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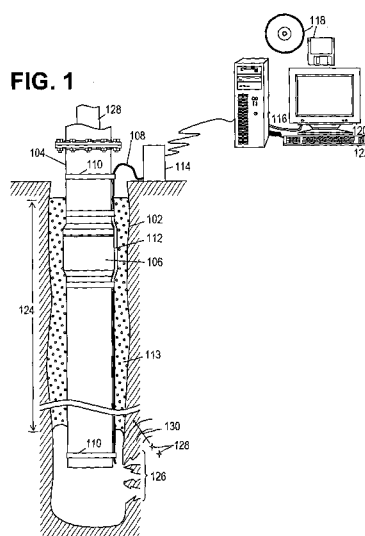
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(54) **Title:** OPTICAL FIBER BASED DOWNHOLE SEISMIC SENSOR SYSTEM BASED ON RAYLEIGH BACKSCATTER



(57) **Abstract:** The present invention provides an optical fiber-based seismic monitoring system including a light source that drives an optical fiber positioned within a borehole. At least one light sensor analyzes Rayleigh backscattered light to obtain an acoustic signal for each of multiple points along the borehole. One or more processors operate to determine microseismic event direction, distance, and/or intensity based at least in part on phase information of said acoustic signals. The acoustic signal cross-correlations, semblances, or phase-sensitive similarity measures can be determined as a function of scanning direction to accurately determine the relevant microseismic event information. The optical fiber may be positioned in the cemented annulus of a cased borehole having a shape that extends along more than one dimension (e.g., an L-shaped borehole).

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. G01V1/28 G01V1/22
ADD.

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)
G01V G01H

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

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010/200743 A1 (FORSTER LARRY DALE [US] ET AL) 12 August 2010 (2010-08-12) paragraph [0002] paragraph [0010] paragraphs [0020], [0022], [0023] paragraphs [0027], [0028], [0033], [0037]	1-17
X	US 2010/200744 A1 (PEARCE JEREMIAH GLEN [US] ET AL) 12 August 2010 (2010-08-12) figure 2 paragraphs [0009] - [0013] paragraph [0029] paragraph [0033] paragraphs [0044], [0046], [0054], [0055] ----- -/--	1-8, 10-17

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

☒ See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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