CLAIMS

1. A trunk piston marine engine lubricating oil composition for improving asphaltene handling in use thereof in operation of the engine when fuelled by a heavy fuel oil, which composition comprises or is made by admixing in excess of 50 mass% of the composition of an oil of lubricating viscosity, and:

(A) one or more oil-soluble phenolic compounds comprising distilled cashew nut liquid or hydrogenated distilled cashew nut shell liquid; and

(B) an overbased metal hydrocarbyl-substituted hydroxybenzoate detergent;

wherein the treat rate of (A) and (B) in the lubricating oil composition is from 1 to 25 mass%.

2. The composition as claimed in claim 1 where (A) is hydrogenated cardanol.

3. The composition as claimed in claim 1 or 2 where the phenolic compounds are 3-pentadecylphenol and 3-pentadecylresorcinol.

4. The composition as claimed in claim 1, 2 or 3, where the phenolic compounds comprise 50 or more mass % of 3-pentadecylphenol, where the pentadecyl group is linear and is attached to the aromatic ring at its first carbon atom.

5. The composition as claimed in any one of the preceding claims, where (B) has

(B1) a basicity index of less than two and a degree of carbonation of 80 % or greater; or

(B2) a basicity index of two or greater and a degree of carbonation of 80 % or greater; or

(B3) a basicity index of two or greater and a degree of carbonation of less than 80 %; or

(B4) a basicity index of less than two and a degree of carbonation of less 80 %,

where degree of carbonation is the percentage of carbonate present in the overbased metal hydrocarbyl-substituted hydroxybenzoate detergent expressed as a mole percentage relative to the total excess base in the detergent.

6. The composition as claimed in claim 5 where the metal in (B) is calcium.

7. The composition as claimed in either claim 5 or 6 where the hydrocarbyl-substituted hydroxybenzoate in (B) in a salicylate, preferably C_9 to C_{30} alkyl-substituted.

8. The composition as claimed in any one of claims 1 to 7 where the oil of lubricating viscosity contains 50 mass % or more, such as more than 60 mass %, of a basestock containing greater than or equal to 90 % saturates and less than or equal to 0.03 % sulphur or a mixture thereof.

9. The composition as claimed in claim 8 where the basestock containing greater than or equal to 90 % saturates and less than or equal to 0.03 % sulphur is a Group II basestock.

10. The composition as claimed in any of claims 1 to 9 having a TBN of 20 to 60, such as 25 to 55.

11. The use of from 1 to 15 mass% of component (A) as defined in any of claims 1 to 4 in a trunk piston marine lubricating oil composition for a medium-speed compression-ignited marine engine to improve asphaltene handling during operation of the engine, fueled by a heavy fuel oil, and its lubrication by the composition.

12. A method of operating a trunk piston engine medium-speed compression-ignited marine engine comprising

(i) fueling the engine with a heavy fuel oil; and

(ii) lubricating the crankcase of the engine with a composition as defined in any of claims 1 to 10.

14. A method of dispersing asphaltenes in a trunk piston marine lubricating oil composition during its lubrication of surfaces of the combustion chamber of a marine-speed compression-ignited marine engine and operation of the engine, which method comprises

(i) providing the composition as defined in any of claims 1 to 10;

(ii) providing the composition in the combustion chamber;

(iii) providing heavy fuel oil in the combustion chamber; and

(iv) combusting the heavy fuel oil in the combustion chamber.

CLAIMS

1. A trunk piston marine engine lubricating oil composition for improving asphaltene handling in use thereof in operation of the engine when fuelled by a heavy fuel oil, which composition comprises or is made by admixing in excess of 50 mass% of the composition of an oil of lubricating viscosity and:

   (A) one or more oil-soluble phenolic compounds which are distilled cashew nut shell liquid or hydrogenated distilled cashew nut shell liquid; and
   (B) an overbased metal hydrocarbyl-substituted hydroxybenzoate detergent;
   wherein the treat rate of additives (A) and (B) in the lubricating oil composition is in the range of 1 to 25 mass%.

2. The composition as claimed in claim 1 where (A) is hydrogenated cardanol.

3. The composition as claimed in claims 1 or 2 where the phenolic compounds are 3-pentadecylphenol and 3-pentadecylresorcinol.

4. The composition as claimed in claim 1, wherein the phenolic compounds comprise 50 or more, such as 60 or more, such as 70 or more, such as 80 or more, such as 90 or more, mass % of 3-pentadecylphenol, where the pentadecyl group is linear and is attached to the aromatic ring at its first carbon atom.

5. The composition as claimed in any one of claims 1 to 4, where (B) has

   (B1) a basicity index of less than two and a degree of carbonation of 80 % or greater; or
   (B2) a basicity index of two or greater and a degree of carbonation of 80 % or greater; or
   (B3) a basicity index of two or greater and a degree of carbonation of less than 80 %; or
   (B4) a basicity index of less than two and a degree of carbonation of less 80 %,
   where degree of carbonation is the percentage of carbonate present in the overbased metal hydrocarbyl-substituted hydroxybenzoate detergent expressed as a mole percentage relative to the total excess base in the detergent.

6. The composition as claimed in claim 5 where the metal in (B) is calcium.

7. The composition as claimed in any of claims 4 to 6 where the hydrocarbyl-substituted hydroxybenzoate in (B) is a salicylate, preferably C_9 to C_{30} alkyl-substituted.

8. The composition as claimed in any of claims 1 to 7 where the oil of lubricating viscosity contains 50 mass % or more, such as more than 60 mass %, of a basestock containing greater than or equal to 90 % saturates and less than or equal to 0.03 % sulphur or a mixture thereof.

9. The composition as claimed in claim 8 where the basestock containing greater than or equal to 90 % saturates and less than or equal to 0.03 % sulphur is a Group II basestock.

10. The composition as claimed in any of claims 1 to 9 having a TBN of 20 to 60, such as 25 to 55.

11. A method of operating a trunk piston engine medium-speed compression-ignited marine engine comprising.
(i) fueling the engine with a heavy fuel oil; and
(ii) lubricating the crankcase of the engine with a composition as defined in any of claims 1 to 10.

12. A method of dispersing asphaltenes in a trunk piston marine lubricating oil composition during its lubrication of surfaces of the combustion chamber of a marine-speed compression-ignited marine engine and operation of the engine, which method comprises

(i) providing a composition as defined in any of claims 1 to 10;
(ii) providing the composition in the combustion chamber;
(iii) providing heavy fuel oil in the combustion chamber; and
(iv) combusting the heavy fuel oil in the combustion chamber.