

UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING ALLOYS.

1,133,019.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWARD D. GLEASON, of Flatbush, in the State of New York, have invented a certain new and useful Improvement in Processes of Making Alloys, where-
of the following is a specification.

It is the object of my invention to provide an alloy which has the ductility, brilliancy, durability, and capacity for resisting oxidation which is characteristic of sterling silver and may be employed in electrometallurgy as a substitute for that metal.

In the ordinary process of making an electrolyte for electroplating with fine silver, a fused nitrate of silver is made, said nitrate is precipitated as a chlorid and the chlorid dissolved in a solution of potassium cyanid, to form an electrolytic solution, and the latter requires an anode of silver. Therefore, it may be noted that the alloy of silver and cadmium, produced as hereinafter described, may be advantageously employed for the purposes herein contemplated, because it is not only much less costly than the silver for which it forms a commercial substitute, but is more readily and cheaply reduced to an electrolytic solution for, as hereinafter described, the nitrate of said alloy is directly soluble in water without the employment of acids or precipitation as chlorid, and, the electrolyte formed of said alloy may be decomposed and maintained by the employment of an anode of said alloy.

In accordance with my invention a definite quantity of silver is fused, and, being covered with powdered borax said molten mass is heated to approximately the boiling point of silver, the proper temperature being indicated by slight ebullition of the mass. Fragments of cadmium are then added to the molten silver while the latter is agitated; care being taken to introduce the cadmium as quickly as possible beneath the covering of borax. It may be observed that if the silver is not agitated while the cadmium is being mixed therewith, a button of silver is formed at the bottom of the mass. Moreover, if the borax covering is insufficient or the cadmium projects therethrough, a large percentage of the cadmium is lost by fuming.

I find that a satisfactory alloy for the purposes herein contemplated may be made from less than 65% of silver and more than

35% of cadmium, for instance, from 55% of silver and 45% of cadmium.

The molten alloy, made as above described, may then be cast in an ingot, comminuted and reduced to nitrate. For instance, one part of said alloy may be dissolved in two parts of chemically pure nitric acid. To this solution, one ounce of potassium nitrate may be added and the mixture subjected to the action of a slow fire until all excess of the acid is evaporated. The molten mass being then cooled, the product is a cake of hard white fused nitrate, double the weight of the alloy employed and free from acid, and readily soluble in hot water and slowly in cold water. In order to form an electrolyte from said nitrate; three ounces of the latter may be directly dissolved in two quarts of hot water, and, four ounces of the salt of potassium cyanid being separately dissolved in two quarts of water, the two solutions, each consisting of two quarts of water, may be mixed, forming one gallon of electrolyte which is translucent and free from sediment. A piece of bright copper dipped in said electrolyte, for a few seconds, will have deposited thereon a uniform coating of an alloy of silver and cadmium of the original proportions, and having the aforesaid characteristics of a fine silver coating. However, I prefer to employ for the decomposition and maintenance of the electrolyte an anode formed of said alloy as above described.

Although an alloy having the proportions of silver and cadmium above specified may be advantageously employed, as described, it is to be understood that alloys of different proportions may be made and utilized in accordance with this invention. For instance, I have employed an alloy consisting of 10% of silver and 90% of cadmium. Therefore, I do not desire to limit myself to the precise procedure hereinbefore described, as it is obvious that various modifications may be made therein without departing from the scope of my invention as defined in the following claims.

I claim:—

1. The herein described process of making a ductile alloy, which consists in heating silver to approximately its boiling point; and then adding cadmium to the molten silver, under a covering which limits the fuming of

the cadmium while the two metals are being mixed.

2. The herein described process of making a ductile alloy, which consists in heating silver to approximately its boiling point; adding cadmium to the molten silver, under a covering of borax; and maintaining the molten mass in a state of agitation while the two metals are being mixed.

3. The herein described process of making a ductile alloy, which consists in heating silver to approximately its boiling point; and, adding cadmium to the molten silver, in the proportion of 55% of silver and 45% of cadmium.

4. The herein described process of making a ductile alloy, which consists in heating silver

to approximately its boiling point; then adding cadmium to the molten silver, under a covering of a fluxing medium; and, maintaining the molten mass in a state of agitation while the two metals are being mixed.

5. A ductile alloy containing 55% of silver and 45% of cadmium.

6. A ductile alloy consisting of less than 65% of silver and more than 35% of cadmium.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this twenty-seventh day of June, 1911.

EDWARD D. GLEASON.

Witnesses:

ARTHUR E. PAIGE,
JNO. R. WATTS.