(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
2 August 2012 (02.08.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/103461 A3

(51) International Patent Classification:
E21B 49/08 (2006.01) *G01V 9/00* (2006.01)

(21) International Application Number:
PCT/US2012/022946

(22) International Filing Date:
27 January 2012 (27.01.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/437,259 28 January 2011 (28.01.2011) 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, 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, 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, MD, 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).

Declarations under Rule 4.17:

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

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

Published:

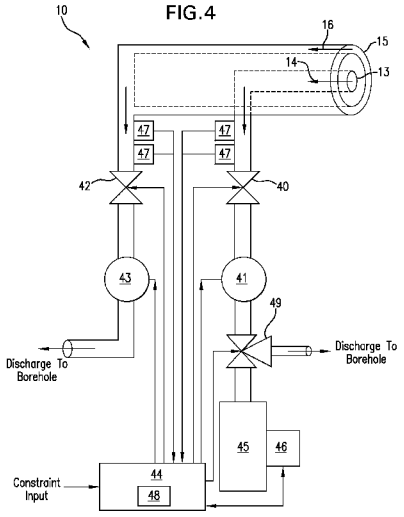
— *with international search report (Art. 21(3))*

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

[Continued on next page]

(54) **Title**: OPTIMIZATION OF SAMPLE CLEANUP DURING FORMATION TESTING

FIG.4



(57) **Abstract**: Disclosed is a formation testing tool for extracting formation fluid from an earth formation penetrated by a borehole having a drilling fluid. The tool includes: a sample flow element configured to extract formation fluid from the formation in a sample zone; a sample zone seal forming a perimeter defining the sample zone; a contamination removal flow element configured to extract formation fluid contaminated with the drilling fluid from a contamination removal zone in the formation; a contamination removal zone seal forming a perimeter defining the contamination removal zone, which surrounds and excludes the sample zone; and a controller configured to control a sample flow rate in the sample flow element and a contamination removal flow rate in the contamination flow removal element in order to decrease an amount of time required to acquire a sample of the formation fluid having an acceptable amount of contamination.

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WO 2012/103461 A3

(88) Date of publication of the international search report:
22 November 2012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/022946

A. CLASSIFICATION OF SUBJECT MATTER

E21B 49/08(2006.01)i, G01V 9/00(2006.01)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 49/08; E21B 47/00; E21B 49/10; E21B 33/12

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

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

eKOMPASS(KIPO internal) & Keywords: downhole, formation testing tool, sample flow element, sample zone seal, contamination removal flow element, contamination removal zone seal, controller, mud-filtrate contamination

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2010-0132940 A1 (PROETT, MARK A. et al.) 03 June 2010 See paragraphs 0024, 0026, 0028-0030, 0032, 0033, 0034 and figures 2, 3.	1,2,4-6,13,14 ,16-18,21 3,7-12,15,19,20
Y	US 2008-0078581 A1 (GOODWIN, ANTHONY R.H. et al.) 03 April 2008 See paragraph 0032 and figure 2.	3
Y	US 7857049 B2 (SHERWOOD, JOHN D.) 28 December 2010 See abstract, column 6, lines 4-14, column 7, lines 30-67 and figure 1.	7-12,15,19,20
A	US 2009-0283266 A1 (NOLD, III, RAYMOND V. et al.) 19 November 2009 See paragraphs 0062-0065 and figures 5, 12A-12E.	1-21

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 SEPTEMBER 2012 (12.09.2012)	**17 SEPTEMBER 2012 (17.09.2012)**

Name and mailing address of the ISA/KR

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Facsimile No. 82-42-472-7140

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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