

UNITED STATES PATENT OFFICE.

LELAND M. WILLEY, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

METAL-PLATING.

955,446.

Specification of Letters Patent.

Patented Apr. 19, 1910.

No Drawing.

Application filed January 14, 1909. Serial No. 472,343.

To all whom it may concern:

Be it known that I, LELAND M. WILLEY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Metal-Plating, of which the following is a specification.

This invention relates to the art of coating surfaces of one metal with another metal of a different character and more especially to the art of coating surfaces of an oxidizable metal or alloy with a substantially non-oxidizable metal which is electro-positive relative thereto.

Heretofore the coating of surfaces of one metal with another metal has ordinarily been accomplished either by electro-deposition or by dipping the metal part to be coated in a molten bath of the coating metal. The former method besides being expensive of operation produces more or less unsatisfactory results due to porosity of the coating, and the latter method is ordinarily objectionable on account of the lack of uniformity of the thickness of the coating and on account of the tendency of the coating metal to assume a crystalline appearance. Moreover, both of these methods are objectionable in that they require the metal part to be coated to be carefully freed from all surface oxidations before application of the coating.

The object of my invention is to provide an improved and inexpensive method of coating bodies of oxidizable metal with another metal electro-positive thereto.

While my invention is applicable generally to oxidizable metals, I have chosen iron as an example of such oxidizable metal and will accordingly direct the following detailed description to my method of coating that metal with a particular metal.

In case the iron body to be treated has become oxidized to such an extent that a scale is formed, the latter is removed by any of the well known methods, but in the practice of my method an ordinary film of oxid on the surface of the body tends to accelerate rather than to impede the formation of a perfect union between surfaces of the iron and the coating metal and accordingly is not removed. A molten bath is provided as follows: About 100 parts of a salt of zinc, preferably

a halogen salt such as zinc chlorid, is heated until it melts (about 262° C.) and this is continued until the mass comes to a quiet fusion. 10 to 50 parts of finely divided metallic zinc or of zinc dust, which latter is a by-product of spelter mills consisting of fine particles of pure zinc and zinc oxid, is added in small quantities during constant stirring. In order to increase the fluidity of the bath 3 to 10 parts of ammonium chlorid is now added in small quantities. When the bath thus made up has come to a quiet fusion, the metal body to be coated is immersed therein and left for a period of time depending upon the thickness of the metal body and the thickness of coating desired. For ordinary bolts and nuts half an hour is sufficient. The iron body is then removed from the molten bath and immersed in water or other suitable liquid to remove any salt or scale that may adhere to the coated article.

Upon removal from the water the iron body will be found to be very evenly coated with non-crystalline zinc which cannot be chipped or scaled from the surface of the iron body. By reason of the perfect union between the two metals and the ability to control the thickness of the coating, it becomes possible to treat parts adapted to have threaded engagement without interference with their ready assemblage, and accordingly the method is especially applicable to bolts, nuts, etc.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. The method of coating an oxidizable metal surface with another metal electro-positive thereto consisting of immersing the metal surface in a molten bath made by heating a quantity of a salt of the coating metal and mixing therewith a less quantity of the coating metal.

2. The method of coating an oxidizable metal surface with another metal electro-positive relative thereto consisting of immersing the metal surface in a molten bath made by heating a quantity of a salt of the coating metal and mixing therewith smaller quantities of finely divided coating metal and salammoniac.

3. The method of coating iron surfaces

with zinc consisting of immersing the iron surface in a molten bath made by heating 100 parts zinc chlorid until quiet fusion is reached and gradually mixing therewith 10
5 to 50 parts of finely divided zinc and 3 to 10 parts salammoniac, removing the iron surface from the bath and washing.

In witness whereof, I have hereunto set my hand this 12th day of January, 1909.

LELAND M. WILLEY.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.