

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
25 June 2020 (25.06.2020)



(10) International Publication Number
WO 2020/131051 A1

(51) International Patent Classification:

E21B 23/04 (2006.01) **E21B 34/06** (2006.01)
E21B 23/06 (2006.01)

(21) International Application Number:

PCT/US2018/066522

(22) International Filing Date:

19 December 2018 (19.12.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant: **HALLIBURTON ENERGY SERVICES, INC.** [US/US]; 3000 N. Sam Houston Pkwy E., Houston, TX 77032-3219 (US).

(72) Inventors: **ROANE, Thomas, Owen**; 257 Private Road, Alvord, TX 76225 (US). **GUAN, Zheng**; 10821 Leesa Drive, McKinney, TX 75070 (US). **WELSHOEFER, Benjamin, Jon**; 111 Forest Heights Ct, Montgomery, TX 77016 (US).

(74) Agent: **LI, William** et al.; Mcguirewoods LLP, 1750 Tysons Blvd., Suite 1800, Tysons Corner, VA 22102 (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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,

DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

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

(54) Title: METHODS AND TOOLS TO DEPLOY DOWNHOLE ELEMENTS

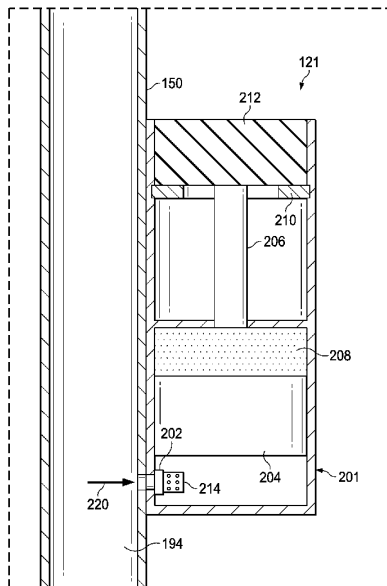


FIG. 2

(57) Abstract: The embodiments include methods and tools to activate downhole apparatuses. In one embodiment, a hydrostatic pressure intensifier includes a housing having at least two different internal cross-sectional surface areas. The housing includes a device mounted on the housing and operable to actuate in response to being subject to a threshold amount of pressure. The housing also includes a first piston housed in a first chamber of the housing, where the first piston has a first cross-sectional area and a first stroke length, and a second piston housed in a second chamber of the housing, where the second piston has a second cross-sectional area and a second stroke length, and where the first cross-sectional area is greater than the second cross-sectional area. The hydrostatic pressure intensifier also includes a fluid flow restrictor that restricts fluid flow through the valve to control an amount of pressure applied by the first piston.

WO 2020/131051 A1