



(51) International Patent Classification:
B25B 23/14 (2006.01) **B25B 23/147** (2006.01)
B25B 23/151 (2006.01)

(21) International Application Number:
PCT/US2009/042691

(22) International Filing Date:
4 May 2009 (04.05.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/050,067 2 May 2008 (02.05.2008) US

(71) Applicant and

(72) Inventor: **FRANCIS, Dale** [US/US]; 11116 W. Little
York, Bldg. 5, Houston, TX 77041 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FRANCIS, Nicholas** [US/US]; 8 Dufresne Loop, Luling, LA 70070 (US). **BERNARD, William, P.** [US/US]; 8 Dufresne Loop, Luling, LA 70070 (US). **BERNARD, Oswald, J.** [US/US]; 8 Dufresne Loop, Luling, LA 70070 (US). **HIS-**

COX, Lan [US/US]; 10900 Corporate Center Drive, Suite 100, Houston, TX 77041 (US). **COMPTON, Brian** [US/US]; 15322 Wild Timber Corporation, Cypress, TX 77433 (US). **JONES, Arthur** [US/US]; 12125 Ann Lane, Houston, TX 77064 (US).

(74) Agents: **NORTH, Brett, A.** et al.; Garvey, Smith, Nehrbas & North, L.L.C., 3838 N. Causeway Blvd., Suite 3290, Metairie, LA 70002 (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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,

[Continued on next page]

(54) Title: IMPROVED TORQUE WRENCH SYSTEM HAVING A MULTIPLE TORQUE STATIONS

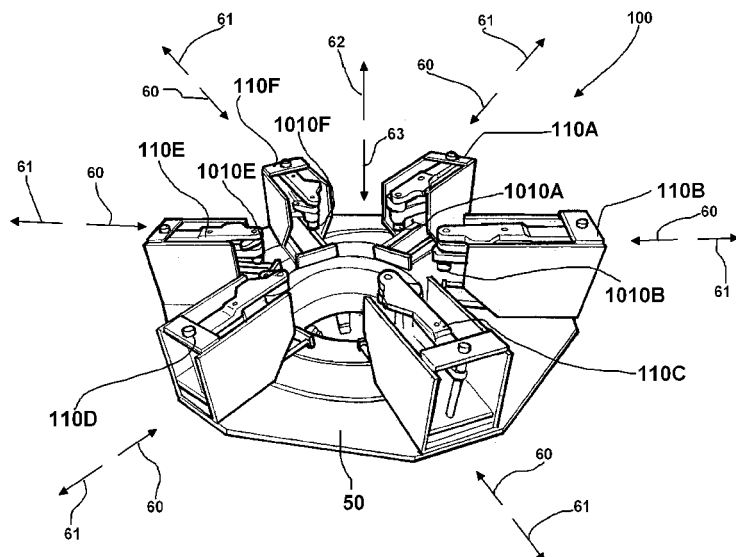


FIG. 57

(57) Abstract: An improved multi-bolt and nut torque wrench for installing and removing bolts or nuts from flanged joints or the like which includes a plurality of torque stations having a plurality of high torque wrenches for engaging the heads of the bolts or nuts during a high torque phase of removal or installation; a plurality of low-torque motors operatively engaged with the wrenches for rotating the bolts or nuts during the low torque phase of removal or installation; a source of hydraulic fluid for driving the low-torque motors during the low-torque phase, and driving the high-torque wrenches during the high torque phase; and a mechanism for switching between the two phases depending on the torque needed.



TM), European (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, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:

25 February 2010

Published:

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