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[Continued on next page]

(54) Title: THERMAL NEUTRON POROSITY FROM NEUTRON SLOWING-DOWN LENGTH, FORMATION THERMAL NEUTRON CAPTURE CROSS SECTION, AND BULK DENSITY

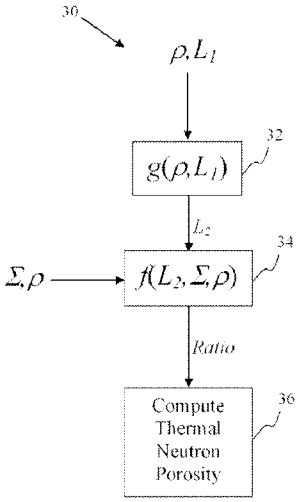

FIG. 3

(57) Abstract: A method for determining at least one formation property calculated from neutron measurements acquired with a downhole tool includes emitting neutrons from a source in the tool into the formation, detecting neutrons with at least one detector in the downhole tool, calculating a first slowing-down length (L_1) based on the detected neutrons, and deriving a second slowing-down length (L_2) based on the first slowing-down length (L_1). Further steps include deriving a correlation function for relating slowing-down lengths from a first tool to slowing-down lengths associated with a different source, wherein the correlation function depends on formation properties such as bulk density; and applying the correlation function to the slowing-down length of the first tool to derive the slowing-down length of the second tool. A method for determining a thermal neutron formation porosity based on a slowing-down length from epithermal neutron measurements from an electronic neutron source includes converting the slowing-down length into a computed neutron slowing-down length from thermal neutron measurements from a chemical neutron source, wherein the converting uses a correlation function that depends on formation bulk density; deriving a thermal neutron countrate ratio based on the computed neutron slowing-down length, wherein the deriving uses a function that depends on the formation bulk density and formation sigma; and computing the thermal neutron formation porosity from the thermal neutron countrate ratio.

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B. FIELDS SEARCHED

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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 practical, search terms used)
EPO-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.
A	US 5 789 752 A (MICKAEL MEDHAT W [US]) 4 August 1998 (1998-08-04) column 1, line 40 - line 53 column 2, line 31 - line 48 column 2, line 61 - column 3, line 5 column 3, line 22 - line 27 column 3, line 42 - line 50	1

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

☒ See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5789752 A	04-08-1998	NONE	