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HARD METAL BODY

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It is well-known practice to secure shaped hard metal bodies to supporting bodies, which generally consist of tool-steel, by brazing. This method is, however, difficult of accomplishment if hard metal rings, for example grinding cylinders or the like, i. e. bodies having a supporting sectional area that is small in proportion to their external dimensions, are to be secured to the respective supporting bodies. In fact, this method facilitates the development of tension cracks as a consequence of either the contraction strains set up during brazing on account of the different coefficients of expansion of the supporting body and the hard metal body, or the bending stresses caused by the cambering of supporting bodies of lesser strength when subjected to the brazing operation.

Another known method, which consists in connecting hard metal tips to the supporting shank by forcing the tip against the tool body, under pressure and simultaneous heating of the tip, in cases where it is intended to secure hard metal rings, for example grinding cylinders or the like, to supporting members, proves likewise costly, having regard to the use of special moulds, and is not always feasible.

With a view to eliminate such difficulties, it has already been proposed to make the support from an alloy having a coefficient of expansion approximately equal to that of the hard metal ring, and to braze the hard metal body onto it.

The present invention essentially consists in that the supporting member is made from a sintered alloy, and that the hard metal body, which may, by way of example, be composed of tungsten carbide, alone or in mixture with other carbides, as titanium carbide, tantalum carbide, niobium carbide, vanadium carbide, and up to 20% auxiliary metal with lower melting point, as cobalt, nickel and/or iron, is secured onto it by sintering.

Thus, as an example, the supporting member is produced by pressing a mixture of, for example, 38 to 45% nickel, remainder iron, and then sintering it at a temperature of about 1200° C. Such sintered plate is surface ground, and the likewise surface ground shaped hard metal body is placed upon it. The whole is then once again heated to a temperature of about 1200 to 1300° C. In cases where recarburization is to be avoided, it is convenient to effect the heating in

a ceramic tube, using hydrogen as a protective gas.

Instead of the before-mentioned mixture, one may also start, depending on the intended use, from pure carbonyl iron, or from an iron-chrometungsten alloy, or from molybdenum, or molybdenum alloys. It is of advantage to choose for the support an alloy having a coefficient of expansion that corresponds fully or approximately to that of the hard metal body.

In some cases where it is important for the hard metal body to lie plane on its supports, the sintering of the supporting member may be performed in one operation with the sintering-on of the shaped hard metal bodies. It is possible to facilitate and accelerate the sintering-on of the hard metal body by applying a pressure, which may be exerted, for example, by a molybdenum body placed upon it.

The sintering-on operation may, if necessary, be further facilitated by interposing between the support and the hard metal body a pulverulent mixture of an iron-nickel alloy, or of a soft metal, as cobalt or nickel or the like, in pulverulent condition.

The present invention is of particular interest to the fixing of grinding cylinders that are impregnated with diamond grains and are, owing to the heterogeneity brought about by such diamonds, inferior in strength to the standard hard metal. Such grinding cylinders represent a high value, which is another reason calling for their being fixed so as to eliminate any breakage in order to avoid disintegration in view of the high speeds of rotation being used.

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

1. A tool comprising a ring-shaped diamond impregnated tool bit sintered to a separately formed sintered supporting shank, said bit consisting of a hard metal body and said shank consisting of about 38 to 45% nickel with the remainder substantially all iron.

2. A tool comprising a ring-shaped tool bit sintered to a supporting shank, said bit consisting of diamonds distributed through a sintered composition consisting of tungsten carbide and metal of the iron group, said shank consisting of a sintered alloy containing about 38 to 45% nickel with the remainder substantially all iron.

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