

UNITED STATES PATENT OFFICE

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TARNISH RESISTANT ALLOY

No Drawing.

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This invention relates to silver alloys and is concerned more particularly with a novel silver alloy which has great resistance to tarnish and other discoloration and which may have varying physical properties depending upon the purpose for which it is to be used.

The new alloy contains a preponderating amount of silver, ranging for example, from 80% to 95%, the amount of silver present depending on the purpose for which the alloy is to be used. If desired it may be of sterling fineness, the term "sterling" being used to designate a silver alloy which contains, per thousand parts, approximately 925 parts of silver and the remainder of base metal. Silver alloys as customarily made include copper as the base metal and such alloys are subject to discoloration which may be due to the action of various substances contained in dilute form in the atmosphere, or in the case of tableware, the discoloration or tarnish may result from exposure of the ware to the action of fruit acids, or contact with foods containing sulphur in various forms and other substances which contain ingredients which react with the silver.

It is the object of my invention to provide a silver alloy which resists discoloration and corrosion, and I accomplish this result by substituting for the copper ordinarily used as the base metal in such an alloy, cadmium and nickel.

When cadmium is added to silver, there is produced a very ductile white alloy which can be worked by rolling, spinning and the like to a substantially greater extent than the ordinary silver-copper alloy, without becoming hard. Apparently the cadmium forms with the silver a homogeneous alloy of uniform quality and satisfactory in many respects as, for example, in its tarnish-resisting qualities, but such an alloy is usually so soft that an article made from it and produced with little working of the metal is comparatively soft and is not sufficiently resistant to deformation and marring for ordinary purposes. Such an article, therefore, is likely to become readily dented or bent in service and is objectionable for that reason.

I have found that silver and nickel alone

do not make satisfactory alloys but when nickel and cadmium are combined with silver in an alloy, the nickel apparently contributes to the tarnish-resisting qualities of the combination and at the same time alters the mechanical properties so that by proper selection of the proportions of these three ingredients, it is possible to produce an alloy having the desired tarnish-resisting qualities and the ductility and malleability desired for specific purposes.

An alloy, which has the desired tarnish-resisting as well as mechanical properties, made in accordance with this invention contains a preponderating amount of silver and relatively small amounts of cadmium and nickel. The silver may run from 80% to 95%, for example, with the combined amounts of cadmium and nickel not exceeding one-quarter of the amount of the silver, or 20% of the total. The cadmium may run from approximately 4.9% to 19.9%, while the nickel may vary from 0.1% to 2%. Under ordinary circumstances, the amount of cadmium present will be in excess of the amount of nickel.

An alloy containing cadmium approaching the upper limit is likely to be comparatively soft and ductile and may therefore be best used in the production of articles in which considerable working is required. For production of articles requiring little working, the alloy used will have less cadmium and more nickel. A noticeable hardening effect may be obtained with as little as 0.1% nickel, provided the cadmium present is relatively small in amount, and for ordinary purposes the nickel will be relatively small in amount not to exceed 0.5% though I contemplate that as high as 2% nickel may be used in special instances. Increasing the amount of nickel varies the physical properties of the alloy as previously indicated while increasing the cadmium increases the resistance of the alloy to corrosion and tarnish.

Silver which is in the greatest demand at the present time is sterling silver and such an alloy produced in accordance with the present invention may contain about 925 parts of silver per 1000 parts, from 1.0 to 20 parts of

nickel, and from 55 to 74 parts of cadmium. "Solid" silver may from a scientific standpoint be considered to contain as little as 66.6% of silver but I prefer to produce the
5 new alloy with a greater proportion of silver and find that the best results are obtained when the silver runs above approximately 80%.

10 An alloy containing the specified ingredients in the proportions mentioned is found to resist corrosion and discoloration to a much greater extent than ordinary alloys which contain silver with copper as the base metal. Inasmuch as the mechanical properties of the
15 new alloy may be varied within a substantial range by proper variation in the ingredients as indicated, the new alloy is capable of wide use in the production of various articles for example, tableware or hollow ware.

20 I claim:

1. An alloy containing silver ranging from 80% to 95%, nickel ranging from 0.10% to 2%, and the remainder cadmium.
2. An alloy containing about 92.5% of silver,
25 ver, nickel from 0.10% to 2%, and the remainder cadmium.

In testimony whereof I affix my signature.
ROBERT H. LEACH.

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