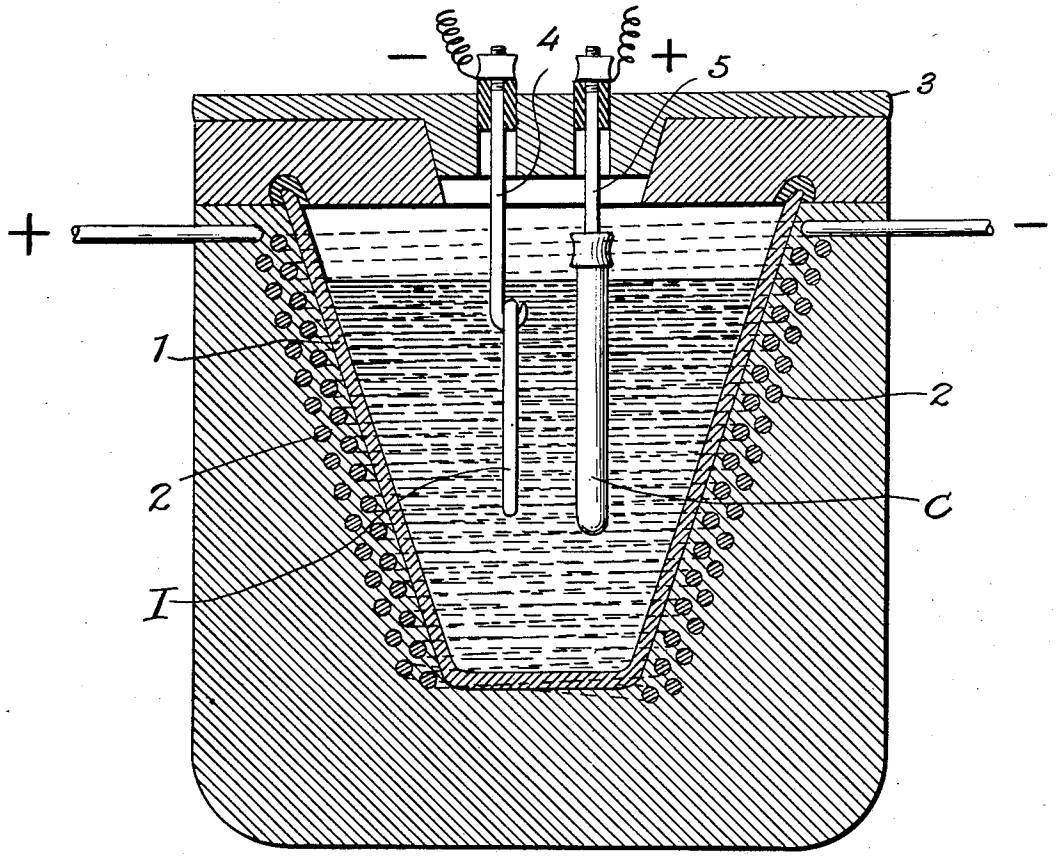
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ELECTROPLATING CHROMIUM, ETC., ON IRON, ETC

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ELECTROPLATING CHROMIUM, ETC., ON IRON, ETC.

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2 Claims. (Cl. 204—19)

This invention is a novel improvement in the art of electroplating metals on other metals from low-melting fused compound baths without melting or compacting the deposited metal, the temperature of the bath being kept below the melting point of the metal to be deposited.

The general object of this invention is to electroplate metals which lie in the central group of the periodic system of chemical elements and whose inner shells of electrons have not been filled thus causing such elements (namely—titanium, vanadium, chromium, manganese, iron, zirconium, neodymium, molybdenum, hafnium, tantalum, tungsten and uranium) to exhibit numerous valence forms, on various other metals from low melting fused alkali baths without the simultaneous deposition of hydrogen.

The particular object of the present invention is to electroplate chromium on iron from a solution of sodium chloride, sodium hydroxide and chromic oxide. I have discovered that chromium can be plated directly on iron from a solution in which the melt is made up of sodium chloride, sodium hydroxide and chromic oxide, and the particular object of this invention is to carry out this plating process.

To enable others skilled in the art to understand and use the invention I will explain one method of and apparatus for plating chromium on iron; and to facilitate an understanding thereof will explain the same in connection with an apparatus conventionally illustrated in the accompanying drawing, forming part of this application, to which reference is made by numerals designating parts referred to herein.

In accordance with my invention a vessel 1 of suitable size and shape is filled with a mixture of sodium chloride, sodium hydroxide, and chromium oxide. The mixture preferably contains 70.0 mole percent sodium hydroxide, 15.0 mole percent sodium chloride and 15.0 mole percent green chromium oxide (Cr_2O_3). The melting point of such mixture is approximately 415° centigrade.

The vessel 1 should be made of iron. The vessel 1 may be heated by any suitable means; but preferably by means of electrical heating devices, indicated at 2, by which it can be maintained at a temperature of around 455° C.

The vessel is provided with a suitable close-fitting refractory lid 3 provided with the anode and cathode connections, and will prevent the absorption of CO_2 from the atmosphere by the fused alkali. The cathode connection 4 and anode connection 5 can be connected in the usual manner with any suitable source of electrical energy.

To deposit chromium on iron, the iron object, indicated at I, should be ground smooth, carefully rubbed with fine emery powder, then brightly polished with rouge, washed with alcohol and dried. Such an object is then suitably connected to the cathode connection 4 in the lid. A stick of pure chromium C is then connected to the anode connection in the lid.

When the plating bath is melted in the vessel the lid is placed thereon and the object I and chromium stick C immersed in the molten bath. An electric current amounting to 0.5 of an ampère per square centimeter of surface of the object to be plated is then passed through the bath. The molten bath is an excellent conductor so that a current density of 0.5 of an ampere per square centimeter may be obtained with a drop in the potential of less than 10 volts across the electrodes, if the electrodes are about two inches apart. The heat generated by such electrical current keeps the temperature of the mixture in the bath above its melting point; which is all that is desired.

In about half an hour the plated object should be removed and washed with water, then rubbed with a wool cloth to bring out the luster of the original polished metal. The washings should be saved to reclaim the plating mixture. If desired the plated object may be washed with alcohol, dried, and a second coat of chromium applied.

In electroplating other metals hereinabove referred to the same process could be followed, as in electro-plating chromium, using the proper oxide thereof as a solute, and the sodium chloride and sodium hydroxide as the solvent.

A bath consisting of lithium hydroxide, lithium chloride and chromium trioxide can be used in the manner above set forth with good results.

I claim:

1. The herein described method of electroplating chromium on iron consisting in placing the iron in an eutectic bath composed of a mixture of an oxide of chromium, a sodium chloride and a sodium hydroxide, placing in said bath a stick of substantially pure chromium, said iron and said chromium being respectively connected to the cathode and anode, passing an electric current through the bath between said stick and the iron until the iron is plated, removing the iron from the bath and washing off the plating mixture adhering thereto.

2. The herein described method of electroplat-

ing chromium on iron, consisting in producing a molten bath composed of a mixture of chromium oxide, sodium chloride and sodium hydroxide, placing in said bath the iron object to be plated and a substantially pure stick of chromium, connecting said object and said stick respectively to an anode and cathode, and passing an electric current of about 0.5 of an ampere per square centimeter of surface of the object through the bath between the object and stick until the object is plated, removing the object from the bath when the plating efficiency begins to drop, and removing the plating mixture adhering to the plated object.

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