



- (51) **International Patent Classification:**
E21B 44/00 (2006.01) *G06F 9/455* (2006.01)
G06G 7/48 (2006.01)
- (21) **International Application Number:**
 PCT/US2015/020299
- (22) **International Filing Date:**
 12 March 2015 (12.03.2015)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
 61/951,831 12 March 2014 (12.03.2014) US
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- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, 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.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

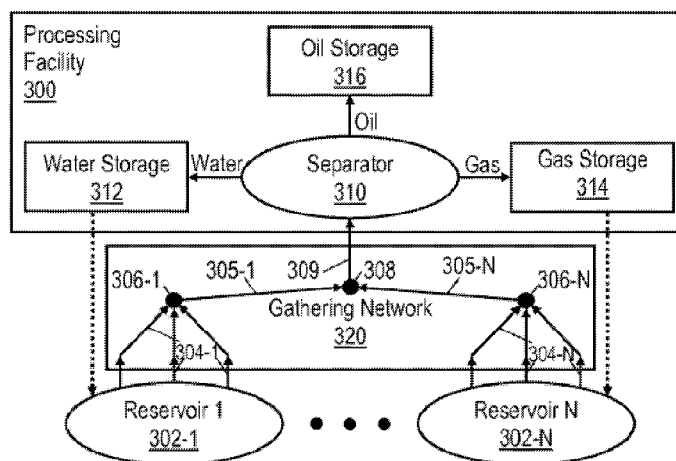
Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

- (54) **Title:** SHARED EQUATION OF STATE CHARACTERIZATION OF MULTIPLE FLUIDS

**FIG. 3**

(57) **Abstract:** System and methods of modeling fluids in a simulation of fluid production in a multi-reservoir system with a common surface network are provided. Pressure-volume-temperature (PVT) data is determined for fluids in each of a plurality of reservoirs coupled to the common surface network. A shared equation of state (EOS) characterization representing each of the fluids across the plurality of reservoirs is generated based on the corresponding PVT data. Data representing properties of the fluids in each reservoir is calculated based on the shared EOS characterization of the fluids. When the calculated data is determined not to match the PVT data associated with the fluids in each reservoir, the shared EOS characterization is adjusted based on a difference between the calculated data and the PVT data.