Patented Sept. 26, 1944 2,358,939

UNITED STATES PATENT OFFICE

2,358,939

LUBRICANTS

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No Drawing. Application November 8, 1940, Serial No. 364,840

9 Claims. (Cl. 252—33)

This invention relates to lubricants, and more particularly to soap-containing lubricants of improved appearance and stability.

Lubricating oils are frequently compounded with metallic soaps to yield fluid to solid products. In these products, as ordinarily prepared, there is a tendency for the oil to separate from the compounded product, and this tendency may be particularly pronounced in the fluid and semi-fluid products. The ordinary products also have a cloudy or opaque appearance, and for purposes of producing a product of improved appearance and stability, it is desirable to overcome this defect and provide a clear, transparent lubricant.

It is an object of this invention to provide novel stabilizing agents for soap-containing lubricants, which stabilizing agents also have the property of overcoming the cloudy or opaque appearance of the lubricants.

It is a further object of this invention to provide an improved method of preparing soap-containing lubricants involving intensive milling of the lubricant in the presence of stabilizing agents, whereby the stability of the lubricants is further improved.

It has been found that certain well-known emulsifiers have the property of stabilizing soap-containing lubricants and improving the appearance of soap-containing lubricants. In an intensive investigation of the addition of emulsifiers to soap-containing lubricants, we have found that certain sulphonates improve the properties of this type of lubricant, and that, in general, other emulsifiers show little or no improvement. The sulphonates which have been found to be particularly effective are the petroleum sulphonates known as mahogany sulphonates, i. e., the oil-soluble sulphonates produced by the treatment of petroleum oils, or fractions or extracts thereof, with sulphuric acid or other equivalent sulphonating agents. These sulphonates are preferably employed in the form of their alkali-metal salts, for example, the sodium salts. The proportion of petroleum sulphonates to produce the desired stabilization of the lubricant depends upon the soap content of the lubricant and, in general proportions of 2 to 20% of petroleum sulphonates, based on the soap content, are effective.

While the stabilizers of this invention may be added to any soap-containing lubricant with favorable results, we have found that the stabilizers are most effective for liquid lubricants containing from about 0.5 to 6% of a water-insoluble soap, such as lime soap. One type of liquid lubricant, designed particularly for the lubrication of textile machinery, which is materially improved by the stabilizers and method of preparation of this invention, is a lubricant comprising a mineral lubricating oil and from about 0.5 to 6% lime soap derived from animal or vegetable oils and fats or mixtures thereof. The lime soap in this type of lubricant may be replaced by a mixed base soap containing a major proportion of calcium soap and a minor proportion of sodium soap.

In order to more fully disclose the invention, the following example is given, but it is to be understood that the invention is not limited thereto.

A base composition was prepared from the following ingredients:

	Parts by weight
Tallow	7.3
Elaine oil (commercial oleic acid)	7.3
Cottonseed oil	7.3
Lime (98.8% $Ca(OH)_2$)	2.68
Lye (49.0% NaOH)	.22
Lubricating oil (300 viscosity naphthene base oil)	20.0
Water	20.0

These ingredients were charged to a pressure kettle and heated with agitation over a period of about an hour to a temperature of about 335° F., the pressure at this point being about 100 pounds per square inch. The resulting product was then heated in an open kettle at about the boiling point of water for about three hours to dehydrate the same, and then additional amounts of the lubricating oil were added slowly while agitating and allowing to cool until the proportion of soap was about 15% of the total composition. The resulting product had the appearance of a cup grease.

In preparing a lubricant containing about 3.5% soap, this base composition was thinned with a portion of the required amount of lubricating oil (300 viscosity naphthene base oil), and sufficient commercial mahogany sulphonates, containing about 42% of sodium mahogany sulphonates, was added to give a proportion of sodium mahogany sulphonates of about 2.5% of the soap content. This required a proportion of about 6% of the commercial mahogany sulphonates, based on the soap content. The mixture of base composition, lubricating oil, and emulsifier was heated with agitation to about 290 to 310° F. and maintained at 290 to 310° F. until the composi-

tion was substantially dehydrated. After allowing the substantially dehydrated mixture to cool to about 200° F. sufficient water was incorporated in the mixture with agitation to give the composition maximum stability. In general, the proportion of water for maximum stability is from 0.1 to 0.5%, and in this example the proportion was about 0.3% of the final composition containing about 3.5% soap. The remainder of the lubricating oil was then added with agitation. It is preferable to add the lubricating oil in portions as described above, but it is to be understood that all of the required amount of lubricating oil may be added before the step of heating to substantial dehydration.

The resulting lubricant was a clear, transparent product which showed only very slight oil separation in storage for six months. However, to further improve the product against oil separation, it was subjected to intensive shearing stresses by running through a colloid mill several times. The intensive mixing in the colloid mill resulted in material improvement in the product especially with respect to oil separation. After six months' storage the oil separation in the product which had been run through a colloid mill was so slight as to be negligible for all practical purposes.

The lubricating oil used in the example was a naphthene base oil having the following characteristics:

Gravity, °A. P. I.	20.6
Flash, °F	370
Fire, °F	425
Viscosity, S. U. at 130° F.	316
Color, Lovibond 6" cell	100
Pour, °F.	−20

Any suitable petroleum lubricating oil, such as a distillate or refined residual oil, having a viscosity of from 70 at 100° F. to about 150 at 210° F. can be employed. For a textile lubricant, a lower viscosity oil of about 300 or below at 100° F. is preferred.

Other grades of lubricant having soap contents of from about 0.5 to 6% may be prepared as described in the specific example, or by equivalent methods, with the modification that the proportion of lubricating oil is adjusted to result in lubricants of the desired soap content.

Obviously, many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

What we claim is:

1. A liquid lubricant comprising a petroleum lubricating oil, a water-insoluble polyvalent metal soap in a proportion to maintain the fluidity of the lubricant at ordinary atmospheric temperatures, and a small percentage of an alkali metal petroleum mahogany sulphonate, based on the polyvalent metal soap content, to maintain the transparency of the lubricant and to stabilize the lubricant against oil separation.

2. A liquid lubricant comprising a petroleum lubricating oil, about 0.5–6.0% by weight of a lime soap, and about 2–20% by weight, based on the lime soap content, of an alkali metal petroleum mahogany sulphonate to maintain the transparency of the lubricant and to stabilize the lubricant against oil separation.

3. A liquid lubricant comprising a petroleum lubricating oil, about 0.5–6.0% by weight of a mixed base soap containing a major proportion of calcium soap and a minor proportion of sodium soap and about 2–20% by weight, based on the mixed base soap content, of an alkali metal petroleum mahogany sulphonate to maintain the transparency of the lubricant and to stabilize the lubricant against oil separation.

4. A liquid lubricant comprising a petroleum lubricating oil, from 0.5–6.0% of a lime soap, from 0.1–0.5% water, and a proportion of an alkali metal petroleum mahogany sulphonate of the order of 2–20% of the lime soap content.

5. A method of stabilizing a polyvalent metal soap-containing liquid lubricant which comprises incorporating in the lubricant a small proportion of an alkali metal petroleum mahogany sulphonate of the order of 2–20% of the polyvalent soap content.

6. A method of stabilizing a polyvalent metal soap-containing liquid lubricant which comprises incorporating in the lubricant a small proportion of an alkali metal petroleum mahogany sulphonate, based on the polyvalent metal soap content, and subjecting the mixture to intensive shearing stresses.

7. A method of stabilizing a polyvalent metal soap-containing liquid lubricant which comprises incorporating in the lubricant about 2–20% by weight, based on the polyvalent metal soap content, of an alkali metal petroleum mahogany sulphonate, and passing the mixture through a colloid mill.

8. A method of preparing a stable polyvalent metal soap-containing liquid lubricant of improved appearance and transparency which comprises mixing a mineral lubricating oil with about 0.5–6.0% by weight of a water-insoluble polyvalent metal soap, adding a small proportion of an alkali metal petroleum mahogany sulphonate, based on the polyvalent metal soap content, and passing the mixture through a colloid mill.

9. A method of preparing a stable polyvalent metal soap-containing liquid lubricant of improved appearance and transparency which comprises heating under pressure a mixture of mineral lubricating oil, saponifiable fatty material and lime to effect saponification of the fatty material, and provide a lime soap content in the finished lubricant of about 0.5–6.0% by weight, adding a small proportion of an alkali metal petroleum mahogany sulphonate of the order of about 2–20% by weight of the lime soap content, heating to effect substantial dehydration of the mixture, partially cooling, and then adding from 0.1–0.5% by weight of water, and passing the mixture through a colloid mill.

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CERTIFICATE OF CORRECTION.

Patent No. 2,358,939. September 26, 1944.

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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 2, second column, line 26, claim 5, before the word "soap" insert --metal--; 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 16th day of January, A. D. 1945.

Leslie Frazer

(Seal) Acting Commissioner of Patents.