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SILVER ALLOY

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This invention relates to a silver alloy suitable for use in place of pure silver and for 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 electrical contacts, silverware, jewelry and dental alloys.

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

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

It is a still further object of the present invention to produce an alloy which has improved tarnish resisting characteristics.

Another object of the present invention 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 and freedom from welding or sticking.

Other objects of the invention will be apparent from the following description taken in connection with the appended claims. 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 claims. 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.

The present invention contemplates the addition to silver of magnesium and lithium. It is contemplated that alloys may be produced according to the invention, having the ingredients combined in the following range of proportions:

	Per cent
Lithium	.002 to 3
Magnesium	.05 to 15

Balance substantially all silver

We have also found that the addition of the following elements may improve the characteristics of the present alloys covered by the present invention:

	Per cent
Tin	up to 11
Manganese	up to 20
Nickel	up to 10
Phosphorus	up to 8
Silicon	up to 2

It is also possible to substitute copper for a substantial part of the silver.

A number of preferred compositions are given below.

	Per cent
a. Magnesium	3.25
Lithium	.01
Silver	Balance
b. Magnesium	2
Lithium	.05
Silver	Balance
c. Magnesium	5
Lithium	.02
Silver	Balance
d. Magnesium	3
Lithium	.01
Copper	10
Silver	Balance
e. Magnesium	3
Lithium	.02
Copper	22
Silver	Balance

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

The alloys of the present invention are preferably 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°-450° C. and therefore will go readily into solution when added to the silver or silver-copper melt.

The effect of lithium is to completely deoxidize the silver melt and to free same 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 clean castings. The alloy also has improved workability. If lithium is used on proportions such as contemplated it was found that alloys of silver with magnesium will show greatly improved electrical characteristics. Contact alloys of this type have very improved characteristics as far as material transfer and contact resistance are concerned.

The metal surface is kept clean during operation.

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 when these materials are processed at elevated temperatures and if they contain higher percentages of lithium.

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 claims.

What is claimed is:

1. An alloy containing .002 to 3% lithium, .05 to 15% magnesium and the balance substantially all silver.

2. An alloy composed of .002 to 1% lithium, .05 to 4% magnesium and the balance silver.

3. An alloy composed of .002 to .05 lithium, 2 to 4% magnesium and the balance silver.

4. A silver-magnesium-lithium alloy having better casting and working properties, cleaner surface and greater freedom from inclusions and oxides than a silver-magnesium alloy of similar composition, said alloy consisting of .05 to 15% magnesium, .002 to 3% lithium and the balance substantially all silver.

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