



(51) International Patent Classification:

C10M 141/02 (2006.01) **C10N 10/14** (2006.01)
C10M 141/08 (2006.01) **C10N 10/16** (2006.01)
C10M 141/10 (2006.01) **C10N 30/06** (2006.01)
C10M 169/04 (2006.01) **C10N 30/04** (2006.01)
C10N 10/02 (2006.01) **C10N 30/10** (2006.01)
C10N 10/04 (2006.01) **C10N 40/25** (2006.01)

(21) International Application Number:

PCT/US2015/067573

(22) International Filing Date:

28 December 2015 (28.12.2015)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/097,661 30 December 2014 (30.12.2014) 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: **SCHILOWITZ, Alan, M.**; 15 North 6th Avenue, Highland Park, NJ 08904 (US). **BAILLARGEON, David, J.**; 112 Morningside Drive, Cherry Hill, NJ 08003

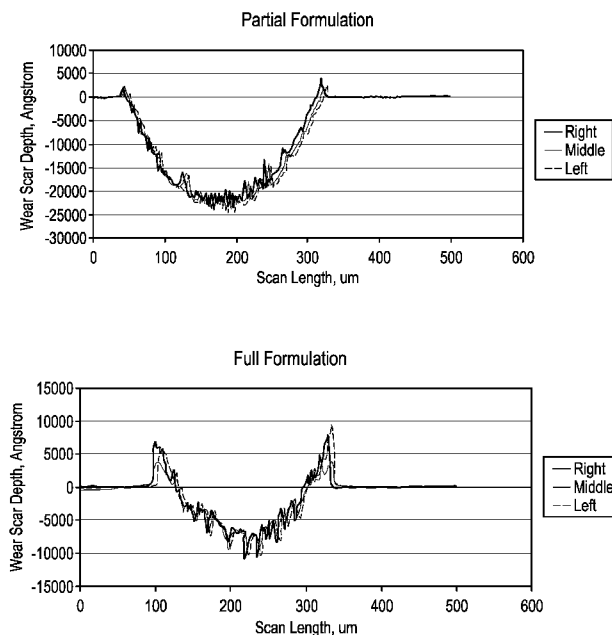
(US). **HAQUE, Tabassumul**; 2 Pioneer Circle, Deptford, NJ 08096 (US). **JACOBS, Peter, W.**; 2 Oak Grove Road, Flemington, NJ 08822 (US). **YABLON, Dalia**; 8 Manns Hill Crescent, Sharon, MA 02067 (US). **NG, Man, Kit**; 51 Liberty Ridge Road, Basking Ridge, NJ 07920 (US). **CARFOLITE, Barbara, Anne**; 8 Mallard Mill Run, Wallingford, PA 19086 (US). **GARY, Dana, J.**; 3349 Kamal Drive, Sarnia, Ontario, N7S 0A5 (CA). **KONICEK, Andrew**; 28 Gleim Road, Whitehouse Station, NJ 08889 (US).

(74) Agents: **MIGLIORINI, Robert 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, 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.

[Continued on next page]

(54) Title: LUBRICATING OIL COMPOSITIONS WITH ENGINE WEAR PROTECTION

**FIG. 1**

(57) Abstract: A method for improving wear control, while maintaining or improving fuel efficiency, in an engine or other mechanical component 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 (i) at least one transition metal salt of a carboxylic acid (e.g., zinc stearate) or (ii) a mixture of at least one transition metal salt of a carboxylic acid (e.g., zinc stearate) and at least one detergent (i.e., an alkali metal or alkaline earth metal salt of an organic acid, or an alkali metal or alkaline earth metal salt of an inorganic acid, or an alkali metal or alkaline earth metal salt of a phenol, or mixtures thereof (e.g., calcium salicylate and/or magnesium sulfonate), as a minor component. The lubricating oils are useful in internal combustion engines.



(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, ST, 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))