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ALLOY

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This invention relates to alloys and is concerned more particularly with a novel gold alloy which possesses high resistance to certain corrosive influences and is capable of being given different degrees of hardness by appropriate heating and cooling treatments. The new alloy is especially resistant to corrosive attack by various types of ink and has physical properties which make it suitable for use in the manufacture of pens. An embodiment of the invention adapted for the production of such articles will, accordingly, be described in detail for purposes of explanation, but it is to be understood and will be obvious from the detailed description following, that the utility of the invention is not limited to that particular application.

The new alloy contains substantial amounts of gold and copper making up the major proportion of its composition, a less amount of silver, and relatively minor amounts of nickel and zinc. The proportions of the constituents of the alloy will, of course, vary in accordance with the purposes for which the alloy is to be used, but ordinarily the proportions will fall within the ranges given in the following analysis, the range limits specified being approximate:

	Percent
Gold	33 to 50
Silver	10 to 18
Copper	30 to 40
Nickel	1 to 5
Zinc	5 to 10

A specific example of the alloy which is a 10 karat gold and which has proved highly satisfactory for use in the manufacture of pens is set forth in the following example, in which the proportions specified are approximate:

Example I

	Percent
Gold	41.7
Silver	14.0
Copper	35.0
Nickel	2.0
Zinc	7.3

The alloy given in this example has shown resistance to attack by ink over a long period and it has physical properties which make it highly desirable for the specific use mentioned.

Other alloys embodying the principles of the invention and of different degrees of fineness are as follows, the proportions given being approximate:

Example II

	Percent
Gold	33
Silver	16
Copper	39
Nickel	3
Zinc	9

Example III

	Percent
Gold	50
Silver	12
Copper	30
Nickel	2
Zinc	6

In addition to its resistance to the corrosive attack by different forms of ink, the new alloy has the further property of being capable of assuming different degrees of hardness, depending on the heat and cooling treatments to which it is subjected. For instance, an alloy of the composition set forth in Example I shows the following characteristics when heated to 1200° F. and 1400° F., respectively:

Annealed 1200° F.

Air-cooled		Quenched	
Scleroscope	Rockwell B	Scleroscope	Rockwell B
28	86.8	27	83.7

Annealed 1400° F.

Air-cooled		Quenched	
Scleroscope	Rockwell B	Scleroscope	Rockwell B
41	93.8	27	79.2

From the data above given, it will be apparent that the specific alloy referred to has the characteristic that, when heated to 1400° F. and cooled in air, it is considerably harder than when heated

only to 1200° F. and either air-cooled or quenched. When heated to 1200° F., the hardness is approximately the same regardless of whether the alloy is cooled in air or quenched. When heated to 1400° F., air cooling gives substantially greater hardness than quenching. Thus, when the new alloy is employed under such conditions as to require that it be soldered at a temperature of 1400° F. or above, and it is allowed to cool slowly in air after soldering, the alloy will have approximately the same hardness as hard cold rolled stock. Such stock has a spring and resistance to deformation which make it particularly suitable for use under conditions in which those properties are important, and since by appropriate treatment, the new alloy may be caused to retain those properties after soldering operations, it is admirably adapted for fabrication.

I claim:

1. An alloy which consists of gold in an amount ranging from about 33 per cent to about 50 per cent, silver in an amount ranging from about 10 per cent to about 18 per cent, copper in an amount ranging from about 30 per cent to about 40 per cent, nickel in an amount ranging from about 1 per cent to about 5 per cent, and zinc in an amount ranging from about 5 per cent to about 10 per cent.

2. An alloy which consists of at least 33 per cent gold, silver in an amount ranging from about 10 per cent to about 18 per cent, copper ranging from about 30 per cent to about 40 per cent, nickel ranging from about 1 per cent to about 5 per cent, and zinc ranging from about 5 per cent to about 10 per cent.

3. An alloy which consists of approximately 41.7 per cent gold, about 14 per cent silver, about 35 per cent copper, about 2 per cent nickel, and about 7.3 per cent zinc.

4. An alloy which consists of about 33 per cent gold, about 16 per cent silver, about 39 per cent copper, about 3 per cent nickel, and about 9 per cent zinc.

5. An alloy which consists of about 50 per cent gold, about 12 per cent silver, about 30 per cent copper, about 2 per cent nickel, and about 6 per cent zinc.

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