

UNITED STATES PATENT OFFICE.

WILLIAM H. ALLEN, OF DETROIT, MICHIGAN,

RUST-PROOFING COATING FOR IRON AND STEEL.

1,290,476.

Specification of Letters Patent.

Patented Jan. 7, 1919.

No Drawing.

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To all whom it may concern:

Be it known that I, WILLIAM H. ALLEN, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Rust-Proofing Coating for Iron and Steel, of which the following is a specification.

This invention relates to the protection of articles of iron and steel from rusting by producing surfaces of phosphates of iron, basic in character, on said articles, and its object is to provide a rust-proofing liquid which can be applied by means of a brush, air spray or by dipping. While the exact formula of the basic phosphate surface is uncertain, it is thought to be $3\text{FePO}_4 \cdot 3\text{Fe}_2\text{O}_3 \cdot 10\text{Fe}_2(\text{PO}_4)_3$.

This invention consists of a liquid which may be applied in any desired manner to the articles to be treated, and in the coating of surfaces of iron and steel with this liquid, in contradistinction to the present method of immersing the articles in a rust-proofing bath consisting of a solution of acid phosphates wherein the articles remain until the proper surface on these articles is obtained, usually two hours when the bath is kept at a boiling point.

To accomplish this invention, a liquid consisting of an acid solution of a phosphate of a metal is applied to the surfaces to be rust-proofed and permitted to dry. Under certain circumstances a second or third application may be desirable, as when the article is covered with thick hard scales of oxid, in which case the liquid penetrates between the scales and the metal and causes the scales to fall off.

The coating liquid is prepared by mixing the acid phosphates of iron, with a weak solution of phosphoric acid. While many acid phosphates are theoretically available, those of iron, zinc and manganese are alone practical for anything but laboratory experiments. Where the phosphates are nor-

mally insoluble, sufficient phosphoric acid is added to produce a super- or acid-phosphate that will remain in solution. To give "body" to the liquid, an excess of acid phosphate may be added to the liquid, or a silicate or clay may be employed. If desired, the surfaces to be treated may be first heated, which insures a more intense action of the coating. The coating is left on the article treated until chemical equilibrium has been established and may thereafter be brushed off or left in place until it flakes off.

The preferred composition of this coating is one hundred parts of an approximately ten per cent. solution of phosphoric acid in water, to which is added approximately one per cent. by weight of ferric phosphate, which will usually so saturate the acid that it is incapable of uniting with any more ferric phosphate to form soluble acid ferric phosphate. This liquid, thickened as stated above if desired, is then applied by means of a brush, air spray, trowel or by dipping. The liquid, if formed by the use of other phosphates, is preferably of the same acidic strength, that is, equal to ten per cent. of phosphoric acid, and is also a saturated solution.

This liquid is particularly useful for protecting the surfaces of the steel work of buildings and bridges, before or after erection, and of railway vehicles, especially freight cars.

I claim:—

1. A liquid rust-proofing to be applied to surfaces of iron and steel consisting of an approximately ten per cent. solution of phosphoric acid in water in which is dissolved approximately one per cent. by weight of ferric phosphate.

2. A liquid rust-proofing to be applied to surfaces of iron and steel consisting of a solution of phosphoric acid and ferric phosphate in water, together with a thickening of inert matter.

WILLIAM H. ALLEN,