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ALLOY, METHOD OF MAKING THE SAME, AND ARTICLE MADE THEREFROM

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This invention relates to alloys or alloy mixtures and methods of compounding the same; more particularly to metallic compositions and articles made therefrom which are non-corrosive and particularly resist corrosion when used as parts of electrolytic apparatus.

It is an object of my invention to provide a metallic mixture in the nature of an alloy which may be readily cast and formed into articles useful in electrolytic apparatus and be resistant to the corrosive action attending their use in this relation.

It is contemplated by my invention to provide electrolytic apparatus parts, such as storage battery terminal posts, clips, cables or parts of electrical battery posts or connections and a metal therefor, preferably as a surface sheathing or covering, which resists corrosion.

Other objects of my invention reside in the provision of a metal composition in the nature of an alloy and a method of compounding the same whereby an alloy is obtained which has various industrial uses, particularly of value where it is desired to provide non-corrosive properties, especially that encountered in electrical connections.

Still further objects of my invention reside in the provision of a metal alloy composition and method of making the same which has particular utility as a storage battery terminal post, clips or connecting parts in that a clean and non-corrosive surface is maintained of the articles made therefrom.

I have found that the baser metals, such as tin and antimony, particularly with additions of copper, may be made substantially corrosive resisting, particularly where used in connection with electrolytic industrial apparatus, such as battery terminals, by alloying with these metals, the decomposition products of ingredients comprising bismuth, zinc, mercury and copper.

In the practice of my invention, an alloy constituting tin, antimony and copper is first prepared to obtain a low melting point alloy. To this alloy, constituting tin, antimony and copper, at the minimum melting point of about 250 to 300° C., I add a mixture of salts, preferably comprising bismuth, zinc and copper. These salts are preferably in the form of bismuth phosphate, zinc oxide and copper sulphate, and then after complete dissemination and diffusion of the salts, mercury is added. While the components thus described are still in the molten condition, the article to be formed is cast therefrom.

In the preferred practice of my invention, tin of the best grade is melted to a temperature of about 233° C. The heat is increased until a temperature of between 1000 to 1090° C. is reached; preferably about 1000° C. would be sufficient. I then add the requisite quantity of copper and completely dissolve and disseminate this second component. When the copper has completely melted, the melt is permitted to cool until a temperature of about 600° C. is reached. At this point the antimony content is added until completely melted. The alloy thus prepared may be refined or cleaned off by skimming the upper surface.

The alloy thus prepared may then have added to it a mixture of salts comprising a bismuth compound, such as bismuth phosphate, a zinc compound, such as zinc oxide, and a copper compound, such as copper sulphate. Bismuth phosphate, zinc oxide and copper sulphate are the ingredients preferred by me.

While still molten, the mercury content is then added, drop by drop.

In a still more preferred practice of my invention, the ingredients may be added as follows:—

Formula A

Tin	90–98 lbs.
Antimony	5–10 lbs.
Copper	2–8 lbs.
Bismuth phosphate	4–10 grams
Zinc oxide	4–10 grams
Copper sulphate	4–10 grams
Mercury	10–25 drops or minims

A still more particular and preferred form of the formula aforementioned, is as follows:

Formula B

Tin	94 lbs.
Antimony	6 lbs.
Copper	5 lbs.
Bismuth phosphate, Copper sulphate, Zinc oxide	4⅓ grams or 0.153 oz. of each
Mercury	15 drops

In the preparation of articles contemplated by me, such as battery terminal posts, electrodes, clips or other similar electrolytic accessories, it is preferred by me to first prepare an alloy of the tin, antimony and copper metals from the formulas above enumerated and just prior to casting the battery terminal posts, electrodes, clips or sheathing for such articles, where this alloy is

merely to serve as a protective coating for a core of iron, steel or other material, and then melt the alloy first prepared, of tin, antimony and copper, and just before casting or forming the article, add to it the other components in the order mentioned, to wit, the bismuth phosplate, zinc oxide and copper sulphate, and then the quantity of mercury specified.

While the alloy thus prepared is still fluid, it is cast or formed into a sheath about a core of baser metal, such as steel, iron or the like, to form the completed article.

Should it be found desirable to remelt the articles so prepared, a smaller portion of the salts enumerated and mercury may be added upon remelting.

The alloy so prepared will be found to be extremely corrosion resisting and particularly valuable in connection with electrolytic operations or parts of apparatus, such as storage batteries. The corrosive action of acids or acid fumes will be resisted by this metal, making it admirably suitable for storage battery terminals, clips, nuts and similar battery parts.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is—

1. The method of producing the herein described alloy for corrosion resisting articles which comprises preliminarily preparing an alloy of tin, antimony and copper, melting the alloy so prepared and then adding bismuth phosphate, zinc oxide and copper sulphate, followed by an addition of mercury and then forming the alloy so prepared into an article without substantial change in temperature.

2. As a new article of manufacture, a direct melt of an alloy comprising about 94 pounds tin, about 6 pounds antimony, about 5 pounds copper and small quantities of decomposition products of bismuth phosphate, zinc oxide and copper sulphate and a few drops of mercury added at the temperature at least that of the lowest melting point of the alloy comprising tin, antimony and copper.

3. As a new article, an electrolytic conductor having an exposed surface portion made from a direct melt of an alloy of tin 90 to 98 pounds, antimony 5 to 10 pounds, copper 2 to 8 pounds, the decomposition products of bismuth phosphate from 4 to 10 grams, zinc oxide from 4 to 10 grams, copper sulphate from 4 to 10 grams at the melting of the alloy of tin, antimony and copper, and about 10 to 25 minims of mercury.

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