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SINTERED HARD ALLOY FOR MACHINING HARD CASTINGS

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My invention relates to hard alloys and has in particular for its object sintered hard alloys intended for machining hard castings.

Sintered hard alloys are used almost in all branches of machining practice owing to their excellent properties which are superior to those of all other cutting alloys. So, for example, sintered hard alloys consisting of tungsten carbide and cobalt are used with good success even for machining chilled castings. It has appeared, however, that the sintered hard alloys obtainable on the international market are suited for an economically satisfactory machining of materials, such as chilled castings, of a maximum Shore hardness of 95 only, whilst chilled castings of greater hardness, for example rolls for cold rolling mills, cannot be machined even by the best hard alloys obtainable on the international market. Consequently, manufacturers of rolls for cold rolling mills have to grind the rolls.

My invention has for its object sintered hard alloys by which also chilled castings can be machined with very good economical success the Shore hardness of which amounts to at least 95, for example to more than 100. Such a sintered hard alloy according to my invention consists of

Up to 8% auxiliary metal, such as cobalt, nickel or iron, single or in mixture,
From 0.5 to 3% vanadium carbide,
From 0.25 to 1.5% molybdenum carbide,
Balance tungsten carbide.

A sintered hard alloy of the above composition is distinguished by an extremely refined texture which in my opinion is to be considered as the cause for the greatly increased hardness of these hard alloys when compared with other hard alloys on the market.

I have obtained particularly good results in machining chilled castings by means of the hard alloys referred to, by so determining the ratio of the vanadium carbide to the molybdenum carbide in the alloy that it does not greatly differ from 2:1, and, in particular, by the alloy containing about 1% vanadium carbide and about 0.5% molybdenum carbide. In consequence of the extraordinarily increased hardness of my new hard alloys it is possible, for instance with a sintered hard alloy containing about 1% vanadium carbide, about 0.5% molybdenum carbide, and the balance tungsten carbide, to obtain in cutting off tests made on a chilled cast roll of a hardness of 103 Shore, at a cutting speed of 2 m. per minute, a feed of 0.1 mm. per revolution, and with a cutting off width of 15 mm., a running time of 36 minutes. Even when in such a test the cutting speed would be increased to 4 m. per minute and the feed to 0.16 mm. per revolution, the running time would be still 9 minutes up to bluntness.

To estimate the great advantage offered in machining materials of this class by my new hard alloys, it is to be borne in mind that the best sintered hard alloys obtainable on the international market do not at all attack materials of the hardness referred to.

What I claim and desire to secure by Letters Patent is:

1. Sintered hard alloys containing from 0.5 to 3% vanadium carbide, from 0.25 to 1.5% molybdenum carbide, up to 8% auxiliary metal, such as cobalt, nickel or iron, single or in mixture with the remainder tungsten carbide.

2. Sintered hard alloys as specified in claim 1, in which the ratio of the vanadium carbide percentage to that of molybdenum carbide is about 2:1.

3. A sintered hard alloy consisting of about 1% vanadium carbide, about 0.5% molybdenum carbide, about 6% cobalt, balance tungsten carbide.

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