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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 October 2012 (04.10.2012)

WIPO | PCT

(10) International Publication Number
WO 2012/135607 A3

(51) International Patent Classification:
G01V 3/20 (2006.01) *E21B 47/00* (2006.01)
G01V 3/38 (2006.01)

(21) International Application Number:
PCT/US2012/031424

(22) International Filing Date:
30 March 2012 (30.03.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/469,920 31 March 2011 (31.03.2011) 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).

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR FORMATION RESISTIVITY MEASUREMENTS IN OIL-BASED MUD USING A FLOATING REFERENCE SIGNAL

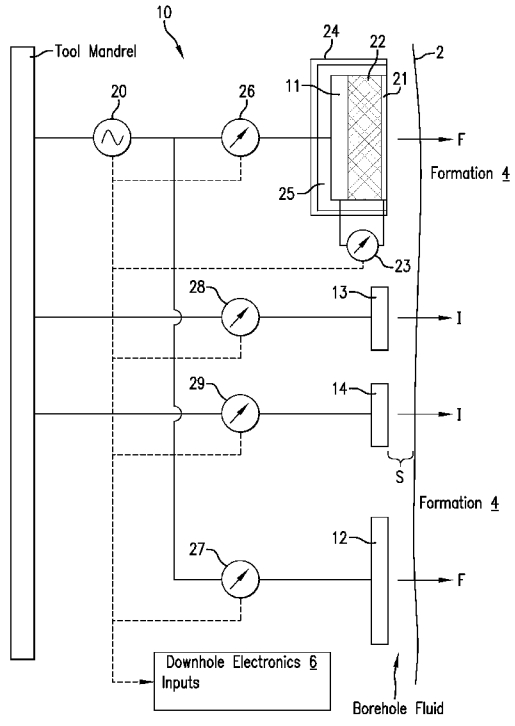

FIG.2

(57) Abstract: Disclosed is an apparatus for estimating a property of an earth formation penetrated by a borehole containing an oil-based drilling fluid. The apparatus includes an electrode disposed at a carrier and configured to inject alternating current into the formation. An electrically conductive plate is disposed between the first electrode and a borehole wall. An electrical insulator is disposed between and contacts the first electrode and the conductive plate. The apparatus is configured to prevent the drilling fluid from being disposed between the first electrode and the conductive plate. A first sensor is used to measure an electric field established between the first electrode and the conductive plate. A processor is configured to receive a measurement of the electric field to use as a floating reference signal to determine a phase difference with respect to a measured electrical quantity related to the injected electrical current in order to estimate the property.

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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))*

(88) Date of publication of the international search report:
27 December 2012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/031424

A. CLASSIFICATION OF SUBJECT MATTER

G01V 3/20(2006.01)i, G01V 3/38(2006.01)i, E21B 47/00(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)

G01V 3/20; G01V 3/00; G01R 27/26; G01V 3/08

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: electrode, current, insulator, phase difference

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0072833 A1 (LEONTY A. TABAROVSKY) 19 March 2009 See paragraphs 3, 4, 38-52; claims 1, 2, 6, 7, 8 and figures 1, 5.	1-19
A	US 6225806 B1 (JOHN WILLIAM AIDAN MILLAR et al.) 01 May 2001 See column 3, lines 3-13; claim 1 and figure 1.	1-19
A	US 2005-0068036 A1 (TSILI WANG et al.) 31 March 2005 See paragraphs 34, 35; claims 1, 26 and figure 1.	1-19
A	US 2006-0055418 A1 (RICHARD D. OGILVY et al.) 16 March 2006 See paragraph 29; claim 20 and figure 1.	1-19

☐ 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
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"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	Date of mailing of the international search report
31 OCTOBER 2012 (31.10.2012)	**01 NOVEMBER 2012 (01.11.2012)**

Name and mailing address of the ISA/KR
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Facsimile No. 82-42-472-7140

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Telephone No. 82-42-481-5709

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/031424

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