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LUBRICANT

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8 Claims. (Cl. 252—56)

The invention relates to lubricants, and particularly to mineral oil lubricants having incorporated therein minor quantities of additive materials adapted to improve lubrication properties, and to inhibit or retard deposition of varnish, lacquer and sludge, as caused by deterioration of the oil in normal lubrication service.

Commercial petroleum lubricating oils, no matter how highly refined, have a definite tendency to deteriorate under the lubricating conditions encountered in internal combustion engines. High crank case temperatures, and other increasingly severe requirements in engine performance, aggravate the rate of oil deterioration from thermal decomposition and oxidation. Deposits, in the nature of varnish, lacquer and sludge, are products of this deterioration, and in modern engines with close clearances small amounts of these deposits may seriously interfere with proper operation, or may even cause engine seizure. The problems of inhibiting oil deterioration, and of maintaining oil cleanliness during lubrication service, are, therefore, of essential importance, and while the prior art suggests many ways of accomplishing these ends, further improvements is desirable.

It is an object of this invention to provide lubricating oil compositions which are effectively inhibited against the formation of varnish, lacquer and sludge deposits, and further to provide additive compounds for lubricants of improved detergency action.

I have found that metal salts of 2-ethyl butyric and 2-ethyl hexoic acids are excellent detergents for all common lubricating oils, and that these compounds as additives in small concentrations minimize deposition of deterioration products, and thereby improve the over-all lubricating properties of the oil. Some of these salts are inherently soluble in petroleum oils in an amount sufficient to provide good detergency action, and those which are less soluble, or substantially insoluble, can be readily incorporated in oils with the aid of solubilizing agents, such as aliphatic acids and alcohols, alkyl esters, or other compounds known to have a solubilizing function. The actual amount of salt additive necessary to provide the results intended may vary broadly within a range from about 0.2% to 5.0% by weight of the oil, depending upon the properties of the untreated oil base; and with the more common commercial lubricants, additions of about 0.5% to 2.0% of the metal salt have given very satisfactory results.

From many tests made with these additives there is indication that the 2-ethyl butyrates and 2-ethyl hexoates of any of the common metals have detergency value in oils; hence derivatives of all metals are included within the broadest intent of the invention, provided the salt has sufficient oil solubility, or can be suitably incorporated in the oil with the aid of solubilizing agents. The salts derived from cobalt, magnesium, nickel and zinc have proven particularly effective in their ability to inhibit varnish and sludge deposition, and these compounds need no solubilizer to incorporate them with oil in required operative amounts. In accelerated laboratory detergency tests, in tests on Lauson engines under conditions simulating Diesel operation, and in service runs on full scale Chevrolet engines, lubricants containing the additives specified have a remarkably improved cleanliness over untreated oils, and as compared with the better additive-treated commercial oils now known, the new lubricants also show a greater effectiveness in suppressing lacquer and sludge deposition.

As is customary in the compounding of completely inhibited mineral oil lubricants, one or more other additives of different primary function may be used along with the essential ones of this invention. Another additive of the antioxidant type may, for example, be desirable, and in fact is recommended for many oils, as a further protection against excessive oil deterioration. Many oxidation inhibitors, such as sulfur, nitrogen or phosphorus-containing compounds, are known in the art, and are compatible with the 2-ethyl butyrate and 2-ethyl hexoate salts, to produce a cooperative action which is highly effective. No restrictions are intended, however, with regard to other inhibitor agents, and they may or may not be present in accordance with the broader scope of this invention. Likewise the invention contemplates usage of these new additives in any of the common petroleum lubricating oils, including both asphaltic and paraffin base oils, and those refined by different known methods.

This disclosure is in part a continuation of my copending application Serial No. 415,067, filed October 15, 1941.

I claim:

1. A lubricant consisting essentially of a mineral oil containing a detergent composed of about 0.20% to 5.0% by weight of a metal salt of an acid of the group consisting of 2-ethyl butyric acid and 2-ethyl hexoic acid.

2. A lubricant consisting essentially of a mineral oil containing a detergent composed of about

0.20% to 5.0% by weight of a 2-ethyl butyrate salt of a metal of the group consisting of cobalt, magnesium, nickel and zinc.

3. A lubricant consisting essentially of a mineral oil containing a detergent composed of about 0.20% to 5.0% by weight of a 2-ethyl hexoate salt of a metal of the group consisting of cobalt, magnesium, nickel and zinc.

4. A lubricant consisting essentially of a mineral oil containing a detergent composed of about 0.20% to 5.0% by weight of a metal salt of an acid of the group consisting of 2-ethyl butyric acid and 2-ethyl hexoic acid, and oxidation inhibiting amounts of an anti-oxidant compound.

5. A lubricant consisting essentially of a petroleum lubricating oil containing a detergent composed of about 0.50% to 2.0% of cobalt 2-ethyl hexoate.

6. A lubricant consisting essentially of a petroleum lubricating oil containing a detergent composed of about 0.50% to 2.0% of magnesium 2-ethyl hexoate.

7. A lubricant consisting essentially of a petroleum lubricating oil containing a detergent composed of about 0.50% to 2.0% of nickel 2-ethyl hexoate.

8. A lubricant comprising a petroleum lubricating oil containing a detergent composed of about 0.50% to 2.0% of zinc 2-ethyl hexoate.

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