[0020] The invention further provides the method disclosed herein in which the lubricating composition is supplied to the crankcase and to the gear (or multiplicity of gears).

[0021] The invention further provides the method disclosed herein in which the lubricating composition is supplied to the crankcase and wet clutch.

[0022] The invention further provides the method disclosed herein in which the lubricating composition is supplied to the crankcase and both the gear (or gears) and the wet clutch.

[0023] The invention further provides the method disclosed herein in which the lubricating composition further includes an additional friction modifier for the reduction of dynamic friction, including one or more of an antiwear agent, a dispersant, a metal-containing detergent, a viscosity modifier, an antioxidant, an anti-foam, and a pour point depressant.

[0024] The invention further provides the method disclosed herein in which the internal combustion engine is a 4-stroke engine.

[0025] The invention further provides the method disclosed herein in which the 4-stroke engine is a motorcycle engine.

[0025a] The invention further provides a lubricating composition for maintaining static friction in an internal combustion engine comprising a crankcase and at least one of a gear and a wet-clutch, the lubricating composition comprising:

a) an oil of lubricating viscosity;

b) an acid-functionalized succinimide of i) a hydrocarbyl-substituted succinic anhydride, the hydrocarbyl substituent of the hydrocarbyl-substituted succinic anhydride comprising an ethylene-propylene copolymer; and ii) aminosalicylic acid.

DETAILED DESCRIPTION OF THE INVENTION

[0026] This invention provides a method of lubricating an internal combustion engine comprising a crankcase and at least one of a gear and a wet-clutch, said method comprising supplying to said crankcase and at least one of the gear and wet-clutch a lubricating composition comprising: (a) an

oil of lubricating viscosity; and (b) a friction modifying additive which is the reaction product of a hydrocarbyl-substituted succinic anhydride and an acid functionalized amine compound.

Internal Combustion Engine

[0027] The internal combustion engine of the invention comprises a crankcase, a gear and a wet-clutch. Optionally the internal combustion engine further comprises a manual or automatic transmission. In one embodiment the gear is from a gearbox.

[0028] As used herein the term “wet-clutch” is known to a person skilled in the art as meaning one that contains a clutch plate(s) that is bathed or sprayed

The Claims defining the invention are as follows:

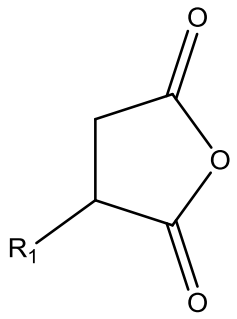
1. A method of maintaining static friction in an internal combustion engine comprising a crankcase and at least one of a gear and a wet-clutch, the method comprising supplying to the crankcase and at least one of the gear and wet-clutch a lubricating composition comprising:

(a) an oil of lubricating viscosity; and

(b) the reaction product of a hydrocarbyl-substituted succinic anhydride and aminosalicylic acid.

2. The method of claim 1, wherein the reaction product is a succinimide acid.

3. The method of claim 1 or claim 2, the hydrocarbyl-substituted succinic anhydride or reactive equivalent having the Formula (1):



Formula (1)

wherein R^1 is a hydrocarbyl group containing from 10 to 100 carbon atoms.

4. The method of any one of claims 1 to 3, wherein the hydrocarbyl substituent of the hydrocarbyl-substituted succinic anhydride comprises a polyolefin.

5. The method of any one of claims 1 to 4, wherein the polyolefin comprises an ethylene-propylene copolymer.

6. The method of any one of claims 1 to 3, wherein the hydrocarbyl substituent of the hydrocarbyl-substituted succinic anhydride comprises a polyisobutyl group.

7. The method of claim 6, wherein the polyisobutyl group has a number average molecular weight of at least 400, or 500 or 800, from 800-3000, or 800-1,500.

8. The method of any one of claims 1 to 7, wherein the aryl compound is an amine-substituted benzoic acid or derivative thereof.

9. The method of any one of claims 1 to 8, wherein the aminosalicylic acid is 5-aminosalicylic acid.

10. The method of any one of claims 1 to 9, wherein the reaction product is present at 0.5 wt % to 1.2 wt %, or 0.1 wt % to 4 wt % or 0.25 wt % to 2 wt % of the lubricating composition.

11. The method of any one of claims 1 to 10, wherein the lubricating composition is supplied to the crankcase and to the at least one gear (or multiplicity of gears).

12. The method of any one of claims 1 to 10, wherein the lubricating composition is supplied to the crankcase and the wet clutch.

13. The method of any one of claims 1 to 12, wherein the lubricating composition is supplied to the crankcase and both the gear (or gears) and the wet clutch.

14. The method of any one of claims 1 to 13, wherein the lubricating composition further comprises an additional friction modifier for the reduction of dynamic friction, comprising one or more of an antiwear agent, a dispersant, a metal-containing detergent, a viscosity index improver, an antioxidant, an anti-foam, and a pour point depressant.

15. The method of any one of claims 1 to 14, wherein the internal combustion engine is a 4-stroke engine.

16. The method of any one of claims 1 to 15, wherein the 4-stroke engine is a motorcycle engine.

17. A lubricating composition for maintaining static friction in an internal combustion engine comprising a crankcase and at least one of a gear and a wet-clutch, the lubricating composition comprising:

a) an oil of lubricating viscosity;

b) an acid-functionalized succinimide of i) a hydrocarbyl-substituted succinic anhydride, the hydrocarbyl substituent of the hydrocarbyl-substituted succinic anhydride comprising an ethylene-propylene copolymer; and ii) aminosalicylic acid.