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[21] Application No.: GCC/P/1999/404 [22] Filing Date: 11/12/1999 [30] Priority: [31] Priority No. [32] Priority date [33] State 09/210,520 11/12/1998 US [72] Inventor: Alain P. Dorel [73] Owner: Schlumberger Holdings Limited, Craigmuir Chambers, Road Town, Tortola, British Virgin Islands [74] Agent: Suleiman Ibrahim Al-Ammar	[51] Int. Cl. ⁷ : E21B 7/06 [56] Cited Documents: - DE 2734020 A (GRAEFER ALBRECHT DIPL BERGING) 08 February 1979 - US 4828050 A (HASHIMOTO TOM T) 09 May 1989 - US 3743034 A (BRADLEY W) 03 July 1973

[54] ROTARY STEERABLE WELL DRILLING SYSTEM UTILIZING SLIDING SLEEVE

[57] Abstract: An actively controlled rotary steerable drilling system for directional drilling of wells, the system having a rotary drive component rotatable within a tubular sliding tool collar that incorporates elastic anti-rotation members to maintain a coupled relation with the borehole wall during drilling. An offsetting mandrel is supported within the tool collar by a knuckle joint for pivotal movement and for rotation relative to the tool collar and has a lower end extending from the tool collar and supporting a drill bit. To achieve controlled steering of the rotating drill bit, orientation of the tool collar is sensed and the offsetting mandrel is maintained geostationary and selectively axially inclined relative to the tool collar by orienting it about the knuckle joint. An alternator and a hydraulic pump, located within the tool collar, are driven by relative rotation of the rotary drive component with the tool collar to produce electric power and hydraulic pressure for the electronics package of the tool and for actuation of hydraulic system components. Hydraulic cylinder and piston assemblies, actuated by tool position signal responsive solenoid valves, control the angular position of the offsetting mandrel with respect to the tool collar. The hydraulic pistons are servo-controlled responsive to signal input from tool position sensing systems such as magnetometers and accelerometers which provide real-time position signals to the hydraulic control system.

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No. of figures: 5

