



- (51) International Patent Classification:  
E21B 10/46 (2006.01)
- (21) International Application Number:  
PCT/US2013/026931
- (22) International Filing Date:  
20 February 2013 (20.02.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
13/401,231 21 February 2012 (21.02.2012) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, 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))

(88) Date of publication of the international search report:  
25 June 2015

(54) Title: USE OF EDDY CURRENTS TO ANALYZE POLYCRYSTALLINE DIAMOND

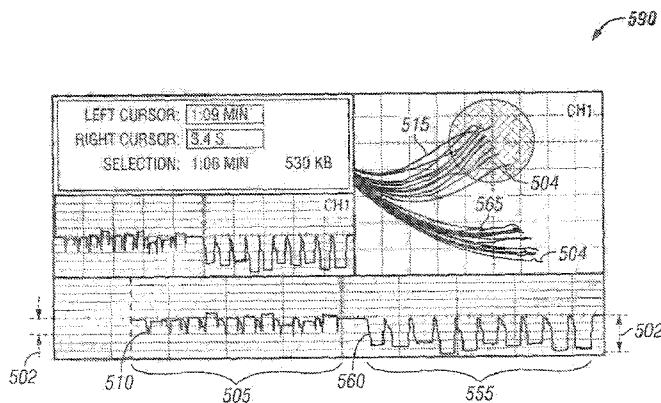


FIG. 5C

(57) Abstract: A method, system, and apparatus for non-destructively characterizing one or more regions within an ultra-hard polycrystalline structure using eddy current measurements. The apparatus includes an eddy current measuring device having at least one terminal, a leached component comprising a polycrystalline structure, a first wire, and a probe. The leached component includes a cutting surface and an opposing second surface. A portion of the polycrystalline structure extending inwardly from the cutting surface has at least a portion of a catalyst material removed from therein. The first wire electrically couples the terminal to the probe, which is placed in contact with the cutting surface. The eddy current is measured one or more times and compared to a calibration curve to determine an estimated leaching depth within the polycrystalline structure. A data scattering range is ascertained to determine a relative porosity of the polycrystalline structure or the leaching quality within the polycrystalline structure.



INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2013/026931

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 10/46 (2013.01)

USPC - 175/431

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)

IPC(8) - B22F 1/02; B23B 27/14, 27/20; E21B 10/00, 10/36, 10/46, 10/56, 10/567; G01B 7/00, 7/02, 7/06, 21/08; G01D 5/24 (2013.01)  
USPC - 51/307, 309; 156/281; 175/426, 428, 431, 434; 324/658, 662, 663, 671

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
CPC - B22F 1/02; E21B 10/48, 10/5676 (2013.01)

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

Google Scholar, Google Patents, Patbase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y -- A	US 7,616,734 B1 (CORBETT et al) 10 November 2009 (10.11.2009) entire document	1,5,7,19,20,26 ----- 2-4,6,10-13,16-18,21-25 ----- 8,9,14,15
Y -- A	US 2008/0290866 A1 (CUFFE et al) 27 November 2008 (27.11.2008) entire document	2,3,17,18,24,25 ----- 8,9,14,15
Y -- A	US 2009/0152018 A1 (SANI et al) 18 June 2009 (18.06.2009) entire document	4,13,16,21,22 ----- 8,9,14,15
Y -- A	US 4,290,016 A (LORENZI) 15 September 1981 (15.09.1981) entire document	6,10-12,23 ----- 8,9,14,15
A	US 2002/0179864 A1 (FIELDEN et al) 05 December 2002 (05.12.2002) entire document	1-26

Further documents are listed in the continuation of Box C.

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"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

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"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  
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Date of the actual completion of the international search  
08 April 2013

Date of mailing of the international search report

26 APR 2013

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