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COPPER SILVER ALLOY

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1 Claim. (Cl. 75-153)

5 This invention relates to a new copper silver alloy for use as replacement of pure silver and for all uses to which previously known silver alloys have been employed, of which may be mentioned particularly, uses of the alloys of the present invention in connection with silver solders, electrical contacts, silverware, jewelry and dental applications.

10 This application is a continuation-in-part of prior-filed copending application Serial No. 257,667 filed February 21, 1939.

It is one object of the present invention to provide an alloy which has improved electrical properties such as electrical conductivity.

15 It is a further object of the present invention to provide an alloy which shows great fluidity in the molten state and lends itself to casting of very intricate shapes.

20 It is a further object of the present invention to produce an alloy which has improved wetting characteristics when used as a silver solder.

25 A still further object is to produce a new alloy which has superior electrical characteristics when used as an electrical make-and-break contact such as low material transfer, low contact resistance and freedom from welding or sticking. Other objects of the invention will be apparent from the following description taken in connection with the appended claim.

30 The present invention comprises the combination of elements, methods of manufacture and the product thereof brought out and exemplified in the disclosure hereinafter set forth, the scope of the invention being indicated in the appended claim.

35 While a preferred embodiment of the invention is described herein, it is contemplated that considerable variation may be made in the method of procedure and the combination of elements without departing from the spirit of the invention.

40 The present invention contemplates the addition of lithium and silver to copper base alloys. In the formation of the alloy it is preferable to provide a composition of the materials specified in the following proportions by weight.

45 Lithium..... Per cent .002 to 3
Silver..... 16 to 49.9

50 Balance substantially all copper, the copper amounting to greater than 50% of the alloy.

One specific composition is as follows:

55 Copper..... Per cent 60
Lithium..... .5
Silver..... 39.5

We have also found that the following elements may also be added to improve the characteristics of the new alloys of the present invention:

	Per cent	
Cadmium.....	Up to 25	5
Zinc.....	Up to 28	
Tin.....	Up to 11	
Manganese.....	Up to 20	
Nickel.....	Up to 10	
Phosphorus.....	Up to 8	10
Silicon.....	Up to 2	
Magnesium.....	Up to 8	
Beryllium.....	Up to 3	
Calcium.....	Up to 2	15

In addition to these baser elements, materials from the palladium, platinum or gold group may also be present up to 10% each.

20 The alloys of the present invention may be prepared by melting the ingredients together in the correct proportions. The lithium is preferably added in the form of a silver-lithium master alloy, containing approximately 15% of lithium. This master alloy has a very low melting point which is in the neighborhood of 410 to 450° C. and therefore will go readily into solution when added to the silver-copper melt.

25 The effect of lithium is to completely deoxidize the silver melt and to free it from other impurities which are harmful. Part of the lithium will be eliminated together with these impurities and the remaining melt will be free from inclusions and oxides. The presence of lithium also prevents the further oxidation of the melt during the heating periods to which the melt may be subjected and the material retains a very high fluidity during pouring, resulting in extremely clean castings.

30 Since lithium decreases the melting point of silver very materially and since an eutectic is formed at 2.7% lithium, having a melting point of 610° C. care must be exercised if these materials are being processed at elevated temperatures and if they contain higher percentages of lithium. By proportioning the ingredients correctly the materials can be easily processed into desirable forms. We have also found that the addition of other elements, which are usually employed in silver-copper base alloys such as cadmium to improve the contact performance or tarnish resistance or zinc which improves the tarnish resistance or manganese which improves the fluidity or nickel which improves the strength and the like can be made to the alloys of the present invention in order to provide materials

for certain specific purposes, particularly for certain silver solders.

While the present invention, as to its objects and advantages, has been described herein as carried out in specific embodiments thereof, it is not desired to be limited thereby but it is intended to cover the invention broadly within the spirit and scope of the appended claim.

What is claimed is:

An alloy containing .002 to 3% lithium, 16 to 49.9% silver and the balance substantially all copper, said copper amounting to greater than 50% of said alloy.

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