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61/599,992 17 February 2012 (17.02.2012) US
- (71) **Applicant:** THE LUBRIZOL CORPORATION
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- (74) **Agents:** TYRPAK, Michele M. et al.; The Lubrizol Corporation, 29400 Lakeland Blvd., Mail Drop 022B, Wickliffe, Ohio 44092-2298 (US).
- (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, BN, 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, PA, 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.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

- with international search report (Art. 21(3))
— 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:**
21 November 2013

(54) **Title:** LUBRICATING COMPOSITION INCLUDING ESTERIFIED COPOLYMER AND LOW DISPERSANT LEVELS SUITABLE FOR DRIVELINE APPLICATIONS

(57) **Abstract:** A lubricating composition, method of making, and method of use are disclosed. The lubricant includes an esterified copolymer including a backbone that includes units derived from a vinyl aliphatic monomer and units derived from a carboxylic acid monomer, the carboxylic acid monomer comprising an α,β -ethylenically unsaturated dicarboxylic acid or derivative thereof. The lubricating composition also includes an oil of lubricating viscosity. The lubricating composition includes no more than 2.5 wt. % of dispersant for dispersing oxidation products, other than the esterified copolymer.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/026009

A. CLASSIFICATION OF SUBJECT MATTER
INV. C10M145/16 C10M149/00
ADD.

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)
C10M

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 practicable, search terms used)

EPO-Internal, COMPENDEX, INSPEC, 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	GB 922 878 A (MONSANTO CHEMICALS) 3 April 1963 (1963-04-03) the whole document	1-9, 12-42
X	WO 2010/014655 A1 (LUBRIZOL CORP [US]; PRICE DAVID [GB]; BARTON WILLIAM [GB]; VISGER DANI) 4 February 2010 (2010-02-04) cited in the application the whole document	1-3, 5-19, 21-25, 28-31, 33-42
X	US 6 544 935 B1 (VARGO DANIEL M [US] ET AL) 8 April 2003 (2003-04-08) cited in the application the whole document	1,2,5,6, 8,9, 14-17, 23-26, 33-36, 38,40-42
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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 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	Date of mailing of the international search report
18 September 2013	02/10/2013

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Greß, Tobias
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/026009

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 014 750 A1 (ITALMATCH CHEMICALS S P A [IT]) 14 January 2009 (2009-01-14) the whole document	1,2, 10-18, 20,23, 24, 28-30, 33-35, 38-42
X	WO 2011/146692 A1 (LUBRIZOL CORP [US]; BARTON WILLIAM R S [GB]; PRICE DAVID [GB]; MOSIER) 24 November 2011 (2011-11-24) paragraphs [0094], [0129], [0138] - [0139]; claims 1,3-5,7-10,13-16, 21 pages 100-108	1-9, 14-25, 30,31, 33-42
X	US 5 435 928 A (BECK HEINZ [DE]) 25 July 1995 (1995-07-25) cited in the application claims 1-4; examples 1-5	1,2,10, 11, 22-25, 28, 33-35, 38,40
X	US 6 174 843 B1 (PEYTON KIM B [US] ET AL) 16 January 2001 (2001-01-16) cited in the application claim 1	1,2,10, 11,17, 22-24, 28,30, 31, 33-35, 38,40

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/026009

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 all searchable 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.:

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 5-9, 36, 37(completely); 1-4, 12-35, 38-42(partially)

A lubricating composition comprising: a) an esterified copolymer with a backbone comprising units derived from a vinyl aliphatic monomer and units derived from a carboxylic acid monomer, the carboxylic acid monomer comprising an alpha,beta-ethylenically unsaturated dicarboxylic acid or derivative thereof; b) an oil of lubricating viscosity; and wherein the lubricating composition comprises no more than 2.5 wt. % of dispersant for dispersing oxidation products, other than the esterified copolymer and wherein the esterified copolymer comprises a nitrogen-containing group.

2. claims: 10, 11(completely); 1-4, 12-35, 38-42(partially)

A lubricating composition comprising: a) an esterified copolymer with a backbone comprising units derived from a vinyl aliphatic monomer and units derived from a carboxylic acid monomer, the carboxylic acid monomer comprising an alpha,beta-ethylenically unsaturated dicarboxylic acid or derivative thereof; b) an oil of lubricating viscosity; and wherein the lubricating composition comprises no more than 2.5 wt. % of dispersant for dispersing oxidation products, other than the esterified copolymer and wherein the esterified copolymer is substantially free of a nitrogen-containing group.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/026009

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