

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
30 June 2022 (30.06.2022)



(10) International Publication Number
WO 2022/139854 A1

(51) International Patent Classification:

E21B 33/126 (2006.01) *E21B 34/06* (2006.01)
E21B 33/128 (2006.01) *E21B 23/06* (2006.01)

(21) International Application Number:

PCT/US2020/067542

(22) International Filing Date:

30 December 2020 (30.12.2020)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/132,924 23 December 2020 (23.12.2020) US

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

(72) Inventors: **FRIPP, Michael Linley**; 2601 E Belt Line Road, Carrollton, Texas 75006 (US). **APICHART-THABRUT, Terapat**; 2601 E. Belt Line Road, Carrollton, Texas 75006 (US). **MURPHY, Robert Travis**; 2601 E. Belt Line Road, Carrollton, Texas 75006 (US).

(74) Agent: **SUAREZ, Vera et al.**; Haynes and Boone, LLP, 2323 Victory Avenue, Suite 700, Dallas, Texas 75219 (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, IT, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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: 3D PRINTED BARREL SLIP

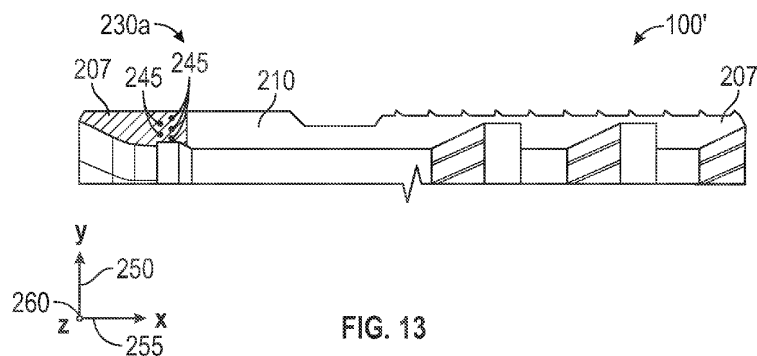


FIG. 13

(57) Abstract: A 3D printed barrel slip that includes a radially expandable barrel slip body that is movable from an unexpanded position to an expanded position; wherein the body has an outer surface that, when in the unexpanded position, defines a first radius; wherein the first radius is associated with a first curvature; and wherein, when in the expanded position, portion(s) of the outer surface has a second curvature that is less than the first radius. The body is an integrally formed single-component body that defines an external surface; and an internal chamber isolated from the external surface. The internal chambers affect the strength of portions of the body to control the timing of deployment of the barrel slip.

WO 2022/139854 A1