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METAL PROTECTIVE COATING METHOD

Lionel Cinamon, New York, N. Y.

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4 Claims. (Cl. 117—127)

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This invention relates to rust inhibiting using a non-acidic phosphatic composition for effecting rust inhibition.

Heretofore it has been regarded as essential in the operation of rust inhibiting processes to utilize acidic compositions for such purposes. The vast majority of these processes depend upon the use of phosphoric acid in combination with various phosphates and other materials. The phosphatic inhibition is regarded as providing the most advantageous type of protection for metals which have a tendency to rust.

Although there have been attempts to provide non-acidic methods for the production of protective coverings of metals, these methods have not been successful. In an early patent (Gravell, U. S. P. 1,555,798) the patentee suggested that the pickling of ferrous metals be followed by a neutralization of the pickling acid with water glass, and stated that this operation resulted in the formation of a skin which protected the metal against the rusting influences of the atmosphere. This skin was, however, a temporary one, and removed in subsequent working of the metal, such as, for instance, in drawing operations.

The coating did not possess the advantages of a phosphatically produced protective coating.

It has been found that phosphatic coatings of the acidic type when deposited subsequent to pickling and neutralization with sodium silicate were unsatisfactory. Other workers have reported that the silicate coatings were to be avoided since they produced rough surfaces, and presented other undesirable characteristics.

I have discovered that it is possible to obtain phosphatic protective coatings without using acidic media. These coatings possessing rust inhibiting properties are unique in that they are produced by the action on the metal of an alkaline solution of phosphates and silicates.

Accordingly it is an object of this invention to produce a rust inhibiting coating on metals which tend to rust by treating said metals with a non acidic solution containing phosphates and silicates.

Another object is to produce a rust inhibiting coating of a phosphatic character without the employment of an acid medium.

Thus I have been able successfully to protect ferrous metal surfaces against rusting or corro-

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sion by the action thereon of a non-acidic solution of a silicate and a phosphate, as for instance, a solution prepared from an alkaline silicate and phosphate.

As an example of such a combination of soluble salts, I prepare a mixture:

Tetra sodium pyrophosphate	10
Sodium meta silicate	4
Tri sodium phosphate	2

In carrying out the rust inhibiting treatment, the metal to be protected may be cleaned so as mechanically to remove as much as possible of the undesirable material on the surface of the metal. Then, it is pickled according to customary modes of procedure, after which operation the metal is thoroughly rinsed to remove the pickling liquid.

The rinsed metal is then dipped into a hot bath prepared from the above composition, using approximately 4–8 oz. of the said composition per gallon of water. The temperature of the bath may be maintained at from 180°–212° F.

I have found that the rust inhibiting action of the combination of the salts is effective when the solutions thereof are made from mixtures in which they are present in the following ranges:

	Parts
Tetra sodium pyrophosphate	1–20
Sodium meta silicate	½–10
Tri sodium phosphate	¼– 5

Effective rust inhibiting baths may be prepared from the foregoing combination of salts combined in the ranges described, by dissolving said combination in water. The solution may be prepared by dissolving from ½ ounce of the combination of salts in one gallon of water up to the saturation point of the mixture.

When more than about 8 ozs. of the combined salts are dissolved in a gallon of water, the solution shows increased efficiency in rust protection but it tends to leave a white salt film on the metal which may be found objectionable. If a supersaturated solution of the combined salts is used, such solution may also exhibit objectionable characteristics in that the salts tend to crystallize out and deposit on the metal.

Although the compositions described above are prepared from the sodium salts I have found that

other soluble salts are equally effective as long as the solutions thereof are definitely alkaline in character and non-acidic in reaction.

With respect to the temperature of the bath, I have found that it is effective at temperatures below 180° F., and in fact it may be used cold to produce rust inhibition of the metal but in such case the time of drying the treated metal is substantially lengthened.

Having thus described my invention, I claim:

1. Process of rust inhibiting a metal which comprises: thoroughly cleaning the metal to produce a bright metallic surface; and subjecting said metal, after such cleaning, to the action of an aqueous solution comprising essentially in combination from ½ oz. per gallon to the saturation concentration of

	Parts
Tetra sodium pyrophosphate	1–20
Sodium meta silicate	½–10
Tri-sodium phosphate	¼–5

2. Process of rust inhibiting a metal which comprises: thoroughly cleaning the metal to produce a bright metallic surface; and subjecting said metal, after such cleaning, to the action of an aqueous solution comprising essentially in combination from ½ oz. per gallon to the saturation concentration of

	Approximate parts
Tetra sodium pyrophosphate	10
Sodium meta silicate	4
Tri sodium phosphate	2

3. Process of rust inhibiting a metal which comprises: pickling the metal; washing the pickled metal; and subjecting said metal, after such cleaning, to the action of an aqueous solution comprising essentially, in combination, from ½ to about 8 oz. per gallon of:

	Parts
Tetra sodium pyrophosphate	1–20
Sodium meta silicate	½–10
Tri-sodium phosphate	¼–5

4. Process of rust inhibiting a metal which comprises: pickling the metal; washing the pickled metal; and subjecting said metal, after such cleaning, to the action of an aqueous solution comprising essentially, in combination, from ½ to about 8 oz. per gallon of:

	Approximate parts
Tetra sodium pyrophosphate	10
Sodium meta silicate	4
Tri sodium phosphate	2

LIONEL CINAMON.

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