

Title (en)

Positioning techniques in multi-well environments

Title (de)

Positionierungstechniken in Umgebungen mit mehreren Bohrlöcher

Title (fr)

Techniques de positionnement dans des environnements à puits multiples

Publication

EP 2818632 A2 20141231 (EN)

Application

EP 14173737 A 20140624

Priority

- US 201361839311 P 20130625
- US 201414301123 A 20140610

Abstract (en)

A method is provided to determine a distance, a direction, or both between an existing first wellbore and at least one sensor module of a drill string within a second wellbore being drilled. The method includes using the at least one sensor module to measure a magnetic field and to generate at least one first signal indicative of the measured magnetic field. The method further includes using the at least one sensor module to gyroscopically measure an azimuth, an inclination, or both of the at least one sensor module and to generate at least one second signal indicative of the measured azimuth, inclination, or both. The method further includes using the at least one first signal and the at least one second signal to calculate a distance between the existing first wellbore and the at least one sensor module, a direction between the existing first wellbore and the at least one sensor module, or both a distance and a direction between the existing first wellbore and the at least one sensor module.

IPC 8 full level

E21B 47/022 (2012.01); **E21B 7/04** (2006.01); **E21B 43/30** (2006.01); **E21B 44/00** (2006.01); **E21B 47/00** (2012.01); **E21B 47/024** (2006.01); **E21B 47/09** (2012.01)

CPC (source: EP US)

E21B 7/04 (2013.01 - EP US); **E21B 43/305** (2013.01 - EP US); **E21B 44/00** (2013.01 - US); **E21B 44/005** (2013.01 - EP US); **E21B 47/00** (2013.01 - EP US); **E21B 47/0228** (2020.05 - EP US); **E21B 47/024** (2013.01 - EP US); **E21B 47/092** (2020.05 - EP US)

Citation (applicant)

- US 2004069721 A1 20040415 - INGELMAN MAGNUS [SE], et al
- US 4072200 A 19780207 - MORRIS FRED J, et al
- EP 0366567 A2 19900502 - MAGRANGE INC [US]
- US 36569 A 18620930
- US 5485089 A 19960116 - KUCKES ARTHUR F [US]
- US 5589775 A 19961231 - KUCKES ARTHUR F [US]
- US 8095317 B2 20120110 - EKSETH ROGER [NO], et al
- US 8185312 B2 20120522 - EKSETH ROGER [NO], et al
- EP 0682269 A2 19951115 - HALLIBURTON CO [US]
- US 2012139530 A1 20120607 - MCELHINNEY GRAHAM A [GB], et al
- EP 0793000 A2 19970903 - HALLIBURTON CO [US]
- US 8579044 B2 20131112 - ALLEN PETER [GB], et al
- US 6957580 B2 20051025 - EKSETH ROGER [NO], et al
- US 8065085 B2 20111122 - EKSETH ROGER [NO], et al
- E.J. STOCKHAUSEN; W.G. LESSO: "Continuous Direction and Inclination Measurements Lead to an Improvement in Wellbore Positioning", SPE/IADC 79917, 19 February 2003 (2003-02-19)
- B.M. SMIRNOV: "Method of Determining the Coordinates and Magnetic Moment of a Dipole Field Source", IZMERITEL'NAYA TEKHNIKA, June 1990 (1990-06-01)
- A.G. NEKUT; A.F. KUCKES; R.G. PITZER, 8TH SPE, ONE DAY CONFERENCE ON HORIZONTAL WELL TECHNOLOGY, 7 November 2001 (2001-11-07)
- W. BOSUM; D. EBERLE; H.J. REHLI: "A Gyro-Oriented 3-Component Borehole Magnetometer for Mineral Prospecting, With Examples of its Application", GEOPHYSICAL PROSPECTING, vol. 36, 1988, pages 933 - 961, XP002046819
- G. MCELHINNEY; R. SOGNES; B. SMITH: "Case Histories Demonstrate a New Method for Well Avoidance and Relief Well Drilling", SPE/IADC, vol. 37667
- W. BOSUM; D. EBERLE; H.J. REHLI: "A Gyro-Oriented 3-Component Borehole Magnetometer for Mineral Prospecting, With Examples of its Application", GEOPHYSICAL PROSPECTING 36, 1988, pages 933 - 961, XP002046819
- DAVID MEEKER: "Finite Element Method Magnetics," Version 4.2, User's Manual, 2010, article "URL: <http://www.femm.info/Archives/doc/manual42.pdf>,"

Cited by

CN107201894A

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 2818632 A2 20141231; **EP 2818632 A3 20160615**; **EP 2818632 B1 20190501**; CA 2854746 A1 20141225; CA 2854746 C 20181002; MX 2014007597 A 20150427; US 2014374159 A1 20141225

DOCDB simple family (application)

EP 14173737 A 20140624; CA 2854746 A 20140618; MX 2014007597 A 20140620; US 201414301123 A 20140610