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LUBRICATING OIL

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12 Claims. (Cl. 252—38)

The present invention relates to lubricating oils containing certain compounds as addition agents for improving the quality of the lubricating oils and also to the method of preparing said addition agents.

It is known to add various metallic salts and soaps to oils as detergents, inhibitors and viscosity regulators. While some metallic salts are soluble in oil even at room temperature, many are considerably less soluble in oil even at higher temperatures and, therefore, require a solubilizer in order to obtain the full benefits of the addition agent. Free fatty acid, certain esters, numerous alcohols, fats, sulfonic soaps, etc. have long been known to exert a solubilizing influence on metallic salts and soaps to a greater or lesser degree.

One object of the present invention is to add organic metallic salts and/or soaps which are normally insoluble in oil or at most soluble to a rather small degree to a lubricant together with a new and improved solubilizer. The salt or soap and solubilizer may be added to the oil separately or together or they may be reacted together and the resulting product added to the oil.

More particularly the present invention relates to the use of phosphatides and commercial mixtures of the same as solubilizers for metal salts of aliphatic carboxylic acids and metal soaps of fatty acids which are slightly soluble in oil. Phosphatides include, for example, lecithin and cephalin, while the commercial mixtures comprise mixtures of both lecithin and cephaline together with residual fatty oil and free fatty acids. The commercial products frequently contain about 65% phosphatides, based on phosphorus content and about 35% of fatty oil plus fatty acid.

Whenever the term "phosphatides" appears herein it is to be understood that not only the pure compounds such as lecithin and cephalin but also the commercial mixtures of lecithin, cephalin, oil, etc. are intended.

Phosphatides have been found to be far superior to any of the solubilizers mentioned hereinbefore when the addition of slightly oil-soluble metallic salts of carboxylic acids and fatty acid soaps are contemplated. A lubricating oil, to which the addition agent and solubilizer have been added, is clear and transparent. The use of phosphatides or phosphatidic material has the further advantage that the solubilizer itself serves to stabilize the mineral oil. This is particularly advantageous in view of the fact that certain previously known solubilizers, such as fatty acids, alcohols, esters, etc. have an adverse effect in this regard.

It is believed that the phosphatidic material reacts with the normally slightly oil-soluble organic salt or soap to form a complex or double salt which is more readily soluble in oil. It is, therefore, a further object of the present invention to provide a method for preparing such complex salts.

The normally slightly oil-soluble salts and soaps which are contemplated in the present invention are the Group I and Group II metal salts of aliphatic acids, particularly straight-chain carboxylic acids such as stearic, palmitic, ricinoleic, oleic, and the like, and even acids such as formic, acetic, propionic, butyric and the like. The term "metal salts" as used in the present specification is intended to include not only those metallic salts of fatty acids which are normally regarded as soaps, but also the metallic salts of the low molecular weight aliphatic acids such as formic, acetic, etc.

More particularly, the present invention relates to such salts as calcium or sodium stearate or palmitate, strontium oleate, cadmium butyrate, calcium formate, acetate or propionate, copper acetate and the like.

In carrying out the present invention, it is possible to add either the metallic salt or the phosphatide to the oil first. It is, furthermore, possible to treat the metallic salt with the phosphatide before adding the reaction mixture to the oil. Calcium salts of essentially saturated fatty acids having 22 to 26 carbon atoms are soluble in mineral oil to the extent of not more than about 0.25% without the use of a solubilizer. Most calcium salts of fatty acids having 20 carbon atoms or less are practically insoluble in mineral oil even at elevated temperatures. Furthermore, the calcium soap of No. 2 Stearine Pitch which contains chains varying in length from 12 to 24 carbon atoms, although fairly soluble in hot oil, gradually separates from the oil at room temperature.

It has been found that 0.1% to 7.5% of phosphatidic materials is sufficient to act as solubilizer for from 0.1% to 1.0% of calcium salts which are normally slightly soluble in mineral oil. More specifically, 1.5% phosphatide will completely solubilize 0.25% of a calcium salt of an aliphatic acid, which is, in most cases the desired quantity of the addition agent. It is to be noted, in accordance with the present invention, that the phosphatidic material may also be used for the purpose of improving the solubility of

metal salts which are already soluble in oil to a greater or lesser degree.

It is sometimes advisable to prepare the double salts of the phosphatides before addition to the oil and this may be accomplished in the following manner: A water solution, preferably concentrated, of the desired metal salt, such as calcium acetate, barium butyrate, cadmium formate and the like is added directly to the commercial phosphatide which has been slightly warmed. If desired, and in order to facilitate handling, the commercial phosphatide may be diluted with mineral oil, preferably in the proportion of 1 part material to 1 part or more of mineral oil. After the reaction has taken place, the water is evaporated off under reduced pressure. The double salt may then be added in amounts of from 0.05% to 1% or more to the oil. If desired other types of addition agents or inhibitors may be added to the oil.

While the present invention has been described in connection with certain preferred embodiments, it is to be understood that these are by way of illustration and not by way of limitation. The scope of the present invention is to be limited only by the appended claims.

We claim:

1. A lubricant comprising a lubricating oil, a metal salt of a carboxylic acid in an amount in excess of that which would be soluble in said lubricating oil and a phosphatidic material in an amount sufficient to render said first mentioned amount of said salt soluble in said oil.

2. A lubricant as claimed in claim 1 wherein the phosphatidic material comprises lecithin and cephalin.

3. A lubricant as claimed in claim 1 wherein the phosphatidic material comprises cephalin.

4. A lubricant as claimed in claim 1 wherein the phosphatidic material comprises lecithin.

5. A lubricant comprising a lubricating oil, a metal salt of an aliphatic acid in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatidic material in an amount sufficient to render said first-mentioned amount of metal salt soluble in said oil.

6. A lubricant comprising a lubricating oil, a Group I metal salt of an aliphatic acid in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatidic material in an amount sufficient to render said first-mentioned amount of metal salt soluble in said oil.

7. A lubricant comprising a lubricating oil, a Group II metal salt of an aliphatic acid in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatidic material in an amount sufficient to render said first-mentioned amount of metal salt soluble in said oil.

8. A process for improving a lubricating oil comprising incorporating with said oil a metal salt of an aliphatic acid in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatide in an amount sufficient to render said first-mentioned amount of salt soluble in said oil.

9. A process for improving a lubricating oil comprising incorporating with said oil a sodium salt of an aliphatic acid having not more than 26 carbon atoms in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatide in an amount sufficient to render said first-mentioned amount of salt soluble in said oil.

10. A process for improving a lubricating oil comprising incorporating with said oil a calcium salt of an aliphatic acid having not more than 26 carbon atoms in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatide in an amount sufficient to render said first-mentioned amount of salt soluble in said oil.

11. A process for improving a lubricating oil comprising incorporating with said oil an alkali metal stearate in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatide in an amount sufficient to render said first-mentioned amount of salt soluble in said oil.

12. A process for improving a lubricating oil comprising incorporating with said oil an alkaline earth metal stearate in an amount in excess of that which would be normally soluble in said lubricating oil, and a phosphatide in an amount sufficient to render said first-mentioned amount of salt soluble in said oil.

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CERTIFICATE OF CORRECTION.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 32, for "cephaline" read --cephalin--; page 2, first column, line 30, claim 1, before "soluble" insert --normally--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of March, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

DISCLAIMER

2,270,241.—*Elmer Wade Adams*, Hammond, Ind., *Lawrence C. Brunstrum*, Chicago, Ill., and *Alfred W. Weitkamp*, Whiting, Ind. LUBRICATING OIL. Patent dated January 20, 1942. Disclaimer filed June 3, 1943, by the assignee, *Standard Oil Company*, (*Indiana*).

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 7, 8, 10, and 12 of the above numbered patent.

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