

UNITED STATES PATENT OFFICE.

AUGUSTE J. ROSSI, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO THE TITANIUM ALLOY MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

ALLOYS OF THE PRECIOUS METALS AND METHOD OF INCREASING HARDNESS OF SUCH ALLOYS.

1,022,596.

Specification of Letters Patent.

Patented Apr. 9, 1912.

No Drawing.

Application filed May 6, 1910. Serial No. 559,656.

To all whom it may concern:

Be it known that I, AUGUSTE J. ROSSI, a citizen of the United States, and a resident of Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Alloys of the Precious Metals and Methods of Increasing Hardness of Such Alloys, of which the following is a specification.

My present invention relates to the hardening of such alloys including particularly such as used in coinage, jewelry and the like, and has for its object the imparting to such alloys so employed and containing present conventional proportions of copper, such novel increased hardness as will enable them to better resist frictional wear to which they may be subjected.

As well understood, the precious metals, *i. e.* gold and silver, are inherently so soft as to lose important proportions of their weight by the wear to which subjected when employed in coins, jewelry, or the like. It has therefore from time immemorial been the practice to alloy for such uses one of the said precious metals with various proportions of a harder metal, as copper, the gold and silver coinage of most countries being correspondingly debased by intentional additions of copper varying from 9 to 10% or thereabouts, and the said alloys intended for commercial uses and commonly known as "sterling" gold or sterling silver containing as high as 25% of copper.

Notwithstanding these admixtures of the baser metal, the resulting coinage, money, bars, jewelry, etc., are still nevertheless subject to important undesired losses from friction and wear in use, and the object of my present invention is to provide means for preventing such losses and the production of articles comparatively not subject thereto.

I have discovered that if to either of the said "precious metals", while molten, there be added the present usual conventional proportions of a copper previously purified by, or alloyed with, titanium as respectively per Letters Patent No. 905,232, granted to me December 1, 1908, and Letters Patent No. 935,863, granted to me Oc-

tober 5, 1909, or there be added to such precious metal, when molten together with the desired per cent. of previously unpurified or unalloyed copper, a small amount of titanium or of my said alloy of copper with titanium, the final resulting alloy of said precious metal with copper will be so hardened as to substantially resist, without loss of weight, substantially all wear incident to ordinary usage.

My invention may be practiced as follows: The copper intended for use in hardening the precious metal, whether gold or silver, as aforesaid is first melted and the molten bath thereof is added and melted therewith some of my alloy or compound of copper and titanium for which Reissued Letters Patent No. 12,764 were on March 17, 1908 granted to me, the amount of said alloy so added being preferably proportioned to insure in the bath the presence of sufficient metallic titanium to combine with undersired elements and compounds present and leave a final copper product containing substantially no titanium, or, if desired, not to exceed 1% of titanium as per my said Letters Patent No. 905,232. The resulting purified copper product is then added to a bath of the molten precious metal *i. e.* gold or silver as the case may be and in such proportion as to secure in the final product or alloy the desired proportion of copper. The said resulting final product being an alloy of gold or silver with copper should contain not to exceed traces of titanium and will therefore be of substantially the same purity as formerly required for coinage and commercial uses aforesaid, but its resistance to abrasion will be found much greater than that of a corresponding alloy to which, or its constituents, the titanium has not been added. It will be obvious that substantially the same results may be attained by adding to a bath of either molten gold, or molten silver, a certain amount of copper not previously treated with titanium as aforesaid and then also adding sufficient of my said alloy of copper and titanium, containing a sufficient percentage of titanium, to impart to the bath as a whole enough metallic titanium to combine with all undesired ele-

ments and compounds present in said bath and leave in the final product thereof substantially no titanium.

I am satisfied that notwithstanding usually accepted comparative purity of the precious metals gold and silver, these nevertheless do contain in their usual commercial condition as raw materials more or less of undesired impurities and compounds, which tend to impart to the mass undesirable susceptibility to abrasion and wear. Such impurities are, I believe, beneficially affected or removed through the action of the titanium when added as last above mentioned, and I therefore suggest that whenever analysis or other test discloses such impurities, care be taken to proportion the titanium added so as to insure its action thereon as well as on undesired elements, compounds and impurities imported into the bath by the copper thereto added.

It will be understood that my invention as herein claimed is limited to methods of treatment of the precious metals in which the titanium employed is so proportioned as to leave in the final resulting product not to exceed traces of titanium.

What I claim as new and desire to secure by Letters Patent is the following, viz:—

1. As a new article a metallic substance composed principally of a precious metal, a harder metal therewith alloyed and containing also not to exceed traces of titanium.

2. As a new article a metallic substance composed principally of gold, a harder metal therewith alloyed and containing also not to exceed traces of titanium.

3. As a new article a metallic substance composed principally of gold, copper therewith alloyed and containing also not to exceed traces of titanium.

4. The metallurgical method which comprises bringing together in molten state a precious metal, a harder metal and titanium proportioned to combine with undesired ele-

ments and compounds and secure a final product containing not to exceed traces of titanium.

5. The metallurgical method which comprises bringing together in molten state gold, a harder metal and titanium proportioned to combine with undesired elements and compounds and secure a final product containing not to exceed traces of titanium.

6. The metallurgical method which comprises bringing together in molten state gold and an alloy of copper with titanium proportioned to combine with undesired elements and compounds and secure a final product containing not to exceed traces of titanium.

7. The method of producing an alloy of a precious metal with a harder metal which comprises bringing together in molten state said precious metal and an alloy of said harder metal with titanium, the said titanium being proportioned to combine with undesired elements and compounds present and secure a final product containing not to exceed traces of titanium.

8. The method of producing an alloy of gold with a harder metal which comprises bringing together in molten state said gold and an alloy of said harder metal with titanium, the said titanium being proportioned to combine with undesired elements and compounds present and secure a final product containing not to exceed traces of titanium.

9. The method of producing an alloy of gold with copper which comprises bringing together in molten state said gold and an alloy of copper with titanium, the said titanium being proportioned to combine with undesired elements and compounds present and secure a final product containing not to exceed traces of titanium.

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Witnesses:

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