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[Continued on next page]

(54) Title: GAIN-CORRECTED MEASUREMENTS

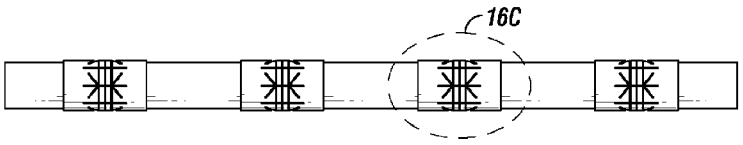


FIG. 16A

(57) Abstract: A method to obtain gain-corrected measurements. A measurement tool having one or more arrays is provided, wherein the arrays include two co-located triaxial transmitters and two co-located triaxial receivers. Measurements are obtained using the transmitters and the receivers. Impedance matrices are formed from the obtained measurements and the impedance matrices are combined to provide gain-corrected measurements. The apparatus may alternatively be a while-drilling logging tool having one or more arrays, wherein each array comprises a transmitter, a receiver, and a buck, and wherein the signal received by the receiver is subtracted from the signal received by the buck or vice versa. A slotted shield may be incorporated into either embodiment of the tool. The slots may form one or more island elements. A material is disposed in the slots. The islands and shield body have complementary tapered sides that confine the islands within the shield body.

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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))*

— *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))*

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31 May 2012

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Previous Correction:
see Notice of 5 January 2012

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/034126

A. CLASSIFICATION OF SUBJECT MATTER

G01V 3/26(2006.01)i, G01V 3/18(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 3/26; G01V 3/00; G01V 3/18; G01V 3/30; G01V 1/40

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: triaxial, impedance, matix

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6304086 B1 (GERALD N. MINERBO et al.) 16 October 2001 See abstract; claims 1, 6, 9 and figures 1, 2, 4, 6.	1-15,22-26
A	US 4675611 A (CARROLL W. CHAPMAN et al.) 23 June 1987 See abstract; column 5, line 30 - column 6, line 49 and figures 1, 4.	1-15,22-26
A	US 2008-0224707 A1 (MACMILLAN M. WISLER et al.) 18 September 2008 See abstract; claims 1-5 and figures 6A, 9A.	1-15,22-26
A	US 2004-0059515 A1 (W. DAVID KENNEDY) 25 March 2004 See abstract and figure 1.	1-15,22-26

☐ 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 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
"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
13 APRIL 2012 (13.04.2012)	**13 APRIL 2012 (13.04.2012)**

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

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YANG, Jeong Rok
Telephone No. 82-42-481-5709

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/034126

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:

Group 1 : Claims 1-15 and 22-26 are directed to a method comprising: providing a tool which has one co-located triaxial transmitter and one co-located triaxial receiver; obtaining measurements using the co-located triaxial transmitter and the co-located triaxial receiver; and forming an impedance matrix from the obtained measurements.

Group 2 : Claim 16 is directed to an apparatus to determine a formation property of a subsurface formation, comprising: a while-drilling logging tool having one or more arrays, wherein each array comprises a transmitter, a receiver, and a buck.

Group 3 : Claims 17-21 are directed to a shield for a downhole logging tool, comprising: a shield body having slots therein; one or more island elements bordered by the slots; and a material disposed in the slots.

1. ☐ As all required addtional 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.:
1-15, 22-26

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.

PCT/US2011/034126

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