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[US/US]; 6401 N. Eldridge Parkway, Houston, Texas 77041 (US).</p> <p>(72) Inventors: MITCHELL, Andrew B.; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US). BARTLETT, Chris D.; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US). SCANTLEBURY, David; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US). MURPHY, Rick; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US).</p> | <p>(US). ELLIS, Fife B.; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US). NORWOOD, Gregory; c/o Innovex International, Inc., 6401 N. Eldridge Parkway, Houston, Texas 77041 (US).</p> <p>(74) Agent: HAUSMAN, Brian et al.; 910 Louisiana Street, Houston, Texas 77002 (US).</p> <p>(81) Designated States (<i>unless otherwise indicated, for every kind of national protection available</i>): 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.</p> <p>(84) Designated States (<i>unless otherwise indicated, for every kind of regional protection available</i>): 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, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT,</p> |
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(54) Title: LOCK RING ACTUATOR FOR TUBING HANGER INSTALLATION

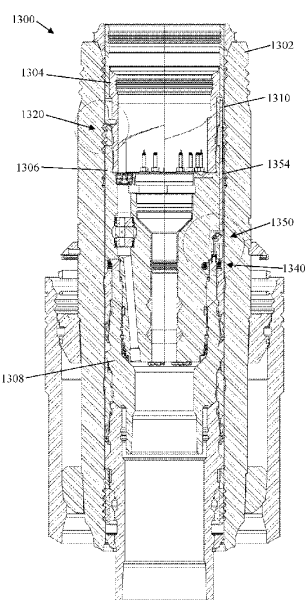


FIG. 13A

(57) Abstract: A hanger assembly includes: a main body; a lock ring coupled to the main body and configured to expand radially outward into a profile on an inner diameter of the wellhead; and an actuator, wherein the actuator is capable of transferring an axial force from the actuator into outward radial expansion of the lock ring toward the profile on the inner diameter of the wellhead. An interface between the actuator and the lock ring is shaped such that: axially downward movement of the actuator from a starting position to an intermediate position actuates the lock ring into the profile; and axially downward movement of the actuator from the intermediate position to a pre-load position applies a pre-load to the hanger assembly.

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