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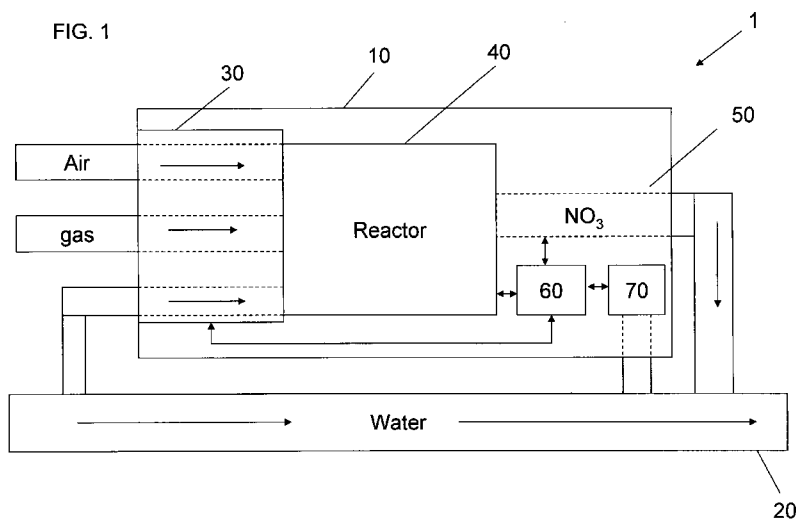
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(54) Title: A METHOD AND APPARATUS FOR ON-SITE PRODUCTION OF NITRATE IONS



(57) Abstract: An apparatus and method produces nitrate ions on-site from water, natural gas and air extracted in proximity to the apparatus. The apparatus generates nitrate ions and brings the nitrate ions into contact with an aqueous system. Hydrogen sulfide present in the aqueous system is removed and the production of hydrogen sulfide by sulfate-reducing bacteria (SRB) is eliminated by introducing into the system nitrate ions, whereby denitrifying microorganisms, using nitrate, outcompete the sulfate-reducing bacteria for the available carbon nutrients, thus preventing the SRB from producing hydrogen sulfide. Nitrate ions generated by the apparatus and added to the aqueous system which contains the denitrifying microorganisms can enhance oil recovery by means of-a microbial enhanced oil recovery mechanisms.

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## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2009/002113****A. CLASSIFICATION OF SUBJECT MATTER***C01B 21/48(2006.01)i, C01B 21/20(2006.01)i*

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 since 1975.  
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) &amp; keyword : nitrate ions, natural gas, oxygen, nitrogen

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006-0039847 A1 (WAYNE SCOTT KABOORD et al.) 23 February 2006 See the abstract and paragraph [7]-[10]	1 - 20
A	US 2005-0025692 A1 (DAWN M. BECHER et al.) 03 February 2005 See the abstract and paragraph [19]-[44]	1 - 20
A	US 7326340 B2 (JAMES PAUL HARSHMAN et al.) 05 February 2008 See the abstract and column 2 line 16 - column 3 line 30	1 - 20
A	US 7186341 B2 (DAVID J. HUNNIFORD et al.) 06 March 2007 See the abstract and column 2 line 7 - column 3 line 59	1 - 20

 Further documents are listed in the continuation of Box C. See patent family annex.

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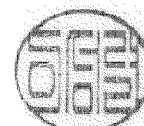
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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