

UNITED STATES PATENT OFFICE.

ROBERT JAY SHOEMAKER, OF CHICAGO, ILLINOIS, ASSIGNOR TO LEADIZING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LEAD-COATING PROCESS.

1,405,167.

Specification of Letters Patent. Patented Jan. 31, 1922.

No Drawing.

Application filed April 15, 1920. Serial No. 374,089.

To all whom it may concern:

Be it known that I, ROBERT J. SHOEMAKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lead-Coating Processes, of which the following is a specification.

My invention relates to the operation of coating or plating articles made of iron or steel, with a lead plating; and the primary object of the invention is to provide an improved plating process which will be simpler and more economical than the methods heretofore used, and whereby the body or article may be plated or coated with a film of the plating metal which will be very thin, so that the plating metal is not wasted, but at the same time even, homogeneous and non-porous in character. Other incidental objects will be mentioned in connection with the following description of certain preferred methods of operation involving the principles of the invention.

The articles are immersed in a concentrated water solution of lead acetate, to which is preferably added a small amount of acetic acid. The solution may contain 50% by weight of the lead acetate, 5% acetic acid, and the balance water. The solution is heated to approximately 212° Fahrenheit, at which temperature the lead acetate disassociates, producing deposition of the lead upon the surface to be plated. Iron acetate is formed which, under the influence of heat, is decomposed into iron hydrate and acetic acid. The iron hydrate will settle to the bottom of the tank and may be drained off. The solution can be built up by adding new lead acetate crystals and acetic acid from time to time. This method is suitable for plating billets for cold drawing or stamping in substitution for the common method of "doping." The process as described to this point is not claimed herein as it forms the subject matter of an application filed December 11, 1920, Serial No. 429,889, as a continuation-in-part of this application. While the plating produced as above is dense and adheres firmly to the metal body to which it is applied so that a billet for cold drawing, for example, may be drawn without use of the ordinary lubricant, it may nevertheless contain minute pores, (closed naturally by the drawing process) but which if the article

is not subjected to further treatment by drawing otherwise may permit rusting through. To further increase this density of the plating the article is subjected to the following treatment:

The article is immersed in a fluid medium inert with respect to lead and heated to a temperature not below the melting point of lead, this medium consisting, preferably, of a liquid or substance liquid at the temperature used and of a character to freely flow from the plated surface when the article is removed from the bath. I prefer to use a bath of zinc chloride to which common salt is added, preferably in the proportions of 80% zinc chloride and 20% sodium chloride which is heated to approximately 650° Fahrenheit. For malleable iron castings, for example, or other iron or steel articles having a somewhat rough surface, I found it desirable to use a mixture of 80% of zinc chloride, 15% of common salt and 5% of tin chloride. At the temperature noted the lead plating dissolves superficially and flows with the result that the plating is made homogeneous and non-porous. Treatment in the bath of zinc chloride and common salt, or the bath containing the tin chloride, will last about two or three minutes. The tin of the tin chloride, apparently, makes the dissolved lead more fluent and besides covers the lead plating with a thin film of lead, or alloys the lead plating with tin, the result being, in any event, that the coating is made brighter and is less affected by acids. The function of the common salt is to increase the fluidity of the bath in which the article is immersed so that the molten substance constituting the bath will more freely flow off from the article when the article is removed from the bath.

An important advantage of this process is that the articles may be handled a considerable number at a time, instead of singly as in other lead plating operations, which means a very considerable saving in time and labor. Another advantage is that the lead coating will be very thin so that the process may be used for plating threaded bolts or the like since the plating metal will not fill up the threads.

I claim:

1. Method of lead plating a metal article which consists in bringing the surface to be plated into contact with a concentrated water solution of lead acetate heated to a tempera-

60

65

70

75

80

85

90

95

100

105

110

ture which will produce disassociation of the lead acetate and deposition of the lead on said surface, and then bringing the plated surface into contact with zinc chloride and common salt heated to a temperature which will superficially dissolve and produce a flow of the lead plating.

2. Method of lead plating a metal article which consists in bringing the surface to be plated into contact with a concentrated water solution of lead acetate to produce deposition of the lead on said surface, and then immersing the plated article in a fluid medium inert with respect to lead and heated to a temperature not below the melting point of lead.

3. Method of lead plating a metal article which consists in bringing the surface to be plated into contact with a concentrated water solution of lead acetate heated to a temperature which will produce disassociation of the lead acetate and deposition of the lead on said surface, and then bringing the plated surface into contact with a molten bath containing zinc chloride as a principal constituent to superficially dissolve and produce a flow of the lead plating.

4. Method of lead plating a metal article

which consists in bringing the surface to be plated into contact with a concentrated water solution of lead acetate heated to a temperature which will produce disassociation of the lead acetate and deposition of the lead on said surface and then bringing the plated surface into contact with a molten bath containing zinc chloride as a principal constituent and also tin chloride, for the purpose described.

5. Method of plating a metal article which consists in coating the same with a covering of lead and then bringing the coated surface into contact with a molten bath containing tin chloride.

6. Method of plating a metal article which consists in coating the same with a covering of lead and then bringing the coated surface into contact with a molten bath containing zinc chloride and tin chloride.

7. Method of plating a metal article that consists in coating the same with lead and then immersing the plated article in a fluid medium inert with respect to lead and heated to a temperature not below the melting point of lead.

ROBERT JAY SHOEMAKER.