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ELECTROPLATING OF NONCONDUCTIVE SURFACES

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5 Claims. (Cl. 204—30)

Various processes are known for producing metal coatings electrolytically on objects of insulating material or on objects with a nonconducting surface. For carrying out such electroplating processes, the insulating surface of the object must first be made conductive, e. g. by graphiting or by depositing an exceedingly thin metal coating (metal mirror) from a reducible metal salt solution. On to this first conductive surface coating, a copper layer is then usually first electrolytically deposited from alkali cyanide or acid copper galvanoplastic baths, and finally a further electrolytic deposit of another metal is produced.

The present invention refers particularly to those processes in which the first conductive surface coating on the object consists of an exceedingly thin metal coating, e. g. a silver mirror or a copper mirror which is deposited from a corresponding metallic salt solution by chemical reduction. It has been proved that, when the object is suspended in those galvanic baths which usually serve for the electrolytic separation of copper, namely acid galvanoplastic copper baths or also alkali cyanide copper baths, an exceedingly thin metal coating of this kind is attacked by these baths in a manner which causes solution, so that considerable wastage occurs because the galvanoplastic copper deposits then turn out irregular or incomplete.

The purpose of the invention is to remove these drawbacks. According to the invention, this is brought about owing to the fact that the object, which is provided for instance with a silver mirror, is treated cathodically for some time in an aqueous copper sulphate solution before suspension in one of the usual galvanic copper baths, the pH value of the copper sulphate solution amounting to about 3.4 to 1.8. This corresponds to aqueous solutions of copper sulphate which contain only up to about 2.5 gms. of free sulphuric acid per litre. In so doing, the concentration of the copper sulphate preferably amounts to only about 40 to 100 gms. per litre. In baths of this kind, a satisfactory electrolytic coppering of the exceedingly thin metal surface is obtained without risk of its partial solution or injury in any other manner during suspension. Objects with an exceedingly thin silver layer can even be suspended in the copper sulphate solution for several hours without current.

After the metal surface is well covered with copper in the copper bath constructed according to the invention, the further thickening of the copper deposit can be effected in one of the usual galvanic copper baths, for instance in one of the acid copper baths, usual in galvanoplastics, containing about 200 to 300 gms. of copper sulphate and about 15 to 40 gms. of free sulphuric acid per litre and of which the pH value amounts to about 1.1 to 0.9.

I claim:

1. Process for the production of a conductive coating on an object having a nonconductive surface, which comprises reducing a solution of a copper salt while in contact with said surface, thereby producing a thin copper deposit thereon, then electrolytically depositing further copper on said copper deposit from solution containing copper sulphate and some free sulphuric acid and having a pH value of from about 3.4 to about 1.8, and finally building up the copper coating by electrolytic deposition from a solution containing a higher concentration of copper sulphate and of free acid than said last mentioned solution.

2. Process for the production of a conductive coating on an object having a nonconductive surface, which comprises providing a thin metal deposit on said surface and then electrolytically depositing copper on said metal deposit from an aqueous solution containing copper sulphate and some free sulphuric acid and having a pH value from about 3.4 to about 1.8 and finally building up the copper coating by electrolytic deposition from a solution containing about 200 grams to about 300 grams of copper sulphate and about 15 grams to about 40 grams of free sulphuric acid per litre.

3. Process for the electrolytic production of a metal coating on an object having a nonconductive surface which comprises providing a thin metal deposit on said surface, then electrolytically depositing copper on said metal deposit from an aqueous solution containing copper sulphate and some free sulphuric acid and having a pH value of from about 3.4 to about 1.8, and finally electrolytically depositing metal on the copper coating, from a solution containing a higher concentration of metal salt and of free acid than said last-mentioned solution.

4. Process for the electrolytic production of a metal coating on an object having a nonconductive surface which comprises providing a thin silver deposit on said surface and then electrolytically depositing copper on said silver deposit from an aqueous solution containing copper sulphate and some free sulphuric acid and having a pH value of from about 3.4 to about 1.8 and finally depositing metal on the copper coating,

from a solution containing a higher concentration of metal salt and of free acid than said last-mentioned solution.

5. Process for the electrolytic production of a metal coating on an object having a nonconductive surface which comprises reducing a solution of a salt of a metal while in contact with said surface thereby producing a thin metal deposit thereon then electrolytically depositing copper on said metal deposit from an aqueous solution containing copper sulphate and some free sulphuric acid and having a pH value of from about 3.4 to about 1.8 and finally electrolytically depositing metal on said copper coating, from a solution containing a higher concentration of metal salt and of free acid than said last-mentioned solution.

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