



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
02.12.2015 Bulletin 2015/49

(51) Int Cl.:
E21B 7/06 (2006.01) E21B 7/15 (2006.01)

(43) Date of publication A2:
06.02.2013 Bulletin 2013/06

(21) Application number: **12179100.8**

(22) Date of filing: **02.08.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Halliburton Energy Services, Inc.**
Houston, TX 77072 (US)

(72) Inventor: **Dirksen, Ronald J.**
Spring, TX Texas 77389 (US)

(74) Representative: **Patel, Nikesh et al**
A.A. Thornton & Co.
10 Old Bailey
London EC4M 7NG (GB)

(30) Priority: **02.08.2011 US 201161514304 P**

(54) **Systems and Methods for Directional Pulsed Electric Drilling**

(57) Pulsed-electric drilling systems can be augmented with a steering mechanism that shifts at least a portion of a bit relative to a borehole centerline. Illustrative mechanisms include ball-and-socket joints(82), pivot-and-hinge joints, rotary steerable systems, and bent

subs. As the bit (26) detaches formation material using electric pulses, the detached material being flushed away by a flow of drilling fluid, the shifting of the bit from the centerline causes the borehole to turn in the direction of the bit.

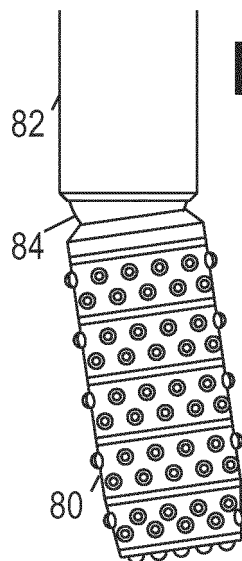


FIG. 3B



EUROPEAN SEARCH REPORT

 Application Number
 EP 12 17 9100

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 420 358 A (SCHLUMBERGER HOLDINGS [VG]) 24 May 2006 (2006-05-24)	1,3,5-7, 11,13, 15-17,19	INV. E21B7/06 E21B7/15
Y	* First sentence; page 4, paragraph 2; figures 1,5,6,8 * * Third sentence; page 4, paragraph 3; figure 1 * * page 8, paragraph 2-3; figure 5 * * Penultimate sentence; page 9, paragraph 2; figure 5 * * A greater degree ... direction of drilling.; pages 10-11; figure 6 * * Second and third sentence; page 12, paragraph 1; figure 8 * * Last sentence; page 12, paragraph 2; figure 1 * * page 5, paragraph 1; figure 1 * -----	2,4, 8-10,12, 14,18	TECHNICAL FIELDS SEARCHED (IPC) E21B
Y	US 6 158 529 A (DOREL ALAIN P [US]) 12 December 2000 (2000-12-12) * column 1, lines 5-11; figures 1,2,4 * * column 1, lines 15-23 * * column 5, lines 27-53 * * column 11, lines 3-26; figure 4 * -----	2,4, 8-10,12, 14,18	
A	WO 90/05235 A1 (NOBLE JAMES BAIN [GB]) 17 May 1990 (1990-05-17) * page 9, lines 1-11; figures 3,4 * -----	3,4	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 October 2015	Pasquini, Matteo
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 12 17 9100

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-10-2015

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 2420358	A	24-05-2006	EA	200701082 A1	26-10-2007
			EA	200801237 A1	29-08-2008
			GB	2420358 A	24-05-2006
			US	2008245568 A1	09-10-2008
			US	2012103693 A1	03-05-2012
			WO	2006054079 A1	26-05-2006

US 6158529	A	12-12-2000	AU	745767 B2	28-03-2002
			AU	6317899 A	15-06-2000
			BR	9905828 A	05-09-2000
			CA	2291922 A1	11-06-2000
			CN	1263977 A	23-08-2000
			DE	69921429 D1	02-12-2004
			EP	1008717 A1	14-06-2000
			GC	0000115 A	29-06-2005
			ID	24512 A	20-07-2000
			NO	996051 A	13-06-2000
			RU	2229012 C2	20-05-2004
			US	6158529 A	12-12-2000

WO 9005235	A1	17-05-1990	AU	635509 B2	25-03-1993
			AU	4630189 A	28-05-1990
			BR	8907750 A	27-08-1991
			CA	2002135 A1	03-05-1990
			DE	68914286 D1	05-05-1994
			DE	68914286 T2	03-11-1994
			DK	80591 A	30-04-1991
			EP	0441890 A1	21-08-1991
			NO	911720 A	02-07-1991
			US	5113953 A	19-05-1992
			WO	9005235 A1	17-05-1990

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82