United States Patent [19]

Kohrn et al.

[11] **3,925,073**

[45] **Dec. 9, 1975**

[54] **GOLD/SILVER ALLOYS**

[76] Inventors: **Edward Louis Kohrn,** 9 Sunset Drive, Cape Arthur, Severna Park, Md. 21146; **Seymour Globus,** 268 Wakely Terrace, Bel Air, Md. 21014

[22] Filed: **Nov. 26, 1974**

[21] Appl. No.: **527,189**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 480,890, June 19, 1974.

[52] **U.S. Cl.** ..... **75/173 C;** 75/134 N

[51] **Int. Cl.²** **C22C 5/06**

[58] **Field of Search** ... 75/173 C, 165, 134 C, 134 N

[56] **References Cited**

UNITED STATES PATENTS

1,090,939	3/1914	Newton	75/173 C X

Primary Examiner—L. Dewayne Rutledge
Assistant Examiner—E. L. Weise
Attorney, Agent, or Firm—Larson, Taylor and Hinds

[57] **ABSTRACT**

A tarnish resistant Au/Ag alloy of low gold content exhibiting properties desired in jewelry manufacture consisting essentially of about 25 to 30 percent by weight gold, about 45 to 71 percent by weight silver, about 3 to 25 percent by weight copper, and 0 to about 5 percent by weight zinc.

4 Claims, No Drawings

GOLD/SILVER ALLOYS

This application is a continuation-in-part of parent application Ser. No. 480,890 filed June 19, 1974.

BACKGROUND OF THE INVENTION

This invention relates to improvements in gold base alloys. More particularly the present invention is directed to low gold alloys possessing the properties desired in the manufacture of articles of jewelry.

Gold, per se, being a relatively soft metal is unsuitable for the manufacture of jewelry articles and must be alloyed with other metals so as to acquire the properties that make it serviceable for jewelry purposes. The most desirable properties for jewelry purposes in gold base alloys are castability, workability, tarnish resistance, luster and color. To achieve these properties it is generally necessary for the gold content of the alloys to be at least 41.65% by weight (i.e., at least **10** karat). It is well recognized that gold base alloys containing levels of gold lower than about 41.65% exhibit low tarnish resistance and quite often poor castability and workability. These drawbacks which characterize low gold alloys are particularly true of the gold/silver alloys of the prior art.

Attempts have been made to overcome this problem of poor tarnish resistance in below **10** karat gold/silver alloys by the inclusion in such alloys of minor amounts of other metals. Unfortunately these efforts have not been without their shortcomings for while tarnish resistance may be improved by such additions, one or more of the other desired properties, i.e. workability, castability including porosity, luster and color are invariably adversely effected.

OBJECTS OF THE INVENTION

One object of the present invention therefore is to provide a low gold alloy which possesses all the desired properties for jewelry manufacture.

Thus, it is an object of the invention to provide a low gold base alloy that can be worked, cast, molded, engraved, soldered and stamped using existing techniques with normal jewelry equipment.

It is also an object of the invention to provide a low gold alloy which is of sufficient hardness to take a normal jewelry finish either bright or textured as desired.

Another object of the invention is to provide a low gold base alloy characterized by a substantially total loss of porosity.

Yet another object of the invention is to provide a low gold base alloy of excellent color and luster.

A further object of the invention is to provide a low base alloy which in addition to possessing the aforementioned properties manifests a high tarnish resistance under normal usage.

Another object of the present invention is to produce a low gold base alloy that is characterized by an electrical conductivity substantially that of pure gold.

Still another object of the invention is to provide both yellow and white low gold alloys which can be cold drawn to essentially the same high levels without substantial loss.

Lastly, it is an object of the invention to provide at substantially reduced cost a low gold alloy which is a substitute for and which possesses all the beneficial properties of **10–14** karat gold base alloys.

SUMMARY OF THE INVENTION

These and other objects of the invention are obtained by a metal alloy consisting essentially of about 25 to 30 percent by weight gold, about 45 to 71 percent by weight silver, about 3 to 25 percent by weight copper and 0 to about 5 percent zinc.

DETAILED DESCRIPTION

The color of the alloys of the invention are either yellow or white depending upon the concentrations of silver and copper present in the metal alloy. In the case of yellow alloys the metal alloy consists essentially of about 25 to 30 percent, preferably 27 to 29 percent by weight gold; about 45 to 57 percent, preferably 47 to 55 percent by weight silver; about 18 to 25 percent, preferably about 18 to 23 percent by weight of copper and 0 to about 5 percent, preferably about 1 to 3.5 percent by weight zinc.

Illustrative of preferred yellow alloys are those consisting essentially of about 25 to 30 percent by weight, gold, about 45 to 57 percent by weight, silver, about 18 to 20 percent by weight, copper and about 1 to 3.5 percent by weight, zinc.

In the case of white alloys the metal alloy consists essentially of about 25 to 30 percent by weight gold; about 57 to 71 percent by weight silver; about 3 to 10 percent by weight copper and 0 to about 5 percent by weight zinc.

Preferred white alloys consist essentially of about 25 to 30 percent by weight gold, about 65 to 68 percent by weight silver, about 3 to 5 percent by weight copper and about 0 to 2 percent by weight zinc.

The process of manufacturing the alloys of the invention does not differ from the standard practice in the manufacture of alloys of precious metals. The alloys may be prepared by simply weighing out the proper proportions of the constituents, placing them in a refractory crucible and subjecting the mixture to a heat sufficient to melt the materials. Care should be taken, however, to insure uniform alloying and mixing of the constituents.

A more convenient method for preparing yellow gold alloys of the invention comprises alloying in equal proportions 14 karat yellow gold with sterling silver. The composition of 14 karat yellow gold generally is as follows: 56.25% Au, 30.7–32.8% Cu, 4.2–10.5% Ag and 2–7% Zn. Sterling silver is constituted of 92.5% Ag and 7.5% Cu. Thus, the constituencies of these materials is such that 50/50 blends of the yellow 14 karat gold and sterling silver provides novel low yellow gold alloys of the invention. White gold alloys of the invention on the other hand are most conveniently prepared by blending in the proper proportions pure gold, pure silver, copper and optionally zinc.

The following examples are included to further illustrate the present invention.

EXAMPLE I

A 50/50 blend of 14 karat yellow gold and sterling silver were weighed and charged together into a refractory crucible wherein they were heated to a temperature of 1600°F with a gas torch until completely melted. The melt was stirred with a graphite rod immediately prior to casting and the alloy melt was then cast in air into a standard investment mold in the form of a ring. Upon cooling the alloy casting was removed and found to be sound with good surface fidelity and with-

out unsightly porosity. After removal from the mold all that was required was the usual clean up of the ring. No filling with gold compositions was necessary.

The head of the ring was subsequently mechanically worked, chased and burnished. All of these operations were completed with the same ease and pleasant results that are obtained with 10–14 karat gold alloys.

The finished ring was worn continuously for three months in a city environment without tarnish and without loss of form, color, luster, or polish.

EXAMPLE II

In a refractory crucible were chared 29.17% by weight pure gold, 67% by weight pure silver with the balance copper. The mixture of metals was melted and cast as described in Example I. The resulting white alloy ring after the usual clean up was mechanically worked, chased and burnished as in Example I. The finished ring possessed the same advantageous properties as the yellow alloy ring of Example I.

While the features of this invention have been disclosed with reference to the specific embodiments described therein, it is to be understood that various modifications may be made in the details of the manufacture without departing from the scope of this invention as defined in the appended claims.

It is claimed:

1. A metal alloy consisting essentially of about 25 to 30 percent by weight gold, about 57 to 71 percent by weight silver, about 3 to 10 percent by weight copper and about 0 to 5 weight percent zinc.

2. A metal alloy consisting essentially of about 25 to 30 percent by weight gold, about 65 to 68 percent by weight silver, about 3 to 10 percent by weight copper and about 0 to 2 percent by weight zinc.

3. An article of jewelry formed of the alloy of claim 1.

4. An article of jewelry formed by the alloy of claim 2.

* * * * *