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3,281,264

METHOD OF GOLD-PLATING ALUMINUM

Arthur T. Cape, Monterey, and Jack E. Vestal, Van Nuys, Calif., assignors to Coast Metals, Inc., Little Ferry, N.J., a corporation of Delaware

No Drawing. Filed Jan. 31, 1963, Ser. No. 255,204
3 Claims. (Cl. 117—93.3)

This invention relates generally to a method of plating, but has reference more particularly to the gold plating of aluminum.

In U.S. Patent No. 1,370,967, a gold plating process is described, in which a metallic salt, such as gold sulphide, is mixed with a resin and the mixture dissolved in a solvent, such as turpentine, the solution being then applied, as by spraying or brushing, onto aluminum, after which the surface of the coated aluminum is heated to a temperature of from about 842°–1382° F., thereby reducing the salt, and forming a metallic film of gold on the aluminum.

Gold films or platings formed in this manner, or in any manner involving heating of the coated aluminum in a furnace or by means of a torch, have been found to have an insufficient degree of reflectivity for many purposes, since the temperature of heating is relatively low, and particularly, when the heating is performed in a furnace or by means of a torch, the plated product is usually found to be defective for other reasons.

We have discovered that if, in such a method, the coating, which has been sprayed or brushed onto the aluminum, is subjected to a temperature substantially in excess of the melting point of aluminum, with the heat being supplied in the form of radiant heat, as by means of a tungsten filament, enclosed in a quartz envelope, that the reflectivity of the gold plating which is formed is exceptionally high, so that the plated aluminum sheets are particularly adapted for manufacture into lamp reflectors, and the like.

The melting point of aluminum is about 1237° F., but in accordance with our method, the coating is subjected to a temperature within the range of from about 1600° F. to about 1800° F., a temperature of about 1700° F. being preferred, in most instances. Although these temperatures are considerably in excess of the melting point of aluminum, due to the fact that the heating is localized or confined to the exposed surface of the coating, and due to the protection afforded to the aluminum by the coating, the aluminum is not melted during the plating process.

In accordance with our method, a sheet of aluminum is sprayed or coated in any other manner, as by brushing it on, with a solution of gold chloride, preferably in an essential oil vehicle or carrier, thereby forming a coating on the aluminum sheet.

The coating is then subjected to radiant heat, preferably derived from a tungsten filament in a quartz envelope or lamp. This radiant heat heats the coating to a temperature of from about 1600° F. to about 1800° F., thereby producing the gold chloride, and leaving an extremely

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thin plating of gold on the aluminum, the essential oil vehicle or carrier being driven by or volatilized in the course of this heating.

The gold plating is produced almost instantaneously, and adheres to the aluminum base sheet so strongly that the sheet can be subjected to severe deformation or forming, without breaking the bond of the gold with the aluminum.

The gold film or plating has an exceptionally high degree of reflectivity, which renders the plated sheet especially useful for manufacture into lamp reflectors, and the like.

The important factors in our method are (1) the use of radiant heat for heating the coating, such heating increasing the temperature locally, rather than throughout the sheet, and (2) the attainment of a heating temperature of from about 1600° F.–1800° F., which heating range has been found to be fairly critical, in order to obtain the desired degree of reflectivity.

Although a particular source of radiant heating has been described, any source of radiant heat may be used, as contrasted with heating in a furnace or by means of a torch. The important consideration is that a considerable amount of radiation or radiant heat must be supplied for the purposes of the invention.

The method is of advantage also in plating the interiors of cylinders or tubes which cannot be gold plated by other methods, as well as for plating irregular shapes which are difficult to gold plate by other methods.

It will be understood that slight changes may be made in the method, as described, without departing from the spirit of the invention or the scope of the appended claims.

Having thus described our invention, we claim:

1. The method of plating aluminum with gold, which comprises applying a solution of a gold salt to the surface of aluminum to form a coating, and then subjecting only the coating to a temperature of from about 1600° F. to about 1800° F. by radiant heat applied directly to the exposed surface of the coating, whereby the coating is reduced, and a film of gold of high reflectivity is left on the aluminum.

2. The method, as defined in claim 1, in which the solution comprises gold chloride in an essential oil vehicle or carrier.

3. The method, as defined in claim 1, in which the radiant heat is derived from a tungsten filament in a quartz envelope.

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ALFRED L. LEAVITT, *Primary Examiner.*

A. H. ROSENSTEIN, *Examiner.*