



(43) International Publication Date
27 September 2012 (27.09.2012)

(51) International Patent Classification:
C09K 8/36 (2006.01)

[GB/GB]; 7 Canal Street, Woodside, Aberdeen AB24 2SE (GB).

(21) International Application Number:
PCT/GB2012/050619

(74) Agent: **THOMSON, James**; Scotland House, 165-169 Scotland Street, Glasgow, Strathclyde G5 8PL (GB).

(22) International Filing Date:
21 March 2012 (21.03.2012)

(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.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1104691.9 21 March 2011 (21.03.2011) GB

(71) Applicant (for all designated States except US): **M-I DRILLING FLUIDS UK LIMITED** [GB/GB]; Ashleigh House, 1 Abbotswell Road, Aberdeen, Aberdeenshire AB12 3AD (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HODDER, Michael Hayward** [GB/GB]; 5 Hilltop Avenue, Cults, Aberdeen, Aberdeenshire AB15 9RJ (GB). **CHAPMAN, John William** [GB/GB]; 7 Burnside Gardens, Stonehaven, Kincardineshire AB39 2FA (GB). **TOMISSON, Stuart**

(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, MD, 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,

[Continued on next page]

(54) Title: INVERT DRILLING FLUIDS

Concentration Required to give 6rpm reading of 17

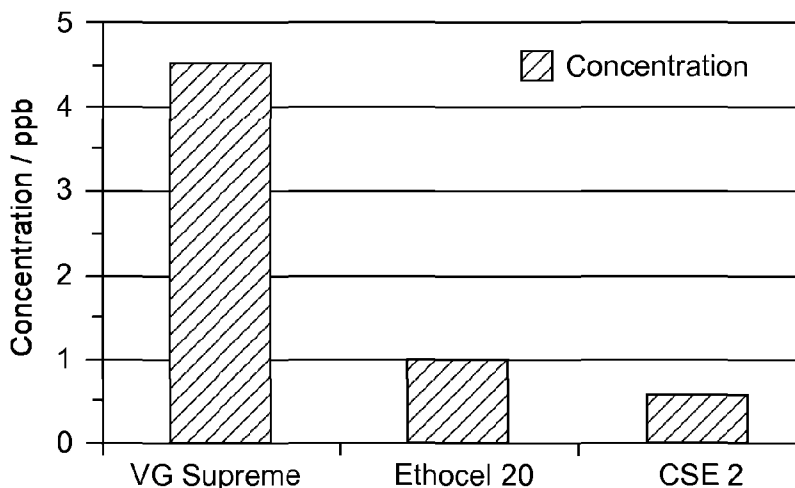


Fig. 4

(57) Abstract: There is described an invert emulsion wellbore fluid that includes: an oleaginous external phase; a non-oleaginous internal phase, wherein a ratio of the oleaginous external phase and non-oleaginous internal phase is less than 50:50 by volume; an emulsifier; and a rheological additive comprising a sulphonated polymer formed from 100 to 10,000 monomers. There is also described a method of drilling a subterranean hole using the invert emulsion drilling fluid.

WO 2012/127230 A3



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

— *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))*

Published:

— *with international search report (Art. 21(3))*

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

13 December 2012

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/050619

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C09K8/36
 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)
 C09K

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 154 224 A1 (BP EXPLORATION OPERATING [GB]) 17 February 2010 (2010-02-17) paragraphs [0044], [0049]; claims 1,2 the whole document -----	1-16,22, 23
X	EP 0 321 130 A2 (NL BAROID INC [US] BAROID TECHNOLOGY INC [US]) 21 June 1989 (1989-06-21) page 3, lines 4-30 page 4, lines 9-25, 29-36 the whole document -----	1-16,22, 23
A	US 4 425 461 A (TURNER S RICHARD [US] ET AL) 10 January 1984 (1984-01-10) claim 1 the whole document -----	1-16,22, 23
	-/--	

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
---	---

Date of the actual completion of the international search 3 October 2012	Date of mailing of the international search report 10/10/2012
---	--

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 Straub, Thomas
--	--

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/050619

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.:

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

International application No

PCT/GB2012/050619

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008/248975 A1 (MAZARD CECILE [FR] ET AL) 9 October 2008 (2008-10-09) cited in the application claim 1 the whole document	1-16,22, 23
A	US 5 633 220 A (CAWIEZEL KAY E [US] ET AL) 27 May 1997 (1997-05-27) claim 1 the whole document	1-16,22, 23
X	WO 87/03613 A2 (LUBRIZOL CORP [US]) 18 June 1987 (1987-06-18)	17,18, 22,23
Y	page 71, paragraph 2; claims 1-3 the whole document	17-23
X	-& CN 86 108 192 A (LUBRIZOL CORP [US]) 9 September 1987 (1987-09-09) corresponding passage to WO is added as machine translation from the Chinese patent to clarify that ethyl cellulose is called "ethocel" in the original (some paragraphs after table 2 in machine translation).; the whole document	17-23
X	WO 01/88059 A1 (ICI PLC [GB]; GRAINGER NEIL [GB]; COX TERENCE [GB]; SCOVELL EDWARD GEO) 22 November 2001 (2001-11-22)	17,22,23
Y	page 7, lines 16-21; examples 1,2 the whole document	17-23
X	US 2010/210480 A1 (BALLARD DAVID ANTONY [GB] ET AL) 19 August 2010 (2010-08-19)	17,22,23
Y	paragraphs [0025], [0026], [0061]; claim 1 the whole document	17-23
A	US 2 582 323 A (FISCHER PAUL W) 15 January 1952 (1952-01-15) column 5, line 39 - column 6, line 6; claims 1,6; example 2 column 6, lines 16-33 the whole document	17-23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/050619

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 2154224	A1	17-02-2010	EP 2154224 A1	17-02-2010
			EP 2324093 A1	25-05-2011
			US 2011146983 A1	23-06-2011
			WO 2010010325 A1	28-01-2010

EP 0321130	A2	21-06-1989	AU 2649588 A	27-07-1989
			BR 8806579 A	22-08-1989
			CA 1314702 C	23-03-1993
			CN 1034018 A	19-07-1989
			DE 3885251 D1	02-12-1993
			DE 3885251 T2	19-05-1994
			DK 703288 A	19-06-1989
			EG 19728 A	31-01-1996
			EP 0321130 A2	21-06-1989
			ES 2045148 T3	16-01-1994
			JP 1221483 A	04-09-1989
			MX 164304 B	31-07-1992
			NO 885575 A	19-06-1989
			US 5021170 A	04-06-1991

US 4425461	A	10-01-1984	AU 560231 B2	02-04-1987
			AU 1905083 A	22-03-1984
			CA 1210232 A1	26-08-1986
			DE 3364270 D1	31-07-1986
			EP 0104829 A1	04-04-1984
			MY 8700412 A	31-12-1987
			NO 833261 A	14-03-1984
			US 4425461 A	10-01-1984

US 2008248975	A1	09-10-2008	US 2008248975 A1	09-10-2008
			US 2011266061 A1	03-11-2011

US 5633220	A	27-05-1997	NONE	

WO 8703613	A2	18-06-1987	AR 245016 A1	30-12-1993
			AU 602134 B2	04-10-1990
			AU 6738287 A	30-06-1987
			BR 8607222 A	06-12-1988
			CA 1319929 C	06-07-1993
			CN 86108192 A	09-09-1987
			DE 3673173 D1	06-09-1990
			EP 0285608 A1	12-10-1988
			ES 2002547 A6	16-08-1988
			JP S63502254 A	01-09-1988
			MX 164002 B	09-07-1992
			PL 262817 A1	16-11-1987
			RU 2104261 C1	10-02-1998
			SG 63891 G	13-09-1991
			WO 8703613 A2	18-06-1987
			ZA 8608856 A	29-07-1987
			ZW 23786 A1	29-04-1987

CN 86108192	A	09-09-1987	AR 245016 A1	30-12-1993
			AU 602134 B2	04-10-1990
			AU 6738287 A	30-06-1987
			BR 8607222 A	06-12-1988
			CA 1319929 C	06-07-1993
			CN 86108192 A	09-09-1987

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/050619

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		DE 3673173 D1	06-09-1990
		EP 0285608 A1	12-10-1988
		ES 2002547 A6	16-08-1988
		JP S63502254 A	01-09-1988
		MX 164002 B	09-07-1992
		PL 262817 A1	16-11-1987
		RU 2104261 C1	10-02-1998
		SG 63891 G	13-09-1991
		WO 8703613 A2	18-06-1987
		ZA 8608856 A	29-07-1987
		ZW 23786 A1	29-04-1987

WO 0188059	A1	22-11-2001	AU 5496301 A
			EP 1282674 A1
			JP 2003533582 A
			MX PA02011300 A
			WO 0188059 A1

US 2010210480	A1	19-08-2010	AR 063177 A1
			BR PI0705935 A2
			CA 2606537 A1
			CO 6030030 A1
			EA 200971091 A1
			EP 2167605 A1
			US 2010210480 A1
			WO 2008147659 A1

US 2582323	A	15-01-1952	NONE

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-16(completely); 22, 23(partially)

An invert emulsion wellbore fluid that includes: an oleaginous external phase; a non-oleaginous internal phase, wherein a ratio of the oleaginous external phase and non-oleaginous internal phase is less than 50:50 by volume; an emulsifier; and a rheological additive comprising a sulphonated polymer formed from 100 to 10,000 monomers.

2. claims: 17-21(completely); 22, 23(partially)

An invert emulsion wellbore fluid that includes: an oleaginous external phase; a non-oleaginous internal phase, wherein a ratio of the oleaginous external phase and non-oleaginous internal phase is less than 50:50 by volume; an emulsifier; and a rheological additive comprising an organosoluble cellulose.
