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COMPOUND FOR AND METHOD OF TREATING METALS.

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To all whom it may concern:

Be it known that I, MATTHEW GREEN, a citizen of the United States of America, residing at Detroit, county of Wayne, and State of Michigan, have invented a new and useful Improvement in Compounds for and Methods of Treating Metals, of which the following is a specification.

My invention relates to a composition for removing or freeing the surface of iron, steel or alloys of the same from rust and at the same time so treating the metal as to prevent or retard further oxidation or rusting. My invention also relates to the method of applying or using my compound successfully.

It is one of the objects of my invention to provide such a compound which will quickly and thoroughly remove rust from metals and which is composed of relatively inexpensive ingredients.

It is a well known fact that phosphoric acid in various forms and solutions has been found to be an excellent rust proofing agent. The salts formed upon metals by the action of phosphoric acid when applied to the metal are of a permanent nature so that the metal is not affected by atmospheric conditions, in so far as oxidation or rust is concerned.

It has not been found practicable, however, to use phosphoric acid alone for removing rust formed upon metals for the reason that its action upon the rust is so slow as to make its use impracticable.

It is one of the objects of my invention, therefore, to add to a solution of phosphoric acid a quantity of some reducing agent sufficient to hasten the action of the solution upon the rust. The purpose of the reducing agent is to absorb the oxygen of which the rust is largely composed in such a manner that the rust is easily and quickly removed.

As a specific reducing agent, I have found that sodium hypophosphite used in conjunction with phosphoric acid and water will perform very successfully the desired results. While I do not wish to be limited to any specific amounts of the ingredients used in my composition, I have found that the following formula will give very desirable results:

	Parts (weight).
50% Phosphoric acid	75
Water	20
Sodium hypophosphite	5

The amount of sodium hypophosphite used may be varied accordingly to the depth of the rust on the metal. That is to say, if there is a comparatively thin coating of rust, a relatively small amount of sodium hypophosphite may be used, whereas if a relatively thick coating of rust is encountered it will probably be found desirable to use a greater percentage of sodium hypophosphite.

The solution may be applied to the metal cold and by means of either a brush or by dipping the metal into a bath of the solution. It may be found necessary when metal is heavily coated with rust and the solution is applied with a brush to give more than one coating of the solution to the metal. When the metal is placed in a bath it should be allowed to remain therein until cleaned, the time depending upon the condition of the metals.

The action of my solution will tend to reduce the rust to a lower state of oxidation making the rust more soluble. In other words, it reduces the rust from a ferric to a ferrous state. It will probably be found that a slight scum or dirt will remain on the metal after being treated with my solution and it is often desirable that this be removed. In order to remove this, the metal may be rinsed either in hot water or in a hot solution of say 5% normal sodium phosphate. If the metal is to be painted, I prefer to wash or rinse it with hot water. If, however, the metal is not to be painted, I prefer to wash or rinse it in the solution of sodium phosphate as this will add to the rust resisting qualities of the surface of the metal. The presence of phoshoric acid in the solution with which the metal is first treated gives the initial rust resisting qualities, so as to ordinarily resist or retard the

formation of further deposits of rust after the metal is so treated.

While I have found it desirable to use phosphoric acid together with a reducing agent in removing the rust, I do not wish to be limited to that ingredient as other ingredients which will act in conjunction with the reducing agent and cause it to work upon the rust may be equally as successful as far as the rust removing properties of my solution are concerned.

It will thus be seen that my invention performs a two fold purpose, namely, the quick and thorough removal of rust from metals, and the prevention of further formation of rust on the metal.

It is obvious that some changes may be made in the quantities of the various ingredients of my solution, in the ingredients used as a reducing agent (it being practicable to use any form of reducing agent) and in the method herein described for utilizing the same without departing from the spirit of the invention therein, and I do not wish to limit myself to the exact proportions or exact methods herein described, it being my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. A compound for treating metals embodying phosphoric acid and a reducing agent, said phosphoric acid being present in a relatively large amount, sufficient to act in conjunction with the reducing agent to remove rust and to at the same time rust-proof the metal.

2. A compound for treating metals embodying phosphoric acid and sodium hypophosphites, the phosphoric acid being present in a relatively large amount, sufficient to act in conjunction with the sodium hypophosphite to remove rust and at the same time rust proof the metal.

3. A compound for treating metals embodying phosphoric acid, sodium hypophosphite and water, the phosphoric acid being present in a relatively large amount, sufficient to act in conjunction with the sodium hypophosphite to remove rust and at the same time rust proof the metal.

4. A compound for treating metals composed of a solution of approximately 75 parts, 50% phosphoric acid, 20 parts water and 5 parts sodium hypophosphite, all by weight.

5. The method of treating metals which consists of subjecting the metal to the action of a solution embodying phosphoric acid and sodium hypophosphite, the phosphoric acid being present in a relatively large amount sufficient to act in conjunction with the sodium hypophosphite to remove rust and at the same time rust proof the metal, and then rinsing the metal with a solution of sodium phosphate.

6. The method of treating metals which consists in subjecting the metal to a solution embracing phosphoric acid and a reducing agent, wherein the phosphoric acid is present in a relatively large amount sufficient to act in conjunction with the reducing agent to remove rust and at the same time rust proof the metal, and then rinsing the metal.

MATTHEW GREEN.