

UNITED STATES PATENT OFFICE

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PROCESS OF TREATING FERROUS METAL ARTICLES

No Drawing.

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The present invention relates to the treatment of ferrous metal articles for the purpose of preparing them for coating with lacquers, enamels, paints or the like, with particular reference to increasing the rust resisting qualities of said articles.

Among the objects of the invention is a process in which the ferrous metal articles are provided with a rust proofing chemically adherent coating.

Another object is a process of rust proofing such articles in which the rust proofing coating is provided in a greatly reduced time of treatment.

Other objects will readily occur to those skilled in the art upon reference to the following description.

In the Patent No. 870,937, issued to Coslett, Nov. 12, 1907, there is described a process in which phosphoric acid is used to treat the surface of ferrous metal articles in order to provide on such articles a coating of phosphatic material, which coating adheres strongly to the surface and is apparently chemically united therewith. This phosphatic coating is highly resistant to rust and protects the metal from oxidation.

In the practicing of the Coslett process and of various modifications which have since been made, it has been found necessary to treat the articles in these solutions and to leave them under such treatment for considerable time so that rust proofing by these various processes requires a period of several hours.

It has been found that this period may be greatly shortened by the modification hereinafter described and in fact, the time is decreased to approximately one third or less of the time required with the Coslett process.

It has been found that by heating the suitably cleaned articles to within a rather narrow temperature range and immersing them, while still heated, in a solution prepared according to the Coslett process and retaining them in the solution for only a very short period, after which they are removed and baked at about the same temperature, as or slightly higher than that of the preheating step, that a protective coat will be formed on the arti-

cles, which coating compares very favorably with the coatings produced by the more complicated and extended processes.

In carrying out the process, the articles are first suitably cleaned by any conventional method, but preferably by pickling, and then thoroughly removing the pickling solution, unless phosphoric acid has been used, in which case thorough removal is not essential. The articles are then heated to a temperature not higher than about 500° to 550° F., preferably, about 500° F., and while at this temperature, plunged into a bath of diluted ortho-phosphoric acid, allowed to remain a short time, say about a minute or two, and then taken out and transferred to a drying oven where they are then again heated to about 325° to 450° F. The strength of acid that seems to give the best results is about 33 $\frac{1}{3}$ per cent acid by weight to the balance water, though considerable variation from these proportions may be made. Repetition of the steps of treating, dipping and baking may be made if found desirable.

While the particular solution of diluted acid has been described as the preferred process, other phosphatic rust proofing solutions may be used with the preheating step to great advantage. Such phosphate solutions as those containing manganese or zinc or iron phosphate or a mixture of these are contemplated by the above statement.

It is also contemplated that such a preheating step will be found advantageous in those treatments which provide the metal with a coating of ferroso-ferric oxid, as it seems that the preliminary heating puts the ferrous articles in a more receptive condition for action by such solutions. When, therefore, the expression "rustproofing solution" is used in the claims, it is intended to cover any of these active rust proofing solutions.

Now having described the invention and the preferred forms of embodiment thereof, it is to be understood that the said invention is not to be limited to the specific details therein set forth, but only by the scope of the claims which follow.

We claim:

1. The process of treating articles having surfaces of ferrous metal, which comprises heating said articles to a temperature of about 500° to 550° F., immersing the heated articles
5 in a rust-proofing solution, then removing said articles from said solution and baking at a temperature of about 325° to 450° F.

2. The process of treating articles having
10 surfaces of ferrous metal, which comprises heating said articles to a temperature of about 500° to 550° F., and immersing the heated articles in a phosphatic rust-proofing solution.

3. The process of treating articles having
15 surfaces of ferrous metal, which comprises heating said articles to a temperature of about 500° to 550° F., immersing the heated articles in a phosphatic rustproofing solution, and removing said articles from said
20 solution and baking at a temperature of about 325° to 450° F.

4. The process of treating articles having surfaces of ferrous metal, which comprises
25 heating said articles to a temperature of about 500° to 550° F., and treating the heated articles with a solution of diluted phosphoric acid solution.

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