Patented Mar. 1, 1932

1,847,941

UNITED STATES PATENT OFFICE

DANIEL GRAY AND RICHARD O. BAILEY, OF ONEIDA, AND WILLIAM S. MURRAY, OF UTICA, NEW YORK, ASSIGNORS TO ONEIDA COMMUNITY, LIMITED, OF ONEIDA, NEW YORK, A CORPORATION OF NEW YORK

METAL ALLOYS AND PROCESS OF PRODUCING THE SAME

No Drawing. Application filed January 22, 1926. Serial No. 83,109.

This invention relates to improvements in alloys or intimate mixtures of metals hereinafter called "alloys", for brevity, and to processes of producing the same.

The alloy to which this invention has reference is one comprising, and preferably consisting of, silver and indium. Such alloy may be either raw material from which to make finished articles or be the coating of a plated article.

Preferably, the silver content will predominate in the alloy and the indium content be such as to render the surface of the alloy tarnish resistant; the silver content for sterling or coin silver standards for example, being about 90% or more.

The alloy may contain additional ingredients to the silver and indium, if desired for certain purposes, but when tarnish resistance is desired the added ingredient or ingredients must be such as not to neutralize the tarnish resisting or shielding action of the indium.

As above indicated, the alloy may be in the form of raw material from which to make finished products, or it may be the coating of a plated article. In the production of the former we may proceed according to the following methods or processes;

1. We introduce into a quartz tube a predetermined quantity of silver and also a predetermined quantity of indium. The tube is evacuated and sealed off, then the tube with contents is heated in a furnace at a temperature above the melting point of silver (960° C.). The heating is continued until the two metals are intimately mixed. The metals thus mixed, or alloys, are then removed and permitted to cool. The quantity of indium used may vary from a fraction of 1% to 25% relatively to the total silver and indium. The quality of tarnish resistance of the alloy increasing as the quantity of indium is increased.

For sterling or coin standards the quantity of indium used should not exceed 10% and it may be less.

2. Silver is surface coated, as for example, by electro deposition, with the desired or required quantity of indium, and the silver with this indium coating is then heated in a furnace at a temperature about the melting point of the indium (155° C.). This heating is continued until the indium has been diffused thru and therefore intimately mixed with the silver. The alloy or intimate mixture is then removed from the furnace and allowed to cool. The heating of the silver with this indium coating may be conducted in the presence of a hydrogen atmosphere.

In the production of the coating of a plated article we proceed as follows:

3. The base or base metal to be coated has first deposited upon it by electro-deposition a coating of silver; a coating of indium is then applied to this silver coating, preferably, also by electro-deposition. Another coating of silver is in turn coated by electro-deposition upon the indium coating. The base with these three coatings is then heated as before described in process "2": "Silver is surface coated, as for example, by electro-deposition, with the desired or required quantity of indium, and the silver with this indium coating is then heated in a furnace at a temperature about the melting point of the indium (155° C.). This heating is continued until the indium has been diffused thru and therefore intimately mixed with the silver. The alloy or intimate mixture is then removed from the furnace and allowed to cool. The heating of the silver with this indium coating may be conducted in the presence of a hydrogen atmosphere." Such heating being continued until the middle coating of indium has been properly diffused thru the coatings of silver. The plated article is then removed from the furnace and subjected to the usual finishing processes of polishing, etc.

If desired the initial or first coating of silver may be omitted and the first coating applied to the base or base metal be of indium followed by a coating of silver, but we prefer to begin with an initial coating of silver.

It will also be understood that instead of using a coating of silver, a coating of indium and a coating of silver or a coating or indium and a coating of silver, additional alternating coatings of these two metals may be used.

What is claimed is:

1. An alloy or intimate mixture consisting of silver and a measurable amount of indium, with the silver content predominating.

2. An alloy or intimate mixture consisting of silver and a measurable amount of indium, with the silver content constituting about 90% or more of the combined silver and indium.

3. A tarnish-resisting alloy or intimate mixture comprising silver and indium, with the silver content predominating and the indium in sufficient quantity to give protection to the alloy or mixture against tarnish.

4. A tarnish-resisting alloy or intimate mixture comprising silver and indium, with the silver content constituting about 90% or more of the combined silver and indium and with the indium in sufficient quantity to give protection to the alloy or mixture against tarnish.

5. The process of producing an alloy or intimate mixture comprising silver and indium which consists in uniting layers of silver and indium and diffusing the latter through the former at a suitable temperature.

6. The process of producing an alloy or intimate mixture consisting of silver and indium which consists in uniting layers of silver and indium and then diffusing the latter through the former at a suitable temperature.

7. The process of producing a tarnish-resisting alloy or intimate mixture comprising silver and indium which consists in uniting layers of silver and indium and then diffusing the latter through the former at a suitable temperature.

8. An alloy or intimate mixture consisting of silver and indium, with the silver content predominating.

9. A tarnish-resisting alloy or intimate mixture consisting of silver and indium, with the silver content predominating.

In testimony whereof, we have hereunto set our hands.

DANIEL GRAY.
RICHARD O. BAILEY.
WILLIAM S. MURRAY.