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PLATING OF ALUMINUM

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10 Claims. (Cl. 117—130)

The present invention relates to a process for the production of firmly adherent metal coatings on objects of aluminum or aluminum alloys, in which the coatings are obtained solely by dipping the objects in suitable metal-salt solutions. According to the invention an aqueous solution of metal-fluoride compounds and in particular an aqueous solution of metal-silicon-fluoride or metal-boron-fluoride is proposed for this purpose. The said salts of metals which are nobler than aluminum are suitable.

In order on one hand to hinder the hydrolysis of the dissolved salts and on the other to improve the deposition of the metal in question on to the objects, it is in some circumstances of advantage to add fluorides of the alkali, light or heavy metals, in particular the fluor-silicates or fluor-borates, to the solution. To improve the metal coating still further and in particular to obtain a fine-crystalline structure of the layer, it has been found advantageous to add to the bath organic or inorganic colloid forming substances or colloids, for example gelatine, gelatoses, albumoses, dextrine and sulphite lye.

The process can advantageously be carried out at room temperature or at raised temperature.

The process according to the invention as compared with the known electrolytic process, enables extremely dense and firmly adherent coatings to be obtained, which ensure resistance to corrosion of the objects treated. As moreover relatively thick coatings can be obtained by the process, the coatings are well adapted for polishing.

Example 1

An almost saturated cadmium-silicon-fluoride solution is diluted with four to five volumes of water. One or two of the above mentioned colloids are added to the solution in the proportion of two to five parts per thousand of the total solution. The work pieces to be treated are dipped in this solution for five to ten minutes at room temperature.

Example 2

An almost saturated solution of zinc-boron-fluoride is diluted with four to five volumes of water. Additions of a heavy metal fluoride say of the metal nickel, iron, copper or tin in the proportion of about two per thousand and of a colloid in the proportion of about five per thousand of the total liquid, follow. The solution is used at about 30 to 40° C.

Having now particularly described and ascer-

tained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

1. A non-electrolytic process for the production of a firmly adherent coating of a pure heavy metal, which is nobler than aluminum and which forms a water-soluble silicon-fluoride and/or boron-fluoride, on objects of aluminum or aluminum alloys, in which the objects are merely immersed in an aqueous solution of a member of the group consisting of the silicon-fluorides and boron-fluorides of said heavy metal until a coating of the latter is formed, the immersion being continued until a pure metallic coating of a thickness of the order of about 0.1 mm. has been produced.

2. A non-electrolytic process for the production of a firmly adherent coating of a pure heavy metal, which is nobler than aluminum and which forms a water-soluble silicon-fluoride and/or boron-fluoride, on objects of aluminum or aluminum alloys, in which the objects are merely immersed in an aqueous solution of a silicon-fluoride of the said heavy metal until a coating of the latter is formed, the immersion being continued until a pure metallic coating of a thickness of the order of about 0.1 mm. has been produced.

3. A non-electrolytic process for the production of a firmly adherent coating of a pure heavy metal, which is nobler than aluminum and which forms a water-soluble silicon-fluoride and/or boron-fluoride, on objects of aluminum or aluminum alloys, in which the objects are merely immersed in an aqueous solution of a boron-fluoride of the said heavy metal until a coating of the latter is formed, the immersion being continued until a pure metallic coating of a thickness of the order of about 0.1 mm. has been produced.

4. A non-electrolytic process for the production of a firmly adherent coating of a pure heavy metal, which is nobler than aluminum and which forms a water-soluble silicon-fluoride and/or boron-fluoride, on objects of aluminum or aluminum alloys, in which the objects are merely immersed in an aqueous solution of a silicon-fluoride of the said heavy metal until a coating of the latter is formed, said solution containing a colloid selected from the group consisting of gelatin, gelatoses, albumoses, dextrine and sulphite-lye, the immersion being continued until a pure metallic coating of a thickness of the order of about 0.1 mm. has been produced.

5. A non-electrolytic process for the production of a firmly adherent coating of a pure heavy metal, which is nobler than aluminum and which

forms a water-soluble silicon-fluoride and/or boron-fluoride, on objects of aluminum or aluminum alloys, in which the objects are merely immersed in an aqueous solution of a boron-fluoride of the said heavy metal until a coating of the latter is formed, said solution containing a colloid selected from the group consisting of gelatin, gelatoses, albumoses, dextrine and sulphite-lye, the immersion being continued until a pure metallic coating of a thickness of the order of about 0.1 mm. has been produced.

6. A process according to claim 1, wherein the concentration of the aqueous solution is that corresponding to a saturated solution of the heavy metal silicon-fluoride or boron-fluoride which has been diluted with about 4-5 volumes of water.

7. A process according to claim 2, wherein the concentration of the aqueous solution is that corresponding to a saturated solution of the heavy metal silicon-fluoride or boron-fluoride which

has been diluted with about 4-5 volumes of water.

8. A process according to claim 3, wherein the concentration of the aqueous solution is that corresponding to a saturated solution of the heavy metal silicon-fluoride or boron-fluoride which has been diluted with about 4-5 volumes of water.

9. A process according to claim 4, wherein the concentration of the aqueous solution is that corresponding to a saturated solution of the heavy metal silicon-fluoride or boron-fluoride which has been diluted with about 4-5 volumes of water.

10. A process according to claim 5, wherein the concentration of the aqueous solution is that corresponding to a saturated solution of the heavy metal silicon-fluoride or boron-fluoride which has been diluted with about 4-5 volumes of water.

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