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[Continued on next page]

(54) Title: EARTH-BORING BITS AND OTHER PARTS INCLUDING CEMENTED CARBIDE

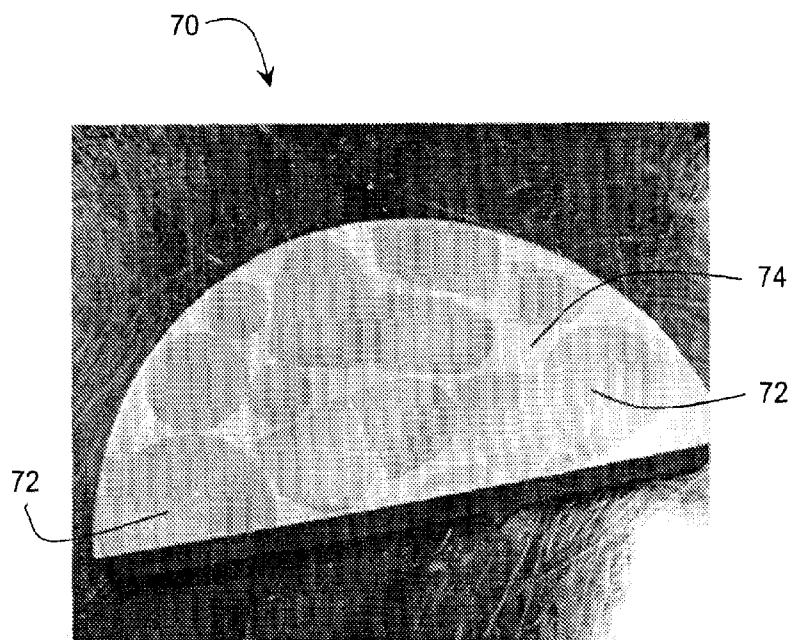


FIG. 5

(57) Abstract: An article of manufacture includes a cemented carbide piece 7 and a joining phase that binds the cemented carbide piece into the article. The joining phase includes inorganic particles and a matrix material. The matrix material is a metal and a metallic alloy. The melting temperature of the inorganic particles is higher than the melting temperature of the matrix material. A method includes infiltrating the space between the inorganic particles and the cemented carbide piece with a molten metal or metal alloy followed by solidification of the metal or metal alloy to form an article of manufacture.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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19 May 2011

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/051126

A. CLASSIFICATION OF SUBJECT MATTER INV. E21B10/42 C22C29/00 ADD.		
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) E21B C22C B22F		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/234820 A1 (MAJAGI SHIVANAND I [US]) 25 November 2004 (2004-11-25) paragraphs [0030] - [0038]; figures 2,3 the whole document	1-21,23, 24
X	US 2005/247491 A1 (MIRCHANDANI PRAKASH K [US] ET AL) 10 November 2005 (2005-11-10) paragraph [0048]; figure 13 the whole document	1,2,6, 15-21,23
X	US 6 461 401 B1 (KEMBAIYAN KUMAR T [US] ET AL) 8 October 2002 (2002-10-08) line 47 - column 4, line 5; claim 1 the whole document	1
A	-/--	22
☒ 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. "&" document member of the same patent family		
Date of the actual completion of the international search 14 March 2011		Date of mailing of the international search report 24/03/2011
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer van Berlo, André

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/051126

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 009 027 A (NAIDICH JURY VLADIMIROVICH ET AL) 22 February 1977 (1977-02-22) column 4, lines 15-30 column 3, lines 58-66; claim 1 the whole document	22
A	----- US 2003/099853 A1 (TAKAYAMA TAKEMORI [JP] ET AL TAKAYAMA TAKEMORI [JP] ET AL) 29 May 2003 (2003-05-29) * abstract the whole document	22
A	----- GB 1 491 044 A (INST MATERIAL AN UK SSR) 9 November 1977 (1977-11-09) the whole document	22
L	----- WO 2011/008439 A2 (TDY IND INC [US]; MIRCHANDANI PRAKASH K [US]; CHANDLER MORRIS E [US]) 20 January 2011 (2011-01-20) claim 34 same composition -----	22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/051126

Box No. 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.: 25-103
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 No. 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 fees, this Authority did not invite payment of additional fees.
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 25-103

The present application contains 103 claims. There are so many dependent and independent claims, and they are drafted in such a way that the claims as a whole are not in compliance with the provisions of clarity and conciseness of Article 6 PCT, as they create a smoke screen in front of the skilled reader when assessing what should be the subject-matter to search. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19). The extent of the search was consequently limited to claim 1-24, which appears to comprise a reasonable definition of what is understood to be the invention for which protection is sought.

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, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/051126

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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