April 3, 1951 G. C. SALMONS 2,547,176

DRIVEHEAD GROUNDING ROD

Filed Oct. 23, 1948

Fig. 2.

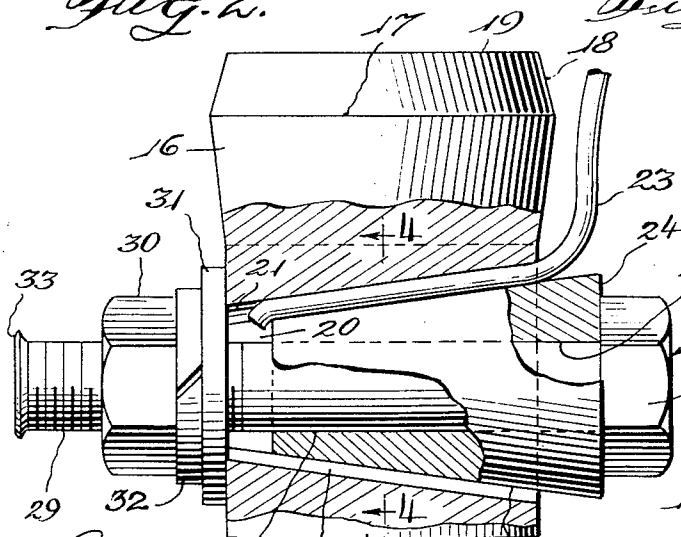


Fig. 5.

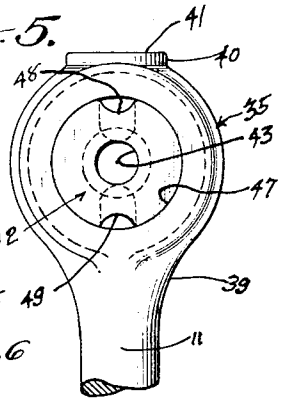


Fig. 1.

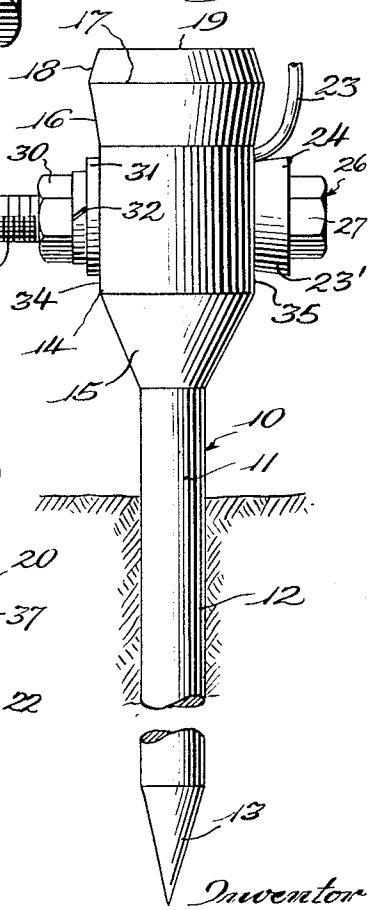


Fig. 6.

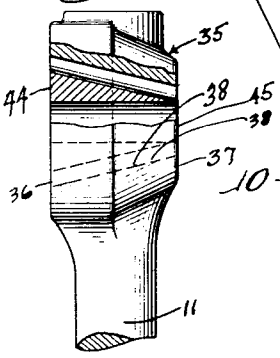


Fig. 3.

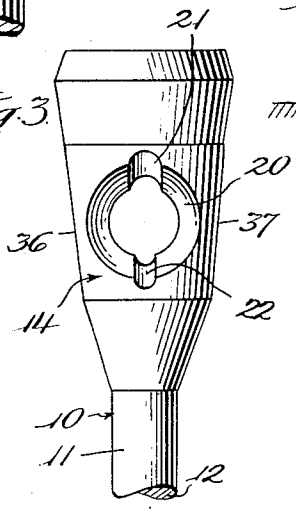


Fig. 4.

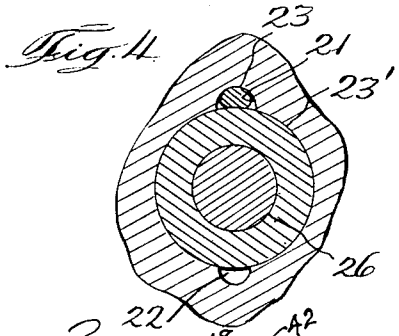
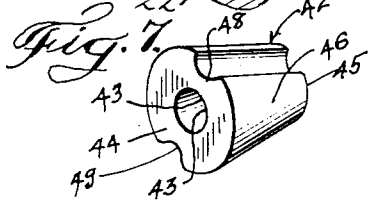


Fig. 7.



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DRIVEHEAD GROUNDING ROD

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4 Claims. (Cl. 174—7)

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The present invention relates to drive head grounding rods, and is particularly concerned with the provision of an improved grounding rod having adequate contact with the earth, and also having a strong and permanent electrical connection with a maximum contact area between the grounding rod and the ground wire.

One of the objects of the invention is the provision of a grounding rod which is simple and cheap to construct, but which is adapted to be provided with a minimum contact resistance connection to ground wires of different sizes.

Another object of the invention is the provision of an improved grounding rod which has good contact with the earth into which it is driven, but which can be readily salvaged by pulling the rod out when its period of service is over.

Another object of the invention is the provision of an improved grounding rod assembly which is economical to manufacture, sturdy, efficient, and adapted to be driven easily without damage to the rod.

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

Referring to the single sheet of drawings accompanying the specification,

Fig. 1 is a fragmentary side elevational view of a ground rod assembly driven into the earth;

Fig. 2 is a fragmentary side elevational view of the ground rod head and connector, on a larger scale and in partial section;

Fig. 3 is a fragmentary side elevational view of a ground rod head, seen from the right of Fig. 2, with the wedging contact removed;

Fig. 4 is an axial sectional view, taken on the plane of the line 4—4 of Figure 2, looking in the direction of the arrows;

Fig. 5 is a fragmentary end elevational view of a modification;

Fig. 6 is a fragmentary side elevational view in partial section; and

Fig. 7 is a view in perspective of the tapered contact-wedging member used in Figures 5 and 6.

Referring to Fig. 1, 10 indicates in its entirety the ground rod assembly, which includes a ground rod 11, having a relatively narrow cylindrical shank 12 provided with a round or conical point 13.

It will be noted that the absence of a head behind the point, such as is frequently employed

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with anchor rods, makes the present rod have a better contact with the surrounding earth. With a guy rod sometimes used for grounding, the head makes a hole larger than the shank so that there is defective contact between the shank and the earth due to the enlarged hole formed by the head.

At its upper end the ground rod 11 has an enlargement 14 and may have a frusto-conical tapered portion 15 between the cylindrical shank 12 and the enlargement 14. Above the frusto-conical enlargement there may be another frusto-conical portion 16, which terminates at the angular ridge 17, but is integrally joined to a tapering frusto-conical portion 18, the latter terminating in a flat head 19, which may also be convex.

The body 14 of the head is provided with a through bore 20, having a gradual taper and being frusto-conical in shape. The enlargement 14 is generally cylindrical on the sides 34 and 35, which are engaged by the washer 31 and by the wedging member 23 in bore 20. On the sides 36 and 37 (Fig. 3) the enlargement 14 may taper downwardly, to save material; but the side 34 in particular should be straight up and down to give a good bearing surface against the washer 31.

The ground rod shank 12 is preferably provided with its drive head by having the head forged on the end of the rod.

The through bore 20 is formed with a pair of partially cylindrical grooves 21, 22, these grooves being oppositely located and of different size or diameter. The grooves have their axes parallel to the elements of the frusto-conical surface and these grooves are adapted to receive ground wires 23 of different sizes. Smaller ground wires are placed in the groove 22, and the larger ones in the groove 21; but it is only necessary that the diameter of the wire be large enough so that the wire will protrude from the groove.

An enlongated and gradually tapered frusto-conical wedging member 23' is provided, having the flat end surface 24. The taper of the wedging member 23' corresponds to that of the through bore 20; and the wedging member 23' has a cylindrical through bore 25. A screw bolt 26 has its head 27 engaging the flat end 24 of the wedging member 23', and has its shank 28 passing through the bore 25 and provided with a threaded portion 29 for receiving a nut 30.

A washer 31 is preferably provided on the threaded end of bolt 26, as well as a spring lock

washer 32; and the end of the bolt is mushroomed over at 33 to prevent the loss of the bolt nut and other parts from the grounding rod.

When a wire, such as the wire 23, is inserted in the appropriate groove 21, as shown in Fig. 4, and engaged by the wedging member 23', tightening of the nut 30 on the bolt 26 will cause the wedging member 23' to be drawn very tightly into engagement with the wire 23. The wire may be slightly flattened and caused to conform to the shape of the groove and the shape of the wedging member 23'; but a very efficient connection, with low contact resistance, is thus provided.

The nut 30 may be driven home until the spring lock washer 32 is rigidly engaged by the nut; but if the metal of the ground wire should flow while cold, the wedge 23' will not loosen, since the expansion of the spring washer 32 still tends to keep the assembly tight.

The operation of the ground rod will be apparent from the description of its parts. It is driven into the ground, as shown in Fig. 1; and the ground wire attached as shown in Figs. 1 and 2. Such a ground has frequent application in the case of transmission lines, and provides a much better ground than if reliance is placed upon guy cables and guy rods.

Referring to Figures 5, 6 and 7, these are views showing modifications in which the grooves are made in the wedging member instead of the tapered bore in which it is received.

Referring to Figures 5 and 6, the ground rod head 35 in this embodiment is preferably provided with the front and rear plane surfaces 36, 37, and the tapered bore 38 runs from one surface 36 to the other 37. The head 35 is provided with the same cylindrical shank 11, and the shape of the head 35 in front elevation is substantially circular, as seen in Figure 5.

The head 35 tapers and has a curved side surface at 39 extending downward toward the shank 11. At its upper end the head 35 preferably has a cylindrical extension 40, with a flat upper surface 41 for engagement with the sledge. The wedging member 42 in this case has a through bore 43 and plane surfaces 44 and 45 at its ends.

Between the ends 44, 45 the wedging member 42 has a frusto-conical surface 46 which is complementary to the tapered frusto-conical bore 47 in head 35. In this modification the wedging member 42 is provided with two or more half-cylindrical grooves 48, 49, located longitudinally of its frusto-conical surface for receiving the ground wire. The operation of this modification is substantially the same as that of Figures 1 to 4.

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 a drive head grounding rod, an integral member having a thin cylindrical shank with a sharp point, a round enlargement at the upper end of said shank, said enlargement being provided with a tapered through bore, and a wedging member of complementary shape located in said bore and having a through bore in said wedging member, a screw bolt in said wedging member having a nut engaging the side of said head, the head of said screw bolt enaging the larger end of said wedging member, there being a partially cylindrical groove located between said wedging member and the through bore in said enlargement for receiving and clamping a ground wire, the said groove being located in the wedging member and extending longitudinally of its tapered surface.

2. In a drive head grounding rod for maintaining constant low resistance contact with a grounding wire, comprising a thin elongated metal member provided with a point for driving deeply into the ground with a minimum amount of resistance to the drive head, said member having an enlarged head provided with a flat driving surface on its upper end, said enlarged head being provided with opposed flat surfaces on its opposite sides and having a frusto-conical tapered bore extending from one flat side to the other flat side, a substantially complementary frusto-conical metal member fitting in said tapered bore, and having a cylindrical through bore and a plane surface on its larger end, said frusto-conical metal member being provided in its tapered surface with a longitudinally extending substantially half cylindrical groove for receiving the ground wire, a screw bolt extending through said through bore, and provided with a metal thrust plate engaging the flat side of the enlargement at the smaller end of the tapered bore, said bolt having its head engaging the plane surface at the larger end of the frusto-conical member and being provided with a spring washer outside of said thrust plate, and with a nut engaging said spring washer, the frusto-conical metal member being drawn into the tapered bore with a ground wire in said groove until the frusto-conical metal member engages the walls of the tapered bore, and the ground wire is deformed in said groove to establish a tight low resistance contact between the ground wire and the grounding rod, the nut driving the spring washer on the bolt to a rigid condition but the spring washer being of sufficient strength to take up any looseness between the ground wire and the groove and the walls of said tapered bore which may be caused by the flow of the metal to establish a low resistance connection.

3. In a drive head grounding rod for maintaining constant low resistance contact with a grounding wire, comprising a thin elongated metal member provided with a point for driving deeply into the ground with a minimum amount of resistance to the drive head, said member having an enlarged head provided with a flat driving surface on its upper end, said enlarged head being provided with opposed flat surfaces on its opposite sides and having a frusto-conical tapered bore extending from one flat side to the other flat side, a substantially complementary frusto-conical metal member fitting in said tapered bore, and having a cylindrical through bore and a plane surface on its larger end, said frusto-conical metal member being provided in its tapered surface with a longitudinally extending substantially half cylindrical groove for receiving the ground wire, a screw bolt extending through said through bore, and provided with a metal thrust plate engaging the flat side of the enlargement at the smaller end of the tapered bore, said bolt having its head engaging the plane surface at the larger end of the frusto-conical member and being provided with a spring washer outside of said thrust plate, and with a

nut engaging said spring washer, the frusto-conical metal member being drawn into the tapered bore with a ground wire in said groove until the frusto-conical metal member engages the walls of the tapered bore, and the ground wire is deformed in said groove to establish a tight low resistance contact between the ground wire and the grounding rod, the nut driving the spring washer on the bolt to a rigid condition but the spring washer being of sufficient strength to take up any looseness between the ground wire and the groove and the walls of said tapered bore which may be caused by the flow of the metal to establish a low resistance connection, the said frusto-conical member having a plurality of said cylindrical grooves of different sizes to be used with different sizes of ground wires.

4. In a drive head grounding rod for maintaining constant low resistance contact with a grounding wire, comprising a thin elongated metal member provided with a point for driving deeply into the ground with a minimum amount of resistance to the drive head, said member having an enlarged head provided with a flat driving surface on its upper end, said enlarged head being provided with opposed flat surfaces on its opposite sides and having a frusto-conical tapered bore extending from one flat side to the other flat side, a substantially complementary frusto-conical metal member fitting in said tapered bore, and having a cylindrical through bore and a plane surface on its larger end, said frusto-conical metal member being provided in its tapered surface with a longitudinally extending substantially half cylindrical groove for receiving the ground wire, a screw bolt extending through said through bore, and provided with a metal thrust plate engaging the flat side of the enlargement at the smaller

end of the tapered bore, said bolt having its head engaging the plane surface at the larger end of the frusto-conical member and being provided with a spring washer outside of said thrust plate, and with a nut engaging said spring washer, the frusto-conical metal member being drawn into the tapered bore with a ground wire in said groove until the frusto-conical metal member engages the walls of the tapered bore, and the ground wire is deformed in said groove to establish a tight low resistance contact between the ground wire and the grounding rod, the nut driving the spring washer on the bolt to a rigid condition but the spring washer being of sufficient strength to take up any looseness between the ground wire and the groove and the walls of said tapered bore which may be caused by the flow of the metal to establish a low resistance connection, the said bolt having its threaded end deformed to prevent the removal of the nut and to maintain a permanent assembly of the parts even while loose.

GEORGE C. SALMONS.

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