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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 January 2009 (22.01.2009)

PCT

(10) International Publication Number
WO 2009/012196 A4

(51) International Patent Classification:
*E21B 10/22* (2006.01)

(21) International Application Number:
PCT/US2008/069925

(22) International Filing Date: 14 July 2008 (14.07.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/949,756 13 July 2007 (13.07.2007) US

(71) Applicant *(for all designated States except US)*: **BAKER HUGHES INCORPORATED** [US/US]; P.O. Box 4740, Houston, TX 77027 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ZAHRADNIK, Anton, F.** [US/US]; 227 Burkwood Ct., Sugarland, TX 77479 (US). **KOLTERMANN, Terry, J.** [US/US]; 26 West Placid Hill Circle, The Woodlands, TX 77381 (US). **DICK, Aaron, J.** [US/US]; 1210 Cortlandt Street, Houston, TX 77008 (US). **NGUYEN, Don, Q.** [US/US]; 11503 Springshire Drive, Houston, TX 77066 (US). **SULLIVAN, Eric, C.** [US/US]; 10714 Sagecanyon, Houston, TX 77089 (US). **RICKS, Gregory, L.** [US/US]; 28714 Binefield Street, Spring, TX 77386 (US).

(74) Agents: **RIDDLE, Albert, J.** et al.; Baker Hughes Incorporated, P.O. Box 4740, Houston, TX 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, 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,

*[Continued on next page]*

(54) Title: ROLLER CONE BIT BEARING, AND BEARING MATERIALS

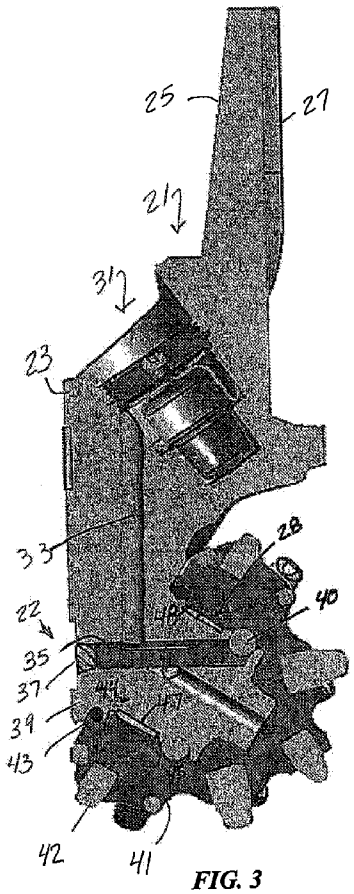



*FIG. 3*

(57) Abstract: A journal bearing element for use in forming a roller cone bit coupled to a bearing shaft to prevent circumferential sliding. Also included are material compositions of the journal bearing element. A journal bearing element is fixed in place relative to a head section and comprised of dense high purity powdered metal alloys with uniform micro-structure. A preferred material is comprised of a metal made of a carbon content of about 2.3 % by weight, chromium of about 14 % by weight, vanadium of about 9 % by weight, and molybdenum at about 1 % by weight.

WO 2009/012196 A4

ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, 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, 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).

**Published:**

— *with international search report*

— *with amended claims*

**(88) Date of publication of the international search report:** 5 March 2009

**Date of publication of the amended claims:** 30 April 2009