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LUBRICATING COMPOSITION

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This invention relates to lubricating compositions and more particularly to a base capable of forming a substantially stable lubricant of varying consistency.

Greases prior to this invention were made by adding to a fat or fatty acids mixed with a small quantity of mineral oil an amount of lime more than theoretically necessary to completely neutralize or saponify the fat or fatty acids. This mixture was thoroughly agitated and heat applied thereto until a soap was produced, and the water, introduced or produced in the reaction, evaporated. This procedure produced a smooth, homogeneous composition comprising a soap and mineral oil. Usually, such a composition contained about 70% of soap and 30% of mineral oil and it was customary to add to this mixture more mineral oil to make a composition comprising approximately 50% of soap and 50% of mineral oil. This product was very hard and unsuited for lubricating purposes.

In order to render this mixture of soap and mineral oil suitable for lubricating purposes, it was necessary to render it more fluid or plastic. This was attained by incorporating an additional quantity of mineral oil. Mineral oil could not be directly added to this mixture for the reason that any additional quantity of mineral oil would cause the soap to be precipitated. By means of a small quantity of water added to the sufficiently cooled mixture and continued agitation, the incorporation of the mineral oil was accomplished without precipitating the soap. This process produced lubricants known as greases. These greases were unstable emulsions of lubricating oil and water. The consistency characteristic of these greases was made to vary from that of an oil of low viscosity to that of a dense plastic mass depending upon the quantity of soap or oil present in the mixture. The external phase of these greases was the mineral lubricating oil, the water being the inner or dispersed phase. When such a grease was subjected to its intended use, the water in the emulsion was driven off, causing a gel of mineral oil and soap to be produced. This gel, when subjected to the violent disruptive forces such as are found between a journal and its bearing, was broken down, whereby the soap was precipitated. Inasmuch as the calcium or lime soaps of the fatty acid used in these greases did not possess lubricating properties, but merely served as carriers for the lubricant (mineral oil), damage to bearings and journals resulted. Also the grease cups through which the grease was supplied, due to the instability of the mixture, would be clogged and proper lubrication would not be obtained.

We have found that by making a calcium or lime soap of a fatty acid having a molecular weight higher than stearic acid (284) and using this compound in a lubricant we can eliminate the above disadvantages and produce a substantially stable, transparent lubricant to which oil may be added in any desired quantity to vary the consistency of said lubricant without the addition of water.

It is, therefore, an object of this invention to produce a base capable of forming a lubricant of any desired consistency.

Another object of this invention is to produce a substantially stable lubricant comprising a lime soap and a mineral oil of any desired consistency.

A specific object of this invention is to provide a lubricant which comprises a lime soap of a fatty acid having a molecular weight higher than stearic acid (284) and a mineral lubricating oil.

Another object of this invention is to provide a method for producing a substantially stable and transparent lubricant of any desired consistency.

Additional objects will appear from the following description and appended claims.

As above stated, this invention broadly comprises a base formed of a lime soap of a fatty acid having a molecular weight higher than stearic acid (284) capable of forming a substantially stable, water-free lubricant of desired consistency upon the addition of a mineral oil.

In making the lubricant, the base may be formed in the manner now practiced in the making of ordinary greases. This method may comprise mixing the fatty acids or compounds containing them with a small quantity of mineral oil and heating said mixture to any desired temperature, preferably 200° F., or higher. Lime or milk of lime may be added to the heated mixture of mineral oil and fatty acid and the heating continued until the water formed in the reaction is more or less evaporated and neutralization of the fatty acids is effected. The mass may then be cut or thinned to the desired consistency with additional mineral oil without the addition of any water. If desired, the mass may be cooled prior to cutting or thinning. Instead of mixing the fat or fatty acids with a small quantity of oil prior to saponification, the fat or fatty acids may be first saponified and then the entire quantity of oil added.

As in the case of all reactions where neutraliza-

tion is desired, it is always desirable to have a large excess of one of the reagents. In our process we employ a quantity of lime insufficient to completely neutralize the free acids. Hence, our composition contains some free fatty acids. We prefer to keep the free fatty acid content not in excess of 0.5% and in some cases 0.1%, since the lower the free acid content, the higher the melting point of the grease.

The fatty acids which we may use in this invention comprise those having a molecular weight higher than stearic acid such as those present in wool wax, carnauba wax, Chinese tallow and the like. The fatty acids or fatty acid-containing waxes may be employed alone or mixed with smaller amounts of fats or waxes of lower molecular weights as, for instance, common vegetable and animal fats (corn oil, cottonseed oil, tallow, fish oil, etc.).

In the above process for producing the compound we state that a mineral oil is used. By the term "mineral oil" we mean any product that is made from petroleum, such as gasoline, kerosene, gas oil, lubricating oils, paraffin wax, petrolatums and asphalts.

As above stated, lubricants of any desired consistency may be produced. If the lubricant is intended to be a grease, a greater amount of the base is incorporated in the mineral oil or a smaller quantity of the latter is used. On the other hand, if a fluid lubricant is desired, the amount of soap may be decreased or the quantity of oil may be increased. It is thus seen that various proportions of ingredients may be used. We have obtained satisfactory results by using a base formed from approximately 10% of lime based on the fat or wax content, and preferably wool wax fatty acids, the quantity of oil depending on the desired consistency. If the composition has an objectionable odor, any of the well-known perfumes may be added thereto.

The lubricating composition produced is transparent and may be of any desired consistency. It is substantially stable under substantially all conditions. On standing, there will be no separation of soap after several days. In use there will be no deposition or precipitation of the soap. Due to the fact that this composition contains no water and is not broken down under operating conditions, it may be used at rather high temperatures exceeding 400° F. or 500° F. Since this lubricant is a substantially stable compound, the feed cups are not clogged and good efficient lubrication is obtained.

Since it is obvious that various modifications may be made in the specific details above described without departing from the nature of this invention, it is to be understood that this invention is not limited to the precise and specific details above set forth except as defined in the appended claims.

We claim:

1. A grease comprising a lime soap of a fatty acid having a molecular weight above 285 and a mineral oil, said grease having a free fatty acid content not exceeding approximately 0.5%.

2. A grease comprising a lime soap of wool wax fatty acid and mineral oil, said grease having a free fatty acid content not exceeding approximately 0.5%.

3. A substantially stable and water-free grease comprising a lime soap of a fatty acid having a molecular weight above 285 and a mineral oil, said grease having a free fatty acid content not exceeding approximately 0.5%.

4. A substantially stable and water-free grease comprising a lime soap of wool wax fatty acid and mineral oil, said grease having a free fatty acid content not exceeding approximately 0.5%.

5. A method of making a grease which comprises heating a fatty acid having a molecular weight above 285, adding lime in quantities sufficient to neutralize the free fatty acid content in excess of approximately 0.5% and adding a sufficient quantity of mineral oil to the resulting mass to bring it to the desired consistency.

6. A method of making a grease which comprises heating wool wax fatty acid, adding lime in quantities sufficient to neutralize the free fatty acid content in excess of approximately 0.5% and adding a sufficient quantity of mineral oil to the resulting mass to bring it to the desired consistency.

7. A method of making a grease which comprises heating a mixture of mineral oil and a fatty acid having a molecular weight above 285, adding lime in quantities sufficient to neutralize the free fatty acid content in excess of approximately 0.5% and adding a sufficient quantity of mineral oil to the resulting mass to bring it to the desired consistency.

8. A method of making a grease which comprises heating a mixture of mineral oil and wool wax fatty acid, adding lime in quantities sufficient to neutralize the free fatty acid content in excess of approximately 0.5% and adding a sufficient quantity of mineral oil to thin the resulting mass to bring it to the desired consistency.

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