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[Continued on next page]

(54) Title: CONTROLLING COAL FINES IN COAL BED OPERATIONS

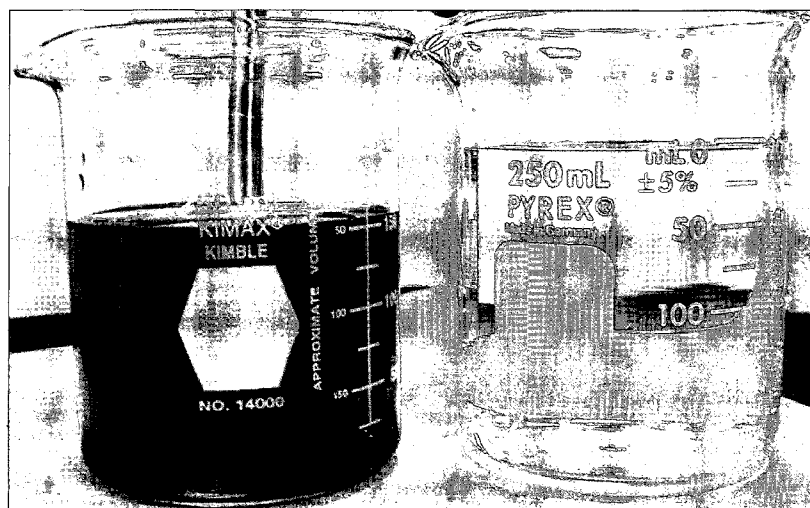


FIG. 4

(57) Abstract: The migration of coal fines within a bed is reduced, inhibited or constrained by contacting the fines with nanoparticles, such as magnesium oxide crystals having an average particle size of about 30 nm. These nanoparticles may coat a proppant during the fracturing of a subterranean formation to produce methane from a coal bed therein. The nanoparticles may also treat a proppant pack in a fractured coal bed. The nanoparticles cause the coal fines to thus bind to or associate with the proppants. Thus, most of the coal fines entering fractures away from the near-wellbore region will be restrained or controlled near their origin or source and the production of methane at a desired level will be maintained much longer than a similar situation than where the nanoparticles are not used.



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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))* (88) **Date of publication of the international search report:**
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A. CLASSIFICATION OF SUBJECT MATTER***C09K 8/58(2006.01)i, C09K 8/528(2006.01)i, E21B 43/16(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)

C09K 8/58; E21B 43/04; C09K 8/506; C09K 8/72; F21B 43/04; C09K 8/56; E21B 43/26; F21B 33/138

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: subterranea, wellbore, fine, migration, particle and metal.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0111718 A1 (GADIYAR BALKRISHNA et al.) 30 April 2009 See abstract and claims.	1-20
A	US 04031959A A (HENDERSON; JAMES H.) 28 June 1977 See abstract and claims.	1-20
A	WO 2009-063165 A1 (HALLIBURTON ENERGY SERVICES, INC. et al.) 22 May 2009 See abstract and claims.	1-20
A	US 05775425A A (WEAVER; JIM D. et al.) 07 July 1998 See abstract and claims.	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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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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US 04031959A A	28.06.1977	None	
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