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- (71) **Applicant (for all designated States except US):** **BAKER HUGHES INCORPORATED** [US/US]; P.O. Box 4740, Houston, Texas 77210-4740 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **PARMETER, Larry J.** [US/US]; 6804 E. Forest Ridge Blvd., Broken Arrow, Oklahoma 74014 (US). **MCVICKER, Van J.** [US/US]; 11940 Fieldstone Drive, Collinsville, Oklahoma 74021 (US). **LEAMY, Brett D.** [US/US]; 26715 Duck Pond Lane, Claremore, Oklahoma 74019 (US).
- (74) **Agents:** **HENDRYX, Thomas N.** et al.; Baker Hughes Incorporated, P.O. Box 4740, Houston, Texas 77210-4740 (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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

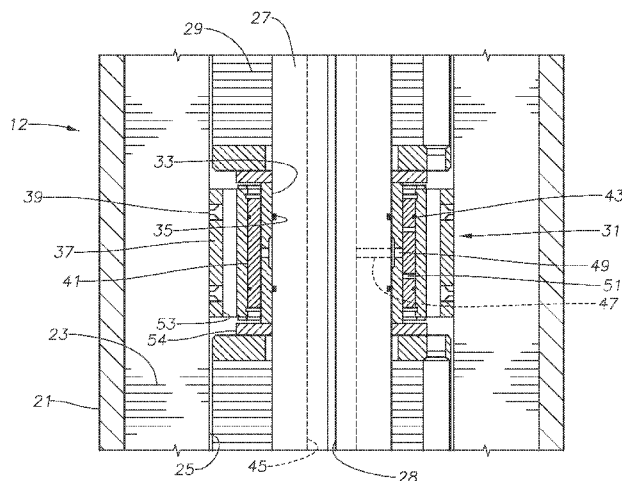
(54) **Title:** TORQUE TRANSMITTING RINGS FOR SLEEVES IN ELECTRICAL SUBMERSIBLE PUMPS

Fig. 4

(57) **Abstract:** An electrical submersible pump assembly has a motor module coupled to a centrifugal pump module by a seal section module. A shaft assembly extends through each of the modules for causing the motor module to rotate the pump module. At least one of the modules has a sleeve extending around the shaft that is of a harder material than the shaft. A torque transmitting ring is deformed between an inner diameter of the sleeve and an exterior portion of the shaft. The inner diameter of the sleeve is a continuous cylindrical surface free of any torque transmitting shoulders. Friction created by the torque transmitting ring transmits the entire rotational force from the shaft to the sleeve.

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

A. CLASSIFICATION OF SUBJECT MATTER***E21B 17/042(2006.01)i, E21B 43/12(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E21B 17/042; E21B 43/12; E21B 43/00; F16D 3/10; F16D 3/76

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: esp, ring, friction, torque, motor, seal, shaft, sleeve, transmit, rotate, groove, hard, carbide, ceramic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	WO 2010-051197 A2 (BAKER HUGHES INCORPORATED et al.) 06 May 2010 See abstract, paragraphs 13,14,17 and figures 1,2	1,2,5-11,14,16 3,4,12,13,15,17-20
Y	US 04772245A A (READMAN; JOHN et al.) 20 September 1988 See abstract, columns 4,5 and figure 1	1,2,5-11,14,16
Y	US 7909090 B2 (REID LESLIE C.) 22 March 2011 See abstract, columns 1,3 and figure 2	7,11,14,16
A	WO 2009-023665 A2 (BAKER HUGHES INCORPORATED et al.) 19 February 2009 See abstract, paragraphs 3,7 and figures 1,2	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

16 OCTOBER 2012 (16.10.2012)

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Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

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Authorized officer

CHOI, Il Seung

Telephone No. 82-42-481-3467



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/030650

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010-051197 A2	06.05.2010	CA 2742031 A1 GB 201107422 D0 GB 2477659 A US 2010-0111711 A1 US 8221092 B2 WO 2010-051197 A3 WO 2010-051197 A3	06.05.2010 15.06.2011 10.08.2011 06.05.2010 17.07.2012 02.09.2010 06.05.2010
US 04772245A A	20.09.1988	None	
US 7909090 B2	22.03.2011	CN 101644273 A CN 101644273 B US 2010-0034491 A1	10.02.2010 15.02.2012 11.02.2010
WO 2009-023665 A2	19.02.2009	US 2009-0047156 A1 US 7950906 B2 WO 2009-023665 A3 WO 2009-023665 A3	19.02.2009 31.05.2011 02.04.2009 19.02.2009