Aug. 16, 1932.

H. A. GARDNER

1,871,508

METALLIC CONDUIT

Filed July 2, 1930

Fig. 1.

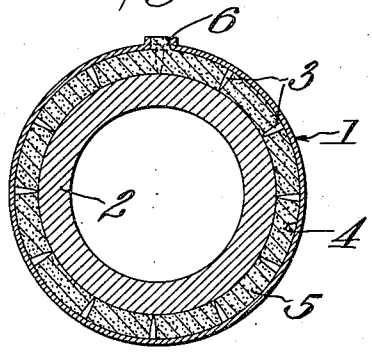
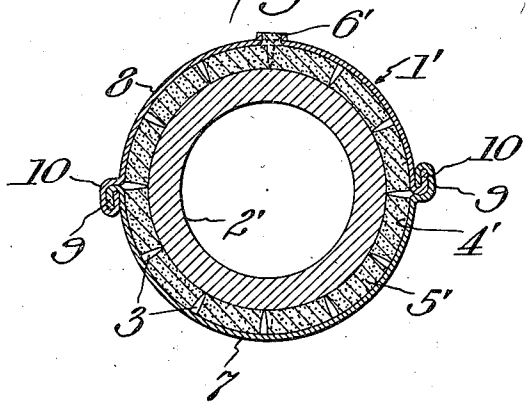


Fig. 2.



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UNITED STATES PATENT OFFICE

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METALLIC CONDUIT

Application filed July 2, 1930. Serial No. 465,441.

This invention relates to a method of and apparatus for protecting metallic conduits. More particularly the invention relates to a method of applying a protective coating of corrosion inhibitive material to metallic conduits which are designed for use under ground and to apparatus for carrying out this method.

It is well known that a metallic conduit which is buried in the ground is subject to the destructive effects of many agencies, such as rusting due to moisture in the ground, acid corrosion due to acid earths surrounding the conduit, and electrolysis due to the presence of electric currents in the ground adjacent the conduit. The destruction of an underground conduit such as is employed to conduct gas, or oil, or is employed to protect electric wires or cables, entails not only a considerable expense for the materials and labor necessary to replace the conduit, but endangers life and property where the conduit is employed in conducting an inherently dangerous substance such as an inflammable or explosive fluid.

One of the objects of the invention is the provision of a method of and apparatus for protecting conduits from corrosion which is simple and inexpensive but at the same time effective in all respects.

Another object of the invention is the provision of a method of and apparatus for protecting underground conduits from corrosion, and which is particularly effective to prevent acid corrosion and electrolytic disintegration of the conduits.

Another object of the invention is the provision of a method of protecting underground conduits which may be practiced after the conduits have been installed and without interrupting the service furnished by the conduit.

Another object of the invention is the provision of a corrosion resistive casing for a metallic conduit, which casing also serves to electrically insulate the conduit.

Features of the invention are illustrated in the accompanying drawing, wherein:

Fig. 1 is a view showing a transverse section of a conduit provided with the protective casing comprising the present invention, and

Fig. 2 is a similar view of a modified form of the invention.

In practicing the invention, a seamless tubular casing 1 of very thin sheet metal, such as twenty-two guage sheet steel, is disposed around a conduit 2 and is spaced uniformly therefrom by a plurality of spacers 3, thereby providing an annular chamber 4 surrounding the conduit. A protective material 5, which is preferably in a fluent form (i. e., liquid, semi-liquid, granulated or powdered), whereby it can be poured, is introduced into the chamber 4 through a filling opening 6 in the top of the casing.

The casing is made in sections of suitable length which sections are joined by telescoping adjoining ends. The ends may be joined in any other suitable manner, so long as the joint is closed tightly enough to retain the protective material. The casing serves not only to retain the protective material but protects the latter against puncture due to sharp rocks, and also prevents soil from sticking to the protective material, and prevents the protective material from being scraped off the conduit.

Where the conduit to be protected has already been installed and is being used, and it is therefore undesirable to remove it, the protective coating may be applied as shown in Fig. 2. The earth or other substance surrounding the conduit is removed from around the conduit throughout a length greater than the length of the coating to be applied. The conduit 2′ is surrounded by a pair of cooperating U-shaped members 7, 8 of sheet metal, the adjacent edges 9, 10 of which are joined by crimping whereby the members form a substantially cylindrical casing around the conduit 2′.

The space 4′ between the casing 1′ and conduit 2′ is then filled with the protective material 5′ which is introduced through the filling opening 6′. Spacers 3′ are provided as in the first form of the invention to space the casing 1′ from the conduit 2′ and to prevent the lower side of the casing 1′ from sagging.

This form of the invention may be em-

ployed also where the protective material is thermoplastic and is not sufficiently fluent to be poured into the chamber. An excess quantity of the protective material is applied to the conduit and is shaped to a substantially uniform thickness. The casing is then disposed around the conduit and protective material, and the edges crimped together, the excess protective material being forced out of the filling opening. It is not absolutely necessary to provide a filling opening in this form of the invention as the excess material may be forced out through the seam before the edges are completely crimped together.

Preferably, the spacers take the form of nails made of zinc, or aluminum, or other metal which is electro-positive to iron, the nails usually being provided as a part of the casing at the time of production. In place of metallic nails, wooden pegs may be used, suitable openings being provided in the casing, if the casing walls are too thick to permit the pegs to be driven therethrough.

Instead of nails or pegs, the spacers may be separate blocks joined to either the casing or the conduit, or both, or they may take the form of fins integral with the casing, or with the conduit. If the spacers are formed as fins, it is necessary, of course, to provide openings in the spacers to permit the protective material to flow therethrough, whereby all of the annular space between the conduit and casing will be filled.

Where the conduit is to be insulated electrically as well as protected from corrosion, the casing and spacers are usually formed of insulating material such as phenolic condensate, or the wooden pegs mentioned above may be used. Instead of constructing the casing of insulating material, it may be constructed of metal and an insulating material employed as the protective material. Where a very high degree of electrical insulation is desired, both the casing and protective material may be insulators.

Where the protective material is plastic in form and/or it is desired to ensure that it will fill all of the space between the conduit and the casing, the protective material may be forced into the chamber under pressure. This may be accomplished by any well known pressure feed system, the delivery end of such system being attached to the filling opening.

If desired, the conduit may be treated as described in my Patent No. 1,230,475 before the protective coating is applied. Briefly stated, this treatment consists in applying a film of tung oil paint to the surface of the conduit, partially drying the oil, and sanding the film before it has hardened. This treatment provides an excellent binding surface for the protective material and serves to increase the protective effect of the same.

It should be obvious that the invention is not limited to the protection of the outer surface of tubular conduits but may be adapted to a large number of other applications wherein it is desired to protect a metallic surface from corrosion.

Any one of a large variety of substances may be employed as the protective material, certain substances being particularly adapted for certain applications. Some of the substances which I have found to be most satisfactory are:

	Parts
A. Cementitious materials	
1. Portland cement	1
Sand	2
Water—sufficient to make a thick slurry.	
2. Lime hydrate	25
Portland cement	50
Water (or none)	
3. Silicate of soda—40° Baumé solution	70
Solid pigments	30
Sand (or none)	
4. Litharge	80
Glycerine	20
B. Thermo-plastic materials	
1. Rosin (or other resin)	
2. Asphalt (or bitumen)	
3. Bichromate of soda (or potash)	
Water	
Gelatin (or glue) sufficient to make a stiff jell when cool.	
C. Cellulosic materials	
1. Viscose solution (cellulose xanthate)	
2. Alkali cellulose dispersed in water.	
D. Rubber materials	
1. Rubber-toluol solution stiffened with zinc pigment	
2. Rubber latex solution	
E. Alkali-forming materials	
1. Caustic soda (or potash) melted	
Filler (or none)	
2. Cyanamid (or carbide)—dry or as a slush formed by mixing with organic liquids.	
F. Pigment and vehicle	
1. Chromate of zinc (or other rust inhibitive pigment)	
Oil (or water) sufficient to form a paste.	

It should be obvious that the invention provides a method of and apparatus for satisfactorily protecting metallic conduits from corrosion which is simple and inexpensive and which may be adapted to a large number of applications.

Although I have described the invention with reference to particular illustrative embodiments, yet I do not wish to limit the invention to such embodiments and I desire that the appended claim be accorded the broadest interpretation consistent with its wording and the prior art.

I claim:

The combination with a ferrous member, of a coating of corrosion inhibitive material disposed on the surface of said member, a metallic jacket disposed over said coating for retaining the same on said ferrous member, and means comprising a plurality of nails formed of a metal which is electropositive to iron extending through said jacket into contact with said ferrous member for spacing said jacket from said ferrous member.

In testimony whereof, I affix my signature.

HENRY A. GARDNER.