Patented Mar. 8, 1927. 1,619,835

UNITED STATES PATENT OFFICE.

BERTRAND S. SUMMERS, OF PORT HURON, MICHIGAN, ASSIGNOR TO THE LOCOMOTIVE TERMINAL IMPROVEMENT CO., OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

PLATING METALS.

No Drawing. Application filed February 9, 1924. Serial No. 691,832.

My invention relates to the electrodeposition of lead or alloys or mixtures thereof with other metals. My invention is of particular utility in the plating of lead on iron objects of articles such as iron pipe which is exposed to corrosion by acids, etc. It has become common practice, for example to so coat iron and steel pipes which are required to withstand the action of acids, etc., to which they are exposed by reason of being embedded in the earth. It is essential for satisfactory results that such pipes be more or less resistent to the action of both acid and alkaline solutions. The pipe if coated with a dense adherent film of lead is fairly satisfactory though somewhat susceptible to the action of alkalies. I have found that when nickel is deposited with the lead a coating much more resistent to both alkali and acid solutions is obtained and the coating is harder and of better color.

If as commonly the lead is deposited from an acid or neutral bath it is difficult to obtain a uniformly dense and adherent coat of lead and moreover the coating is contaminated with more or less iron salts from the bath which quickly oxidize and stain the pipe and rusty color. If, however, the lead is plated from an alkaline bath this difficulty is overcome and a dense, bright, attractive coating is secured. The lead may be plated alone from the alkaline bath in case a lead coating alone is desired. In case, however, an alloy or mixture of lead with another metal such as nickel is preferred, the two metals are plated together from an alkali bath containing salts of both metals.

I have found that a suitable solution for depositing lead alone may be made as follows: Dissolve 3 parts of commercial lead acetate in 16 parts water and separately dissolve 6 parts of commercial caustic soda in 16 parts of water and slowly add the lead solution to the caustic soda solution. When the two solutions have been thoroughly incorporated, add about ¼ part of commercial glue. The electrolyte thus formed may be used for plating in the usual manner.

In case a harder and more resistent coating is used I prefer to deposit nickel with the lead. For this purpose I form an electrolyte by forming separately four solutions, in the first of which I dissolve 1 part of commercial lead acetate in 8 parts of water; in the second, 4 parts of commercial caustic soda in 8 parts of water; in the third, 2 parts of commercial cyanide of soda or potash in 8 parts of water, and in the fourth, 4 parts of a soluble salt of nickel such as the chloride, sulphate or nitrate or any of the well known double salts of nickel in 8 parts of water. The lead acetate solution is slowly added to the caustic soda solution while stirring, until the lead is dissolved. The nickel salt solution is slowly added to the cyanide solution until the nickel salt is completely dissolved in the latter. Then the two resultant solutions are added together to make the electrolyte ready for plating. If desired a small amount of glue may be added to the electrolyte to improve the character of the coating. The bath may then be used in the ordinary manner for plating the articles to be coated. I have found that with either of the above electrolytes a current density from one to two amperes per square foot may be used, the length of the operation depending upon the thickness of coat desired. In plating from the lead-nickel electrolyte I prefer to use two anodes, of lead and nickel, respectively, which preferably have about equal surfaces. If desired for the purpose of securing greater uniformity of deposit, the anodes may be multiplied. Furthermore while the proportions of materials given above are satisfactory, they may be varied within wide limits and more or less of the advantages of my invention obtained and therefore my invention is not limited to such proportions.

I claim:

1. As an article of manufacture, an article of iron covered with an electro-deposited coating of lead and nickel.

2. A bath for electro-depositing a mixture of lead and nickel, said bath consisting of a plumbite of an alkali metal and cyanide of nickel.

BERTRAND S. SUMMERS.