Sept. 29, 1942. D. C. HUBBARD 2,296,927

GUY ROD GROUNDING CLAMP

Filed May 24, 1941

Fig. 1.

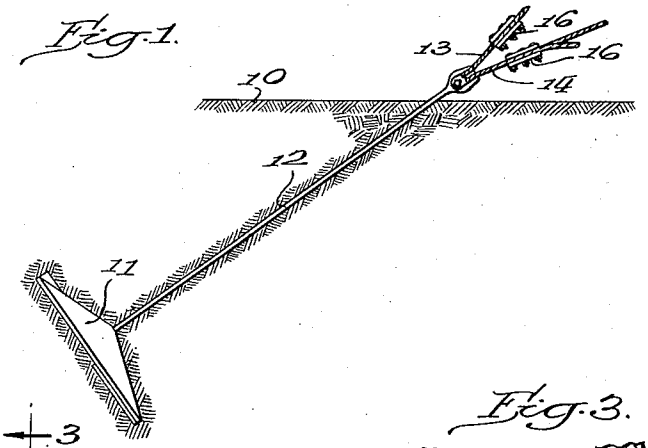


Fig. 2.

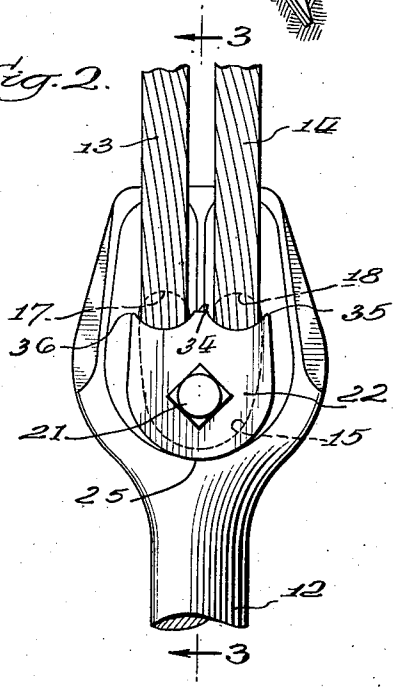


Fig. 3.

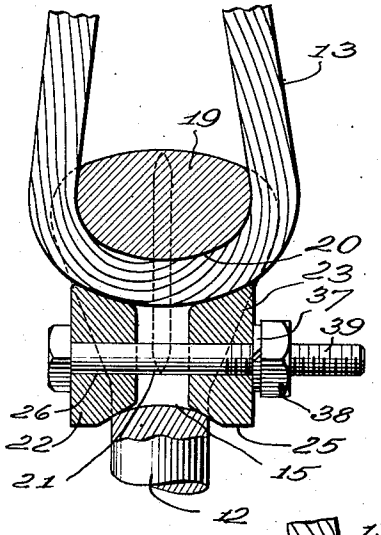


Fig. 6.

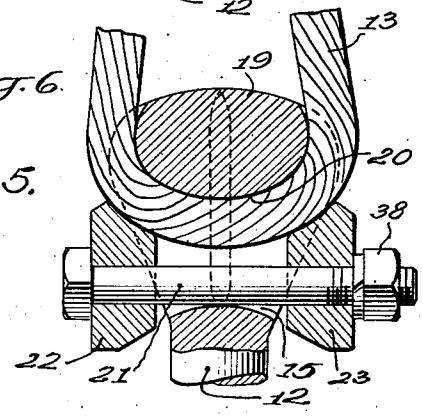


Fig. 4.

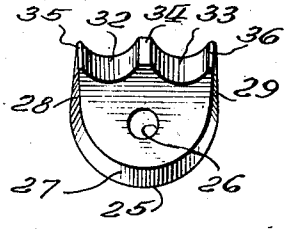
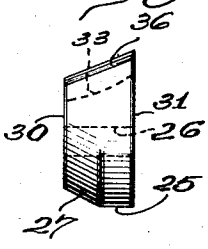


Fig. 5.



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Patented Sept. 29, 1942 2,296,927

UNITED STATES PATENT OFFICE

2,296,927

GUY ROD GROUNDING CLAMP

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Application May 24, 1941, Serial No. 394,989

11 Claims. (Cl. 24—135)

The present invention relates to guy rod grounding clamps, and is particularly concerned with improved guy rod grounding clamps particularly adapted to provide a dependable mechanical and electrical pressure contact between a guy cable and a guy rod of the type adapted to receive two cables in the eye of the rod.

The present application is a continuation in part of my prior application, Serial No. 328,841, filed April 10, 1940, now Patent No. 2,246,407, granted June 17, 1941, and this application is particularly concerned with guy rods of the type using two cables.

Another object of the invention is the provision of an improved guy rod grounding clamp adapted to maintain the substantially cylindrical shape of the guy strand or cable, for the purpose of avoiding the mashing or flattening of the cable, which would otherwise tend to destroy the cable and place unnecessary strain on certain of the parts of the cable.

Another object of the invention is the provision of an improved clamping device for a guy rod, which, by virtue of its firm gripping action, tends to eliminate the abrasive action which occurs on the guy cable and anchor rod, due to causes such as vibrations and slackness in the guy cable.

Another object of the invention is the provision of an improved electrical connecting device for guy rods and guy cables which assists the usual guy cable clamps in securing the cable to the anchor rod and provides additional security and strength for the installation.

Another object of the invention is the provision of an improved electrical connecting device for guy rods and cables which is simple in structure, capable of economical manufacture, sturdy, and adapted to be applied with a minimum amount of labor.

Another object of the invention is the provision of improved electrical connecting devices for guy rods and guy cables which include connecting members adapted to be wedged into engagement with the cable by means of a bolt or other threaded means so as to assure a good electrical connection.

Another object of the invention is the provision of an improved grounding clamp for effecting a grounding of two cables, so constructed that it is adapted to equalize the grounding contact between the clamping members and the two separate cables.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings:

Fig. 1 is a vertical sectional view taken on a plane at right angles to the surface of the ground, and parallel to a guy rod, showing a guy rod and guy cable installation which is equipped with the present clamping device;

Fig. 2 is a fragmentary side elevational view of the upper end of the guy rod, and the lower end of the cable and the guy rod grounding clamp constructed according to the present invention;

Fig. 3 is a fragmentary vertical sectional view taken on the plane of the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a rear elevational view of one of the grounding clamps;

Fig. 5 is a side elevational view of one of the grounding clamps;

Fig. 6 is a view similar to Fig. 3 of a modified form of installation.

The present guy rod grounding clamp is particularly adapted to be used on electrical systems employing a grounded neutral conductor that is connected electrically to the various guy wires.

This is done to increase the grounding efficiency, and naturally the insulators in the guy are eliminated. The clamp is adapted to afford a positive contact between the guy wire and the anchor rod, in order to assure a good electrical connection and a better ground for the various guys.

Referring to Fig. 1, 10 indicates the terrain in which there is an installation comprising an anchor 11 and a guy rod 12. The anchor and the lower end of the guy rod may be of any of the various types, such as the expanding anchors, cone anchors, dead man anchors, etc., and the lower end of the guy rod may be provided with a point and a head, or may be threaded and provided with a nut.

The guys, consisting of a pair of steel cables 13 and 14, preferably galvanized, have their lower ends passed through the eye 15 of a guy rod, and the free end of the cable is secured in each case, above the eye 15 by any suitable type of cable clamp 16.

The present eye of the guy rod 12 is of the type adapted to be used with two cables, and it is provided with a pair of grooves 17 and 18 of substantially circular cross section, which have a substantial fit about the periphery of the cables

13 and 14. The radius of each groove is substantially equal to that of each cable, and in some embodiments of the invention, cables of different size may be used.

The circular grooves 17 and 18 are curved about a yoke 19, which has its inner surface 20, in each case, substantially cylindrical in cross section as shown in Fig. 3, so as to provide a curve 20 of increased perimeter about which the cable is bent.

The gradual curve 20 about the yoke 19 prevents the cable from bending sharply, and tends to prevent flattening of the cable. This curvature lessens the difference in strain between the inner strand of the cable, and the outer strand, at the point of curvature.

Together the substantially circular groove 18 and the gradual curve 20 in the eye 15 are adapted to maintain the shape of the cable at the eye such that it has a greater strength and is adapted to perform its functions for a longer period of time under greater loads than any devices which are otherwise constructed.

The eye 15 of the cable is preferably slightly elongated in a vertical direction over the devices of the prior art, so as to provide room for a threaded bolt 21 extending through the eye and through the clamping members 22, 23.

The clamping members 22 and 23 may be identical in shape and construction, but are reversed as to location. Each of these clamping members comprises a cast metal member having a lower substantially cylindrical portion 25 which is provided with a through bore 26 having a sliding fit on the bolt 21.

The cylindrical portion 25 is integrally joined to a frusto-conical portion 27, and at the top, the body may be provided with substantially flat side portions 28, 29. The inside 30 and the outside 31 may be substantially flat.

The top of each clamping member is preferably provided with a pair of grooves 32, 33 separated by a ridge 34, and bound at each edge by a ridge 35, 36. The grooves 32, 33 are preferably substantially circular in cross section, and the radius of each groove is preferably substantially the same as the radius of the cable 13 or 14, which they are intended to engage.

In some embodiments of the invention, the grooves 32 and 33 may comprise substantially cylindrical grooves which are so arranged that the thickness of the body tapers toward the side 30. Thus the axis of the grooves 32, 33 is inclined toward the bolt 21 at the center of the eye, so that each of the grooves 32, 33 provides a wedging surface for engaging the cable. In the same way, the frusto-conical surface 27 is a wedging surface for engaging the eye 15 in the installation of Fig. 3.

In other embodiments of the invention, the grooves 32, 33 may also be curved longitudinally as shown in Fig. 3, the curvature corresponding to the curvature of the cable in the eye, thereby providing a longer area of contact. In such case the grooves would constitute a partially toroidal surface.

The assembly is preferably made substantially as shown in Figs. 2 and 3, and the clamping members are added to the assembly only after the cable clamps 16 have been secured, and strain has been placed on the guy rod 12 and cables 13 and 14.

The two clamping members 22 and 23 are preferably oppositely disposed in the eye 15, with their grooves 32 and 33 engaging the cables 13 and 14. The bolt 21 is passed through the bores 26, and through the eye 15, and provided with a spring washer 37 beneath its nut 38. As the nut 38 is tightened-up on the threaded end 39 of the bolt, the clamping members 22 and 23 are drawn into tighter contact with the cables 13 and 14, and there is a wedging action between the clamping members 22 and 23 and the cable, and between the clamping members and the eye.

This wedging action effects a cleaning of the engaging surfaces between the guy rod and the clamping members, and the cable and the clamping members, and provides a tight mechanical and electrical contact.

The conical surface 27 on each clamping member permits sufficient rotative action of each clamping member on the bolt 21 so that there is equal engagement with each of the cables 13 and 14. The compression applied to each of the cables is balanced by this rotative action. The lock washer on the bolt provides a measure of resilient clamping action, and prevents the nut from loosening due to vibration.

Referring to Fig. 6, this is a modification in which the size of the eye 15 is smaller in respect to the size of the clamping members 22 and 23, and a longer bolt is provided so that the lower side of the bolt 21 engages the wall of the eye 15 at the bottom. In this case the clamping members 22 and 23 are kept outside the eye 15, but they engage the cable in exactly the same way, with which they have a wedging action. The force applied to the cable at the opposite side, in this case, is balanced about a pivot located at the middle of the bolt, but in all other respects the action of the clamping members is exactly the same as those previously described.

The tight electrical and mechanical contact which is provided by this grounding clamp is independent of the strain or slack in the guy wire, and a good ground is assured through the guy rod and anchor under all conditions.

Because of the firm gripping action between the grounding clamp cable and the guy rod, vibration no longer produces an abrasive action between the guy cable and the anchor rod and the galvanized covering of the guy strand and the guy rod are protected against abrasion at their points of mutual contact.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an electrical connector for guy rods and cables, the combination of a guy rod having an eye with cable means located in said eye and a bolt passing through said guy rod, said bolt having a pair of clamping members arranged on said bolt on opposite sides of said guy rod and said clamping members having wedging surfaces adapted to engage said cable means, and threaded means on said bolt whereby the clamping means may be drawn into wedging engagement with said cable, said guy rod having a pair of cables therein and said wedging surface means comprising a pair of laterally curved grooves for engaging said cables.

2. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a

pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye.

3. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, each of said clamping members having a pair of grooves for receiving and engaging said cable.

4. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, each of said clamping members having a pair of grooves for receiving and engaging said cable, said grooves being substantially circular in cross section.

5. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, each of said clamping members having a pair of grooves for receiving and engaging said cable, said grooves being substantially circular in cross section, and having a radius substantially equal to that of the cable which it engages.

6. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, each of said clamping members having a pair of grooves for receiving and engaging said cable, said grooves being substantially circular in cross section, and said grooves having a curvature longitudinally of the cable to correspond substantially to the curvature of the cable in the eye.

7. In a guy clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, each of said clamping members having a pair of grooves for receiving and engaging said cable, said grooves being substantially circular in cross section, said grooves extending downwardly and inwardly toward said bolt to provide a wedging surface engaging said cable.

8. In a gup clamp assembly, the combination of a fixture having an eye adapted to receive a pair of cables, with a grounding clamp comprising a bolt, a pair of clamping members slidably mounted on said bolt, said bolt passing through said eye, and threaded means for urging said clamping members toward each other and into engagement with said cables, said clamping members each being rotatably mounted in said eye for a limited rotative movement to apply substantially equal compression to portions of the two cables on each side of said eye, said clamping members being tapered from their outer surface toward their inner surface, whereby they are adapted to be wedged into engagement with the eye and the cable.

9. A guy clamp comprising a metal member having a through bore, and having outer flat and inner flat surfaces surrounding said bore, said clamp being formed with a frusto-conical surface on one side, and with a pair of grooves on the other side.

10. A guy clamp comprising a metal member having a through bore, and having outer flat and inner flat surfaces surrounding said bore, said clamp being formed with a frusto-conical surface on one side, and with a pair of grooves on the other side, said grooves extending inwardly toward the smaller side of said member.

11. A guy rod clamping rod assembly comprising a guy rod having an eye formed with a pair of transverse grooves of circular cross-section for receiving a pair of cables, a bolt passing through said eye and engaging the side of the eye opposite to said grooves, a pair of clamping members, each of said clamping members having a pair of grooves for engaging the side of the cable opposite to said first-mentioned grooves, said clamping members being slidably mounted on said bolt, and threaded means on the bolt for urging the clamping members toward each other and into engagement with the cables, the clamping members being rotatably mounted on the bolt to exert substantially equal pressure on both cables and the bolt having a pivotal movement on the opposite side of the eye to apply equal pressure at each clamping member.

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