UNITED STATES PATENT OFFICE.

HANS KAISER, OF AUGSBURG, GERMANY, ASSIGNOR TO THE FIRM OF WOLFRAM-LAMPEN AKTIEN GESELLSCHAFT, OF AUGSBURG, GERMANY.

PROCESS FOR THE PRODUCTION OF ALLOYS OF HIGH MELTING-POINT HAVING DUCTILE PROPERTIES.

1,167,827. Specification of Letters Patent. Patented Jan. 11, 1916.

No Drawing. Application filed February 14, 1914. Serial No. 818,620.

To all whom it may concern:

Be it known that I, HANS KAISER, a citizen of the German Empire, and residing at Augsburg, Germany, have invented certain new and useful Improvements in Processes for the Production of Alloys of High Melting-Point Having Ductile Properties, of which the following is a specification.

This invention relates to the production of alloys or solid metallic solutions of high melting point.

It is already well known to produce sintered bodies of great toughness and elasticity from the metals chromium, vanadium, niobium, tantalum, osmium, ruthenium, zirconium, thorium, or tungsten by choosing one of the said metals as the base or body material and adding a smaller amount of another of the said metals, the resultant mixture being formed under pressure to a suitable shape and sintered at a high temperature, producing a body which is ductile when cold.

As compared with this known process, the present invention relates to a process which enables the properties of toughness and ductility of the product to be greatly increased, and the sintering temperature to be reduced simply by the addition of a third metal, that is to say a second additional metal, to the mixture prepared before sintering. This second additional metal is of such a nature that it will result in the thorough alloying of the metals or the formation of a solid solution. The amount of this second metal added is extremely small in proportion to the first added metal, and it cannot be regarded as having the same action as the first added metal. The metals of the platinum group have proved particularly effective when used as the second added metals. Additions of a fraction of one per cent. of these metals, for instance about 1/20 per cent. of platinum itself will suffice to produce the alloying of tungsten with 1% thorium at a comparatively low sintering temperature. The addition of the third metal for example of platinum, may advantageously be effected at the same time as the mixing of the base and the first added metal, for instance by adding the aqueous solution of any suitable salt of the second additional metal. Alloys of high melting point having ductile properties produced in this way may be employed as the incandescence bodies of electric glow-lamps or as filament supports, as parts of firearms, or as tools and instruments for various purposes.

I claim and desire to obtain by Letters Patent the following:

1. The process substantially as herein described, of making alloys or solid solutions of high melting point having ductile properties, from the rare metals, which consists in preparing a mixture composed of one of said metals as a base or foundation metal, with the addition of a smaller amount of a second one of said metals, and an extremely small added amount of a third one of said metals, and sintering the product.

2. The process substantially as herein described, of making alloys or solid solutions of high melting point having ductile properties, from the rare metals, which consists in preparing a mixture composed of one of said metals as a base or foundation metal, with the addition of a smaller amount of a second one of said metals, and an added amount in the proportion of a fraction of one per cent. or less of a third one of said metals, and sintering the product.

3. The process substantially as herein described of making alloys or solid solutions of high melting point having ductile properties, from the rare metals (such as chromium, vanadium, niobium, tantalum, osmium, ruthenium, zirconium, thorium and tungsten) which consists in preparing a mixture composed of one of said metals as a base or foundation metal, with the addition of a smaller amount of a second one of said metals, and an added amount of a fraction of one per cent. of a different metal of the platinum group, forming the mixture under pressure to suitable shape, and sintering the product.

In testimony whereof I affix my signature in presence of two witnesses.

HANS KAISER.

Witnesses:
A. V. W. COTTER,
N. ROEDER.