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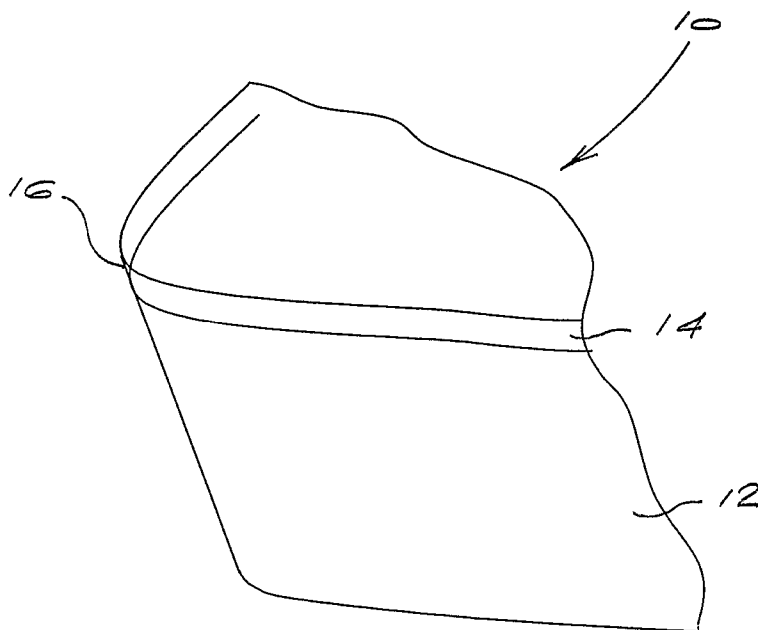
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CUTTING METHOD



(57) Abstract: A cutting tool component (10) which has an ultra-thin layer (14) of ultra-hard material bonded to a cemented carbide substrate (12). The ultra-thin layer of ultra-hard material has a thickness of no greater than 0.2 mm. This cutting tool is used to cut workpieces under roughing and/or interrupted cut conditions. Where the workpiece is a wood product or wood composite the invention extends to cutting such workpieces in general. The ultra-hard material is preferably PCD or PCBN.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. B23C3/00 B23B27/14 B23D61/04 B27M1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B23C B27G B27M B23D B28D B27B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/025805 A (CHO HYUN SAM [US]; HAN KYUNG RYUL [KR]; SONG KI JEON [KR]) 24 March 2005 (2005-03-24)	1-11, 15, 16
Y	page 3, line 12 - page 4, line 17 page 9, line 26 - page 10, line 31 page 14, line 9 - page 15, line 12 page 18, line 17 - page 20, line 23 figures 1A-5	12-14
Y	----- WO 2004/040095 A (ELEMENT SIX PROPRIETARY LTD [ZA]; TANK KLAUS [ZA]; CHAPMAN RAYMOND ALB) 13 May 2004 (2004-05-13) page 2 - page 3 page 8, lines 8-17 figures 7,8 -----	12-14
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

22 May 2007

Date of mailing of the international search report

05/06/2007

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/170407 A1 (TURFITT RONALD [US] ET AL) 21 November 2002 (2002-11-21) paragraphs [0002], [0012], [0013], [0035], [0041], [0063] - [0065] -----	1-9, 15
X	US 5 648 119 A (GRAB GEORGE P [US] ET AL) 15 July 1997 (1997-07-15) column 1, lines 24-27, 41-47 column 4, line 54 - column 5, line 20 column 13, lines 50-67 figures 1A, 1B -----	1-9
X	US 4 690 691 A (KOMANDURI RANGA [US]) 1 September 1987 (1987-09-01) column 2, lines 31-37 column 3, lines 9-13 column 5, lines 39-61 figures 1-9 -----	1, 2, 4, 7-9, 15
A	EP 0 297 071 A1 (SANDVIK AB [SE]) 28 December 1988 (1988-12-28) column 5, line 10 - column 6, line 61 figure 1 -----	1, 10, 11
A	EP 0 520 403 A2 (SUMITOMO ELECTRIC INDUSTRIES [JP]) 30 December 1992 (1992-12-30) page 2, line 55 - page 3, line 21 -----	1, 10, 11
A	EP 0 787 820 A (SAINT GOBAIN NORTON IND CERAMI [US] SAINT GOBAIN [US]) 6 August 1997 (1997-08-06) column 3, line 40 - column 4, line 48 figures 7-12 -----	1, 12-14, 16
A	WO 97/09146 A (KENMAMETAL INC [US]) 13 March 1997 (1997-03-13) page 6, lines 3-23 -----	1
A	US 5 655 860 A (OLES EDWARD J [US]) 12 August 1997 (1997-08-12) column 3, lines 29-66 -----	1

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 17,18

Claims 17 and 18 are not clear and therefore do not meet the requirements of Article 6 PCT. According to Rule 6.2(a) PCT, the claims shall not, except where absolutely necessary, rely, in respect of the technical features of the invention, on references to the description or drawings. In the present case, it appears that the subject-matter for which protection is sought can be defined in terms of its physical characteristics rather than by references to the description and/or drawings. It is therefore apparent that it is not "absolutely necessary" for the subject-matter, for which protection is sought to be defined in this manner. The claims 17 and 18 are therefore unclear in their present format as they do not meet the requirements of Rule 6.2(a) PCT.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 17, 18
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/003559

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2005025805	A	24-03-2005	US 2005210755 A1	29-09-2005
			US 2005050801 A1	10-03-2005
WO 2004040095	A	13-05-2004	AU 2003259458 A1	25-05-2004
			CA 2504518 A1	13-05-2004
			CN 1714225 A	28-12-2005
			EP 1565642 A1	24-08-2005
			US 2006144621 A1	06-07-2006
US 2002170407	A1	21-11-2002	NONE	
US 5648119	A	15-07-1997	AT 239612 T	15-05-2003
			AU 683070 B2	30-10-1997
			AU 7013794 A	19-06-1995
			BR 9408226 A	26-08-1997
			CA 2173354 A1	08-06-1995
			CN 1136292 A	20-11-1996
			DE 69432642 D1	12-06-2003
			DE 69432642 T2	18-03-2004
			DE 731751 T1	03-04-1997
			DK 731751 T3	01-09-2003
			EP 0731751 A1	18-09-1996
			ES 2092453 T1	01-12-1996
			GB 2298873 A	18-09-1996
			JP 9503451 T	08-04-1997
			JP 3137982 B2	26-02-2001
			PL 314266 A1	02-09-1996
			RU 2111846 C1	27-05-1998
			WO 9515258 A1	08-06-1995
			US 5585176 A	17-12-1996
			US 6287682 B1	11-09-2001
ZA 9408136 A	19-06-1995			
US 4690691	A	01-09-1987	CA 1254451 A1	23-05-1989
EP 0297071	A1	28-12-1988	CA 1303365 C	16-06-1992
			DE 3868721 D1	09-04-1992
			IE 63373 B1	19-04-1995
			JP 2018365 A	22-01-1990
			JP 2049308 C	25-04-1996
			JP 7076135 B	16-08-1995
			NO 882812 A	27-12-1988
			US 4766040 A	23-08-1988
			ZA 8804508 A	29-03-1989
EP 0520403	A2	30-12-1992	DE 69205075 D1	02-11-1995
			DE 69205075 T2	21-03-1996
			US 5395700 A	07-03-1995
EP 0787820	A	06-08-1997	CA 2192900 A1	12-07-1997
			JP 9300139 A	25-11-1997
			US 5776355 A	07-07-1998
WO 9709146	A	13-03-1997	AU 6640696 A	27-03-1997
			BR 9610448 A	26-01-1999
			CA 2229919 A1	13-03-1997
			CN 1195308 A	07-10-1998
			DE 847315 T1	07-01-1999

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/003559

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9709146	A		EP 0847315 A1	17-06-1998
			ES 2118680 T1	01-10-1998
			JP 11512346 T	26-10-1999
			US 5653152 A	05-08-1997
<hr/>				
US 5655860	A	12-08-1997	CA 2161758 A1	13-11-1996
			JP 2939866 B2	25-08-1999
			JP 8309612 A	26-11-1996
			US 5672031 A	30-09-1997
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