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(25) Filing Language:

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(26) Publication Language:

English

[Continued on next page]

(54) Title: APPARATUS AND METHOD TO REMOTELY CONTROL FLUID FLOW IN TUBULAR STRINGS AND WELL-BORE ANNULUS

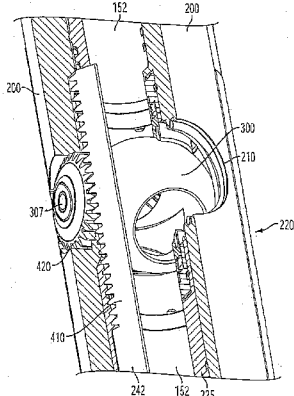


FIG. 4

(57) Abstract: The present invention discloses a method and apparatus for remotely and selectively control fluid flow through tubular string disposed within a wellbore and further control fluid flow between the tubular string inner flow passage and the annular flow passage. The present invention further discloses a method of selectively and remotely receiving and interpreting a form of command or information at a desired apparatus within the wellbore caused by the operator on earth surface.

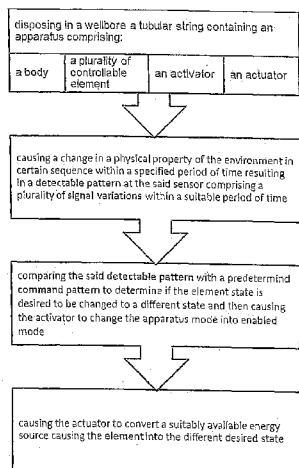


FIG. 14



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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, BN, 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, 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.

(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).

Published:

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

17 April 2014

INTERNATIONAL SEARCH REPORT

International application No
PCT/MY2013/000078

A. CLASSIFICATION OF SUBJECT MATTER INV. E21B21/10 E21B23/00 E21B34/06 E21B47/12 E21B41/00 E21B47/18 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) EPO-Internal, WPI Data														
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Category*</th> <th style="width: 70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width: 20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;"> GB 2 309 470 A (PATERSON ANDREW WEST [GB]; SPECIALISED PETROLEUM SERV LTD [GB]) 30 July 1997 (1997-07-30) figures 1-3 the whole document </td> <td style="vertical-align: top; text-align: center;"> 1,2,4, 9-11,16, 17 </td> </tr> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;"> US 4 373 582 A (BEDNAR JOHN M ET AL) 15 February 1983 (1983-02-15) </td> <td style="vertical-align: top; text-align: center;"> 1,2,4-9, 12-14, 18-25 </td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="vertical-align: top;"> Rotary valves are also acceptable.; column 8, lines 5-6 column 8, lines 38-66 claims 48-53; figures 1-5,7 the whole document column 3, line 34 - column 9, line 65 ----- -/-- </td> <td style="vertical-align: top; text-align: center;"> 3,15 </td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	GB 2 309 470 A (PATERSON ANDREW WEST [GB]; SPECIALISED PETROLEUM SERV LTD [GB]) 30 July 1997 (1997-07-30) figures 1-3 the whole document	1,2,4, 9-11,16, 17	X	US 4 373 582 A (BEDNAR JOHN M ET AL) 15 February 1983 (1983-02-15)	1,2,4-9, 12-14, 18-25	Y	Rotary valves are also acceptable.; column 8, lines 5-6 column 8, lines 38-66 claims 48-53; figures 1-5,7 the whole document column 3, line 34 - column 9, line 65 ----- -/--	3,15
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X	GB 2 309 470 A (PATERSON ANDREW WEST [GB]; SPECIALISED PETROLEUM SERV LTD [GB]) 30 July 1997 (1997-07-30) figures 1-3 the whole document	1,2,4, 9-11,16, 17												
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☒ 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 19 February 2014		Date of mailing of the international search report 28/02/2014												
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer van Berlo, André												

INTERNATIONAL SEARCH REPORT

International application No
PCT/MY2013/000078

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/119668 A1 (HALLIBURTON ENERGY SERV INC [US]; DIRKSEN RONALD JOHANNES [US]; GLEITM) 29 September 2011 (2011-09-29)	19-25
A	758 may be a poppet valve, a rotary valve; the whole document	4-18
Y	----- US 2008/164062 A1 (BRACKIN VAN J [US] ET AL) 10 July 2008 (2008-07-10)	15
A	paragraphs [0048] - [0052]; figures 8,11 the MWD system 150 may include a turbine assembly portion of the hydraulic horsepower of the drilling fluid 170 into electrical energy; paragraphs [0055], [0085], [0085]; claims 7,13	6-8, 11-14, 16-25
Y	----- US 3 667 557 A (TODD WILLIAM L ET AL) 6 June 1972 (1972-06-06)	3
A	the whole document figures 3,7	
A	----- WO 2007/021274 A1 (WELLDYNAMICS INC [US]; TIPS TIMOTHY R [US]; SMITHSON MITCHELL C [US]) 22 February 2007 (2007-02-22)	5-7, 12-15
A	the whole document electricity generation and bypass valve; figure 2	
A	----- WO 99/47789 A1 (CHURCHILL ANDREW PHILIP [GB]) 23 September 1999 (1999-09-23)	1
	the whole document -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/MY2013/000078

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.: 26-36
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:
see FURTHER INFORMATION sheet PCT/ISA/210
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:

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.:

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 26-36

The present application contains 36 claims, of which 9 are independent.

There are so many independent and dependent claims, and they are drafted in such a way, namely without clear distinction between the various possible groups of claims with partially overlapping scope and lacking the two-part form (Rule 6.3 (b) PCT), that due to the wording and interdependency chosen by the applicant, the claims as a whole are not in compliance with the provisions of clarity and conciseness of Article 6 PCT. The claims as filed erect a smoke screen in front of the skilled reader when assessing what should be the subject-matter to search.

The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19).

The extent of the search was consequently limited to claims 1-25, which appear to comprise a reasonable definition of what is understood to be the invention for which protection is sought.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/MY2013/000078

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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