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# UNITED STATES PATENT OFFICE.

THOMAS P. SHIELDS, OF NEW YORK, N. Y., ASSIGNOR TO SHIELDS & MOORE, A FIRM CONSISTING OF THOMAS P. SHIELDS AND C. A. MOORE, OF NEW YORK, N. Y.

## METALLIC ALLOY.

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*To all whom it may concern:*

Be it known that I, THOMAS P. SHIELDS, a citizen of the United States, residing at New York City, New York, have invented certain new and useful Improvements in Metallic Alloys, of which the following is a specification.

The present invention relates to gold alloys and has for its special object to produce so called "green gold" as well as so called "yellow gold" alloys, which alloys can be produced at a low price and in an efficient manner.

The invention will be described in connection with several specific examples but it is to be understood that the invention is not restricted to these specific examples.

In a first example, I employ about 58.3% of fine gold, ½% of chromium, 2% of fine silver, 13% of zinc and 25.2% of copper. This produces an alloy which is relatively low in gold, but possesses the property of not readily tarnishing, and this alloy will be found to have the desired "green gold" color, and will have good working properties. This alloy is very cheap to produce, and can be readily worked with ordinary goldsmith's tools, and also can be readily enameled.

In this example, as in several of the other examples, the amount of silver can be greatly reduced, and if desired can be omitted altogether, and if it is desired to decrease the amount of silver, it is preferable to increase the amount of chromium proportionately, and an alloy to form a good substitute for gold, from which silver is entirely absent, would contain about 8% of chromium as a minimum.

In another particular example, 40% of fine gold, 10% of chromium, 30% of copper, 20% of zinc and no silver are employed. In this alloy it is noted that the amount of gold is relatively low so that the alloy is cheaply produced, and is very suitable for making up jewelry.

The proportions of the constituents can be varied substantially, and the following table illustrates in a general way the amount of variation which can be had, while still giving very satisfactory products:—

| | Per cent. |
|---|---|
| Gold | 40 to 60 |
| Copper | 24 to 30 |
| Zinc | 10 to 30 |
| Silver | 0 to 15 |
| Chromium | 1 to 10 |

In making up the alloy, I preferably mix together the chromium, copper and zinc (and silver if it is to be used) in the proportion in which they are to exist in the final alloy. These metals can be mixed together, melted and granulated, to form a stock alloy, and the desired amount of this is added to the desired amount of fine gold, to give the percentage of gold desired, and again melted and stirred, to give the desired final product.

The final alloys, as will be noted, do not contain any of the metals of the platinum group, which have heretofore been used in alloys of this general class, for the prevention of tarnishing. The metals of this group however are extremely expensive, and I find that the alloys produced in accordance with the present invention are substantially free from tendency to tarnish, even in the form of jewelry about 10 to 14 carat.

The final alloy can of course contain small and somewhat immaterial amounts of other substances, which do not materially alter the properties of the final alloy. Thus, in commercial practice, using metals of commercial qualities, some minor amounts of impurities may be introduced.

I claim:—

1. An intermediate alloy consisting of 1 to 10 parts of chromium, 24 to 50 parts of copper, 10 to 30 parts of zinc, together with some silver but not substantially above 15 parts thereof.

2. An intermediate alloy consisting essen-

tially of 8 to 10 parts of chromium, 24 to 50 parts of copper, and 10 to 13 parts of zinc.

3. A gold alloy consisting of 40 to 60% of gold, 24 to 30% of copper, 10 to 30% of zinc, 1 to 10% of chromium, and some silver, but not more than 15% thereof, the two latter together amounting to at least 8% of the total alloy.

4. A gold alloy consisting essentially of 40 to 60% of gold, 8 to 10% of chromium, 20 to 30% of copper, and 10 to 30% of zinc.

In testimony whereof I affix my signature.

THOMAS P. SHIELDS.