



(51) International Patent Classification:

C10M 141/06 (2006.01) *C10N 30/06* (2006.01)
C10M 141/12 (2006.01) *C10N 30/04* (2006.01)
C10M 161/00 (2006.01) *C10N 40/25* (2006.01)
C10M 129/76 (2006.01) *C10N 60/14* (2006.01)

(21) International Application Number:

PCT/US2014/032476

(22) International Filing Date:

1 April 2014 (01.04.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/920,169 23 December 2013 (23.12.2013) US
 14/219,284 19 March 2014 (19.03.2014) US

(71) Applicant: **EXXONMOBIL RESEARCH AND ENGINEERING COMPANY** [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(72) Inventors: **GAAL, Dennis, A.**; 1154 Stoneshire Drive, Glassboro, NJ 08028 (US). **HERZ, Erik**; 703 Marshall Road, Brookhaven, PA 19015 (US). **PATEL, Mrugesh, Nilesh**; 1001-13 Chestnut Street, Unit 405w, Philadelphia, PA 19107 (US). **DECKMAN, Douglas, Edward**; 5 Peachtree Lane, Mullica Hill, NJ 08062 (US).

(74) Agents: **GUICE, Chad, A.** et al.; Exxonmobil Research And Engineering Company, 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (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, IR, IS, JP, KE, KG, 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, SA, 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.

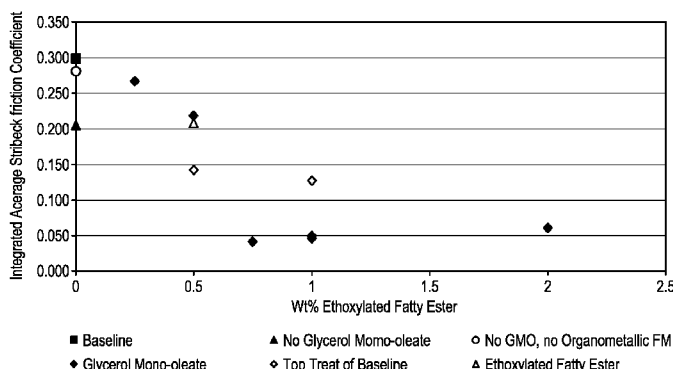
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, 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, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: METHOD FOR IMPROVING ENGINE FUEL EFFICIENCY

Fig. 2



(57) Abstract: A method for improving fuel efficiency and reducing frictional properties while maintaining or improving deposit control, in an engine lubricated with a lubricating oil by using as the lubricating oil a formulated oil. The formulated oil has a composition including a lubricating oil base stock as a major component, and a friction modifier mixture as a minor component. Fuel efficiency and frictional properties are improved and deposit control is maintained or improved as compared to frictional properties and deposit control achieved using a lubricating engine oil containing a minor component other than the friction modifier mixture. A lubricating engine oil having a composition including a lubricating oil base stock as a major component, and a friction modifier mixture as a minor component. The lubricating engine oils are useful in internal combustion engines including direct injection, gasoline and diesel engines.