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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, 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, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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.
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- (88) **Date of publication of the international search report:**
22 November 2012

(54) **Title:** DIBASIC ESTERS UTILIZED AS TERPENE CO-SOLVENTS, SUBSTITUTES AND/OR CARRIERS IN TAR SAND/BITUMEN/ASPHALTENE CLEANING APPLICATIONS

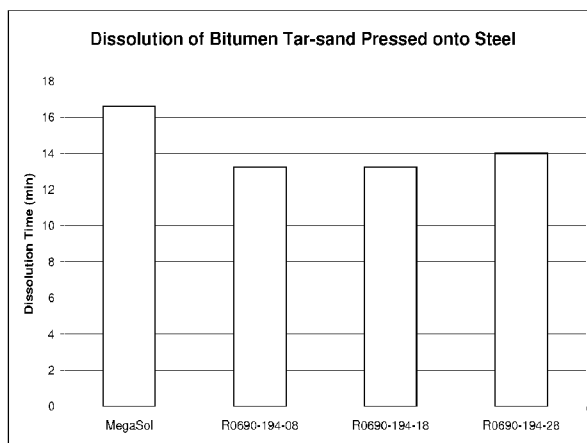


Figure 1

(57) **Abstract:** A heavy oil cleaning composition comprising: a) a blend of dibasic esters comprising dialkyl methyl glutarate and at least one of a dialkyl adipate or dialkyl ethylsuccinate; b) at least one terpene; and c) at least one surfactant. The heavy oil cleaning composition can optionally include at least one glycol ether, at least one alkanolamine, at least one polyol, or at least one sulfosuccinate, or any combination thereof. The heavy oil cleaning composition can further comprise water. Also described are methods for delivering a solvent at reduced concentration comprising the steps of: a) obtaining a terpene-based solvent; and b) mixing the terpene-based solvent with a carrier fluid (the carrier fluid comprising a microemulsion of i) a blend of dibasic esters selected from the group consisting of dialkyl methylglutarate, dialkyl adipate, dialkyl ethylsuccinate, dialkyl succinate, dialkyl glutarate and any combination thereof, ii) at least one surfactant selected from the group consisting of a terpene alkoxyate, an alcohol alkoxyate and any combination thereof; and iii) water) in order to obtain a mixture to clean heavy oils.

A. CLASSIFICATION OF SUBJECT MATTER*C11D 3/43(2006.01)i, C11D 3/44(2006.01)i, C11D 3/20(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)

C11D 3/43; C11D 9/20; C11D 7/50; C23G 1/00; B08B 7/00; C11D 3/44; C11D 3/20; C11D 1/83

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: terpene-base solvent, solvent extender, microemulsion, dibasic ester, surfactant, water

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009-0281012 A1 (TRIVEDI SATYEN et al.) 12 November 2009 See claims 26-27; [0058], [0088]-[0092], and [0100]-[0101].	1-2,4-25
A	US 6090769 A (VLASBLOM; JACK T.) 18 July 2000 See claims 1-4.	1-2,4-25
A	US 4640719 A (HAYES; MICHAEL E. et al.) 03 February 1987 See claims 1-3.	1-2,4-25
A	US 6265367 B1 (CALLAGHAN; IAN C. et al.) 24 July 2001 See claims 4-5.	1-2,4-25
A	US 4867800 A (DISHART; KENNETH T. et al.) 19 September 1989 See claims 1-2.	1-2,4-25

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

Date of the actual completion of the international search

22 AUGUST 2012 (22.08.2012)

Date of mailing of the international search report

24 AUGUST 2012 (24.08.2012)

Name and mailing address of the ISA/KR

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 3
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 3 is missing in this application.

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/001967

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