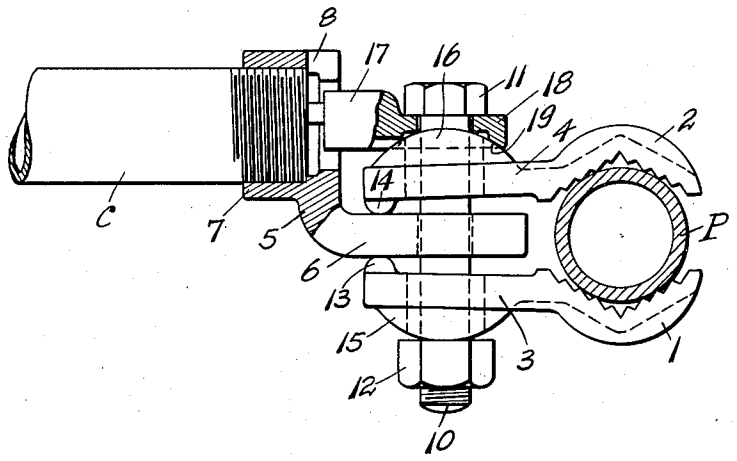
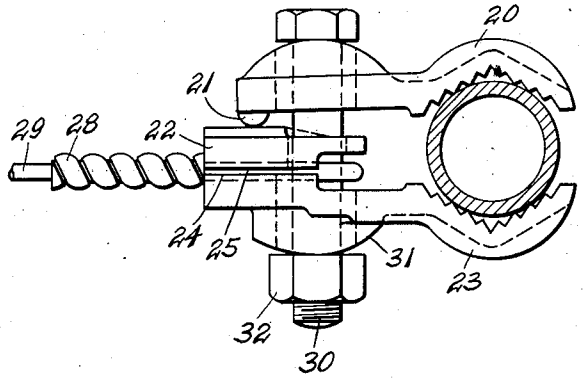


FIG. 2.



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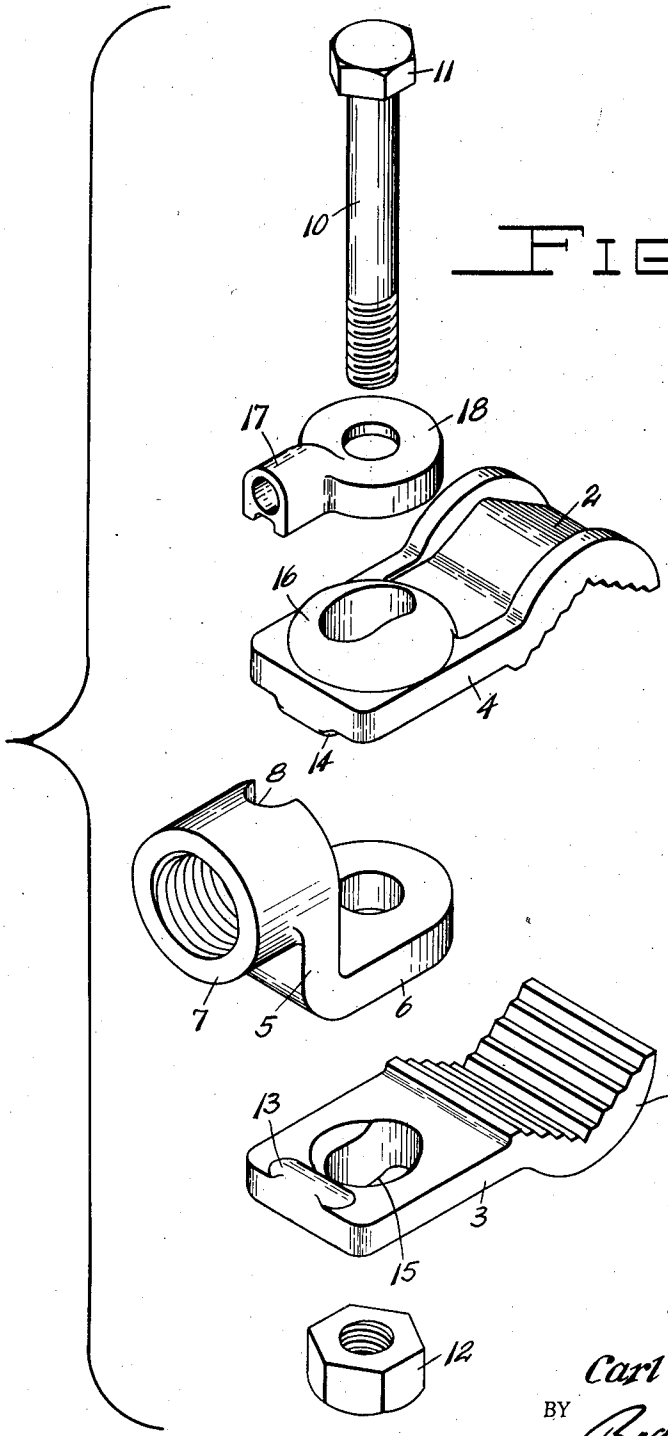


FIG. 3.

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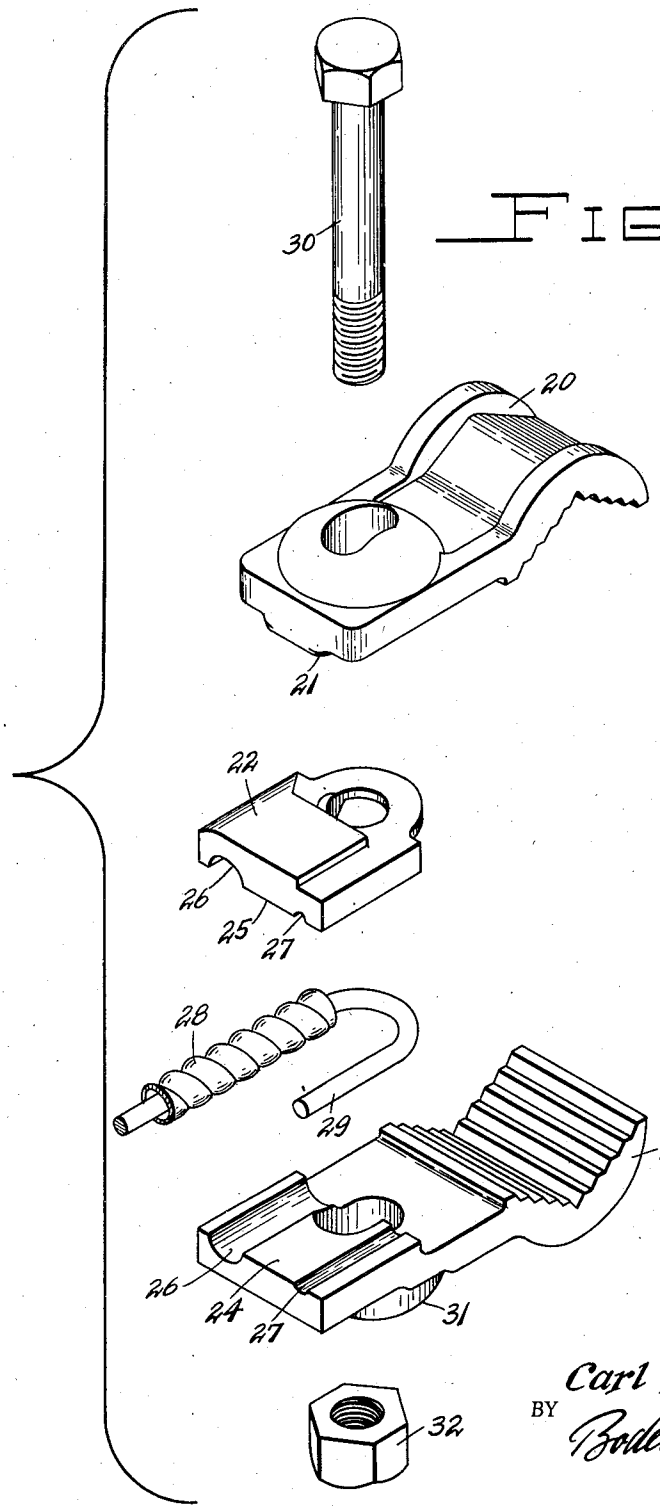


FIG. 4.

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UNITED STATES PATENT OFFICE

1,981,796

ELECTRIC GROUNDING CONNECTER

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Application February 6, 1933, Serial No. 655,338

11 Claims. (Cl. 247—1)

This invention relates to electric connecters or connecters for grounding conductors as to a water pipe, and for grounding an electric conduit system and the electric wire therein to a grounded conductor, as a water pipe, and has for its object a connecter of this type which is particularly and extremely simple and economical in construction, readily installed and consists of a minimum number of parts, which, when assembled, form a strong rigid bracket-like connection.

It further has for its object a connecter which is rigid when finally assembled to act as a supporting bracket for a conduit of an electric conduit system, that is, for supporting a conduit from a water pipe and which is readily adjustable to conform to various angles that the conduit may approach the grounded conductor or water pipe.

It further has for its object a connecter of this type embodying jaws for gripping the grounded conductor or pipe, one or both of which jaws have a fulcrum or pivotal movement effected by a clamping member, as a bolt, and connections in the nature of a universal connection between the clamping means or bolt and the fulcrumed jaw or jaws which permit or facilitate the pivotal action of the jaw or jaws during the tightening of the clamping means.

It further has for its object an arrangement of a wire binding terminal for the grounding wire coming out of the electric conduit system whereby the terminal is clamped or grounded to one of the jaws by the same clamping means which clamp the jaws together and which does not interfere with the pivotal or fulcruming movement of the jaws during the tightening of the clamping means.

Other objects appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of one form of my grounding connecter, partly in section, the conductors connected thereby being also shown.

Figure 2 is a side elevation of a slightly different form of connecter from that shown in Figure 1.

Figures 3 and 4 are exploded views of the connecters shown in Figures 1 and 2.

This connecter comprises generally opposing rigid jaw members for gripping a conductor, as a water pipe, said jaw members having outwardly extending shanks rigid therewith, a rigid intermediate member having a portion extending between the shanks, the connecter having means formed at least in part in the intermediate member for attachment to a second conductor, as an electric conduit or a cable, and means for clamping the jaw members or the shanks thereof toward opposite sides of the intermediate member and also in some instances (Figure 1) in different radial angular relations to the intermediate member and firmly or rigidly uniting the jaw members and the intermediate member together so that they act as a rigid unit.

In Figures 1 and 3, the means for connection to the second conductor or conduit is provided wholly on the intermediate member.

1 and 2 designate respectively opposing jaw members for gripping a grounded conductor, as a water pipe P, the jaw members having outwardly extending shanks 3, 4 respectively, these being usually flat plates rigid with the jaw members. The jaw portions or faces are so shaped as to grip firmly different sizes of pipes.

5 designates the intermediate member, this having a portion 6 which is preferably flat extending between the shanks 3, 4, the intermediate member also having means, as an internally threaded collar or nipple 7, for connection to an electric conduit C. As the jaws have a pivotal movement during their clamping action, one or both coact with the intermediate member to have a pivotal movement or are fulcrumed thereon so as to rock during the tightening action of the clamping means.

In the form shown in Figure 1, both jaws are capable of having the same pivotal movement but in the form shown in Figure 2 wherein one of the jaws or the shank thereof clamps a cable between it and the intermediate member, the other jaw only has a pivotal movement, although as the jaws are clamped toward each other, both would necessarily have some rocking movement, but in the form shown in Figures 2 and 4, due to the flat bearing faces of one jaw, which faces are formed with grooves for receiving a cable, the jaw would not have much of a pivotal movement.

The clamping means here shown is a member, as a bolt 10, extending through the shanks of the jaws and the intermediate member 5 and having shoulders, as the head 11 of the bolt and the nut 12, which thrust toward the outer faces of the shanks 3, 4 and the clamping means and the

shanks are provided with means for permitting a fulcruming or pivotal action of one or both of the jaws during the tightening of the clamping means, that is, tightening of the nut 12.

As shown in Figure 1, both shanks 3, 4 are provided with fulcrums 13 and 14 coacting with the outside faces of the portion 6 of the intermediate member, and the bolt 10 extends through the shanks and intermediate member between these fulcrums and the jaws; and the jaws are provided with rounding bearing faces which in the form shown in Figure 1, because the intermediate member is adjustable into different angular radial relations, is in the form of spherical zones 15 and 16, through which the bolt extends axially. Hence, owing to these rounding surfaces 15 and 16, the pivotal movement of the jaws is facilitated during the clamping of the nut 12 in any angular relation of the intermediate member and the jaws.

In the form shown in Figure 1, which is adapted for grounding an electric conduit system and a grounding wire coming out of the conduit, one of the shoulders 11 or 12 does not engage directly with its coacting rounding surface, as a wire binding terminal 17 is interposed between this shoulder and the opposing rounding bearing surface. Preferably, the wire binding device is interposed between the head 11 of the bolt and the surface 16 and is provided with the usual washerlike collar 18 through which the bolt extends. This collar is, however, provided with a socket 19 receiving the rounding surface 16 to coact therewith with a universal joint action during the clamping of the jaws. The collar 7 is provided with a sight opening 8 through which the soldered joint between the terminal 17 and the wire is visible for inspection, when the terminal is long enough to extend partly into the collar, or when the intermediate member is so short that the end of the terminal necessarily extends into the collar.

In the form shown in Figures 2 and 4, one of the jaws, as 20, only is provided with a fulcrum 21 coacting with the intermediate member 22, the same as in Figure 1, and the shank of the other jaw 23 is formed with a flat bearing surface 24 opposed to a corresponding flat bearing surface 25 on the intermediate member 22. These two opposing surfaces are formed with mating grooves or channels 26 and 27 providing jaw surfaces for engaging an armored cable 28 which corresponds to an electric conduit and the naked projecting end of the wire 29 from which the armor has been removed, the naked end being looped around the clamping bolt 30.

In the forms shown in Figures 2 and 4, the jaws 23 would have but a slight pivotal movement during the clamping of the bolt and to compensate for any incidental pivotal movement, the shank of the jaws is formed with a substantially cylindrical bearing surface 31 with which the nut 32 of the bolt coacts, this being cylindrical instead of spherical because there is not any angular adjustment of the intermediate member relative to the jaw, no angular adjustment being necessary, as the cable is flexible. For manufacturing purposes, the parts of the two forms shown in Figures 1 and 2 are duplicates insofar as possible, hence the jaw 20 is a duplicate of the jaw 3 or 4 (Figure 1).

In the operation of the form shown in Figure 1, the intermediate member is attached to the end of a conduit and the conduit brought, bent or sprung into position, whereby its end is near the conductor or water pipe, at any one of a number of angles. The wire terminal 17 has been previously soldered to the end of the wire coming out of the conduit and the washerlike head thereof placed between the head 11 of the bolt and the surface 16. The jaws 1 and 2 are then placed at any desired angle along the water pipe and the nut tightened. During the tightening of the nut 12, both jaws have a pivotal movement, and this is permitted and made easy without undue binding, owing to the jaws fulcruming on opposite sides of the intermediate member 5 and the spherical surfaces 15, 16 and the spherical socket 19 of the wire binding terminal 17. The fulcruming and the universal joint action may take place in any angular relation of the intermediate member and the jaws.

In the form shown in Figure 2, the cable and wire are placed in juxtaposition between the jaw 23 and the intermediate member 22 and looped around the bolt 30, the jaws placed in juxtaposition to the water pipe and the nut on the bolt tightened. During the tightening of the nut, the jaw 20 will have a pivotal movement and the jaw 23 a slight pivotal movement, the pivotal movement of the jaw 23 being the same as in Figure 1, and the pivotal movement of the jaw 20 being permitted without binding by the cylindrical surface 31. During the tightening of the nut of the bolt 32, the armor of the cable and the wire are firmly clamped between the shank of the jaw 23 and the intermediate member 22 in the grooves 26 and 27 respectively.

What I claim is:

1. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the connecter having means formed at least in part in the intermediate member for attachment to a second electrical conductor, one of said shanks fulcruming on the intermediate member, and means for clamping the shanks against opposite sides of the intermediate member and clamping the jaw members toward opposite sides of the intermediate member, said means including a bolt extending through the shanks and the intermediate member and a nut threading on the bolt, the bolt having shoulders thrusting toward the shanks, said shoulders being the head of the bolt and the nut threading on the bolt, the shoulder coacting with the fulcrumed shank and the fulcrumed shank having coacting bearing surfaces, one of which is rounded to permit rocking movement of the fulcrumed jaw relatively to the bolt during tightening of the nut.

2. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member having a portion extending between the shanks, the connecter having means embodied at least in part in the intermediate member for connection to a second conductor, one of the shanks fulcruming on one side of the intermediate member whereby the fulcrumed shank has a pivotal clamping movement, clamping means for clamping the shanks to the opposite sides of the intermediate member, the clamping means and the shank of the fulcrumed jaw having bearing surfaces coacting with a rocking action facilitating the pivotal movement of the fulcrumed jaw members during tightening of the clamping means.

3. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending flat shanks,

and an intermediate member having a flat portion extending between the shanks and also having means for attachment to the end of an electric conduit, the shanks having projecting fulcrums on their inner faces opposed to the intermediate member, said fulcrums coacting with opposite faces of the intermediate member and each of said shanks being provided with a spherical surface on its outer face and clamping means extending through the shanks and the intermediate member between the fulcrums and the jaw portions of said members, and coacting with the spherical surfaces of said members.

4. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member having a portion extending between the shanks and also having means for connection to a second conductor, said shanks fulcruming on opposite sides of the intermediate member whereby the shanks have a pivotal movement for clamping the jaws on the conductor, clamping means for clamping the shanks toward opposite sides of the intermediate member, the clamping means and the shanks having bearing surfaces coacting with a universal joint action facilitating the pivotal movement of the shanks during the clamping of the jaws on the conductor.

5. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member having a portion extending between the shanks and also having means for connection to a second conductor, said shanks fulcruming on opposite sides of the intermediate member whereby the shanks have a pivotal movement for clamping the jaws on the conductor, the shanks being formed with substantially spherical bearing surfaces and a clamping bolt extending through the shanks and the intermediate member and axially through said bearing surfaces, a nut on the bolt, the head and nut of the bolt coacting with said bearing surfaces with a universal joint action facilitating the pivotal movement of the shanks during the clamping of the jaw members.

6. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member having a portion extending between the shanks and also having means for connection to a second conductor, said shanks fulcruming on opposite sides of the intermediate member whereby the shanks have a pivotal movement for clamping the jaws on the conductor, the shanks being formed with substantially spherical bearing surfaces and a clamping bolt extending through the shanks and the intermediate member and axially through said bearing surfaces, shoulders on the bolt, one being the head of the bolt and the other a nut threading on the bolt, the head and nut of the bolt coacting with said bearing surfaces with a universal joint action facilitating the pivotal movement of the shanks during the clamping of the jaw members, and a wire binding terminal between one of said shoulders and the adjacent bearing surface, said terminal having a socket conforming to the bearing surface.

7. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the intermediate member and the shank of one of the jaw members having means for receiving and clamping a second conductor and means for clamping the shanks against opposite sides of the intermediate member and thereby clamping the jaw members on the conductor between them and also clamping the second conductor between the intermediate member and the shank of one of the jaw members.

8. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the shank of one of the jaw members and the intermediate member being provided with opposing faces formed with means for receiving a second conductor, and means for clamping the shanks against opposite sides of the intermediate member.

9. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the shank of one of the jaw members and the intermediate member being provided with opposing faces formed with means for receiving a second conductor, and with wire binding means for a wire leading out of the second conductor, and means for clamping the shanks against opposite sides of the intermediate member.

10. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the shank of one of the jaw members and the intermediate member being provided with opposing faces formed with means for receiving a second conductor, the other jaw member having a fulcrum coacting with the intermediate member whereby the latter jaw member has a pivotal clamping movement, and means for clamping the shanks against opposite sides of the intermediate member and moving the fulcrumed jaw member about its fulcrum and thereby clamping the jaw members on the conductor between them and clamping the second conductor between the intermediate member and the shank of said one jaw.

11. A grounding connecter comprising opposing jaw members for gripping a conductor, said members having outwardly extending shanks, an intermediate member extending between the shanks, the shank of one of the jaw members and the intermediate member being provided with opposing faces formed with means for receiving a second conductor, the other jaw member having a fulcrum coacting with the intermediate member whereby the latter jaw member has a pivotal clamping movement, and means for clamping the shanks against opposite sides of the intermediate member and moving the fulcrumed jaw member about its fulcrum and thereby clamping the jaw members on the conductor between them and clamping the second conductor between the intermediate member and the shank of said one jaw, the clamping means comprising a bolt extending through the shanks and the intermediate member, shoulders on the bolt, one being the head of the bolt and the other a nut threading on the bolt, the shoulder and the shank of the jaw member which is fulcrumed having coacting bearing faces, one of which is rounding for facilitating the pivotal action of the fulcrumed jaw member during tightening of the nut.

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