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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

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**Declarations under Rule 4.17:**

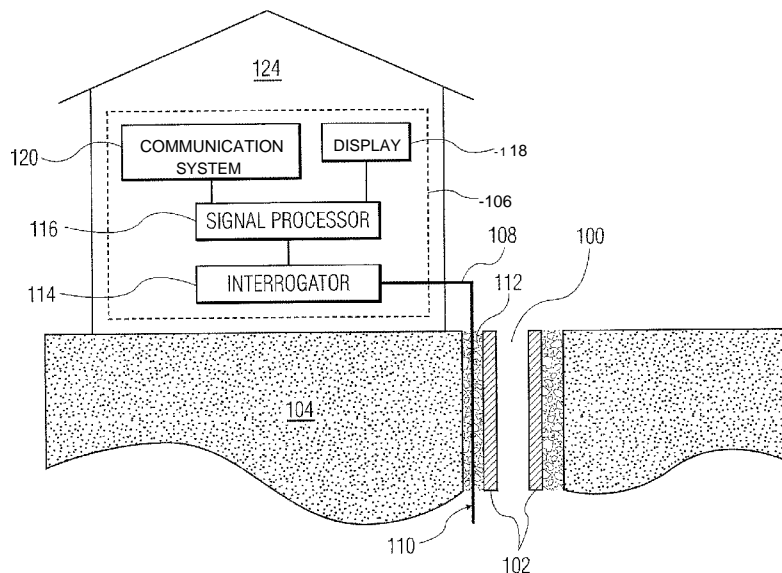
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.1 7(H))

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[Continued on nextpage]

- (54) **Title:** WELLBORE LEAK DETECTION SYSTEMS AND METHODS OF USING THE SAME



**FIG. 1**

(57) **Abstract:** A leak detection system for a wellbore. The leak detection system includes: (1) at least one sensor configured to be positioned outside of a casing of the wellbore; (2) an interrogation system for sending signals to, and receiving signals from, the at least one sensor; and (3) an optical lead cable disposed between the interrogation system and the at least one sensor. A method of detecting a fluid leak in a wellbore is also disclosed.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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23 May 2013

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2012/051338

**A. CLASSIFICATION OF SUBJECT MATTER**

*E21B 47/117(2012.01)i, E21B 47/12(2006.01)I*

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)

E21B 47/1 17; E21B 47/00; G06F 19/00; G01P 15/03; G02B 6/26; E21B 49/00; G02B 6/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & keywords: wellbore, fluid leak, sensor, interrogation, optical fiber, accelerometer and similar terms

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003-0094281 AI (TUBEL, PAULO S.) 22 May 2003 See paragraphs [0025], [0038], [0048], [0052], [0085]-[0086], [0095], claim 11 and figure 1.	1-2, 5-6, 9, 11-25, 28  3-4, 7-8, 10, 26-27
Y	US 2004-0060697 AI (TILTON, FREDERICK T. et al.) 01 April 2004 See paragraph [0040].	3-4, 26-27
Y	US 2009-0210168 AI (VINCELETTE, ANDRE et al.) 20 August 2009 See paragraph [0028] and figure 2.	7-8
Y	US 2005-0076713 AI (KNUDSEN, SVERRE et al.) 14 April 2005 See paragraph [0055] and figures 4-5.	10
A	US 2010-0219334 AI (LEGRAND, PHILIPPE et al.) 02 September 2010 See paragraphs [0009], [0017H0020] and figures 1-3.	1-28

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents:

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"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

Date of the actual completion of the international search

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Date of mailing of the international search report

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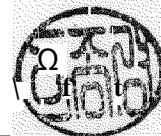


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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2012/051338**

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