

UNITED STATES PATENT OFFICE.

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MATERIAL AND PROCESS FOR PREVENTING METAL FROM RUSTING.

No Drawing.

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This invention relates to preventing material from rusting and one object of the invention is to provide an improved material and method for preventing iron and steel from rusting. Another object of the invention is to provide a basic admixture to which may be added various ingredients to produce special rust inhibitive effects.

For instance a heavy mineral oil produces a liquid protective coating; linseed oil produces a dry elastic coating; shellac produces a hard coating. In the following formula I have selected heavy mineral oil:

Pine oil 40 gallons, phosphoric acid .6 pound, butyl alcohol 5 gallons, heavy mineral oil 20 gallons.

I have discovered that a substantial and uniform coating of iron phosphate can be produced on iron and steel by the application of an admixture of phosphoric acid and a flotation oil, such as turpentine or pine oil. The proportions of the ingredients may be varied to a great extent but the following formula will be found to produce satisfactory results:

Pine oil 40 gallons, phosphoric acid .6 pound.

This admixture is rather viscous but I have discovered that the admixture can be improved by the addition of an oil solvent such as a monohydric alcohol which boils at a higher temperature than ethyl alcohol, as an example, butyl alcohol produces the desired result and although the quantity used may be varied, the following formula shows it in sufficient amount:

Pine oil 40 gallons, phosphoric acid .6 pound, butyl alcohol 5 gallons.

These admixtures may be applied to the metal by dipping or by surface brushing. At first a heavy liquid coating is produced but as time goes on, the pine oil and, when it is used, the butyl alcohol evaporates and the phosphoric acid attacks the metal, so that finally a substantial and uniform coating of phosphate is formed on the metal. This coating produced is satisfactory to prevent the formation of rust when the metal is not exposed to the weather but to have the metal remain free from rust in the weather, I find the phosphate coating must be protected. To provide this protection, I incorporate in my admixture a non-evaporating material which is normally liquid or will become liquid on solution in my admixture so that on the evaporation of the pine oil and the butyl alcohol it will remain in the solid or liquid state to protect the phosphate coating. Such materials as heavy mineral oils or animal and vegetable drying oils or animal and vegetable nondrying oils or gums and rosins are suitable for my

purpose. It often happens that the work to be processed has been pickled, soldered or handled to a great extent and has therefore accumulated obnoxious substances on the surface. When such metal is treated with the above admixtures, rust sometimes develops, due, I believe, to the inability of the admixture to dissolve the obnoxious material and in order to facilitate this solution I may add a solvent such as ethyl or methyl alcohol or denatured alcohol. Ethyl acetate, acetone, etc. may also be used but I prefer to use No. 44 denatured alcohol as shown by the following formula:

Pine oil 40 gallons, phosphoric acid .6 pound, butyl alcohol 5 gallons, heavy mineral oil 20 gallons, No. 44 denatured alcohol 30 gallons.

The last described formula forms a rather thin consolute liquid which is easily applied by brushing, spraying or dipping and its application forms a most satisfactory means of preventing the rusting of fabricated cold rolled sheet steel such as automobile bodies during storage or transit to the paint shop.

As my invention is a chemical one it will be evident to those skilled in the art that chemical equivalents may be substituted for the specific ingredients given in my formulas without departing from the spirit of the invention which is not limited as to mere matters of form or otherwise than as the prior art and the appended claims may require.

I claim:

1. The process of developing a coating of phosphate on the surface of metal consisting in treating the metal with an admixture comprising phosphoric acid and a flotation oil.
2. The process of developing a coating of phosphate on metal consisting in treating the metal with an admixture comprising phosphoric acid and pine oil.
3. The process of developing a coating of

- phosphate on metal consisting in treating the metal with an admixture comprising phosphoric acid, pine oil and butyl alcohol.
4. The process of developing a protected
5 coating of phosphate on metal consisting in treating the metal with an admixture comprising phosphoric acid, pine oil, butyl alcohol and a nonevaporating material.
5. The process of developing a protected
10 coating of phosphate on metal consisting in treating the metal with an admixture comprising phosphoric acid, pine oil, butyl alcohol and a nonevaporating mineral oil.
6. The process of developing a protected
15 coating of phosphate on metal consisting in treating the metal with an admixture comprising phosphoric acid, pine oil, a nonevaporating mineral oil and alcohol.
7. A material for preventing metal from
20 rusting consisting of an admixture comprising phosphoric acid and a flotation oil.
8. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid and pine oil.
- 25 9. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid, pine oil and butyl alcohol.
10. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid, pine oil, butyl alcohol, and a material soluble in the admixture and capable of protecting a phosphate coating.
11. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid, pine oil, alcohol and mineral oil.
12. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid, pine oil, butyl alcohol and mineral oil.
13. A consolute fluid for preventing metal from rusting being the product of mixing together phosphoric acid, flotation oil, mineral oil, and alcohol.
14. A material for preventing metal from rusting consisting of an admixture comprising phosphoric acid, pine oil, butyl alcohol, mineral oil, and ethyl alcohol.
- JAMES H. GRAVELL.