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[Continued on next page]

(54) **Title:** METHOD TO REDUCE CARBIDE EROSION OF PDC CUTTER

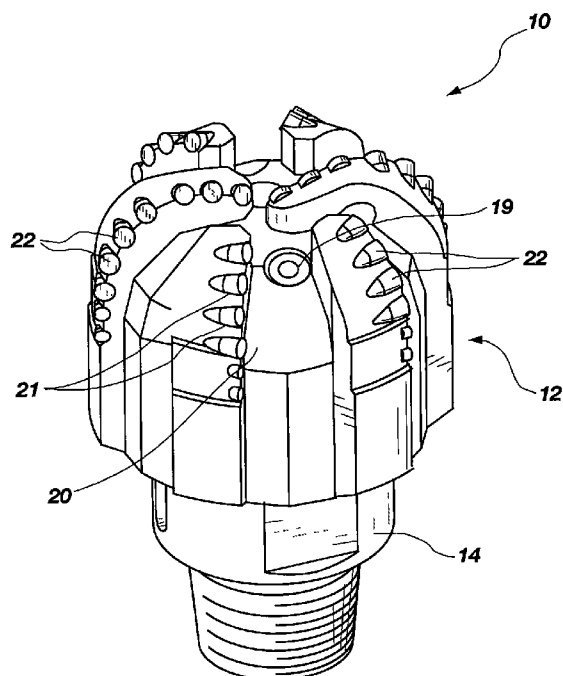


FIG. 1
(PRIORART)

(57) **Abstract:** An abrasive wear-resistant material includes a matrix and sintered and cast tungsten carbide granules. A device for use in drilling subterranean formations includes a first structure secured to a second structure with a bonding material. An abrasive wear-resistant material covers the bonding material. The first structure may include a drill bit body and the second structure may include a cutting element. A method for applying an abrasive wear-resistant material to a drill bit includes providing a bit, mixing sintered and cast tungsten carbide granules in a matrix material to provide a pre-application material, heating the pre-application material to melt the matrix material, applying the pre-application material to the bit, and solidifying the material. A method for securing a cutting element to a bit body includes providing an abrasive wear-resistant material to a surface of a drill bit that covers a brazing alloy disposed between the cutting element and the bit body.

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- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2Qi)*

A. CLASSIFICATION OF SUBJECT MATTER		
<i>E21B 10/46(2006.01)i, E21B 10/54(2006.01)i, C22C 29/08(2006.01)i</i>		
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 10/46, E21B 10/36		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models Japanese utility models and applications for utility models (Chinese Patents and application for patent)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords drill bit, cutting element, bonding material, abrasive wear resistant material and similar terms		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 2007-0056776 A1 (JAMES L OVERSTREET) 15 March 2007 See the abstract ; paragraph [0007] - paragraph [0023] paragraph [0047] - paragraph [0071] ; claims 1-34 and figures 1-8B.	1-21
A	QS 2003-0079916 A1 (THOMAS W. OLDHAM et al.) 01 May 2003 See the abstract and figure 4.	1,6
A	QS 6659206 B2 (LIANG; DAH-BEN et al.) 09 December 2003 See the abstract and figure 2.	1,6
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> 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 application or patent 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 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 "X" 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 "Si" document member of the same patent family		
Date of the actual completion of the international search 28 JANUARY 2010 (28.01.2010)		Date of mailing of the international search report 02 FEBRUARY 2010 (02.02.2010)
Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seogu, Daejeon 302-701, Republic of Korea Facsimile No 82-42-472-7140		Authorized officer KIM, Seong Kon Telephone No 82-42-481-5526 

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/048232**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
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
- 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

Independent claims 1 and 6 are directed to a device for use in drilling subterranean formations

Independent claims 14 and 20 are directed for applying an abrasive wear-resistant material to a surface of a drill bit having an outer surface

The only common technical feature between claims 1, 6, 14 and 20 is the device of claim 1. This feature lacks a novelty with respect to the documents US 2007-0056776 A1 cited in the ISR. Thus, there is no technical relationship left over the prior art among the claimed inventions, leaving the claims without a single general inventive concept

Hence, there is a lack of unity of invention "a posteriori" (PCT Rule 13.1 and 13.2)

- 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 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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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