

(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 822 265 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
15.04.1998 Bulletin 1998/16

(51) Int. Cl.⁶: C22C 29/02, C22C 29/08,
C22C 29/04

(43) Date of publication A2:
04.02.1998 Bulletin 1998/06

(21) Application number: 97115279.8

(22) Date of filing: 18.05.1995

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: 19.05.1994 JP 105584/94
15.02.1995 JP 49290/95

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
95107670.2 / 0 687 744

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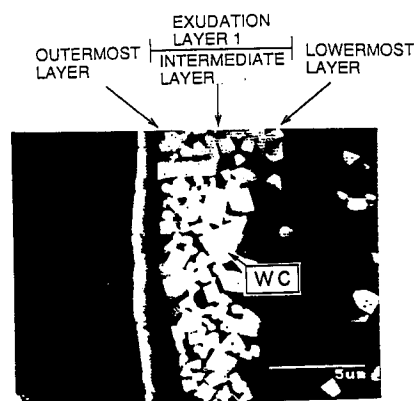
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(54) Nitrogen-containing sintered hard alloy

(57) A nitrogen-containing sintered hard alloy includes a hard phase containing WC serving as an essential element and a carbide, nitride or a carbo-nitride of at least one transition metal being selected from the groups 4, A 5A and 6A of the periodic table or a composite carbo-nitride thereof and a binder phase containing Ni, Co and unavoidable impurities, an exudation layer containing a metal binder phase, mainly composed of Ni and Co, and WC being present on an alloy of this part, wherein the exudation layer is internally divided into a three layers in order of an outermost layer and an intermediate layer and an lowermost layer, wherein the outermost layer containing at least 0 percent by volume and not more than 30 percent by volume of WC with a rest being formed by a metal binder phase, the intermediate layer contains at least 50 percent by volume and not more than 100 percent by volume of WC with a rest being formed by a metal binder phase, the lower layer containing at least 0 percent by volume and not more than 30 percent by volume of WC with a rest being formed by a metal binder phase, wherein the outermost and lowermost layers being at least 0.1 μm and not more than 10 μm in thickness, the intermediate layer being at least 0.5 μm and not more than 10 μm in thickness. According to this composition, it is possible to

provide a nitrogen-containing sintered hard alloy which can be employed as a cutting tool having high reliability with no surface coating also in working under conditions bringing a strong thermal shock.

FIG. 1
SEM
PHOTOGRAPH



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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 5279

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 277 283 A (TOBIOKA MASAOKI ET AL) 7 July 1981 * Claims 1-3; Example *	1-6	C22C29/02 C22C29/08 C22C29/04
A	US 4 830 930 A (TANIGUCHI YASURO ET AL) 16 May 1989 * Claims 1-3 *	1-6	
A,D	EP 0 499 223 A (TOSHIBA TUNGALOY CO LTD) 19 August 1992 * Page 2, lines 33-38 *	1-6	
A	US 5 106 674 A (OKADA YOSHIKAZU ET AL) 21 April 1992 * Col.2, lines 20-55 *	1-6	
A	EP 0 515 340 A (SANDVIK AB) 25 November 1992 * Fig.2; Claims 1-5; Page 2, lines 22-27 and 37-39; Page 3, lines 13-18 *	1-6	
A	EP 0 368 336 A (MITSUBISHI METAL CORP) 16 May 1990 * Claims 1-4; Col.1, lines 6-10 and 36-44 *	1-6	TECHNICAL FIELDS SEARCHED (Int.Cl.6) C22C
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A	US 4 548 786 A (YOHE WARREN C) 22 October 1985 * Examples I,II; Col.3, lines 34-53 *	1-6	
A	US 4 610 931 A (NEMETH BELA J ET AL) 9 September 1986 * Figure 3 *	1-6	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 9 January 1998	Examiner Bjoerk, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)