

UNITED STATES PATENT OFFICE.

FRANK S. LOEB, OF NEW KENSINGTON, PENNSYLVANIA.

PREPARATION OF ALUMINIUM FOR ELECTROPLATING.

SPECIFICATION forming part of Letters Patent No. 630,246, dated August 1, 1899.

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To all whom it may concern:

Be it known that I, FRANK S. LOEB, of New Kensington, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Preparation of Aluminium for Electroplating, of which the following is a specification.

The object of my invention is to electroplate aluminium with other metals, an object which, although often tried, has not hitherto been accomplished satisfactorily.

To prepare the aluminium to receive the electrodeposit, I treat it with one of the acids of the halogen group, preferably hydrofluoric acid, which I have discovered to be much the best and to which I intend to make specific claims in addition to the broader claims. Then I quick the aluminium with a mercury solution, preferably a solution composed of nitrate of mercury, to which is added a cyanid. Then after the quicking I treat the aluminium again in the acid-bath, after which it is ready to receive the electrodeposit. By thus treating the aluminium with acid after it has been quicked the plating of metal subsequently deposited thereon is rendered very adherent and durable, much more so than would be the case if the quicked aluminium were put in the plating-bath without such re-treatment with acid.

I shall now describe the preferable compositions and preferable proportions which I have used in this preparatory treatment and in electroplating, premising that within the scope of my claims the same may be varied by the skilled electrometallurgist in many ways.

The hydrofluoric acid is preferably dilute, made by adding, say, twenty-five cubic centimeters strong acid to two thousand cubic centimeters water. The aluminium, having first been cleansed to remove grease, dirt, &c., and preferably rinsed in hot water, is immersed in the hydrofluoric acid until hydrogen gas is freely evolved from it.

The quicking solution into which the aluminium is put after treatment in the hydrofluoric acid is preferably composed of fifty grams mercury dissolved in, say, one hundred cubic centimeters strong nitric acid, this being added to two thousand cubic centimeters water and thirty grams potassium cy-

anid. The time of immersion of the aluminium in the quicking-bath should depend upon the strength of the bath. With a bath compounded as just stated about five seconds will suffice. Other quicking solutions of mercury may be used.

The hydrofluoric-acid bath into which the aluminium is introduced after its removal from the quicking-bath may be constituted in the same manner as the acid-bath above described, and the length of immersion should be sufficient to cause evolution of hydrogen gas.

The electroplating solution into which the aluminium is put after its second acid treatment is an alkaline or neutral solution, which when copper is to be deposited is preferably constituted as follows and used hot—say at a temperature of from 130° to 180° Fahrenheit: I make eight ounces of copper acetate to a thick paste with water and add eight ounces sodium carbonate dissolved in two quarts of water. In a separate vessel I dissolve eight ounces sodium bisulfite in two quarts water and add this sodium-bisulfite solution to the copper-acetate and sodium-carbonate solution. I also dissolve six ounces potassium cyanid in three quarts water and add it to the previous mixture, and then add five quarts water, making it up to three gallons, when the bath is ready for use. When used, I connect a copper anode to the positive wire and suspend from the negative wire objects to be plated. When sufficiently plated, the article may be cleaned in a suitable manner—say by rinsing in running water, then in hot water, and dried in sawdust. It can then be scratch-brushed, polished, or buffed without injuring the deposited film, which is strong and adherent, so much so that the article may be bent back and forth repeatedly without cracking the film until the aluminium itself breaks.

For electrodepositing brass on aluminium an alkaline brass, both of composition analogous to those above described, may be used. A good brass-plating bath is made of five ounces copper acetate and five ounces zinc chlorid fused, dissolved in water. To this are added ten ounces sodium carbonate and five ounces sodium bisulfite, then seven ounces potassium cyanid, and water enough to make up, say, three gallons.

To plate with silver, the following is a good bath: three ounces silver chlorid, eight ounces potassium cyanid, and eight ounces sodium carbonate dissolved in, say, one gallon water.

5 The foregoing plating-baths are illustrative, and as the essence of my invention is not the depositing of any particular metal or of depositing a metal from any particular alkaline solution I deem it unnecessary further
10 to elaborate on this point.

I claim—

1. The method of preparing aluminium for electroplating, which consists in treating the aluminium with hydrofluoric acid, then quick-

ing the aluminium, and then retreating the 15 quicked aluminium with hydrofluoric acid; substantially as described.

2. The method of preparing aluminium for electroplating, which consists in quicking the aluminium and then treating the quicked alu- 20 minium with hydrofluoric acid; substantially as described.

In testimony whereof I have hereunto set my hand.

FRANK S. LOEB.

Witnesses:

GEORGE B. BLEMMING,
G. I. HOLDSHIP.