May 9, 1939. T. J. LITTLE 2,157,180

ZINC GROUND ROD

Filed Oct. 28, 1937

Fig. 2.

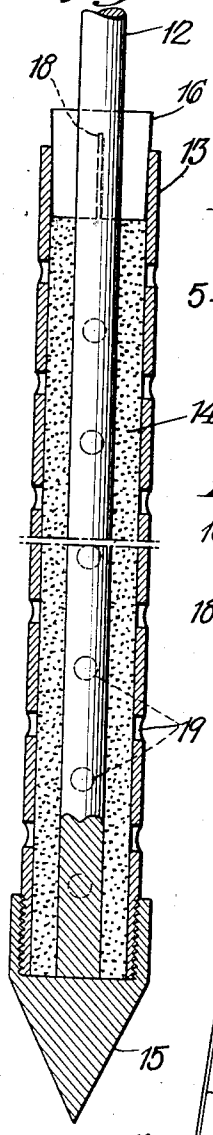


Fig. 4.

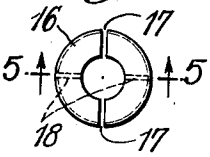


Fig. 5.

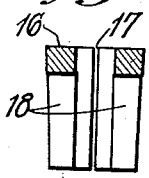


Fig. 3.

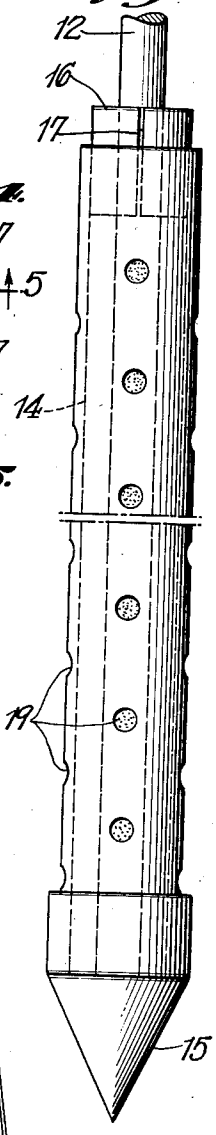


Fig. 6.

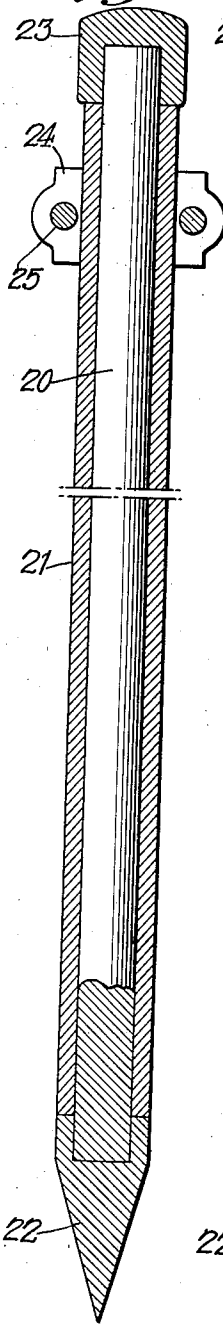


Fig. 7.

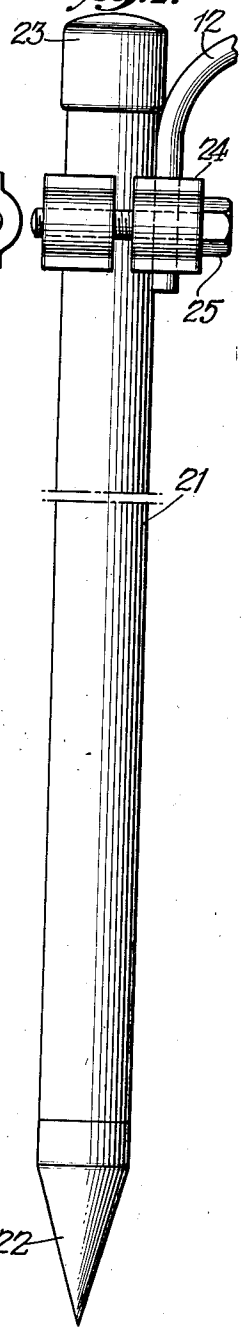
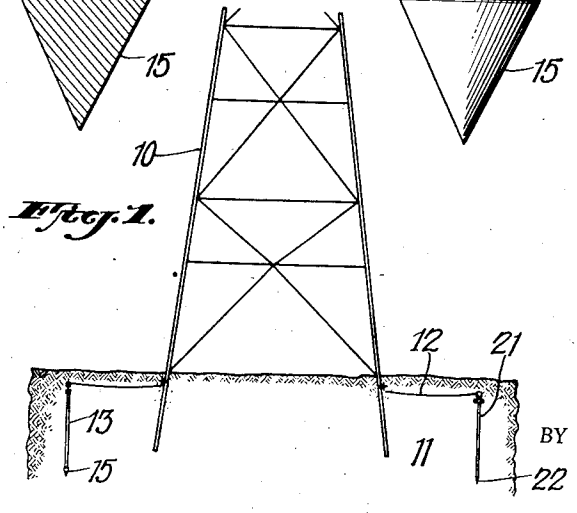


Fig. 1.



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ZINC GROUND ROD

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Application October 28, 1937, Serial No. 171,480

3 Claims. (Cl. 204—1)

This invention relates to improvements in ground rods, such as used for providing a path to ground, for stray electric currents from transmission towers, poles and the like. It is broadly old to provide ground rods of steel, or other metal of considerable strength with coatings of copper to increase their electrical conductivity. Insofar as I am aware, it is practically a universal practice to connect such ground rods with the conductor supporting poles or transmission towers by copper conducting wires. These serve well in many locations. However, where there is a moist ground condition, there is a very strong tendency to set up an electrolytic action between the zinc galvanized coating of the towers and the copper conductor, to which the ground rod is usually attached. Such corrosive action has a tendency to destroy the galvanized coating on the pole or transmission tower and, once the protective galvanized coat is destroyed, rusting and deterioration proceed rapidly.

It is an object of the present invention to provide grounding means, which will inhibit the setting up of such electrolytic action. To these ends, I provide a ground rod carrying either a coating or a filling of zinc and I connect this rod with the galvanized post or transmission tower by means of a zinc wire or conductor. In this way, I prevent the setting up of destructive galvanic action, or like electrolysis.

The above and other more detailed features of the invention will be fully apparent from the following detailed disclosures, the accompanying drawing and the appended claims.

In the drawing—

Fig. 1 is a sectional elevation showing a transmission tower provided with the improved grounding means of the present invention; Fig. 2 is an enlarged view in longitudinal vertical section through an improved ground rod embodying the invention; Fig. 3 is a side elevation of the rod shown in Fig. 2; Fig. 4 is a plan view of a contact plug for securing the zinc ground wire in the ground rod of Fig. 2; Fig. 5 is a section on line 5—5 of the plug shown in Fig. 4; Fig. 6 is a vertical longitudinal section through a modified form of ground rod; Fig. 7 is a side elevation thereof showing a clamping means for coupling a conductor thereto.

Referring in detail to the drawing, 10 is a conventional representation of a tower, such as used for supporting electric transmission lines. These towers are frequently constructed of ferrous metal angles, channels and similar rolled sections, which are galvanized as protection against the elements. As is well known, the galvanizing process consists essentially in applying a layer or skin of zinc to the iron or steel body.

For providing a path for stray electric currents to ground, I provide a ground rod, indicated generally at 11 and connect this ground rod to the tower by means of a ground wire 12 composed of zinc, as distinguished from copper wire heretofore generally used.

I also deem it important to utilize a ground rod of an improved type, which carries a large quantity of zinc either in the form of zinc dust, as in the embodiment of Figs. 2 and 3, or in the form of a zinc sleeve, as in the embodiment of Figs. 6 and 7.

The ground rod of Figs. 2 and 3 comprises a length of galvanized iron pipe 13 carrying a filling of zinc dust 14, which surrounds and embeds one end of the zinc ground wire 12. The pipe 13 is threaded at its lower end to receive a hard metal point 15 of steel, or the like. The pipe is closed at the top by a special form of plug 16, such as shown in Figs. 4 and 5. This plug 16 is slightly tapered, as is apparent from Fig. 5, and is formed in two halves split along the line 17—17 of Fig. 4. And each half section is provided with a kerf 18, so as to impart a certain degree of resiliency thereto and to permit the plug, when driven into the end of the pipe, to the position shown in Fig. 2 to firmly grip the ground wire 12.

This plug will be made of zinc and thus all contacting parts are zinc to zinc surfaces, it being understood that the interior as well as the exterior of the iron pipe carries a galvanized coating. The zinc dust will be well tamped into the pipe prior to the assemblage of the plug about the ground wire. The wall of the pipe will preferably be perforated at a multiplicity of points, as indicated by the holes 19 in the drawing.

The function of the zinc dust is twofold, first, to provide a generous contact between the ground wire and the wall 13 of the rod and, second, to provide a large area of contact for moisture in the soil, this moisture being permitted to enter through the multiplicity of openings 19 provided for the purpose.

With the ground rod of the character shown in Figs. 2 and 3, if after a great number of years of service, the perforated pipe becomes partially destroyed or badly eaten away by soil erosion, the grounding function of the zinc wire will still continue, it being apparent that the path to ground for current will be provided through the zinc wire and the zinciferous material or com-

minuted zinc which constitutes the filling for the pipe.

In the modification of Figs. 6 and 7, I provide a steel rod or core 20, which is surrounded by a heavy shell of zinc 21, which may be either molded thereon or applied by an extrusion process, or may be applied by drawing down zinc into intimate contact with the steel rod. Alternatively, the zinc shell may be electrolytically deposited. This coating 21 is preferably of such a thickness that the mass of zinc is greater than the mass of the ferrous metal core or rod. Also in the embodiment of the invention shown in Figs. 2 and 3, the amount of zinciferous material will predominate. Thus, the composite ground rod of zinc and ferrous metal differs materially from ordinary galvanized coated iron rods and the like in that the mass of zinc is in excess of the mass of the ferrous metal.

To facilitate driving, the rod will usually have a conventional type of steel driving point 22 and a steel driving cap 23 to prevent mutilation by tools used in driving it into the soil. A clamp fitting 24 of suitable form will be provided with a bolt 25 for securely fastening the zinc conductor wire 12 to the rod.

In both embodiments of the invention illustrated, it is apparent that the path of electric current from the pole or tower to ground is through conductors made of zinc and thus there is no tendency to set up detrimental electrolytic action, when the ground rod is used in a damp or moist location.

While one advantage of the disclosed invention is in connection with structures for supporting overhead electrical conductors, it is also apparent that the invention is applicable to the grounding of electrical transformer casings, or other ferrous metal electrical sub-station equipment, where the advantages arising out of the use of the zinciferous rod connected with such equipment by a zinc conductor would be of equal importance.

While I have described quite specifically the embodiments of the invention herein illustrated it is not to be construed that I am limited thereto since various modifications and substitutions of equivalents may be made by those skilled in the art without departure from the invention as defined in the appended claims.

What I claim is:

1. A protective and grounding apparatus for galvanized electric structures which comprises a ground rod of finely divided zinc, a hollow pierced reinforcing element having a surface of metallic zinc enclosing and holding said divided zinc, and a zinc conductor extending from within said finely divided zinc to said galvanized structure.

2. The apparatus of claim 1 in which said zinc conductor extends throughout substantially the length of said mass of finely divided zinc.

3. The apparatus of claim 1 in which the said zinc conductor extends throughout substantially the length of said mass of finely divided zinc and in which said structure is formed of iron galvanized with a zinc coating.

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