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[Continued on next page]

(54) Title: ELECTRICAL GENERATOR AND ELECTRIC MOTOR FOR DOWNHOLE DRILLING EQUIPMENT

(57) Abstract: An electrical generator positionable downhole in a well bore includes a tubular housing having a first longitudinal end and a second longitudinal end, the housing having an internal passageway with a plurality of layers. The layers comprise at least a first protective layer, a second protective layer, and an electrically conductive layer positioned between the first and second protective layers. The layers define an internal cavity. A shaft with magnetic inserts is movably positioned in the internal cavity. Electrical current is generated when the shaft is moved. Alternatively, the device may be supplied with electrical power and used as a downhole motor.

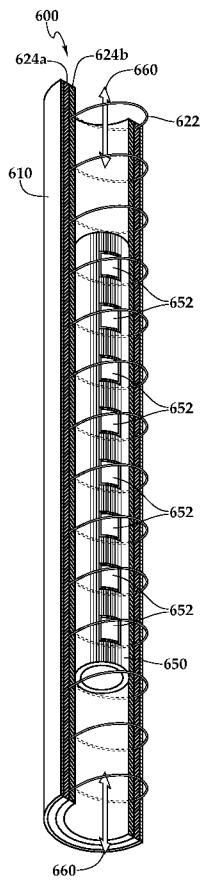


Fig.12





HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, 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.

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27 August 2015

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/045849**A. CLASSIFICATION OF SUBJECT MATTER****E21B 4/04(2006.01)i, E21B 17/00(2006.01)i, E21B 23/00(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 4/04; E21B 7/00; H02K 1/00; E21B 34/06; E21B 4/00; H02K 35/02; G01R 33/02; H02K 41/03; H02K 9/00; E21B 17/00; E21B 23/00

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: electrical generator, protective layer, conductive layer, shaft, magnetic insert, and drilling operation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2004-004099 A1 (SAPPU, BINAY, KUMAR) 08 January 2004 See abstract, page 6, line 25 - page 11, line 2, claims 1-2, and figures 1-2.	1-3, 10-36
Y	US 4370576 A (FOSTER, JR. et al.) 25 January 1983 See abstract, column 2, lines 13-62, and figure 1.	1-3, 10-36
Y	US 2011-0120725 A1 (DOWNTON et al.) 26 May 2011 See abstract, paragraphs [0034]-[0036], and figure 1.	21-26
Y	US 2007-0079989 A1 (BANKSTON et al.) 12 April 2007 See abstract, paragraph [0008], and figures 1-2.	27-30
A	US 5350958 A (OHNISHI, YOSHIHIRO) 27 September 1994 See abstract, column 3, line 7 - column 4, line 39, and figure 4.	1-3, 10-36

 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 another 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

25 June 2015 (25.06.2015)

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/045849**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.: 5 and 9
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:
Claims 5 and 9 are unclear, because they refer to multiple dependent claim which does not comply with PCT Rule 6.4(a).
Therefore, claims 5 and 9 are contrary to PCT Article 6.

3. Claims Nos.: 4 and 6-8
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:

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 fees, this Authority did not invite payment of any additional fees.

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.

PCT/US2013/045849

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004-004099 A1	08/01/2004	AU 2002-321822 A1	19/01/2004
US 4370576 A	25/01/1983	None	
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