

UNITED STATES PATENT OFFICE

2,127,640

METHOD OF CHROMIUM PLATING.

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No Drawing. Application January 7, 1936,
Serial No. 57,923

5 Claims. (Cl. 204—1)

This invention relates to a method of chromium plating, and more particularly to a method of chromium plating on a zinc or zinc alloy base.

5 An object of the invention is to provide an effective method for applying a chromium coating to a zinciferous base.

In accordance with one embodiment of the invention a zinc base is etched prior to the plating operation, and then a heavy electroplated coating of chromium is applied to the base.

10 Heretofore it has been considered detrimental to etch the surface of a zinc base before applying a chromium plate thereto. This appears to be true of light or so-called flash coatings and etching is not necessary for adherence of the chromium in such coatings. However, we have found that in order to apply a heavy chromium coating on a zinc base it is essential to first etch the zinc base. The reason for this is that chromium

20 seems to have a high surface tension and since zinc is relatively weak mechanically, the chromium deposit will peel or scale when a heavy chromium plate is deposited thereon without previous etching of the surface.

25 The zinc or zinc alloy surface to be plated may be etched directly in a Sargent chromium plating solution comprising an aqueous solution of chromic acid and sulfuric acid in which the sulfate radical is in the proportion of 1 to 5 grams per liter of solution, and the chromic acid 250 grams per liter of solution.

30 Regularly shaped parts may be etched in a solution containing a sulfate radical in the proportion of about 2.5 grams or less and chromic acid 250 grams per liter of solution by immersing the parts in the solution one or more minutes before the plating current is applied. Irregularly shaped parts are more difficult to etch and when using a solution containing the sulfate radical in the proportion of about 2.5 grams or less and chromic acid 250 grams per liter of solution, the best results are obtained by first immersing the parts in a solution of approximately 2% sulfuric acid in water. This concentration is not

45 critical and if a more dilute solution is used more time will be required for etching and vice versa. The article is then withdrawn from this solution, rinsed in water, and transferred to the plating bath where it may be plated immediately. However, even irregularly shaped parts may be etched directly in a bath, with a proportion of 5 grams of sulfate radical to 250 grams of chromic acid or higher, the sulfate concentration being sufficient to produce a satisfactory etch by immersing the article in the plating bath one or two minutes

before the current is applied. The etching thus produced results in an adherent mechanical and chemical bonding of the chromium on the zinc surface in the plating operation. In this way chromium plated coatings from 10 to 100 milligrams per square inch may be plated on a zinc or zinc alloy surface without any tendency to peel or scale. Instead of etching the surface to be plated in a sulphuric acid solution, it is evident that other suitable acids which do not form an insoluble film may be used to etch the surface. The chromium coating thus applied is bright and may be buffed to a high luster.

Since the coatings applicable by means of this invention are sufficiently heavy to prevent corrosion of the plated surface, the invention makes it possible to eliminate undercoatings of copper and nickel or the like, which must be applied to zinc or zinc alloy surfaces to prevent corrosion when light or flash coatings of chromium are applied.

It will be understood that the term zinciferous article as used herein and in the annexed claims is intended to include not only surfaces of substantially pure zinc, but also a surface having a substantial zinc content.

What is claimed is:

1. A method of chromium plating on a zinc base which comprises etching said base in a chromic acid-sulfate plating solution, and subsequently electrodepositing an adherent chromium coating of at least 10 milligrams per square inch directly on said base.

2. A method of chromium plating a zinciferous article in a chromic acid sulfate solution having a sulfate to chromic acid ratio of 2.5 to 250 or higher which comprises immersing the article in the solution to etch the article and subsequently applying a plating current to electrodeposit a non-peeling chromium coating of from 10 to 100 milligrams per square inch directly on said article.

3. A method of chromium plating on a zinciferous article which comprises etching the article in a sulfuric acid solution containing approximately 2% sulphuric acid, and subsequently electroplating an adherent chromium deposit of at least 10 milligrams per square inch directly on the etched article.

4. A method of applying a chromium plating upon a zinciferous article which comprises immersing the article for a short period of time in a chromic acid-sulfate chromium plating bath having a sulfate content of sufficient strength to etch the article and subsequently applying a plating

current to the bath with the article as the cathode to apply a non-peeling chromium coating of from 10 to 100 milligrams per square inch directly on said article.

5. A method of chromium plating a zinciferous article which comprises etching the article in a sulphuric acid solution containing approximately 2% sulphuric acid, subsequently immersing the

article in a chromic acid-sulphate plating bath to further etch the article, and finally applying a plating current to the bath with the article as a cathode to plate an adherent chromium coating of at least ten milligrams per square inch directly on the etched article.

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