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PROCESS OF ELECTROLYTICALLY SEPARATING METALLIC CHROMIUM FOR THE PRODUCTION OF CHROMIUM COATINGS ON OTHER METALS.

No Drawing. Application filed August 3, 1926. Serial No. 126,928.

In my prior application for U. S. patent Ser. No. 112,408 filed May 28th, 1926, I have described a process for the electrolytic separation of metallic chromium for the purpose of coating other metals with metallic chromium. The said process substantially consists in subjecting the objects to be coated with chromium to electrolysis as cathodes in a bath containing chromic acid to which small quantities of certain electrolytes, especially neutral or acid salts of organic or inorganic acids, have been added. In certain cases the bath is acidulated, preferably with sulphuric acid, and it is preferred to use anodes consisting of rolled lead. By this process coatings are obtained which are perfectly non-porous and strongly adherent to the metal to be coated, and the coatings can be obtained according to the conditions in various colours and, if desired, with polished surfaces without any subsequent treatment.

Now, on further investigation I have found that especially favourable results are obtained by using as the addition to the chromic acid bath a salt of a certain acid not mentioned in my prior application, and while it is not desired to make in the present application any claim for the general idea of making to the bath additions of the general nature referred to in my prior application, it is desired to claim in the present application the special addition hereinafter referred to.

Therefore, according to the present invention the process for electrolytically depositing chromium on other metals for producing a chromium coating on such metals consists in subjecting the objects to be coated as cathodes to electrolysis in a bath consisting of a chromic acid solution to which an alkali metal iodate such as sodium iodate has been added, in an amount not exceeding .05 gram per litre of bath liquid.

The addition of sulphuric acid is also useful in certain cases where chromic acid is used, as there are in commerce certain qualities of chromic acid which are free from sulphuric acid or only contain a small percentage thereof.

As the anode I prefer to use electrodes of rolled lead which is more dense than cast lead and less liable to be attacked by the electrolytic bath and to contaminate the latter.

The advantage of adding sodium iodate instead of the salts referred to in my said prior application consists in that the chromium coating obtained adheres more closely to the metal to be coated.

Example. To an aqueous solution of chromic acid containing about 5% of CrO_3, sodium iodate $NaIO_3$ is added in quantities which in most of the cases should be only about 0.5 grams per litre of the bath and in certain cases may even be less. The object to be coated is introduced into the bath as the cathode, and as the anode an electrode of rolled lead is used.

Electrolysis is carried on at a temperature of from 35 to 40° C. at a bath voltage of from 3 to 4 volts and a current density of about .06 amperes per square centimetre. The correct acidity of the bath is preferably ascertained by making a preliminary test, and if in such test there is a deposit of brown colored oxides on the cathode, some sulphuric acid should be added to the bath to obtain a good metal deposit.

Under the conditions indicated a pure metallic bright deposit of chromium is obtained. By varying the temperature, voltage and current density it is possible to modify the colour of the deposit. For instance, at a temperature of about from 10 to 25° C. a brownish black coating is obtained.

What I claim is:

1. A process for depositing chromium on other metals which comprises subjecting the metallic object to be coated to electrolysis in a chromic acid bath containing not more than 0.5 gram of sodium iodate per litre of bath liquid.

2. A process for depositing chromium on other metals which comprises subjecting the metallic object to be coated to electrolysis in a chromic acid bath containing 0.5 gram of sodium iodate per litre of bath liquid.

3. A process for depositing chromium on other metals which comprises subjecting the metallic object to be coated to electrolysis in a chromic acid bath containing about 5% of CrO_3 and 0.5 gram of sodium iodate per litre of bath liquid, the electrolysis being carried

on at a temperature of from 35 to 40° C. at a bath voltage of about from 3 to 4 volts and at a current density of about .06 amperes per square centimeter.

4. A process of electrolytically separating metallic chromium for the production of chromium coatings on other metals, which process consists in subjecting the objects to be coated as cathodes to electrolysis in a chromic acid bath to which an alkali metal iodate has been added in a quantity of 0.5 gram per liter of solution.

In testimony whereof I have affixed my signature.

RUDOLF APPEL.