

March 2, 1954

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2,671,007

PROTECTIVE COATING FOR FERROUS METAL SURFACES

Filed Oct. 2, 1948

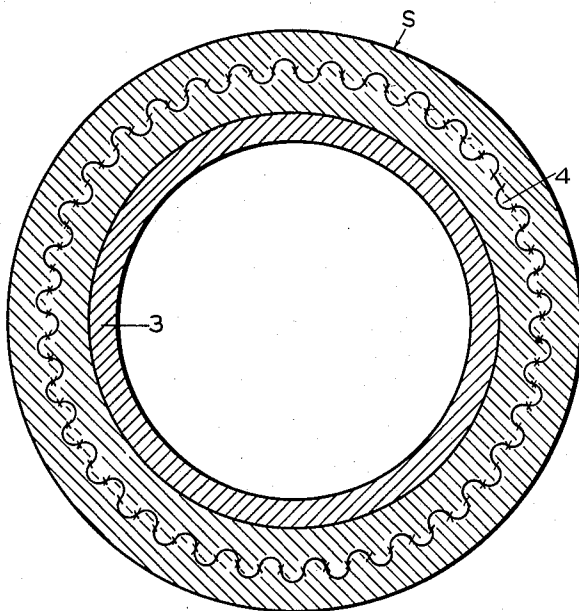


FIG 1

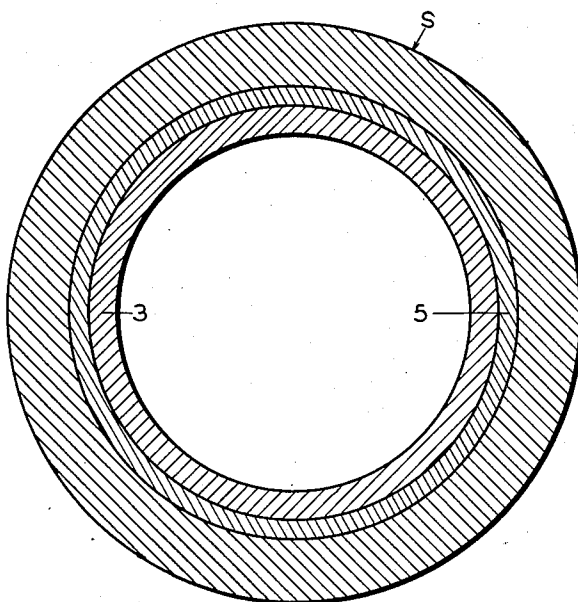


FIG 2

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PROTECTIVE COATING FOR FERROUS
METAL SURFACES

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Application October 2, 1948, Serial No. 52,438

8 Claims. (Cl. 21—2.5)

1

This invention relates to waterproofing and anti-corrosive protective coatings for any metallic or other surface subjected to corrosive conditions, and particularly surfaces of the type that are intended to be embedded in earth or encased in masonry.

Gas and water pipes, in particular, are subjected to corrosive influences when embedded in earth, due to moisture or other corrosive factors. In the past, a plastic coating has been applied to such pipes, which has consisted of two layers of suitable chemical composition applied to opposite surfaces of a fabric. Such a composition is described in British Patent No. 431,606 of March 15, 1938. The presence of the fabric in the composition tends to draw moisture and in this way tends to increase corrosion rather than retarding it, as intended.

It is an object of the present invention to provide a simple, durable and efficient corrosion-resistant coating for pipe lines and the like which forms a resistance to moisture as well as other corrosive influences.

Another object of this invention is to provide a coating composition for metallic surfaces which contains a fabric adapted to be disintegrated rapidly after application to such surfaces.

A further object of the invention is to provide a permanently waterproof, plastic, corrosion-resistant coating for metallic or other surfaces either buried or exposed.

Other objects reside in novel details of preparation and application, all of which will be fully described in the course of the following description.

Briefly described, the present invention includes a fabric impregnated on opposite surfaces with chemical compositions of such character that an initial capillary action is set up when the composition is applied to metal or other surfaces, thereby inducing water absorption and a chemical reaction causing disintegration of the fabric and swelling of the filler material thereby sealing any voids, and finally resulting in the formation of a water-impermeable coating on the treated surface.

The practice of the present invention will be best understood by reference to the accompanying drawings. In the drawings, in the respective views of which like parts have been designated similarly,

Fig. 1 is a section through a metal pipe to which the coating of the present invention has been applied, and illustrating the condition of such coating at the time of application; and

2

Fig. 2 is a similar section illustrating the condition of said coating after it has been in place on the metal for some duration.

In the practice of the present invention, I prefer to produce the coating composition in the form of a bandage or elongated strip. To this end a cloth, preferably loosely woven, and of cotton, jute or similar composition, is impregnated with a plastic as herein described.

In preferred practice, cotton cloth having 38 double filament threads per inch on the warp and 19 single filament threads per inch on the weft, and having a weight not to exceed 146 grams per square yard is used. Any other fabric or fibered material of equivalent properties may be used, but any substantial deviation from these specifications will cause a failure of corrosion-resistance. Thus, if too much material is used, the filler cannot fill in voids and if too little material is used, sufficient moisture will not be drawn into the coating to induce the desired reaction.

This fabric is impregnated with a composition comprising a mixture of petrolatum, talc and kaolin mixed with a quantity of potassium dichromate and sodium phosphate, reduced to colloidal consistency and dispersed throughout the petrolatum. The mixing of the aforesaid composition has been described in the copending application of Marion E. Price, Serial No. 54,251, filed October 13, 1948, now Patent No. 2,601,320, and owned by the assignee of this application; and features described, but not claimed herein, have been made the subject of claims in said application.

The strip or bandage S so produced is wound about the pipe 3 or other object with an edge overlap so as to form a continuous covering or coating on the pipe. After being so applied, water will penetrate the bandage taking the chemical salts into solution, and carrying said solution into contact with the covered surface where a complex phosphate and chromate coating may be formed. For example, when the pipe is a ferrous metal pipe, the protective coating 5 as shown in Fig. 2 formed on the ferrous metal surface is a complex iron phosphate and chromate composition.

After this initial water penetration which is of a temporary and brief character, the filler (talc and kaolin or other suitable materials) in the coating swells and prevents ingress of additional water. Preferably this composition will contain a small amount of bentonite to provide sufficient swelling of the filler to fill the voids formed in the coating in a manner subsequently

described. In the aforesaid action, the fabric 4 is quickly destroyed by a combined bacterial and chemical action, and no further chemical change occurs in the bandage S since the remaining constituents are chemically inert. As a result of the water penetration, the bandage S changes and becomes water impermeable. Within a comparatively short time, the cloth disintegration becomes complete so that the permanent coating is correctly represented by the sectional view in Fig. 2.

This permanent plastic coating is sufficiently yieldable to conform to the pipe contour throughout its expansion and contraction range, as induced by temperature changes; but is sufficiently plastic and tenacious to provide an excellent protective coating for the metal. As the bandage S is water impermeable, this final coating composition overcomes the defects existing in similar coating compositions in which the fabric is preserved rather than destroyed. On some metals, iron and steel for example, complex phosphate chromate salts are formed on the metallic surface, thereby giving additional protection. Such coating is shown at 5 of Fig. 2.

While some variation in the proportion of ingredients may be resorted to, I have found that a superior coating composition is produced in the following manner:

Sixty to seventy parts talc and sixty to seventy parts kaolin are mixed with ninety five to one hundred and five parts by weight of petrolatum with sufficient agitation to thoroughly disperse the solids throughout the petrolatum. To this mixture, one to five parts by weight of a mixture of equal parts of potassium dichromate and sodium phosphate are introduced with stirring or agitation so that the final mix is a product of colloidal consistency distributed throughout the petrolatum.

The aforesaid composition is impregnated into the fabric and the fabric is wound in a roll for later application to metallic or other surfaces. If desired, these rolls may be protected by encasement in foil or other protective covering until ready for use.

While the plastic composition of the present invention is particularly suited as a waterproofing and corrosion-resistant covering for metallic or other surfaces, it is also adapted to protect concretes that are subject to deterioration under corrosive influences. As an example, some of the concrete conduit employed in sewage systems which is subject to acid and/or bacterial attack may be effectively protected by a coating of the present invention.

The present invention is susceptible of several variations and such variations as are described herein are not intended to limit the invention, except within its scope as set forth in the hereunto appended claims.

I claim:

1. A protective sheeting for metallic or other surfaces comprising a fabric strip embedded in a plastic composition, said composition comprising a mixture of petrolatum, a clay material that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate, said mixture of potassium dichromate and sodium phosphate being in sufficient strength to react with said fabric in the presence of moisture to cause the deterioration of said fabric.

2. A protective sheeting for metallic surfaces comprising a cotton fabric strip embedded in a plastic composition, said composition comprising

a mixture of petrolatum, a chemically inert clay that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate, said mixture being of sufficient strength to react with said cloth to cause the deterioration thereof.

3. A protective sheeting for metallic surfaces comprising a jute fabric strip embedded in a plastic composition, said composition comprising a mixture of petrolatum, a chemically inert clay that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate, said mixture being of sufficient strength to react with said cloth to cause the deterioration thereof.

4. A protective sheeting for metallic or other surfaces comprising a fabric strip embedded in a plastic composition, said composition comprising a mixture of petrolatum, a clay material that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate being in sufficient strength to react with said fabric in the presence of moisture to cause the deterioration of said fabric, said swellable clay and said chemical salts being suspended as a colloidal dispersion in the petrolatum.

5. A protective sheeting for metallic and other surfaces as defined in claim 1 in which the composition consists of a mixture of sixty to seventy parts talc, sixty to seventy parts kaolin, ninety five to one hundred and five parts petrolatum and from one to five parts by weight of a mixture of equal parts of potassium dichromate and sodium phosphate.

6. A protective sheeting for metallic or other surfaces as defined in claim 1 in which the mixture of potassium dichromate and sodium phosphate is sufficient to react with the fabric to cause the deterioration thereof and also to react with the metallic surface to form a protective coating thereon.

7. A protective sheeting for metallic or other surfaces comprising a flat strip of fiber material embedded in a plastic composition, said composition comprising a mixture of petrolatum, a clay material that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate, said mixture of potassium dichromate and sodium phosphate being in sufficient strength to react with said material in the presence of moisture to cause the deterioration of said material.

8. A protective sheeting for metallic or other surfaces comprising a fabric of cellulose material embedded in a plastic composition, said composition comprising a mixture of petrolatum, a clay material that swells when in contact with moisture, and a mixture of potassium dichromate and sodium phosphate, said mixture of potassium dichromate and sodium phosphate being in sufficient strength to react with said fabric in the presence of moisture to cause the deterioration of said fabric.

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