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[Continued on next page]

(54) **Title:** TAR MAT FORMATION PREDICTION IN LATE-CHARGE RESERVOIRS

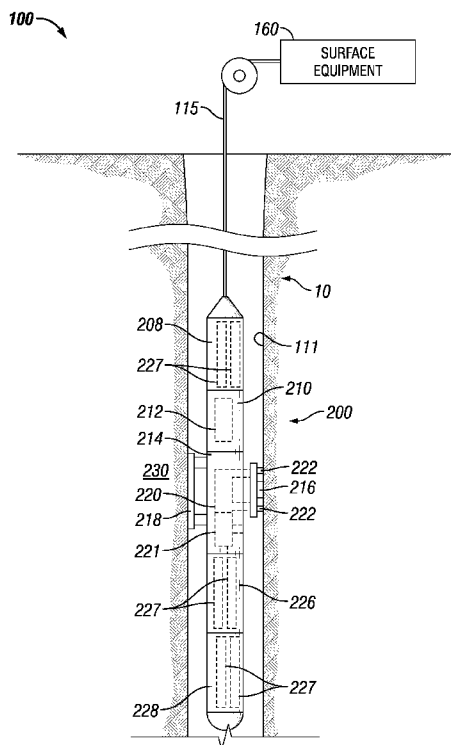


FIG. 6

(57) **Abstract:** A downhole tool, surface equipment, and/or remote equipment are utilized to obtain data associated with a subterranean hydrocarbon reservoir, fluid contained therein, and/or fluid obtained therefrom. At least one condition indicating that a density inversion exists in the fluid contained in the reservoir is identified from the data. Molecular sizes of fluid components contained within the reservoir are estimated from the data. A model of the density inversion is generated based on the data and molecular sizes. The density inversion model is utilized to estimate the density inversion amount and depth and time elapsed since the density inversion began to form within the reservoir. A model of a gravity-induced current of the density inversion is generated based on the data and the density inversion amount, depth, and elapsed time.



DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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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)

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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: data, reservoir, equipment, molecular, density, inversion, depth and GOR

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2014-0166871 A1 (JAMISON et al.) 19 June 2014 See paragraphs [0060]–[0095] and figure 4.	9, 15
A		1–8, 10–14, 16–20
Y	US 2006-0155474 A1 (VENKATARAMANAN et al.) 13 July 2006 See paragraphs [0050]–[0053] and claims 1–4.	9, 15
A	US 2007-0038375 A1 (JALALI et al.) 15 February 2007 See paragraphs [0007]–[0008] and claim 1.	1–20
A	US 2012-0095603 A1 (RASHID et al.) 19 April 2012 See paragraphs [0004]–[0008] and claim 1.	1–20
A	US 2014-0156238 A1 (SCHLUMBERGER TECHNOLOGY CORPORATION) 05 June 2014 See claims 1, 15.	1–20



Further documents are listed in the continuation of Box C.



See patent family annex.

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