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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 January 2011 (20.01.2011)

PCT

(10) International Publication Number
WO 2011/008639 A2

(51) International Patent Classification:
E21B 34/10 (2006.01) *F16K 31/12* (2006.01)
E21B 43/12 (2006.01)

(21) International Application Number:
PCT/US2010/041473

(22) International Filing Date:
9 July 2010 (09.07.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/501,421 11 July 2009 (11.07.2009) US

(71) Applicant *(for all designated States except US)*: **BAKER HUGHES INCORPORATED** [US/US]; P.O. Box 4740, Houston, TX 77210-4740 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **O'BRIEN, Robert, S.** [US/US]; 23226 Hazel Field, Katy, TX 77494 (US). **ROSENBLATT, Steve** [US/US]; 3600 Montrose Boulevard, No. 502, Houston, TX 77006 (US).

(74) Agent: **DUPHORNE, Darin, H.**; Baker Hughes Incorporated, P.O. Box 4740, Houston, TX 77210-4740 (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, 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, 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:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: SUBTERRANEAN VALVE OPERATED BY STRING RELATIVE MOVEMENT

(57) Abstract: A valve is mounted to a tubular string and has an actuation assembly that is isolated from well fluids. The valve member can be a ball that rotates on a pivot and is actuated by relative rotation of string components that straddle the ball. Rotation of one string component is linked to the closure ball by an external slanted slot with an operating ball that rides in it and connects the rotating string component to the closure ball. Travel stops limit the desired rotation of the closure ball in opposed directions. The closure ball can alternatively be rotated by relative longitudinal string component movement that is converted to relative rotation such as through the use of a j-slot mechanism. Internal seals isolate the slanted slot and operating ball from well fluids.

WO 2011/008639 A2