METHOD OF REMOVING GOLD, SILVER, PALLADIUM, OR THE LIKE

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3 Claims. (Cl. 204—1)

This invention relates to a method of removing gold, silver, palladium, or the like, from a metal base.

An object of the invention is to provide an effective and efficient method of removing gold, silver, palladium, or the like, from a metal base.

In accordance with one embodiment of the invention, a zinc copper, brass or bronze base to be stripped of gold is made the anode in an electrolyte comprising a solution of concentrated sulphuric acid in which the base is both chemically and electrolytically inert, while the gold is readily removed thereby from the base.

A complete understanding of the invention may be had by reference to the following description taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a plan view of a tank for electrolytically treating gold, silver or palladium coated zinciferous articles to remove the coating therefrom;

Fig. 2 is a side elevation of a rack for holding the articles while being treated, and

Fig. 3 is an end view of the rack shown in Fig. 2.

It is a well known fact that gold is difficult to dissolve in simple acids, while metals such as copper, zinc, brass, or bronze, are relatively readily soluble. In view of this fact, considerable difficulty has been experienced in the past in removing gold coatings from articles of these metals. For instance, in the manufacture of gold plated brass base transmitter electrode cups, the gold plating on the cups is frequently defective. When the gold is removed by mechanical means, a considerable amount of brass must be removed therewith in order to remove all of the gold, and the reduction of the size of the electrode cup renders it useless for its intended purpose and thus results in a considerable economic loss.

By means of the present invention, the gold may be completely removed from the transmitter cup without affecting the dimensions of the brass base which may be then replated with gold for further use. In removing the gold from the transmitter electrode cups, the cups may be mounted on the rack 8 of a conducting material which has a plurality of screws 7 secured thereto, the alternate screws extending in opposite directions, whereby the large number of electrode cups may be mounted on the rack. The rack 8 may be provided with a hook 9 by means of which a plurality of racks may be hung over a rod 9 in a tank containing a sulphuric acid solution having a specific gravity in the vicinity of 1.65. The positive lead of a direct current source of electrical energy may be connected to the rod 9, and the negative terminal is connected to a plurality of cathodes 11 which comprise a number of rods of nickel or other suitable cathode material. When an electric current is passed between the electrodes with the electrode 9 as an anode, the gold coating on the articles is removed. While the gold is not soluble in sulphuric acid, it appears that immediately adjacent the anode some of the sulphuric acid is converted into persulphuric acid which dissolves the gold from the transmitter cups, but as soon as the dissolved gold passes from the immediate vicinity of the anode, it is precipitated out from the sulphuric acid and collects in the bottom of the tank as a substantially pure gold sludge. When the current is first applied to the electrode, a current of rather high density flows which decreases with time and eventually when all of the gold has been removed the current almost ceases to flow. While it is not desired to be limited to any particular theory of operation, it appears that when the sulphuric acid has a sufficiently high concentration of about 65%, a protective oxide film is formed over the brass which renders the article completely passive in the operation, with the result that the dimensions of the article are not affected, and the article may be again plated to be reused.

If the bath is in operation for a long period, it may heat up and result in an attack on the brass. It is advisable, therefore, to provide cooling means for a bath that is to operate for long periods to prevent the temperature from rising substantially above 100°F.

The invention has been described particularly in connection with the removal of gold from zinc, copper, brass or bronze. The method, however, is equally applicable to the removal of palladium, silver and other metals from such a base, although other methods are well known for removing some metals other than gold from a base of these metals. In the removal of a gold coating from zinc, copper, brass, or bronze, the base metal is not attacked in the method described, but gold may also be removed from other metals, such as iron, in cases where a slight attack on the base metal may be tolerated.

It has been found that small amounts of chromium trioxide may be added to the sulphuric acid solution to accelerate the process, and in freshly made electrolytes of sulphuric acid the addition of small amounts of nickel sulphate accelerates the process to some extent. Concentrated hy-
drochloric acid may also be substituted for the sulphuric acid, although an appreciable attack on the brass will take place, which in some instances may not be objectionable.

While specific embodiments of the invention have been described, it will be evident that many changes and modifications may be made therein, without departing from the spirit and scope of the invention.

What is claimed is:

1. A method of removing gold coating from a copper composition base, which comprises anodically electrolyzing the coated base in an aqueous solution having sufficient sulphuric acid to produce a solution having a specific gravity of 1.65, thereby precipitating the coating metal.

2. A method of removing gold coating from a copper composition base, which comprises placing the coated base in an aqueous sulphuric acid solution having sufficient sulphuric acid to produce a solution having a specific gravity of 1.65 and containing a small amount of chromium trioxide, and passing a current through the solution with the base as an anode, thereby precipitating the coating metal.

3. A method of removing gold coating from a copper composition base, which comprises anodically electrolyzing the coated base in an aqueous solution of sulphuric acid having sufficient sulphuric acid to produce a solution having a specific gravity of 1.65, thereby precipitating the coating metal, and maintaining the temperature of the solution under approximately 100° F.

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