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TITANIUM BASE ALLOY

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This invention relates to titanium base alloys and more particularly to a unique titanium-vanadium-beryllium alloy having high tensile strength and strength retention at elevated temperatures.

An object of the instant invention is to provide an improved titanium base alloy.

Another object of the instant invention is to provide a titanium alloy of high tensile strength and which may be age hardened to such tensile capability.

Still another object of the instant invention is to provide a titanium base alloy which maintains its strength characteristics when subjected to high temperature.

The instant invention consists of an improved alloy composed essentially of from 3 to 5% vanadium, 0.25 to 2.0% beryllium, the balance titanium. Alloys of this composition have a tensile strength of from 120,000 to 140,000 pounds per square inch and illustrate hardness after aging at elevated temperature of from 200 to 500 Vickers units. The hardness of the material depends somewhat upon the temperature at which it is aged. We have found that age-hardening at 300° C. is preferable

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to the usage of higher temperatures, for example 450° or 600° centigrade. We have also found that as the beryllium content is increased there is an increase in hardness. However, such hardness increase is not in direct proportion to such increased beryllium.

The alloy of the instant invention may be readily made by the usual alloying techniques. The material may then be formed into sheets or the like and the sheets in turn may be then fabricated into almost any desired shape. The end products are age hardened at a slightly elevated temperature to yield the tensile strengths above mentioned. In view of the tensile strength retention under high temperature use the instant alloy is admirably suited for the structural and skin members of modern aircraft.

We claim as our invention:

1. A titanium base alloy having high tensile strength at elevated temperatures which is composed essentially of from 3 to 5% of vanadium and from 0.25% to 2% beryllium, balance titanium.
2. A titanium base alloy having high tensile strength at elevated temperatures composed essentially of from 3 to 5% vanadium and 0.25 to 2% beryllium, balance titanium, the titanium containing up to 0.02% hydrogen.
3. A high tensile strength titanium base alloy composed essentially of 4% vanadium and from 0.25% to 0.75% beryllium, balance titanium.

References Cited in the file of this patent

- Titanium project, Navy contract No. NOa(s) 8698, titled The Manufacture of Ductile Titanium and Titanium Alloys, Report No. 17.
Final report, PB 103370 released June 15, 1951, pages 36 thru 48 (Beryllium), and pages 101 thru 106 (Vanadium).