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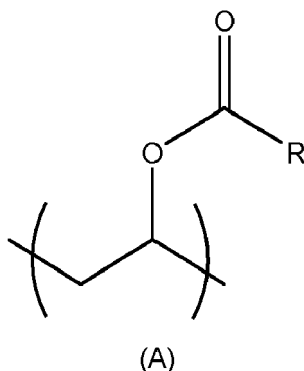
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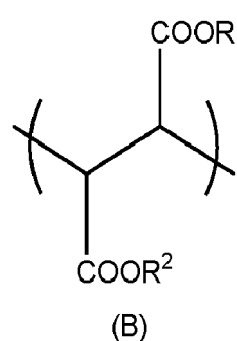
(54) **USES FOR IMPROVING THE LOW TEMPERATURE PROPERTIES OF A MIDDLE DISTILLATE FUEL**

(57) A method of improving the low temperature properties of a middle distillate fuel composition comprising:

- (a) a nitrogen-containing dispersant; and
(b) one or more low temperature property enhancers which are not fumarate vinyl ester copolymers and which are selected from (x) wax antissettling additives; (y) middle distillate flow improvers and mixtures thereof;
the method comprising adding to the fuel an additive (c) which is a copolymer comprising units of formula (A):



and units of formula (B):



wherein R is an alkyl group and each of R¹ and R² is an alkyl group.

(52) Cooperative Patent Classification (CPC): (Cont.)
C10L 2230/14; C10L 2270/026



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 199 377 A1 (INFINEUM INT LTD [GB]) 23 June 2010 (2010-06-23)	1, 3-6, 8-13	INV. C10L1/14
A	* paragraphs [0001], [0009], [0010], [0023] - [0029], [0050] - [0052] * * examples; tables *	2, 15	C10L10/04 C10L10/14 C10L1/16 C10L1/196
X, D	EP 1 932 899 A1 (INFINEUM INT LTD [GB]) 18 June 2008 (2008-06-18)	1, 3-6, 8-13	C10L1/197 C10L1/222
A	* paragraphs [0001] - [0008], [0011] - [0020] * * examples; tables *	2, 15	C10L1/224 C10L1/226 C10L1/232 C10L1/238 C10L1/2383
X	US 2008/141581 A1 (CAPROTTI RINALDO [GB] ET AL) 19 June 2008 (2008-06-19)	1, 3-6, 8-13	
A	* paragraphs [0001] - [0008], [0011] - [0019], [0036] - [0045] * * examples; tables *	2, 15	
X	US 2008/141580 A1 (TACK ROBERT DRYDEN [GB]) 19 June 2008 (2008-06-19)	1, 3-13	
A	* paragraphs [0001] - [0007], [0009] - [0021] * * examples; table 2 *	2, 15	TECHNICAL FIELDS SEARCHED (IPC) C10L
X	WO 95/03377 A1 (EXXON CHEMICAL PATENTS INC [US]; DAVIES BRIAN WILLIAM [GB] ET AL.) 2 February 1995 (1995-02-02)	1, 3-14	
A	* examples *	2, 15	
L	EP 3 818 133 B1 (INNOSPEC LTD [GB]) 23 August 2023 (2023-08-23) * claims 1, 13 *	2, 15	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 31 August 2023	Examiner Keipert, Olaf
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 17 4046

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2199377 A1	23-06-2010	CA 2688963 A1	22-06-2010
		CN 101760266 A	30-06-2010
		EP 2199377 A1	23-06-2010
		JP 2010144177 A	01-07-2010
		KR 20100074031 A	01-07-2010
		US 2010154294 A1	24-06-2010
EP 1932899 A1	18-06-2008	NONE	
US 2008141581 A1	19-06-2008	AT 423831 T	15-03-2009
		CA 2614019 A1	13-06-2008
		CN 101200661 A	18-06-2008
		EP 1935968 A1	25-06-2008
		JP 2008150605 A	03-07-2008
		KR 20080055665 A	19-06-2008
		US 2008141581 A1	19-06-2008
US 2008141580 A1	19-06-2008	CN 101200660 A	18-06-2008
		JP 2008169391 A	24-07-2008
		KR 20080055667 A	19-06-2008
		US 2008141580 A1	19-06-2008
WO 9503377 A1	02-02-1995	CA 2167672 A1	02-02-1995
		DE 69420736 T2	09-03-2000
		DE 69434213 T2	26-01-2006
		EP 0721492 A1	17-07-1996
		EP 0885948 A2	23-12-1998
		EP 0908507 A1	14-04-1999
		JP H09503530 A	08-04-1997
		KR 960704015 A	31-08-1996
		NO 321605 B1	12-06-2006
		WO 9503377 A1	02-02-1995
EP 3818133 B1	23-08-2023	AU 2019298748 A1	07-01-2021
		BR 112020026651 A2	23-03-2021
		CA 3102929 A1	09-01-2020
		CN 112424318 A	26-02-2021
		EP 3818133 A1	12-05-2021
		EP 4234661 A2	30-08-2023
		GB 2576614 A	26-02-2020
		KR 20210027403 A	10-03-2021
		SG 11202012146S A	28-01-2021
		US 2021277320 A1	09-09-2021
		WO 2020008182 A1	09-01-2020

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82