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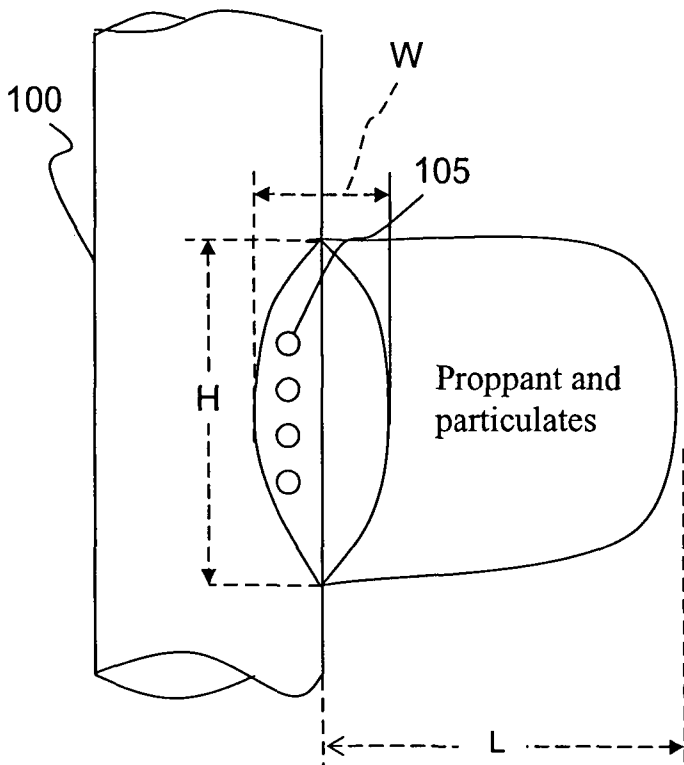
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(54) Title: METHOD FOR LOGGING DEVICE WITH DOWN-HOLE TRANSCIEVER FOR OPERATION IN EXTREME TEMPERATURES



(57) Abstract: A logging radar system and method for measuring propped fractures and downhole formation conditions in a subterranean formation including: a radar source; an optical source; an optical modulator for modulating an optical signal from the optical source according to a signal from the radar source; a photodiode for converting the modulated optical signal output from the optical modulator to the source radar signal; a transmitter and receiver unit; and a mixer. The transmitter and receiver unit receives the source radar signal from the photodiode, transmits the source radar signal into the formation and receives a reflected radar signal. The mixer mixes the reflected radar signal with the source radar signal to provide an output. This technology can be used to describe all fractures connected to the wellbore and differentiate between the dimensions of the two vertical wings of a propped fracture.

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**Declarations under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 07/19114

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - E21B 47/12 (2008.01)  
USPC - 73/152.02

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 47/12 (2008.01);  
USPC - 73/152.02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC - 73/152.01-152.03, 152.46, 152.54; 250/254, 256, 267

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

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

Search Terms: fracture, frequency, wellbore, down-hole, well-logging, transparent, reflect, transmit, receive

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2006/0102345 A1 (McCarthy et al.) 18 May 2006 (18.05.2006), entire document, especially para. [0007]-[0008]	15, 18-20 ----- 1-14, 16, 17
Y	US 6,269,198 B1 (Hodgson et al.) 31 July 2001 (31.07.2001), entire document, especially abstract	1-8
Y	US 6,041,860 A (Nazzal et al.) 28 March 2000 (28.03.2000), entire document, especially FIG. 2	9-14, 16 and 17
Y	US 2006/0102343 A1 (Skinner et al.) 18 May 2006 (18.05.2006), abstract	14
Y	US 2002/0112855 A1 (Arndt et al.) 22 August 2002 (22.08.2002), para. [0098]-[0099]	5
Y	US 3,967,235 A (Dennis et al.) 29 June 1976 (29.06.1976), FIG. 4B	6

Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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