Patented July 3, 1945

2,379,850

UNITED STATES PATENT OFFICE

2,379,850

LUBRICANTS

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No Drawing. Application June 3, 1942, Serial No. 445,644

9 Claims. (Cl. 252—36)

This invention relates to lubricants. More particularly the invention relates to lubricants produced from ricinoleic acid.

The great majority of lubricating oils in use today are made from mineral oil hydrocarbons. These mineral oil hydrocarbons are a mixture of different and distinct hydrocarbons. Each separate hydrocarbon has its own boiling point, viscosity, flash point, pour point, melting point and the like, but the lubricating oil which comprises a mixture of these compounds has a mean boiling point range, a mean viscosity, a variable pour point, etc. When a lubricating oil is made from a crude oil which comes from a specific field, the chemical composition of the hydrocarbons in the crude oil varies from time to time so that the chemical composition of the lubricating oil thus varies. In the manufacture of the lubricating oil the main aim is to provide a predetermined boiling range or a predetermined viscosity.

The viscosities of mineral oil lubricants, particularly paraffin base mineral oils, are greatly affected by the temperature. At high temperatures the paraffin oils become light, mobile liquids while at temperatures below the freezing point of water the oils become solids. A grease which is made up principally from a paraffin base mineral oil becomes so thick and solid at temperatures below zero degrees F. that it ceases to be a lubricant.

The primary object of the present invention is to provide a lubricant having a base of a single definite chemical compound which has fixed physical properties.

Another object of the invention is to provide a lubricating product having a compound of uniform composition as a base product, the viscosity and pour point of such compound being affected to a relatively small degree by changes in temperature.

A further object of the invention is to provide a lubricant in which a synthetic ester of ricinoleic acid is the base material.

A further object of the invention is to provide a grease lubricant in which a recinoleic acid ester is the base lubricant and is gelled with a lithium base soap.

With these and other objects and features in view the invention consists in the improved lubricant hereinafter described and particularly defined in the claims.

Butyl acetyl ricinoleate is a yellow oily liquid which is the result of the reaction of butyl alcohol, acetic acid and ricinoleic acid. This product has distinct lubricating qualities and its viscosity is not greatly changed by changes in temperature. It has a comparatively high boiling point and flash point and will stand comparatively high bearing pressures. Pure butyl acetyl ricinoleate is not suitable for extreme pressure lubrication because the bearings with the lubricant therein tend to seize at a fairly low pressure. However by the use of addition agents the ester may be modified to carry comparatively high bearing pressures and give excellent lubrication. For example with .5% to 1% of sulfurized tricresyl phosphite it has been found that the ricinoleate ester acts as an extreme pressure lubricant and will not permit seizure of the bearing surfaces until extremely high pressures are reached. Also from .5% to 1% of an addition agent sold under the trade name "Polane" can be added to the alkyl acetyl ricinoleate to provide a good lubricant. Polane is oil-soluble and is understood to be an ester of a fatty acid or a chlorinated ester of a fatty acid such as ethyl laurate or dichlor methyl stearate. The sulfurized tricresyl phosphite referred to above is described in the patent to Engelke No. 2,260,303, granted October 28, 1941.

The kinematic viscosity of butyl acetyl ricinoleate is substantially as follows:

Temperature	Viscosity
Minus, 40° C	Very viscous.
Minus—	
17.5° C	423 centistokes.
37.8° C	17.9 centistokes.
93.5° C	5 centistokes.

It has been found that all of the alkyl acetyl ricinoleates have good lubricating properties. For example the product can be made by the use of methyl alcohol, ethyl alcohol, butyl and propyl alcohols, when reacted with acetic acid and ricinoleic acid.

It has been determined that the alkyl acetyl ricinoleates do not all go into solution with metallic soaps to form greases. This compound, however, will form greases with products such as sodium stearate, aluminum stearate and lithium stearate. A very excellent grease may be formed by blending together the following products:

	Per cent
Butyl acetyl ricinoleate	93
Lithium stearate	6
Aluminum stearate	1

The ricinoleate ester preferably has an extreme pressure addition agent such as sulfurized tri-

cresyl phosphite therein in order to make the grease suitable for extreme pressure uses. The aluminum stearate is very valuable in maintaining a uniform gel so that the ester does not tend to separate from the soap. All of the various alkyl acetyl ricinoleates can be blended with lithium and aluminum stearates to form a grease. The esters having the alkyl groups with the smaller number of carbon atoms to the molecule have lower viscosities and thus modify the viscosities of the final product.

The preferred form of the invention having been thus described what is claimed as new is:

1. A lubricant consisting essentially of butyl acetyl ricinoleate having a small amount of load-carrying addition agent therein.

2. A lubricant consisting essentially of an acetyl ricinoleate of a lower alcohol and a small proportion of an extreme pressure agent.

3. A lubricant consisting essentially of butyl acetyl ricinoleate having from .5% to 1% of an extreme pressure addition agent dissolved therein.

4. A lubricant consisting essentially of an acetyl ricinoleate of a lower alcohol, and sufficient lithium soap and aluminum soap to make a stable thickened grease lubricant.

5. A lubricant comprising a major portion of butyl acetyl ricinoleate as a base lubricant, lithium stearate and aluminum stearate to provide a stable thickened grease.

6. A lubricant comprising butyl acetyl ricinoleate 93%, lithium stearate 6%, and aluminum stearate 1%.

7. A lubricant consisting essentially of an acetyl ricinoleate of a lower alcohol, sufficient soap to thicken the same to make a grease, and an extreme pressure agent in sufficient proportion to substantially increase the load-carrying capacity of the lubricant.

8. A lubricating grease consisting essentially of an acetyl ricinoleate of a lower alcohol, and sufficient soap to thicken the same to make a grease.

9. A lubricating composition comprising approximately 93% of an acetyl ricinoleate of a lower alcohol, approximately 6% of lithium stearate and approximately 1% of aluminum stearate.

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