Sept. 8, 1942. W. D. MOORE 2,295,420

PROCESS OF WRAPPING PIPE

Filed Oct. 25, 1939 2 Sheets-Sheet 1

Fig. 1.

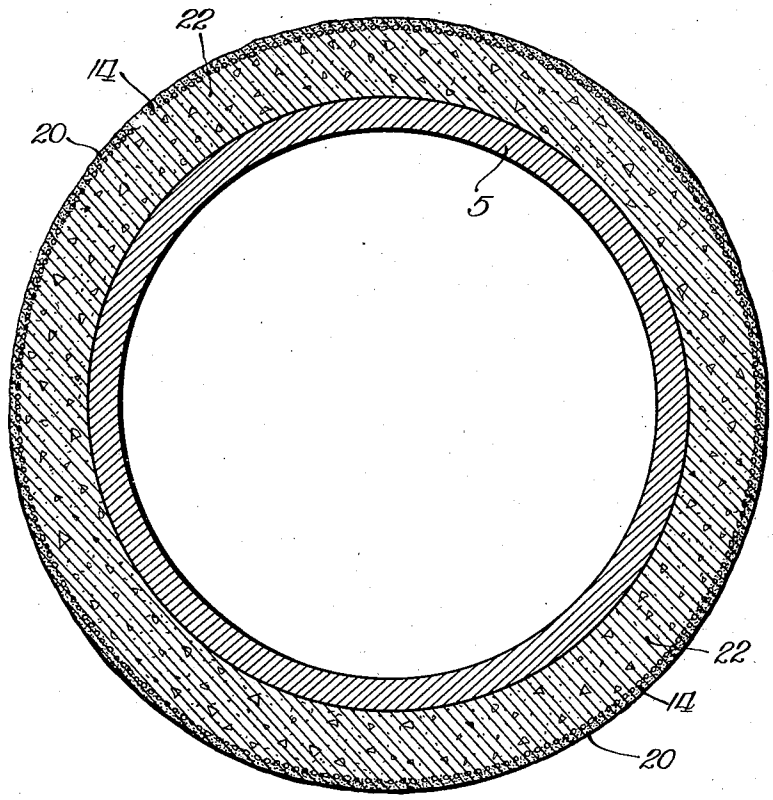
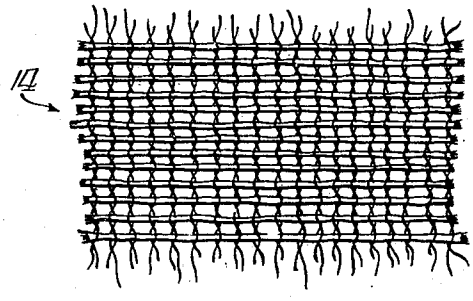


Fig. 2.



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Filed Oct. 25, 1939 2 Sheets-Sheet 2

Fig. 3.

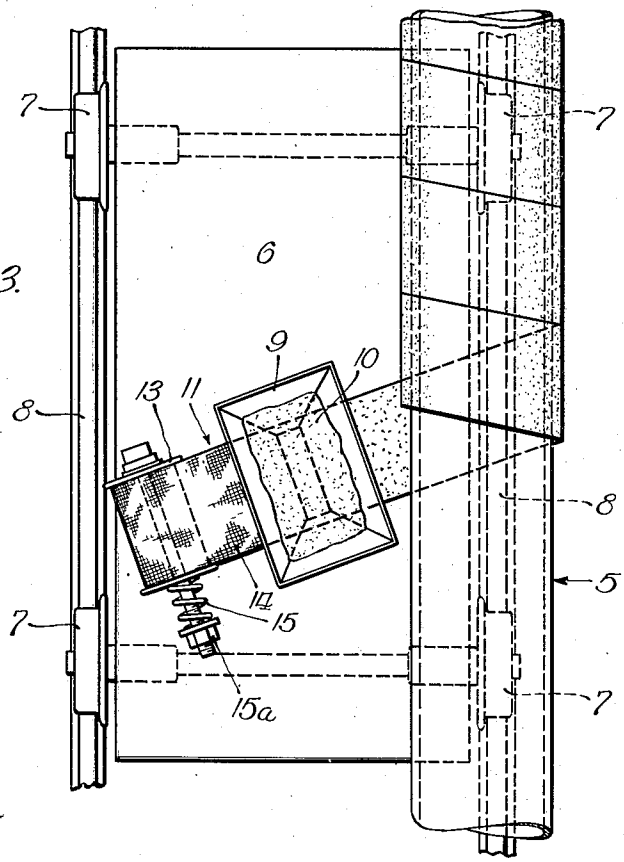
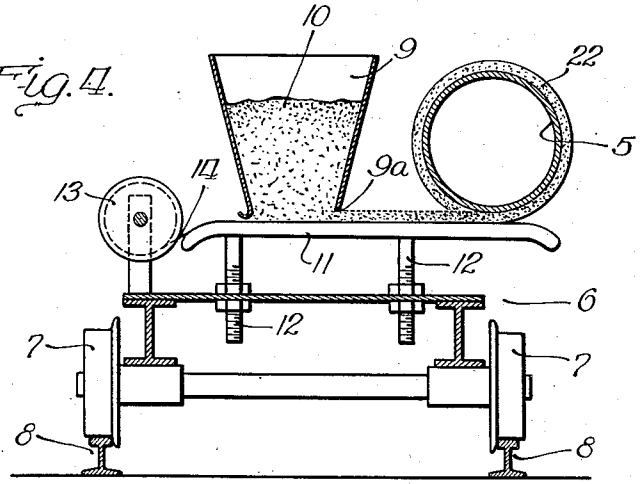


Fig. 4.



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UNITED STATES PATENT OFFICE

2,295,420

PROCESS OF WRAPPING PIPE

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Application October 25, 1939, Serial No. 301,268

1 Claim. (Cl. 25—154)

This invention relates to improvements in processes of making wrapped metal pipe, and among other objects, aims to provide an improved process resulting in metallic pipe having an improved layer of cementitious material on the outside thereof, whereby external corrosion of the pipe is reduced or prevented. Of the common forms of underground corrosion attacking pipe lines, one of the more troublesome is the galvanic type of corrosion such as that caused by oxygen concentration cells in which a current is induced between well aerated and poorly aerated sections of the pipe wall. The outer layer of cementitious material will practically prevent this type of corrosion. Chemical corrosion of the pipe wall by strongly acid or so-called "alkali" soils is also largely nullified by the protective coating. Where the pipe line is subjected to the action of stray current electrolysis the protective layer reduces the intensity of the attack by preventing localization of this type of action.

It is well known that cast iron pipe, under ordinary conditions, in ordinary soils, will last for over 100 years. Under certain unusual conditions any metallic pipe, even cast iron pipe, will fail because of electro-chemical action. Because of this inability of any unprotected metallic pipe to withstand peculiar and strictly local conditions, it is highly advantageous to the manufacturer as well as to the public to provide such pipe with a protective layer of material which is relatively inert chemically, and which will prevent or reduce the attack due to any electrical or chemical action known to occur in the soil. According to the present invention, cast iron or other metallic pipe is coated and wrapped in such a way as to be protected against conditions tending to accelerate corrosion. The pipe protected in accordance with this invention may successfully withstand salt water and acid water if encountered on the outside of the pipe. It is not within the scope of the present invention to protect the inside of pipe from corrosion or other destructive action.

The present application is a companion to an application filed by me on the same day, Ser. No. 301,267 describing and claiming the preferred apparatus for wrapping the pipe. In a divisional application Serial No. 402,527, I am claiming the wrapped metal pipe which is the product of the herein-described process.

In the accompanying drawings forming a part of this specification—

Fig. 1 is a cross section through a cast iron pipe shown protected with a cementitious outer layer in accordance with the invention;

Fig. 2 is a detail on a full size scale showing a fragment of the preferred cotton wrapping incorporated in said outer layer;

Figs. 3 and 4 are, respectively, a plan and a sectional end elevation of one form of apparatus which may be used to carry out the process, both views being diagrammatic.

In carrying out the process of the invention, a pipe length is placed on supports capable of rotating the pipe on its axis at a uniform speed. While the pipe is rotating, a layer of cement mortar is laid on the outside of the pipe at the same time a strip of loosely woven cotton cloth is spirally wrapped under tension about the pipe on the outside of the cement layer. The result is, the pipe is uniformly coated and the cotton wrapping becomes impregnated with the wet cement mortar. The cotton wrapping is preferably of coarse mesh, as illustrated, and some of the cement mortar passes through the interstices of the meshes and forms a thin layer on the outside of the cotton wrapping. The net result is that the cotton wrapping becomes imbedded in the cement layer, which as it hardens forms a protective skin over the wrapping and completely covers the same.

The cotton wrapping used contains no oil or wax and thus is quite different from burlap, which because of its oil or waxy content, actually repels cement and thus cannot be integrally incorporated in the cementitious layer in accordance with the process. Another advantage of the cotton wrapping employed in this process is the fact that unlike burlap it stretches when wet and to an extent sufficient to compensate for the natural expansion of the cement mortar. Afterwards, as the cement mortar sets hard, and hence contracts, the cotton wrapping dries out completely and contracts to the same extent. Thus, there is absolutely no separation at any point between the cotton wrapping and the cement layer, the two becoming integrally joined and indeed indistinguishable in the finished pipe.

The cotton wrapping is very much coarser in weave and of much heavier strands than cheesecloth; therefore the wrapping is far stronger than cheesecloth and is able to absorb far more water. As shown in Fig. 2, which as stated above is full size, the strands which run one way are much heavier than those which run the other way, whereas with cheesecloth, all the strands are of the same gage or size. These heavier strands are loosely spun or fluffy in appearance, and take

up not only the water but also some of the cement mortar itself. Cheesecloth is too weak and is insufficiently absorbent for the purposes of the present invention and besides, it will not allow the cement mortar to pass through it to any appreciable extent.

Referring to Figs. 3 and 4, the pipe length 5 to be protected is placed on any suitable rotary supports (not shown, but well understood in the art) and is then rotated on its axis at a uniform, though variable, speed. A car 6 having wheels 7 which roll on rails 8 is adapted to travel alongside of and parallel to the pipe, and a bin or hopper 9 for holding a supply of cement mortar 10 is carried on the car, preferably on a platform 11 which extends beneath the pipe. Platform 11 is preferably adjustable by screws 12 so that its angle relative to the pipe may be varied. A spool 13 carries a roll of cotton fabric 14, preferably the fabric described above and shown in Fig. 2, and a spring 15, whose tension is adjusted by nut 15*a*, acts as a brake to prevent rotation of the spool except as compelled by direct pull of the cotton fabric. Thus correct tension in the fabric is assured. The fabric passes over the top surface of platform 11 and under the open bottom of the bin or hopper, the walls of which on two sides are slightly spaced above the platform, so as to feed a "ribbon" of cement mortar on top of the moving belt provided by the cotton fabric. The thickness of the cement "ribbon" will of course be determined by the height of the lower edge 9*a* of the hopper wall above the top surface of the cotton fabric, and this height may be adjusted to vary the thickness of the layer of cement, as by means of an adjustable board bolted on the hopper wall (as will be understood without illustration).

As shown, the axis of rotation of spool 13 is at an angle to the axis of rotation of the pipe length; hence the cotton fabric, with the layer of cement on the inside, will be laid spirally, under tension, about the pipe, provided the car moves at uniform speed during rotation of the pipe. Preferably the fabric is laid with a small overlap. Proper tension in the fabric belt is important because it causes the cement mortar to pass through the interstices in the fabric. The car may be driven by a motor geared to the wheels, or may be pulled back and forth by means of a power-actuated cable, or may be moved in other ways, all as is known in various arts and hence not illustrated. Of course the cotton fabric must be tied to the pipe at one end of the pipe (preferably the bell end) prior to the wrapping; and when the wrapping is complete, it must be tied again, and a poultice of cement mortar is then plastered by hand around the ends of the wrapping, which, however, does not cover the extreme end of the spigot, as the latter must fit in a bell to make the usual joint.

The process results in pipe 5 having a thin skin or layer of cement 20 covering fabric 14 which is itself impregnated by the cement, and a heavy layer of cement 22 on the inside of the fabric but completely surrounding the outside of the pipe length except at the portion of the spigot end which must be received within the bell.

The rôle played by the cotton fabric wrapping will be more or less apparent from the foregoing. In the first place, it acts as a belt to lay cement onto the outer surface of the pipe, and to press the cement firmly against said surface, thereby to eliminate air holes and to make a perfect union. While the pipe is being handled, but before the cement has set, the wrapping acts to hold the cement on the pipe. The moisture absorbed by the fabric tends to make curing of the cement much more uniform, so that fine cracks do not form. When the pipe is shipped, the fabric wrapping tends to prevent mechanical injury to the cement layer beneath, as the wrapping itself forms a stony netting adjacent the exterior of the pipe. Until the pipe is laid in its trench, the protection afforded by the wrapping continues.

Obviously the present invention may be practiced with the aid of apparatus quite different from that described; for instance, see the above-identified companion application showing other apparatus. Various details of the process may be modified, within the scope of the appended claim.

Having described the inventive process and the product thereof, what I claim as new and desire to secure by Letters Patent is:

A process of coating pipe which comprises wrapping a strong, coarse meshed, loosely woven, water absorbent fabric under tension spirally around the outside of the pipe, and while the wrapping is going on, depositing wet plastic cement mortar between the fabric and the pipe; the tension being so regulated that part of the cement mortar passes through the interstices of the coarse meshes and envelopes said fabric; said fabric having the property of stretching when wet and to an extent sufficient to compensate for the natural expansion of cement mortar, said fabric drying and contracting with said mortar when it sets, and to the same extent.

WILLIAM DAVIS MOORE.