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(71) Applicant (for all designated States except US): **BAKER HUGHES INCORPORATED** [US/US]; P.O. Box 4740, Houston, TX 77210-4740 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GAVIA, David** [US/US]; 30 Silver Lute Place, The Woodlands, TX 77381 (US). **OLDHAM, Jack, Thomas** [US/US]; 959

Stoneglade Drive, Conroe, TX 77301 (US). **GEORGE, Mathews** [US/US]; 13743 Ludgate Pass, Houston, TX 77034 (US). **DOSTER, Michael, L.** [US/US]; 1327 Chesterpoint Drive, Spring, TX 77386 (US).

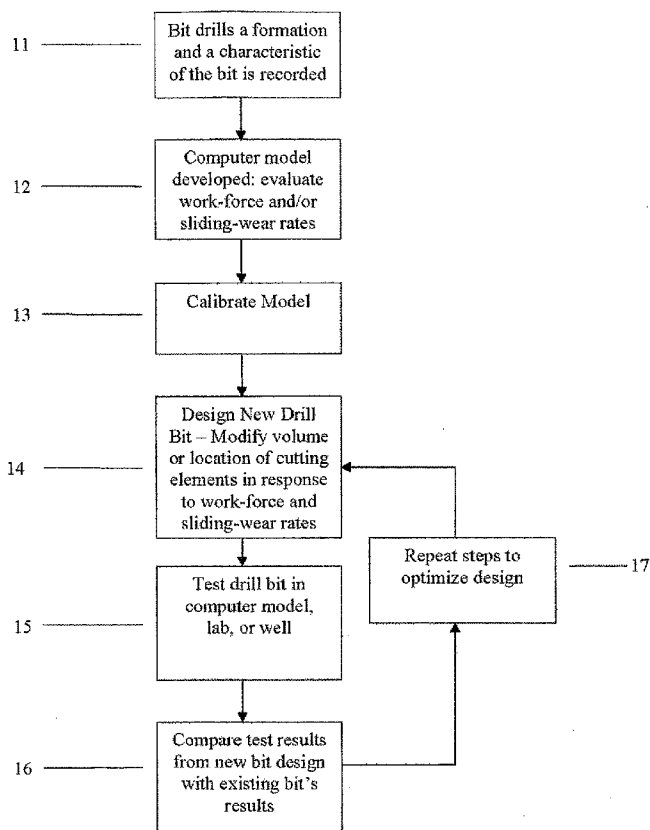
(74) Agents: **WELBORN, Brian, S.** et al.; Baker Hughes Incorporated, P.O. Box 4740, Houston, TX 77210-4740 (US).

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(54) Title: METHODS FOR OPTIMIZING EFFICIENCY AND DURABILITY OF ROTARY DRAG BITS AND ROTARY DRAG BITS DESIGNED FOR OPTIMAL EFFICIENCY AND DURABILITY



(57) Abstract: A method for evaluating existing drill bits and drill bit designs includes measuring several desired characteristics of a bit, including the wear experienced in drilling a formation, such as an actual formation or a simulated formation or a laboratory test fixture. A computer model may be used to evaluate the work-force and/or the sliding-wear rates that cutting elements of the bit experience as compared with the rate-of-penetration and/or durability of the bit. This information may be used to design a new drill bit, which may involve modification of the cutting elements {e.g., moving the location, volume (size and shape) or number of cutting elements from areas of the bit that receive lower work-force and sliding-wear rates to those areas that experience relatively greater work-force and sliding wear-rates. This may permit the cutting elements to be oriented more aggressively relative to a formation to be drilled. Other parameters that may be optimized include the bit profile, blade count, hydraulics, or the like.

WO 2007/056554 A1



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