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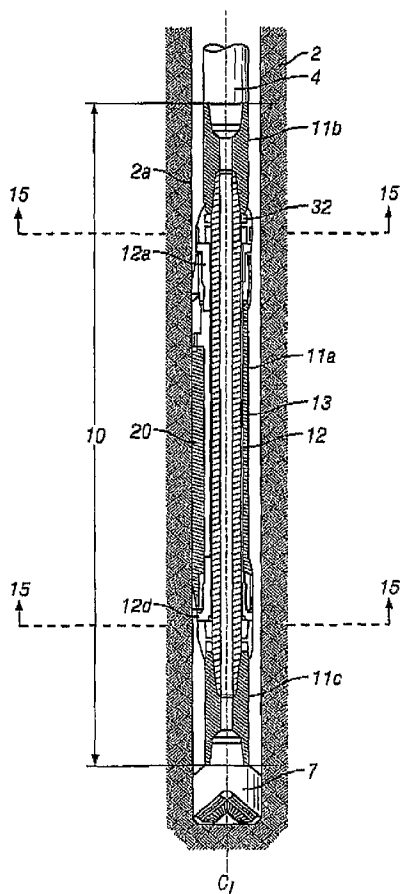
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(54) Title: DOWNHOLE TOOL POSITION SENSING SYSTEM



(57) Abstract: A downhole tool includes a mandrel, an inner sleeve, and an outer housing. The inner sleeve being rotatable relative to the outer housing and the mandrel being rotatable relative to the inner sleeve and the outer housing. The outer surface of the inner sleeve includes more than one selected position organized in at least one set. At least two of the selected positions include magnets. The downhole tool also includes at least one magnetic sensor to sense at least one of the amplitude and polarity of the magnetic field for the selected positions and to transmit a signal indicative of the sensed magnetic field. The downhole tool also includes an electronics system to process the sensor signal to determine a magnet reference position of the inner sleeve relative to the outer housing.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 06/28562

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 47/00 (2007.01)

USPC - 175/40

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)
USPC - 175/40Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 175/40; 175/61; 166/255.1 (search terms below)Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO - WEST - PGPB, USPT, EPAB, JPAB - terms: "downhole tool", "mandrel", "sleeve", "outer housing", "magnet", "magnetic sensor", "electronics system", "North pole magnet", "linear sensor", "motor", "drill string", "drill bit", query, search, refine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/0185315 A1 (MCLOUGHLIN et al.) 12 December 2002 (12.12.2002), entire document, especially abstract, para [0003], [0046], [0047], [0081], [0083], [0086], [0088], [0095], [0123], [0126], [0132], [0133], [0134], [0136], and [0138].	1-24
Y	US 5,448,227 A (ORBAN et al.) 05 September 1995 (05.09.1995), entire document, especially col 13, ln 51 to col 14, ln 6, col 23, ln 57 to col 24, ln 13.	1-24
Y	US 6,257,355 B1 (BAKER) 10 July 2001 (10.07.2001), entire document, especially col 3, ln 47-67, col 4, ln 1-8, and col 6, ln 3-28.	4-7, 12-15, and 20-23

 Further documents are listed in the continuation of Box C.

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"&" document member of the same patent family

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