UNITED STATES PATENT OFFICE.

WILLIAM H. ALLEN, OF DETROIT, MICHIGAN, ASSIGNOR TO PARKER RUST PROOF COMPANY OF AMERICA, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

SOLUTION FOR RUST-PROOFING ARTICLES OF IRON AND STEEL.

1,291,352. Specification of Letters Patent. Patented Jan. 14, 1919.

No Drawing. Application filed January 11, 1917. Serial No. 141,803.

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 Solution for Rust-Proofing Articles of Iron and Steel, of which the following is a specification.

This invention relates to re rust-proofing of surfaces of iron and steel, and its object is to provide a material which will be most effective for this purpose.

This invention consists in combining a small percentage of zinc in the form of metal, oxid or phosphate with an intensifying agent such as a maganese oxid, and phosphoric acid dissolved in water, into which solution the articles to be treated are kept immersed for several hours, the bath being at a boiling point.

It has been found that the surfaces of the articles treated in this bath become blacker and are more resistant to the action of the elements than when the zinc is omitted, and that the time required for this treatment is reduced. The completion of the treatment in both cases is indicated by the cessation of the bubbles that rise from the articles being treated before chemical equilibrium is established.

The preferred proportions of the bath are: water, one hundred parts, phosphoric acid, approximately five-tenths of one per cent., manganese dioxid, approximately four-tenths of one per cent., and the metallic equivalent of zinc, from one to ten per cent. of the weight of the maganese dioxid. The larger amount of the zinc gives more pronounced results, but the addition of the smaller minute amount is beneficial. The proportions of acid and manganese oxid may be varied through quite wide limits.

It seems to be quite clearly established that the action of the acid on the iron and steel is to form ferrous phosphate, and that the manganese dioxid is oxygen bearing and gives up oxygen to some of the ferrous phosphate, changing it to ferric phosphate. These ferric and ferrous phosphates are probably formed at the surface of the metal being treated and while in the nascent state unite with the metal to produce a black rust-proof surface. Any oxygen bearing compound of a metal such as potassium, sodium, calcium, barium, strontium or manganesium chromate, dichromate, manganate or permanganate may be substituted for the manganese dioxid, although the expense connected with the use of the others is greater—in some cases prohibitive.

I claim:—

1. A solution for rust-proofing the surfaces of iron and steel consisting of a solution in water of phosphoric acid, manganese dioxid and zinc.

2. A solution for rust-proofing surfaces of iron and steel consisting of a solution in water of phosphoric acid, an oxygen bearing compound of a metal, and zinc.

WILLIAM H. ALLEN.