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TARNISH-RESISTING SILVER AND SILVER PLATE AND PROCESS FOR PRODUCING THE SAME

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This invention relates to a tarnish-resisting silver or silver plate alloy and articles consisting of or having a surface consisting of such an alloy. It also relates to processes of producing such an alloy or article.

The tarnishing of silver or silver plate is a source of much inconvenience and expense to dealers and users in that frequent cleaning of the silver or silver plate, by rubbing, polishing, etc., is necessary to restore them to their natural color and brightness; such cleaning also in time resulting in more or less wear of the polished surface and the ornamentation thereon.

This objection is overcome by the improvements of the present invention, which provides a silver or silver plate alloy or articles consisting of or having a surface of such an alloy.

This is accomplished according to the present invention by combining with silver or silver plate a metal or metals which, in such combination, will have a shielding action as to tarnish so that the article consisting of such an alloy or having such an alloy surface will be tarnish resisting.

The alloy metals preferred for this purpose and which are included within the phrase "a metal having a shielding action as to tarnish as hereinafter used in the claim" are tin, aluminum, calcium, magnesium, bismuth, palladium, zinc and antimony. These may be used separately or in combination of two or more, according to the results desired. Such combination is particularly desirable where the metal, as, for example, palladium, is too expensive for use alone.

The present invention has particular reference to the production of tarnish resisting silver or silver plate having a silver content equal to or exceeding that of coin or sterling silver, namely about 90% or 92½%, the other contents being a base metal, such for example, as copper, and such shielding metal or metals. The silver content may however, and in some cases will greatly exceed these percentages so that the alloy will be pure silver except for a small percentage of the alloy metal. This is particularly desirable for silver-plating.

The silver or silver plate alloy may be produced in the following three ways:

1st, By the electrodeposition upon each other of successive alternate layers of silver and the shielding metal or metals and the diffusion of the latter thru the former. Stating this in a more detailed way, a layer of the shielding metal or metals is first deposited upon a suitable base, a layer of silver is then deposited upon this layer of shielding metal or metals, and the product of these two operations is then subjected to heat to cause the diffusion of the shielding metal or metals thru and to the surface of the silver. This step of heating is preferably carried on in a non-oxidizing atmosphere (and for that purpose in an oil bath) first, at a temperature of 350° F. for four hours and then at a temperature of 425° F. for eight hours.

In the solution or solutions used for such electrodeposition the base to be plated will be the cathode and the silver and shielding metal or metals the anodes, and the relative thickness of the two metals (silver and alloy) may be regulated, and therefore the relative proportions of these two metals in the final product predetermined by varying the current density of the solution and the length of time the cathode is immersed in the solution.

2nd, By superimposing layers of the silver and the shielding metal or metals, and then combining and intimately uniting the layers, by hot rolling or by cold rolling followed by heating.

3rd, By finely dividing the alloy metal or metals and then subjecting the silver and such metal or metals, in an atmosphere of hydrogen, to such a heat as will cause the shielding metal or metals to be absorbed by and intermingled with the silver. Stated in greater detail, the silver and the finely divided shielding metal or metals are placed in a suitable furnace which has a rotating muffle so that all of the silver will be exposed uniformly to the finely divided particles of the shielding metal. The silver here referred to may be in

sheets or other forms to be afterwards used in the manufacture of silverware articles or it may be finished articles of silverware, such as spoons, forks, etc.

The term "article" as used in the following claim is intended to include ingots, sheets etc. of silver and also manufactured silverware articles.

What is claimed is:

A tarnish-resisting article whose outer surface portion comprises an intimate mixture of solid metals, one of which is silver and another of which is a metal absorbed in the silver and having a shielding action as to tarnish, the silver forming the principal component, said surface portion having the properties of a solid solution resulting from the absorption of the shielding metal by solid silver.

In testimony whereof, we have hereunto set our hands.

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