Jan. 22, 1935. W. H. BOWDEN 1,988,645

METHOD OF PREPARING AND PLATING AN ALUMINUM OBJECT

Filed Jan. 7, 1931

Fig. 1.

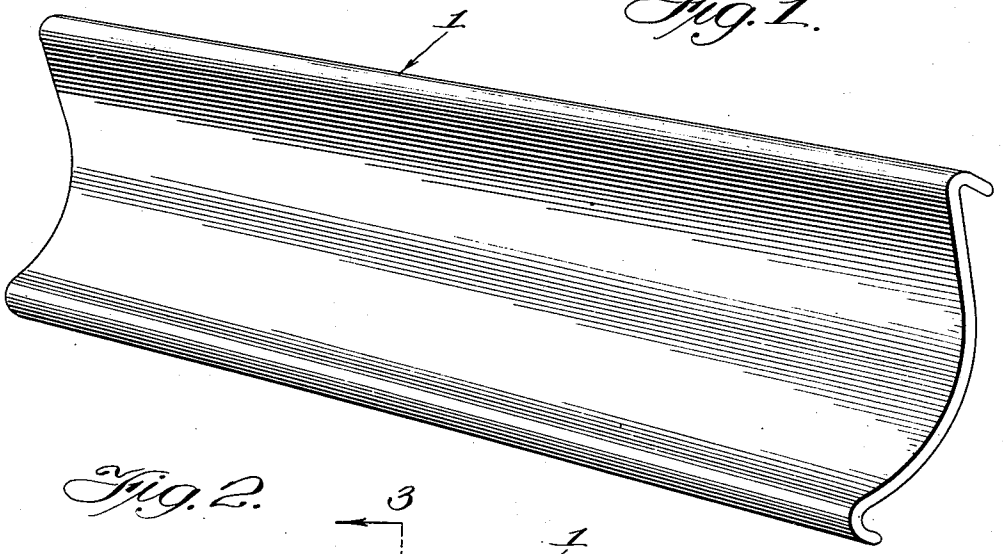
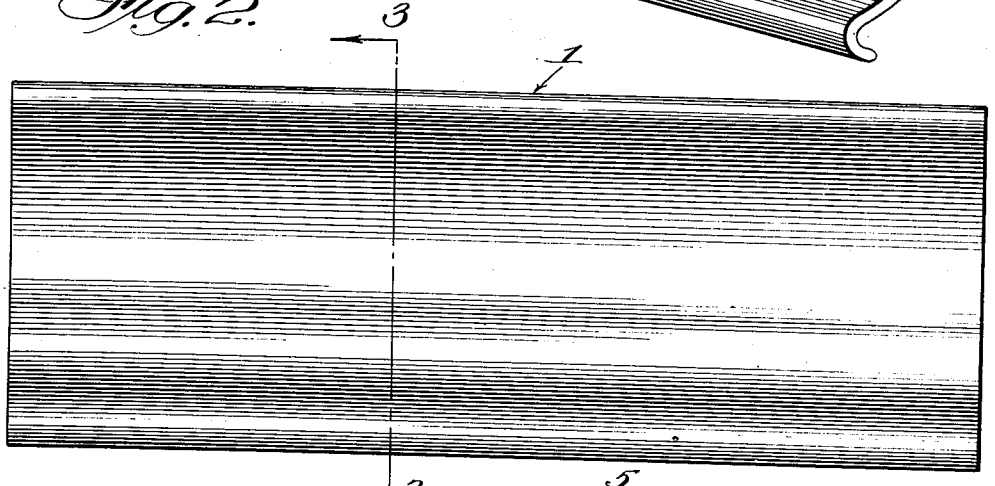


Fig. 2.



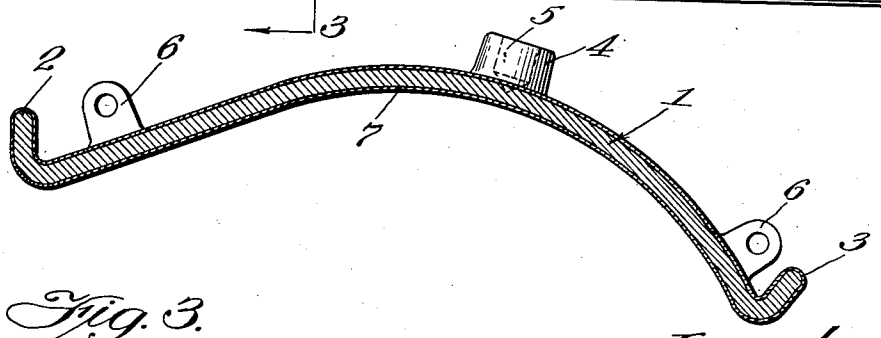


Fig. 3.

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METHOD OF PREPARING AND PLATING AN ALUMINUM OBJECT

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7 Claims. (Cl. 204—3)

The present invention relates to plating an aluminum object, and more in particular to a novel method of preparing the object to be plated with chromium.

Another object of the invention is the provision of a novel process of preparing and plating or coating cast aluminum. Prior to the present invention, the coating or plating of hard or chilled aluminum with a hard metal, such as chromium or the like, had not been successfully or commercially accomplished. By the present method and the various steps thereof, the aluminum is suitably etched in order to roughen the surface and to remove any oxide formed thereon, is then rinsed to remove the etching solution, is again etched or treated in an acid solution other than the first etching solution, and while still moist from the latter acid or etching solution is transferred to the plating tank. By reason of the treatment of the metal by the initial etching solution, no scratch brush or other mechanical treatment of the aluminum for roughening the same, is necessary.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear, and are inherently possessed thereby.

The invention further resides in the construction, combination, and arrangements of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions, without departing from the spirit of the invention.

Referring to the drawing,

Fig. 1 is a view in perspective of the ironing shoe;

Fig. 2 is a view in front elevation of the shoe;

Fig. 3 is a view in vertical cross section taken in a plane represented by the line 3—3 of Fig. 2.

Referring more particularly to the disclosure in the drawing, the embodiment selected to illustrate the invention is shown as comprising a curved or arcuate ironing shoe 1 provided with rearwardly turned or formed flanges 2 and 3. The body of the shoe is composed of aluminum, generally cast and hardened or chilled. The rear of the shoe is provided with a plurality of bosses 4 which are internally threaded at 5 for the reception of bolts or the like for connecting and retaining heating elements and a backing plate (not disclosed). Lugs 6 are also disposed adjacent the flanges 2 and 3 at the ends of the shoe, for the reception of end plates (not disclosed) enclosing the ends of the heating elements. The ironing surface is shown as provided with a coating or plated surface 7 of chromium or the like, which presents a surface relatively harder than the material of the shoe. In order to properly and commercially plate aluminum, and especially a hard or chilled aluminum structure, it is essential that this structure be suitably prepared for the plating operation. The present invention comprehends such a successful preparation of the aluminum, consisting in initially cleaning the aluminum and then etching the same in a solution containing hydrofluoric acid (H_2F_2), nitric acid (HNO_3), and water (H_2O).

The solution which I have found to be particularly well adapted for this etching operation in order to slightly roughen the surface and remove any oxide which may be on the work, consists of approximately fifteen parts water, five parts nitric acid, and one part hydrofluoric acid, although it is to be understood that the ratio of parts may be somewhat varied in order to give a proper etching solution. After this initial etch, the work is rinsed in cold water to remove the etching solution, the work then being treated or etched in a second solution consisting of chromic acid (CRO_3), sulphuric acid (H_2SO_4), and water. In preparing such a solution, I found the following to be admirably adapted for this purpose: A solution made of 30 ozs. of chromic acid, 0.34 oz. of sulphuric acid, these to be mixed with a gallon of water. The particular parts of this solution may also be varied within certain limits to give the proper solution. This latter acid or etching solution forms an aluminum oxide which covers the shoe as it leaves the tank, and the work, while still covered with a film of this latter acid or etching solution in order to prevent futher oxidation, is then transferred to the plating tank which has connected thereto a source of current supply for the final plating operation.

By treating the work in the above outlined manner, it is possible to successfully and commercially plate aluminum in order to adapt it for successful use in an ironing shoe. By the use of such material in an ironing shoe, danger of burning the ironing roll is eliminated. The necessity of a thermal control is also eliminated, since the structure is self-regulating.

The heat generated in the heating element of the ironing shoe, is readily conducted through-

out the body of the shoe, and especially to those portions which are doing useful work. By reason of this excellent conductivity, a faster heating and quick starting is accomplished, the shoe being ready for use in but a fraction of the time necessary to raise a steel, iron, or the like, shoe, to the proper temperature for the ironing operation. Also by reason of its excellent conductivity, a lighter heating element can be employed, thereby cutting down the cost of current consumption and effecting a considerable saving in the cost of operation of the ironing machine.

Having thus disclosed the invention,

I claim:

1. The method of preparing an aluminum object for chromium plating, comprising the steps of etching the surface thereof in a solution containing hydrofluoric acid, rinsing said etched surface, and immersing said surface in a solution containing chromic acid.

2. The method of preparing and plating an aluminum object, comprising the steps of etching the surface thereof in a solution containing hydrofluoric acid, treating said surface in a solution containing chromic acid, and thereafter plating the surface with chromium.

3. The method of preparing and plating an aluminum surface, comprising the steps of treating said surface in an hydrofluoric acid solution, then treating said surface in a chromic acid solution and transferring the surface direct to a plating tank for chromium plating the same.

4. The method of preparing and plating an aluminum object, comprising the steps of etching the surface thereof in a solution containing hydrofluoric acid, treating said surface in a solution including chromic and sulphuric acid, and chromium plating said surface.

5. The method of preparing and plating an aluminum surface, comprising the steps of treating said surface in an hydrofluoric acid solution, rinsing said surface to remove the solution, treating said surface in a solution containing chromic acid, and then chromium plating said surface.

6. The method of preparing and plating an aluminum surface, comprising the steps of treating said surface in an etching solution containing hydrofluoric acid, rinsing said surface in cold water, treating said surface in a solution containing chromic acid, and then chromium plating said surface.

7. The method of preparing and plating an aluminum surface, comprising the steps of immersing the surface in a solution of hydrofluoric acid, nitric acid and water to roughen the surface; rinsing said surface; immersing the surface in a solution of chromic acid, sulphuric acid and water, transferring said surface to a plating tank while still wet from the latter solution; and chromium plating the surface.

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