Patented May 29, 1923. 1,457,149

UNITED STATES PATENT OFFICE.

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PREPARING ALUMINUM OR ITS ALLOYS FOR ELECTROPLATING.

No Drawing. Application filed May 10, 1920. Serial No. 380,360.

To all whom it may concern:

Be it known that I, HARRY DOUGLAS CUNNINGHAM, a subject of the King of Great Britain, residing at 11ª Bond Street, Brighton, Sussex, England, have invented certain new and useful Improvements in Preparing Aluminum or Its Alloys for Electroplating, of which the following is a specification.

This invention relates to improvements in or connected with the electroplating of aluminum and (or) its alloys, hereinafter referred to by the expression "aluminum" for the sake of brevity.

It has hitherto been a practical impossibility to provide aluminum with a coating of copper or other metal by electrolytic means, and, owing to the fact that aluminum is more or less deleteriously affected by exposure to the air, salt water or the like, it has not been possible to utilize aluminum to the desirable extent. It is true that attempts have been made to coat aluminum with copper electrolytically, but such coatings did not properly adhere in places, with the result that blisters were formed and these broke or became detached so that the aluminum became exposed and oxidized or deteriorated with greater or lesser rapidity.

Now according to this invention, the aluminum or aluminum alloy is treated in such a manner as to remove all oxide from the surface, and from what may be called the pores of the metal near the surface by rubbing the aluminum thoroughly with an abrasive material such as finely powdered pumice, brickdust or other suitable material until all oxide or other foreign matter is removed. Preferably, the abrasive material is applied moist, water being suitably added, and it has been found that the process is assisted or accelerated if the temperature of the liquid be 80° F., more or less. This initial rubbing or scouring process may be effected by hand or mechanically and the whole surface of the aluminum, including the pores of the metal and microscopic depressions, is deprived of all oxide or other foreign matter. The abrasive material is then washed off, leaving the surface clean, and the aluminum is subjected to a second scouring process by means of a hand brush or swab or a revolving brush, mop or the like may also be employed. The brush is dipped in or supplied with a strong solution of copper sulphate and the abrasive material employed is suitably more finely divided than that used for the first scouring process. Suitable proportions for this solution are 1½ pounds of copper sulphate to one gallon of water. The water employed may be ordinary water, rain water or distilled water. The temperature of the solution is conveniently about 90° F. As a result of this second scouring process, the article, made of aluminum and being treated, will receive a thin but uniform coating of copper showing a pink or copper colour. The article in question is then scratch-brushed, swilled in clean water and finally put into an electrolytic bath of copper sulphate rendered acid by the addition of a small proportion of, say ¼ pound of sulphuric acid or nitric acid to the gallon of solution. Suitable proportions for this bath are 1½ pounds of copper sulphate and 4 ounces of sulphuric acid to 1 gallon of rain water or distilled water. An electric current of a preferably low voltage is employed, say 1½ to 2 volts, and the article is allowed to remain in the bath until a sufficient coating is deposited thereon. The article is then ready for the electro-deposition of other metals, such as nickel, for example, in the usual manner.

I claim:—

1. The process of electro-plating articles of aluminum and its alloys, comprising an initial cleaning of the article, then treating the article with a mixture of an abradant and a solution of copper sulphate so as to remove oxide and simultaneously impart a coating of copper to the article, and finally electroplating the article.

2. The process for preparing articles made of aluminum and its alloys, for electro-plating, comprising the scouring of the article with an abrasive material such as pumice, brickdust or the like to remove oxide or other foreign matter, removing the abrasive material and other foreign matter, subjecting the article to a second scouring of abrasive material moistened with a solution of copper sulphate to impart a thin coating of copper and removing the abrasive material or other foreign matter, substantially as set forth.

3. The process for preparing articles of aluminum and its alloys for electro-plating comprising the scouring of the article with an abrasive material rendered moist by the addition of water, washing the article, scouring the article for a second time with an abrasive material moistened with an acid solution

of copper sulphate having the effect of imparting a thin coating of copper to the article, applying a scratch brush and finally washing, substantially as set forth.

4. The process for preparing articles of aluminum and its alloys for electro-plating, comprising the scouring of the article with an abrasive material rendered moist by the addition of water, washing the article, scouring the article for a second time with an abrasive material moistened with an acid solution of copper sulphate whereby a thin coating of copper is formed on the article, applying a scratch brush, washing for a second time and finally placing the article in an electrolytic bath of copper sulphate for obtaining a thicker coating of copper, prior to the final electro-deposition of another metal, substantially as set forth.

5. The process for electro-plating articles of aluminum and its alloys comprising the scouring of the article with an abrasive material rendered moist by the addition of water having a temperature of about 80° F., washing the article, scouring the article with a strong solution containing approximately 1½ pounds of copper sulphate to 1 gallon of water and having a temperature of about 90° F. to obtain a thin coating of copper, applying a scratch brush, washing for a second time, placing the article in a bath of copper sulphate containing approximately 4 ounces of acid to 1 gallon of water for obtaining by electrolysis at a low voltage a thicker coating of copper and finally coating the article with another metal by electro-deposition, substantially as set forth.

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