

(43) International Publication Date
27 December 2012 (27.12.2012)

- (51) **International Patent Classification:**
E21B 33/038 (2006.01) *E21B 43/01* (2006.01)
- (21) **International Application Number:**
PCT/US2012/043274
- (22) **International Filing Date:**
20 June 2012 (20.06.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/499,037 20 June 2011 (20.06.2011) US
- (71) **Applicant (for all designated States except US):** **BP CORPORATION NORTH AMERICA INC.** [US/US]; 501 Westlake Park Boulevard, Houston, TX 77079 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **MATAWAY, Thomas, Patrick** [US/US]; 150 W. Warrenville Road, MC 200-1W, Naperville, IL 60563 (US). **BOND, Stanley, Leroy** [US/US]; 150 W. Warrenville Road, MC 200-1W, Naperville, IL 60563 (US). **BEYNET, Pierre, Albert** [US/US]; 150 W. Warrenville Road, MC 200-1W, Naperville, IL 60563 (US).
- (74) **Agent:** **SHUNG, Albert, K.**; BP America Inc., 150 W. Warrenville Road, Mc 200-1W, Naperville, IL 60563 (US).

(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).

Published:

- 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))

[Continued on next page]

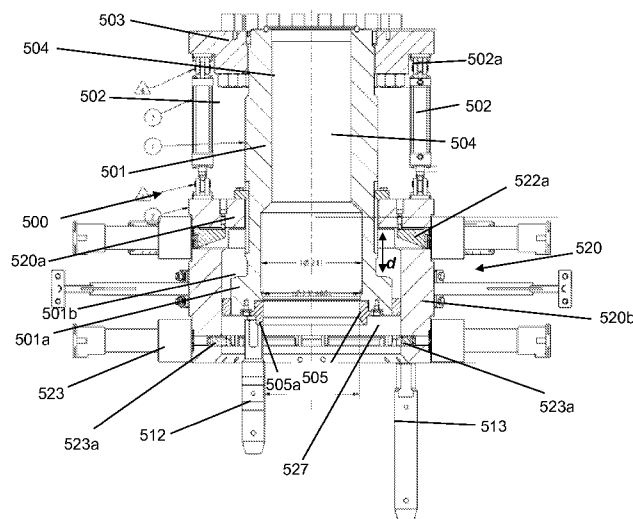
(54) **Title:** SUBSEA CONNECTOR WITH AN ACTUATED LATCH CAP ASSEMBLY

FIGURE 4B

(57) **Abstract:** Methods and devices for forming a subsea connection over an existing subsea connection are described herein. In one embodiment, a subsea connector for forming a sealed connection to a subsea flange connection comprises a connector body having a sealing portion. The connector body has a throughbore running therethrough, and a subsea connection coupled to the connector body. The subsea connector also comprises a latch cap assembly movably disposed around the sealing portion. The latch cap assembly comprises a flange cavity which is configured to completely enclose and couple to an existing subsea connection. The connector body and latch cap assembly together are configurable to form a sealed connection to the subsea connection. In addition, the subsea connector comprises a plurality of bidirectional actuators for moving the latch cap assembly over the connector body. The bidirectional actuators are coupled to the subsea connection and the latch cap assembly.



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

19 September 2013

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/043274

A. CLASSIFICATION OF SUBJECT MATTER
INV. E21B33/038 E21B43/01
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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	F. Adamek: "Macondo well oil containment, a supplier perspective in time of industry crisis", INTSOK US-Norway Technology conference, HOUSTON 30 March 2011 (2011-03-30), XP007922012, Retrieved from the Internet: URL: http://www.intsok.com/style/downloads/GE%20Oil_PDF_GE.pdf [retrieved on 2013-06-20] page 11 - page 15 the whole document ----- -/-	1-26



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

21 June 2013

Date of mailing of the international search report

04/07/2013

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

Brassart, P

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/043274

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 2012/006555 A1 (FRASER THOMAS A [US] ET AL) 12 January 2012 (2012-01-12) figures 1-11 paragraphs [0002], [0025] - [0029], [0038] - [0058] -----	1-9, 14-23
X,P	US 2012/006557 A1 (FRASER THOMAS A [US] ET AL) 12 January 2012 (2012-01-12) figures 1-11 paragraphs [0002] - [0007], [0011], [0026] - [0030], [0035] - [0052] -----	24-26
A	US 3 517 738 A (PETERSEN WILLIAM H) 30 June 1970 (1970-06-30) the whole document -----	1-23
A	US 4 823 879 A (BRAMMER NORMAN [GB] ET AL) 25 April 1989 (1989-04-25) the whole document -----	1-23
A	US 3 841 665 A (CAPOT L) 15 October 1974 (1974-10-15) the whole document -----	1-23
A	JP S49 139302 U (ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO.) 30 November 1974 (1974-11-30) the whole document -----	1-23
A	US 3 325 190 A (ECKERT LAWRENCE A ET AL) 13 June 1967 (1967-06-13) the whole document -----	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/043274

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012006555	A1	12-01-2012	AU 2011203302 A1 02-02-2012
		BR PI1103493 A2 11-12-2012	
		GB 2481910 A 11-01-2012	
		SG 177820 A1 28-02-2012	
		US 2012006555 A1 12-01-2012	
US 2012006557	A1	12-01-2012	AU 2011203299 A1 02-02-2012
		BR PI1103459 A2 16-04-2013	
		GB 2481909 A 11-01-2012	
		SG 177821 A1 28-02-2012	
		US 2012006557 A1 12-01-2012	
US 3517738	A	30-06-1970	DE 2000364 A1 23-07-1970
		FR 2027910 A1 02-10-1970	
		GB 1290196 A 20-09-1972	
		US 3517738 A 30-06-1970	
US 4823879	A	25-04-1989	GB 2225044 A 23-05-1990
		US 4823879 A 25-04-1989	
US 3841665	A	15-10-1974	AU 475548 B2 26-08-1976
		AU 5615073 A 28-11-1974	
		CA 987229 A1 13-04-1976	
		DE 2329657 A1 03-01-1974	
		FR 2141340 A5 19-01-1973	
		GB 1374712 A 20-11-1974	
		IT 998131 B 20-01-1976	
		JP S549564 B2 25-04-1979	
		JP S5024103 A 15-03-1975	
		NL 7305511 A 11-12-1973	
		NO 148496 B 11-07-1983	
		US 3841665 A 15-10-1974	
JP S49139302	U	30-11-1974	NONE
US 3325190	A	13-06-1967	NONE