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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
04 September 2025 (04.09.2025)

WIPO | PCT

(10) International Publication Number
WO 2025/183700 A1

(51) International Patent Classification:
E21B 43/12 (2006.01) *E21B 34/10* (2006.01)
E21B 34/06 (2006.01)

(21) International Application Number:
PCT/US2024/017838

(22) International Filing Date:
29 February 2024 (29.02.2024)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
18/591,649 29 February 2024 (29.02.2024) US

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

(72) Inventor: **EL MALLAWANY, Ibrahim**; 3000 N. Sam Houston Parkway E., Houston, Texas 77032-3219 (US).

(74) Agent: **GARDNER, Jason D.** et al.; Kilpatrick Townsend & Stockton LLP, 1100 Peachtree Street, Suite 2800, Atlanta, Georgia 30309 (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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,

(54) Title: PIEZOELECTRIC PUMP FOR WELLBORE TOOL

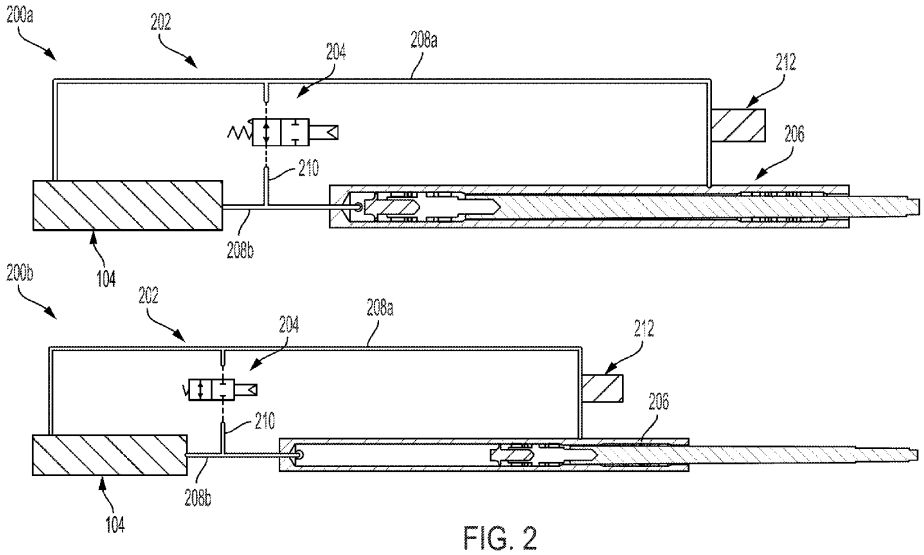


FIG. 2

(57) Abstract: A system can be used to control a wellbore tool using a piezoelectric pump. The system can include a piston, the piezoelectric pump, and a solenoid valve. The piston can be positioned in a wellbore to control the wellbore tool. The piezoelectric pump can be coupled with the piston to generate differential pressure. The piston can be actuated in at least a first direction or a second direction in response to receiving the differential pressure. The solenoid valve can be coupled with the piezoelectric pump to selectively cause the piezoelectric pump to apply the differential pressure in the first direction or in the second direction.

WO 2025/183700 A1

[Continued on next page]

DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, 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))*