UNITED STATES PATENT OFFICE.

ALEXANDER ELLIOT HASWELL AND ARTHUR GEORGE HASWELL, OF VIENNA, AUSTRIA-HUNGARY.

PROCESS OF COATING METALS WITH OXIDES.

SPECIFICATION forming part of Letters Patent No. 453,355, dated June 2, 1891.

Application filed November 3, 1890. Serial No. 370,221. (Specimens.) Patented in Austria-Hungary May 22, 1890, No. 5,129 and No. 15,938.

To all whom it may concern:

Be it known that we, ALEXANDER ELLIOT HASWELL and ARTHUR GEORGE HASWELL, both subjects of the Queen of Great Britain, and both residents of Vienna, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Coating Iron, Steel, Nickel, Zinc, or Tin for the Prevention of Corrosion, (for which we have obtained Letters Patent in Austria-Hungary, dated May 22, 1890, No. 5,129 and No. 15,938,) of which the following is a specification.

Our invention consists of a method of forming an anti-corrosive deposit of binoxide of lead or of a mixture of binoxide of lead with binoxide of manganese on iron or steel by means of a galvanic current passed through a bath in which the articles of iron or steel are immersed.

The process is as follows: The article to be coated is first carefully cleaned by means of any well-known method employed in the usual processes of electro-deposition in order to remove all oxides and fatty material. Our galvanic bath contains in one liter of water eight to eighty grams of nitrate of lead and twenty to fifty grams of nitrate of ammonia. The article to be coated is immersed in the said bath after being attached to the positive pole of a galvanic battery or dynamo-electric machine and an electric current is passed through the bath until the article has obtained the required thickness of deposit. In practice good results have been obtained with an electric current of a strength of one-half to one ampère per square decimeter surface of the article to be coated and a tension of two to two and one-half volts. The temperature of the bath may vary from 64° to 75° Fahrenheit. A deposit of suitable thickness is formed after about ten minutes' exposure in the bath. To the above-described bath a small quantity—that is to say, about half a gram—of nitrate of protoxide of manganese may be added and then a deposit of binoxide of manganese will be formed, together with the deposit of binoxide of lead.

We claim as our invention—

1. The hereinbefore-described process of electro-depositing binoxide of lead on iron and steel, which consists in immersing the article to be coated in a bath containing nitrate of lead and nitrate of ammonia in solution and in depositing binoxide of lead from such bath by passing an electric current through the said bath.

2. The hereinbefore-described process of electro-depositing binoxide of lead and binoxide of manganese on iron and steel, which consists in immersing the article to be coated in a bath containing nitrate of lead, nitrate of protoxide of manganese, and nitrate of ammonia in solution and in depositing binoxide of lead and binoxide of manganese from such bath by passing an electric current through the said bath.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ALEX. ELLIOT HASWELL.
ARTHUR GEORGE HASWELL.

Witnesses:
T. G. HARDY,
E. G. J. MOELLER.