GOVERNMENT OF INDIA : THE PATENT OFFICE, 214, ACHARYA JAGADISH BOSE ROAD, CALCUTTA-17.

Specification No. 118256, 24th October, 1968. (Accepted—13th July, 1970)
Index at acceptance—70C4+5[LVIII(5)]

"IMPROVEMENTS IN OR RELATING TO ELCTROYTES FOR THE ELECTROCHEMICAL MARKING ON METALS"

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, RAFI MARG, NEW, DELHI-1, INDIA, AN INDIAN REGISTERED BODY INCORPORATED UNDER THE REGISTRATION OF SOCIETIES ACT (ACT XXI OF 1860)

THIS IS AN INVENTION BY DR. SANKARAN GURUSWAMY, SCIENTIST, CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE, KARAIKUDI-(MADRAS STATE), INDIA, INDIAN CITIZEN.

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

This invention relates to improvements in the electrolytes used for the electrochemical marking on metals.

The method of electrochemical marking of metals is at present employed for transferring letters, designs and numbers on metals so that metal articles of industry and commerce are marked for the purpose of identification, certificate of quality and for advertisement. The method has the advantages of speed, clarity, permanence, case of production and minimum damage to the underlying metal.

Full details of the method, however, are not available. The necessary equipment and know-how for the work will have to be imported involving foreign exchange and dependance on foreign firms.

The main object of this invention is to develop indigenous know-how on the subject and to design suitable equipment for the electrochemical marking of metals. The previous patent by Dr. Sankaran Guruswamy and Dr. Gollakota probhakara Rao is concerned with improvements in or relating to the electrochemical marking of metals.

The invention is concerned specifically with improvements in or relating to electrolytes for the electrochemical marking on metals and has for its principal object to propose the use of an aqueous solution of suitable combination of electrolytes which, when used in an absorbant pad, will cause in the shortest possible time an etch/and/or deposit mark on metals by the passage of current.

It is further the object of the invention that it should be possible to conveniently select a combination of electrolytes so that minimum chemical attack occurs on the metal when no current passes through the solution and that the chemicals used for the work are not harmful to the operator engaged in the electrochemical marking of metals.

To these ends, the invention broadly consists in the use of suitable combination of electrolytes, mineral acids, oxidising agents, and organic chemicals comprising of chlorides, chromates, borates, hydroxides and sulphates of iron, copper, alkali and alkaline earth metals in concentrations ranging from 2 to 20% and of organic chemicals like salicylic, benzoic, tarteric acids, EDTA (ethylene diamine tetraacetic acid), polyvinyl alcohol and others in concentrations ranging from 0.1 to 10% to effect the etch and/or deposit of the metal.

Thus in accordance with one embodiment, a combination of ferric chloride, sodium chloride and sulphuric acid is suitable for effecting an etch mark on metals using direct current; a combination of sodium hydroxide, sodium chloride, potassium dichromate and salicylic acid is suitable for effecting an etch/deposit mark on metals using alternating current.

It is obvious that other modifications can be made within the ambit and scope of this invention.

The invention will now be fully described with reference to the following four aqueous solutions of combination of different chemicals :

1. For etch marking using direct current on mild steel, stainless steel and aluminium. Time of marking 20 to 40 seconds. D. C. supply 20 to 25 volts depending on the stencil area and the electrode holder used.

Sodium chloride	16 gms.	Dissolved in 100 c. c. of water
Boric acid	4 gms.	

2. For etch/deposit marking using alternating corrent on mild steel. Time of marking 10 to 15 seconds. A. C. supply 20 to 25 volts depending on the stencil area and the electrode holder used.

Sodium chloride	16 gms.	Dissolved in 100 c. c. of water
Tartaric acid	4 gms.	
Ferrous ammonium sulphate	4 gms.	
Boric acid	4 gms.	
Copper sulphate	Trace	

3. For etch/deposit marking using alternating current on galvanised iron, brass, tin plated materials. Time of marking 10 to 15 seconds. A. C. supply 20 to 25 volts depending on the stencil area and the electrode holder used.

Sodium chloride	10 gms.	Dissolved in 100 c. c. of water
Sodium hydroxide	5 gms.	
Potassium dichromate	5 gms.	
Benzoic acid	1 gm.	

4. For etch/deposit marking using alternating current on mild steel, stainless steel, brass, galvanized iron. Time of marking 3 to 5 seconds. A. C. supply 20 to 25 volts depending on stencil area and the electrode holder used.

Sodium chloride	8 gms.	Dissolved in 100 c. c. of water
Potassium dichromate	4 gms.	
Polyvinyl alcohol	2 gms.	

The following are the main advantages of the invention :

1. The chemicals are readily available, are not costly and are not harmful to the operator employing the electrochemical method of marking.

2. The chemicals effect minimum attack on the metals as long as current is not flowing through the solution.

We Claim :

1. A composition for the electrochemical marking of metals which comprises suitable combinations in concentrations ranging from 2 to 20% of (a) the following eiectrolytes, acids and oxidizing agents : sodium chloride, ferrous ammonium sulphate, copper sulphate, sodium hydroxide, boric acid and potassium dichromate and (b) organic chemicals like benzoic, tartaric acids, EDTA (ethylene diamine tetraacetic acid), and polyvinyl alcohol in concentrations

ranging from 0.1 to 10% to effect the etch and/or deposit of the metal.

2. A composition as claimed in claim 1 which comprises a combination of ferric chloride, sodium chloride and sulphuric acid for effecting an etch mark on metals using direct current.

3. A composition as claimed in claim 1 which comprises combination of sodium hydroxide, sodium chloride, potassium dichromate and salicylic acid for effecting an etch/deposit mark using alternating current.

4. A composition for the electrochemical marking of metals comprising of electrolytes substantially as herein described and illustrated.

sd. Illegible
PATENTS OFFICER
Council of Scientific and Industrial Research

Dated this 17th day of October, 1968.

Prabhat Press,Meerut/Patent/73—150