

UNITED STATES PATENT OFFICE

2,031,986

IMPROVED LUBRICANTS AND PROCESS FOR
MANUFACTURING THE SAMEReginald K. Stratford and Jack L. Huggett, Sar-
nia, Ontario, Canada, assignors to Standard Oil
Development CompanyNo Drawing. Application July 16, 1931,
Serial No. 551,304

6 Claims. (Cl. 87-9)

The present invention relates to improved lubricants and more particularly those containing metallic salts of organic acids as compounding ingredients. Our invention will be understood from the following description of the oils and their method of manufacture.

It has been found advantageous to compound hydrocarbon oils with metallic compounding agents for special purposes such as gear lubricants and for this purpose the lead, aluminum and other salts of fatty acids such as oleic acid have been used in quantity from 1 to 10% or more in viscous lubricating oil cuts, such as have viscosities from 60 sec. at 210° F. to 100 seconds or 150 at 210° F. Ordinarily 2 to 5% of lead oleate is suitable. The great difficulty in this has been to produce stable compounds from which the lead or other metal soap will not precipitate on standing. We have found that this is increasingly difficult with the higher grade oils.

Oils have been previously classified as paraffinic or naphthenic or asphaltic or mixed base oils, but more recently the classifications have been perfected by the use of the term viscosity index. This index is based on a comparison of the viscosities of the oil measured in Saybolt seconds at 100 and 210° F. and the method has been fully explained in an article appearing in Chemical and Metallurgical Engineering vol. 36 No. 10 page 618, by G. H. P. Davis and E. W. Dean. By this classification oils of high quality have indices from 80 to 100 or higher in rare cases; since low grade oils have indices from 15 to 30 and the quality, i. e. in respect to temperature-viscosity characteristics, is directly related to the index.

We have found that heavy metal soaps, in contradistinction to the alkali or alkaline earth soaps, especially lead oleate in anhydrous form is soluble to a substantial degree in low grade oils, but that such substances are less soluble as the quality or viscosity index of the oil increases. For example, a Colombian oil having a viscosity index of 40 dissolves up to 10% of lead oleate at room temperature. The same amount is soluble in a better quality oil of 80 viscosity index at 150° F. but on cooling the soap settled out or formed a stiff gel indicating supersaturation. The actual solubility in such an oil was found to be about .01%.

We have further discovered that the addition of relatively small quantities of certain substances which may be termed "solubilizing agents" or "stabilizing agents", have the effect of rendering the soap soluble in oils of high viscosity index, say above 50 or 60 or even above 70

or 80 and that the soap is evidently in a stable form as it shows little or no tendency to settle out after long standing, heating or in use. The substances which we use are generally phenolic in character, ordinary phenol being perhaps the best, although cresol, xyleneol or alpha naphthol are also suitable. As little as 1.5% of phenol is satisfactory, for example in an 85 viscosity index oil to render 4% of lead oleate completely stable. The following table shows the amount of the other substances which will stabilize the same composition:

	Per cent
Cresol	2
Xyleneol	3
Alpha-naphthol	3

If an insufficient quantity of the substance is used the soaps show a tendency to settle after several weeks or months, but under ordinary conditions the quantities given above are satisfactory for producing continued stability. The added phenolic substances sometimes change the physical properties such as viscosity slightly, but ordinarily the amount required is not enough to make a marked change. Certain other substances may be added to mask the odor of phenol or cresol and pine oil or other similar substances are suggested.

While our addition agents are useful in oils of both low and high viscosity index, it will be understood that they are more useful for the latter and enable the compounders to use high grade oils which have not been available for this purpose. In this class are the oils extracted with phenol and similar solvents, hydrogenated petroleum lubricants and the like.

Our invention is not limited to lead oleate since other metallic oleates are equally desirable nor to the oleates in particular, since other acids of equal or greater molecular weight may be used, such as palmitic, stearic or the acids derived from paraffin by oxidation either with air or oxygen or other oxidizing agents such as nitric acid. Nor is our invention to be limited to any theory of the mechanism of the process nor the action of the addition agent, but is to be limited only by the following claims in which we wish to claim all novelty inherent in the invention.

What we claim is:

1. A stable lubricating oil comprising a viscous hydrocarbon base containing 1 to 10% of a soap of a heavy metal and 1 to 3% of a solubilizing agent of phenolic character.

2. A stable lubricating oil comprising a viscous hydrocarbon base characterized by viscosity in-

dex above about 50, 1 to 10% of a soap of a heavy metal selected from the class of lead and aluminum and 1 to 3% of a phenolic solubilizing agent.

3. A stable lubricating oil comprising a viscous hydrocarbon oil base of predominantly paraffinic character, 1 to 10% of a lead soap and 1 to 3% of a phenolic solubilizing agent.

4. Composition according to claim 3 in which the oil has a viscosity in excess of 60 seconds Saybolt at 210° F. and a viscosity index above 80 and the solubilizing agent is phenol.

5. Composition according to claim 3 in which the oil has a viscosity in excess of 60 seconds Saybolt at 210° F. and a viscosity index above 80 and the solubilizing agent is cresol.

6. Composition according to claim 3 in which the oil has a viscosity in excess of 60 seconds Saybolt at 210° F. and a viscosity index above 80 and the solubilizing agent is alpha naphthol.

R. K. STRATFORD. 10
J. L. HUGGETT.