



(51) International Patent Classification:
E21B 19/16 (2006.01)

(21) International Application Number:
PCT/IE2012/000031

(22) International Filing Date:
22 June 2012 (22.06.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2011/0293 23 June 2011 (23.06.2011)

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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, 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: DRILLING APPARATUS WITH CONTINUOUS ROTATION WHILE TUBULAR IS BEING ADDED

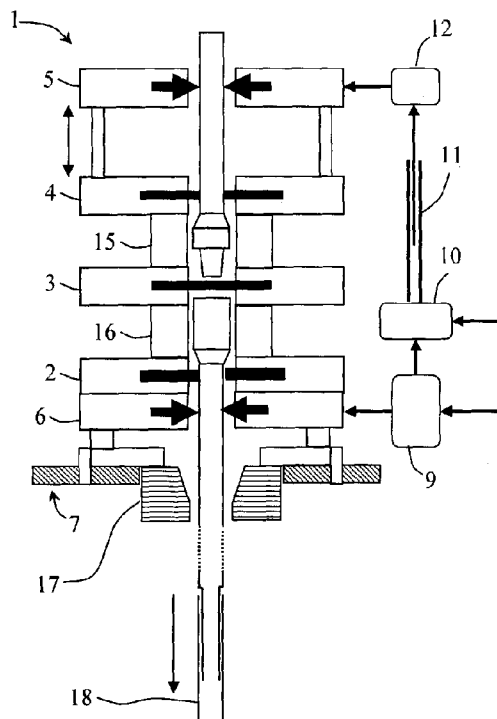


Fig. 1

(57) Abstract: A drilling apparatus (1) provides continuous rotation, and in some embodiments also vertical translation of the drill bit, such that weight can be kept on the bit and drilling can continue uninterrupted during connections. The connection is made in a pressure chamber formed by seals (2, 4) and spacers (15, 16). An upper snubber (5) grips the drill string above the joint and a lower snubber (6) grips it below the joint. The top drive is decoupled as the snubbers take over drill string drive, and apply a differential torque so that the connection is made. This achieves continuous rotation during the connection, and by use of an extension sub (18) drilling is also continuous.

**Published:****(88) Date of publication of the international search report:**

3 April 2014

- *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))*

INTERNATIONAL SEARCH REPORT

International application No

PCT/IE2012/000031

A. CLASSIFICATION OF SUBJECT MATTER

INV. E21B19/16

ADD.

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

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/012685 A1 (MARIS INTERNAT LTD [GB]; NEFFGEN JAMES MICHAEL [GB]; JENNER JAMES WILL) 10 February 2005 (2005-02-10) abstract figures 3,4 page 4, paragraph 4 - paragraph 5 page 13, paragraph 2 page 6, paragraph 4	1-5,25
X	WO 2005/019596 A1 (COUPLER DEVELOPMENTS [GB]; AYLING LAURENCE JOHN [GB]) 3 March 2005 (2005-03-03) cited in the application abstract page 2, paragraph 4-6 page 2, paragraph 2 page 3, paragraph 2-3 page 5, paragraph 3 page 14, paragraph 3	1-4,25



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

11 October 2013

Date of mailing of the international search report

14/02/2014

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IE2012/000031

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:

see additional sheet

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 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.:

"see additional sheet(s)"

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/IE2012/000031

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005012685	A1	10-02-2005	NONE

WO 2005019596	A1	03-03-2005	CA 2539039 A1 03-03-2005
		EP 1660753 A1 31-05-2006	
		US 2006254822 A1 16-11-2006	
		WO 2005019596 A1 03-03-2005	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5, 25

In addition to the common concept the claims of invention I defines drill string drive and a snubber drive in order to be interconnected.

2. claims: 6, 7

In addition to the common concept the claims of invention II defines drill string drive in order to rotate the drill string while a tool joint is connected or disconnected.

3. claim: 8

In addition to the common concept the claims of invention III defines an hydraulic drive in order to raise the apparatus described in claim 1.

4. claims: 9-11

In addition to the common concept the claims of invention IV defines a drill string in order to apply the desired bit weight.

5. claims: 12-16

In addition to the common concept the claims of invention V defines extension sub in order to expand the drill string.

6. claim: 17

In addition to the common concept the claims of invention VI defines an apparatus being fixed on the drill floor etc in order to resisting torque.

7. claims: 18-21

In addition to the common concept the claims of invention VII defines the drill string drive in order to specify its drive mechanism.

8. claim: 22

In addition to the common concept the claims of invention VIII defines a system in order to keep the mud circulating.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

9. claim: 23

In addition to the common concept the claims of invention IX defines a system in order to drill through rocks better.

10. claim: 24

In addition to the common concept the claims of invention X defines an automatic drilling system in order to achieve higher safety levels.
