

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
6 March 2008 (06.03.2008)

PCT

(10) International Publication Number
WO 2008/027881 A3

(51) International Patent Classification:

C10L 1/22 (2006.01) **C09D 11/00** (2006.01)
C10M 159/12 (2006.01) **C10N 30/04** (2006.01)
C10M 159/16 (2006.01) **C10N 40/25** (2006.01)
C10L 10/18 (2006.01)

(21) International Application Number:

PCT/US2007/076978

(22) International Filing Date: 28 August 2007 (28.08.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

11/469,690 1 September 2006 (01.09.2006) US

(71) Applicant (for all designated States except US): **THE LUBRIZOL CORPORATION** [US/US]; 29400 Lakeland Blvd., Wickliffe, Ohio 44092-2298 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STEVENSON, Paul, R.** [GB/GB]; P.O. Box 88, Belper Derby DE56 1QN (GB). **THETFORD, Dean** [GB/GB]; P.O. Box 88, Hexagon House, Blackley Manchester M9 8ZS (GB). **VILARDO, Jonathan, S.** [US/US]; 29400 Lakeland Blvd., Wickliffe, Ohio 44092-2298 (US).

(74) Agents: **HILKER, Christopher, D.** et al.; 29400 Lakeland Blvd., Wickliffe, Ohio 44092-2298 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
29 May 2008

(54) Title: QUATERNARY AMMONIUM SALT OF A MANNICH COMPOUND

(57) Abstract: A quaternary ammonium salt detergent made from the reaction product of the reaction of: (a) Mannich reaction product having a tertiary amino group, said Mannich reaction product being prepared from the reaction of a hydrocarbyl-substituted phenol, an aldehyde, and amine; and (b) a quaternizing agent suitable for converting the tertiary amino group to a quaternary nitrogen and the use of such quaternary ammonium salt detergents in a fuel composition to reduce intake valve deposits.



WO 2008/027881 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/076978

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C10L1/22 C10M159/12 C10M159/16 C10L10/18 C09D11/00
 ADD. C10N30/04 C10N40/25

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)
 C10L C10M C09D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 725 612 A (MALFER DENNIS J [US] ET AL) 10 March 1998 (1998-03-10) column 4, lines 9-14; claims 1,3,10,27	1-4,7,8, 12,13
X	US 4 179 424 A (BALLWEBER EDWARD G [US] ET AL) 18 December 1979 (1979-12-18) column 4, line 30 - column 6, line 7	1,2,4-6, 8
X	US 4 071 327 A (DORER JR CASPER JOHN) 31 January 1978 (1978-01-31) column 2, lines 21-28 column 3, lines 28-34 column 5, lines 45-57; claim 1	1-8,12, 13

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 document 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 another 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 10 January 2008	Date of mailing of the international search report 03/04/2008
---	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Bertrand, Samuel
---	---

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/076978

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.:
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:

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:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
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.:

see additional sheet

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.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: (1-6) in part, 7, 8 in part, 12, 13

A fuel composition comprising a quaternary ammonium salt of a Mannich compound and a method of fuelling an internal combustion engine.

2. claims: (1-6,8) in part, 9-11, 14,15

A lubricating oil composition comprising a quaternary ammonium salt of a Mannich compound and a method of lubricating an internal combustion engine.

3. claims: (1-6,8) in part, 16-21

A composition comprising a particulate solid, an organic medium and a quaternary ammonium salt of a Mannich compound.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/076978

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 5725612	A	10-03-1998	AU 728980 B2	25-01-2001
			AU 2473097 A	11-12-1997
			DE 69705776 D1	30-08-2001
			DE 69705776 T2	13-06-2002
			EP 0811672 A2	10-12-1997
			HK 1003388 A1	15-02-2002
			JP 3726249 B2	14-12-2005
			JP 10060460 A	03-03-1998
			SG 50843 A1	20-07-1998
			TW 394790 B	21-06-2000
			US 5634951 A	03-06-1997
US 4179424	A	18-12-1979	CA 1102029 A1	26-05-1981
US 4071327	A	31-01-1978	AU 7480674 A	06-05-1976
			CA 1008665 A1	19-04-1977
			DE 2452662 A1	22-05-1975
			FR 2249948 A1	30-05-1975
			GB 1460999 A	06-01-1977
			IT 1023156 B	10-05-1978
			JP 1238287 C	31-10-1984
			JP 50075606 A	20-06-1975
JP 59009598 B	03-03-1984			