(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 May 2012 (18.05.2012)

PCT

(10) International Publication Number
WO 2012/064379 A1

(51) International Patent Classification:
E21B 21/00 (2006.01) *H02K 44/02* (2006.01)
E21B 21/08 (2006.01)

(21) International Application Number:
PCT/US2011/032417

(22) International Filing Date:
14 April 2011 (14.04.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/942,745 9 November 2010 (09.11.2010) US

(71) Applicant *(for all designated States except US)*: **VETCO GRAY INC.** [US/US]; 4424 West Sam Houston Parkway North, Suite 100, Houston, TX 77041 (US).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **JENNINGS, Charles, E.** [US/US]; 11322 Gettysburg Court, Tomball, TX 77377 (US).

(74) Agents: **CONKLIN, Mark, A.** et al.; General Electric Company, Global Patent Operation, 2 Corporate Drive, Suite 648, Shelton, CT 06484 (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,

[Continued on next page]

(54) Title: PUMPING MUD BY ELECTROHYDRODYNAMIC PROPULSION

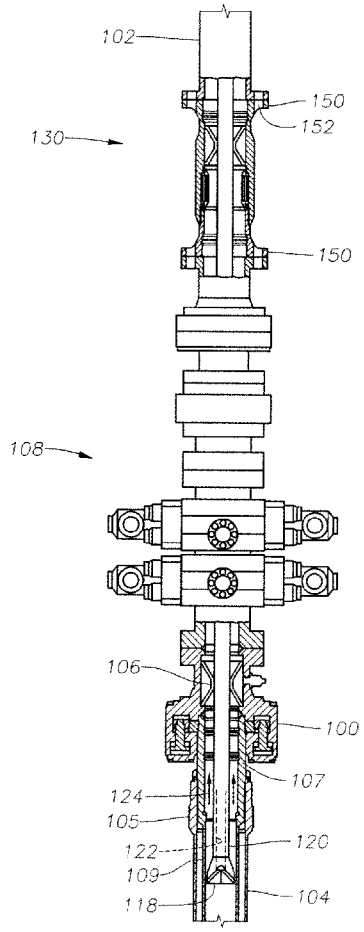

Fig. 1

(57) Abstract: A section of riser casing urges drilling mud through the riser (102), either upward from the sea floor to reduce head pressure or downward toward the wellbore. The section of riser casing (130) may use an electromagnet (132), two or more electrodes (134), or a combination of electromagnets and electrodes to urge drilling mud having electrohydrodynamic properties through the riser casing.

WO 2012/064379 A1

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

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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