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**(54) Title:** MECHANICAL SPECIFIC ENERGY DRILLING SYSTEM

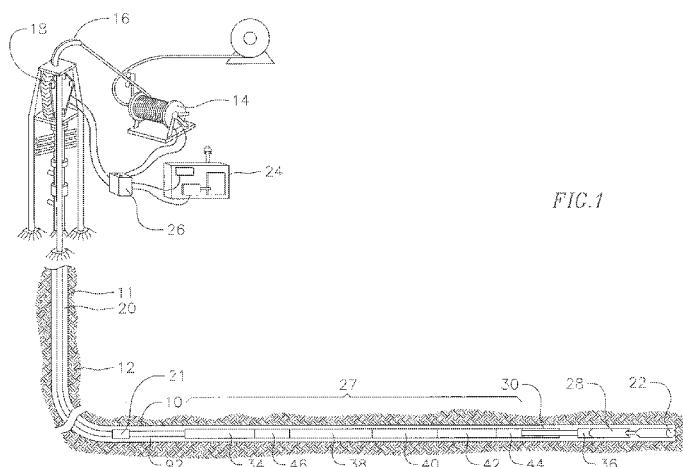


FIG. 1

- (57) Abstract:** A mechanical specific energy downhole drilling assembly having a bottomhole assembly including drill pipe and a drill bit, a weight on bit and torque sub for sensing torque, weight on bit and revolutions per minute of the drill bit; a command and control sub for receiving input from the weight on bit and torque sub for determining instantaneous mechanical specific energy of the downhole drilling assembly and an anti-stall tool responsive to real time mechanical specific energy information from the command and control sub to adjust the weight on the drill bit to maximize rate of penetration of the drill bit.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/33313

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 44/02 (2012.01)

USPC - 175/27

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)

IPC(8) - E21B 44/02 (2012.01)

USPC - 175/27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC - 73/152.43, 152.46, 152.48, 152.49, 152.59; 175/24, 57, 61 (text search - see terms below)

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

PubWEST(USPT,PGPB,EPAB,JPAB); Google Scholar; Google Patents

Search Terms: drill, computer, controller, weight, bit, specific, energy, WOB, adjust, modify, sub, torque, rpm, ROP, command, wellbore, downhole, aggressiveness, fluid, properties, vibration, mud, pulse, telemetry, vent,... etc.

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                           | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------------------------------|-----------------------|
| Y         | US 2006/0162962 A1 (Koederitz et al.) 27 July 2006 (27.07.2006), fig 1A and 2, para [0024] and [0036]-[0038] | 1-20                  |
| Y         | US 2009/0173540 A1 (Mock et al.) 09 July 2009 (09.07.2009), para [0021]                                      | 1-20                  |
| Y         | US 2008/0249714 A1 (Calhoun et al.) 09 October 2008 (09.10.2008), para [0097]-[0098]                         | 2 and 15              |
| Y         | US 2010/0108383 A1 (Hay et al.) 06 May 2010 (06.05.2010), para [0101]-[0103]                                 | 6, 9-10 and 14-20     |
| Y         | US 4,351,037 A (Scherbatskoy) 21 September 1982 (21.09.1982), col 1, ln 11-16                                | 12                    |
| Y         | US 4,348,058 A (Coakley et al.) 07 September 1982 (07.09.1982), col 6, ln 41-53                              | 13 and 20             |
| Y         | US 5,467,832 A (Orban et al.) 21 November 1995 (21.11.1995), col 13, ln 60-66                                | 10 and 19             |

☐ Further documents are listed in the continuation of Box C.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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"&amp;" document member of the same patent family

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