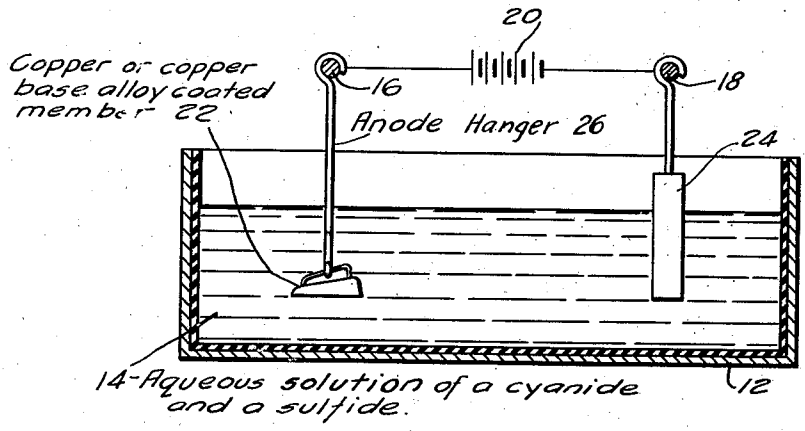
Sept. 24, 1946. J. C. LUM 2,408,220

STRIPPING OF COPPER FROM ZINC

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WITNESSES:

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STRIPPING OF COPPER FROM ZINC

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2 Claims. (Cl. 204—146)

1

This invention relates to the recovery of surface layers of copper or copper base alloys from base members to which the copper or copper base alloy has been applied.

In applying surface coatings of copper or copper base alloys to base members such, for example, as zinc die castings, there may be encountered large amounts of defective parts and in order to realize the maximum value from the defective members it is necessary to remove the surface copper or copper alloy coating. In particular, where the coating itself is defective in that it has blistered or is not uniform or otherwise is not satisfacory while the base member may be otherwise reuseable, the maximum value from the rejected members may be secured if only the copper or copper alloy coating is removed without detriment to the base member. The base member if successfully uncoated may be cleaned and replated to produce a satisfactory commercial article.

The object of this invention is to provide for substantially completely removing copper and copper base alloys from base members without adversely affecting the base member.

Another object of the invention is to provide for substantially completely removing copper and copper base alloys from a zinc base without adversely affecting the zinc base.

Other objects of the invention will in part appear hereinafter. For a fuller understanding of the nature and objects of the invention, reference should be had to the sole figure of the drawing showing a schematic cross sectional view of one form of apparatus suitable for carrying out the invention.

It has been discovered that a copper coating or a coating consisting of an alloy the major proportion of which is copper may be substantially completely removed from a base member, particularly zinc base members, without an adverse effect on the base member. In particular, it has been found that an aqueous solution of a cyanide and a sulphide may be applied to copper and copper base alloy coatings to rapidly and substantially completely effect their removal.

In practicing the invention, an aqueous solution of a cyanide and a sulphide, particularly alkali metal cyanides and sulphides, produce an unexpected result in that they exert a powerful solvent effect upon copper and copper base alloys without attacking base metals, such as zinc, to which the cuprous coating may have been applied. The aqueous solution may be prepared to contain from one part to saturation of each of the sulphide and cyanide compounds per hundred parts of water, all parts by weight. Highly satisfactory results have been obtained when from 6 to 10 ounces per gallon each of sodium cyanide and sodium sulphide are present in the solution. It is desirable that the cyanide and sulphide be present in approximately the same proportion by weight though this is not necessary. Good results have been obtained when 5 times as many moles of sodium cyanide as moles of sodium sulphide are present in the same solution.

2

The base member, for example, a zinc die casting which has been copper plated and from which the copper plate is to be removed, may be immersed in the hot aqueous solution of sulphide and cyanide. In a short period of time, depending on the thickness of the coating and the temperature of the bath, the copper will be completely removed and the zinc base metal left completely free of copper. Furthermore, the zinc surface will be found to be clean and not attacked by the solution whereby it maintains its original shape and dimensions. The zinc casting may be replated following a simple cleaning operation.

In order to expedite the removal of the copper or copper base alloy coating the base member, it has been found that the application of a reverse or deplating electrical current is advantageous. Referring to the single figure of the drawing, there is illustrated a suitable deplating bath 10 for practicing the invention. The vat 12 of suitable material, for example, rubber coated steel, contains the aqueous solution 14 of the cyanide and sulphide in which the metal removal is to be carried out. An anode bar 16 and a cathode bar 18 suitably connected to a source of direct current 20 is arranged over the vat 12 for the suspension of anode hangers 26 and the cathode plate 24. The copper or copper base alloy coated member 22 to be treated is supported on the anode hanger 26. The aqueous solution 14 may be either hot or cold. A current at a few volts passing through the member 22 supported from the anode 16 will cause a rapid and highly effective deplating of the copper or copper base alloy which will be replated upon the cathode plate 24. The copper or copper base alloy is thus economically recovered for reuse or resale.

The member 22 after having been deplated may be left in the bath 14 without any detrimental or adverse effects on the metal surface. It will be found that the surface will be quite clean and in a condition corresponding to that which it had before the copper or copper alloy had been applied thereto. It may be retreated or reprocessed and refinished without any difficulty.

As an example of the type of copper alloy coatings which may be removed from the base member may be mentioned by the various high copper brasses and bronzes. The electrolytic reverse current will remove ternary alloys containing a major proportion of copper. For example, an alloy composed of 65% copper, 25% tin and 10% zinc has been removed quite successfully in the bath operated as shown in the figure of the drawing. Other copper alloys containing a predominant proportion of copper may be similarly processed.

Since certain changes can be made in the above process without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. The process of rapidly and substantially completely removing a surface layer of a metal of the group consisting of copper and copper base alloys containing a major amount of copper applied to a zinc base member without detrimentally affecting the zinc base member which comprises immersing the member in an aqueous solution composed essentially of from about 6 to 10 ounces per gallon each of an alkali metal cyanide and an alkali metal sulfide and applying direct current, the member being the anode while being immersed in the solution.

2. The process of rapidly and substantially completely removing a surface layer of a metal of the group consisting of copper and copper base alloys containing a major amount of copper applied to a zinc base member without detrimentally affecting the zinc base member which comprises immersing the member in an aqueous solution composed essentially of from saturation to one part by weight of an alkali metal cyanide and from saturation to one part by weight of an alkali metal sulfide for each 100 parts by weight of water and applying direct current, the member being the anode while being immersed in the solution.

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