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IMPROVEMENTS IN OR RELATING TO THE ELECTROCHEMICAL MARKING ON SILVER.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH,

RAFI MARG, NEW DELHI-1, INDIA, AN INDIAN REGISTERED BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT, (ACT XXI OF 1860).

The following specification particularly describes and ascertains the nature of this invention and the manner in which it is to be performed :-

This is an invention by DR. SANKARAN GURUSWAMY, Scientist and STHANUSUBRAMONIA IYER KRISHNAMOORTHY, Senior Laboratory Assistant, Central Electrochemical Research Institute, Karaikudi-3 (Tamil Nadu), both Indian citizens.

This invention relates to improvements in or relating to the electrochemical marking on silver.

The following Indian Patents 111691, 118016 and 118256 go into the practical details of the electrochemical marking of metals and alloys like mild steel, aluminium, stainless steel, brass and others and are based on (a) the electrochemical etching of the anode by chloride ion, (b) the solubility of chlorides of the metals and (c) the deposition of complex organic compounds formed by the action of electric current on polyvinyl alcohol and potassium dichromate.

The above mentioned solutions cannot be used for the electrochemical marking of silver as chloride ion does not etch silver.

The object of this invention is to obviate this disadvantage by (a) using the nitrate as the etching ion and (b) controlling the solubility of silver chromate with the help of ammonium hydroxide.

To these ends, the invention broadly consists in passing an electric current through an electrode holder containing potassium nitrate, potassium dichromate, polyvinyl alcohol and ammonia with the material to be marked as the anode; the voltage is adjusted in the range 10 to 25v and time of passage of current varied from 2 to 20 seconds to obtain the best marking for the particular job in hand.

The following typical examples are given to illustrate the invention :

EXAMPLE 1

A deep etch filled with black material (so that the marking is prominent on silver) is obtained on thick silver plate as follows :

An electrode holder described in Patent No. 118016 was employed using a mixture of potassium nitrate 8 g, potassium dichromate 4 g, polyvinyl alcohol 2 g, all dissolved in 100 c. c. of water and sufficient ammonia add-

ed to bring the pH to 9.5. D.C. voltage of 15 volts was employed. Time of etching 15 seconds; marking area : 9 typewritten size letters. The marked area was washed with soda and dried.

EXAMPLE 2

For marking thin silver foils, procedure is the same as in Example 1 except that the marking is carried out at a higher voltage and for shorter time. For marking 9 typewritten size letters on a thin silver foil, as D. C. voltage of 20 and marking time of 3 seconds give satisfactory results.

EXAMPLE 3

Alternating current can also be used in the place of direct current in Examples (1) and (2). Typical A. C. voltage will be 15 volts and 5 seconds for thin foils. The markings made using alternating current, however, have to be protected by a thin transparent lacquer coating like nitrocellulose.

The following are among the main advantages of the invention :

1. It has the advantages of speed, clarity, permanence, ease of production and minimum damage to the underlying metal.
2. It is capable of being adapted to the needs of continuous marking of silver articles in industry and commerce.

WE CLAIM :

1. A process for the electrochemical marking of silver which consists in passing an electric current through an electrode holder containing potassium nitrate, potassium dichromate, polyvinyl alcohol and ammonia with the object to be marked as the anode : the voltage being adjusted in the range of 10 to 25 v. and the time of passage of current varied from 2 to 20 seconds whereby the best marking for the particular job in hand is obtained.

2. A process for the electrochemical marking of silver substantially as hereinbefore described.

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COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

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Price : TWO RUPEES.