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(71) Applicant: **LANDMARK GRAPHICS CORPORATION** [US/US]; 2107 City West Blvd., Bldg. 2, Houston, Texas 77042 (US).

(72) Inventors: **HUANG, Xiaoqian**; 3702 Gable Grove LN, Katy, Texas 77494 (US). **SAMUEL, Robello**; 11306 Dawnheath Dr, Cypress, Texas 77433 (US).

(74) Agents: **NGUYEN, Daniel G.** et al.; Locke Lord LLP, 600 Travis, Suite 2800, Houston, Texas 77002-3095 (US).

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(54) Title: METHOD AND APPARATUS FOR OPTIMIZED UNDERBALANCED DRILLING

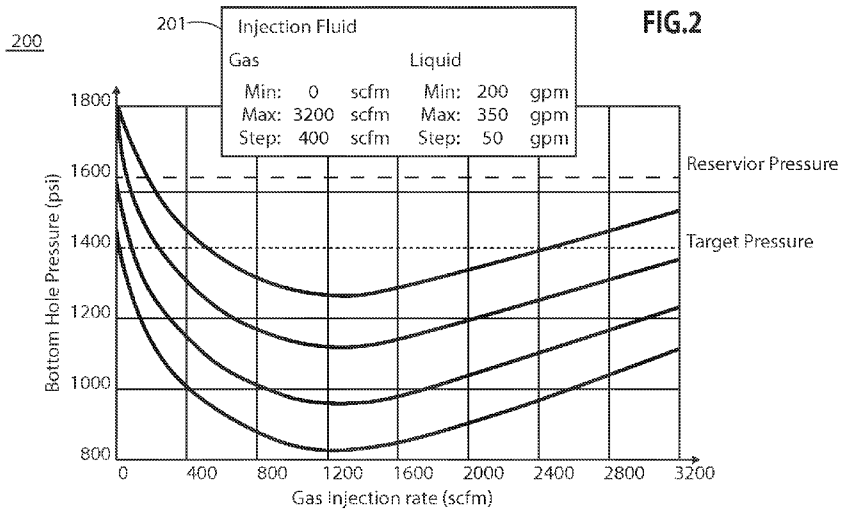

FIG.2

(57) Abstract: The invention concerns a computer implemented method for underbalanced drilling. In one embodiment, the method includes determining a plurality of gas injection rate versus bottom hole pressure curves for a plurality of liquid injection rates for a specified minimum and maximum gas injection rate and a minimum and maximum liquid injection rate. Next, the method determines a set of four interception curves including a minimum motor equivalent liquid rate interception curve, a minimum vertical liquid velocity intercept curve, a minimum horizontal liquid velocity intercept curve, and a maximum motor equivalent liquid rate intercept curve for a specified minimum and maximum mud motor rate range and a minimum horizontal and vertical annulus velocity.