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LUBRICANT

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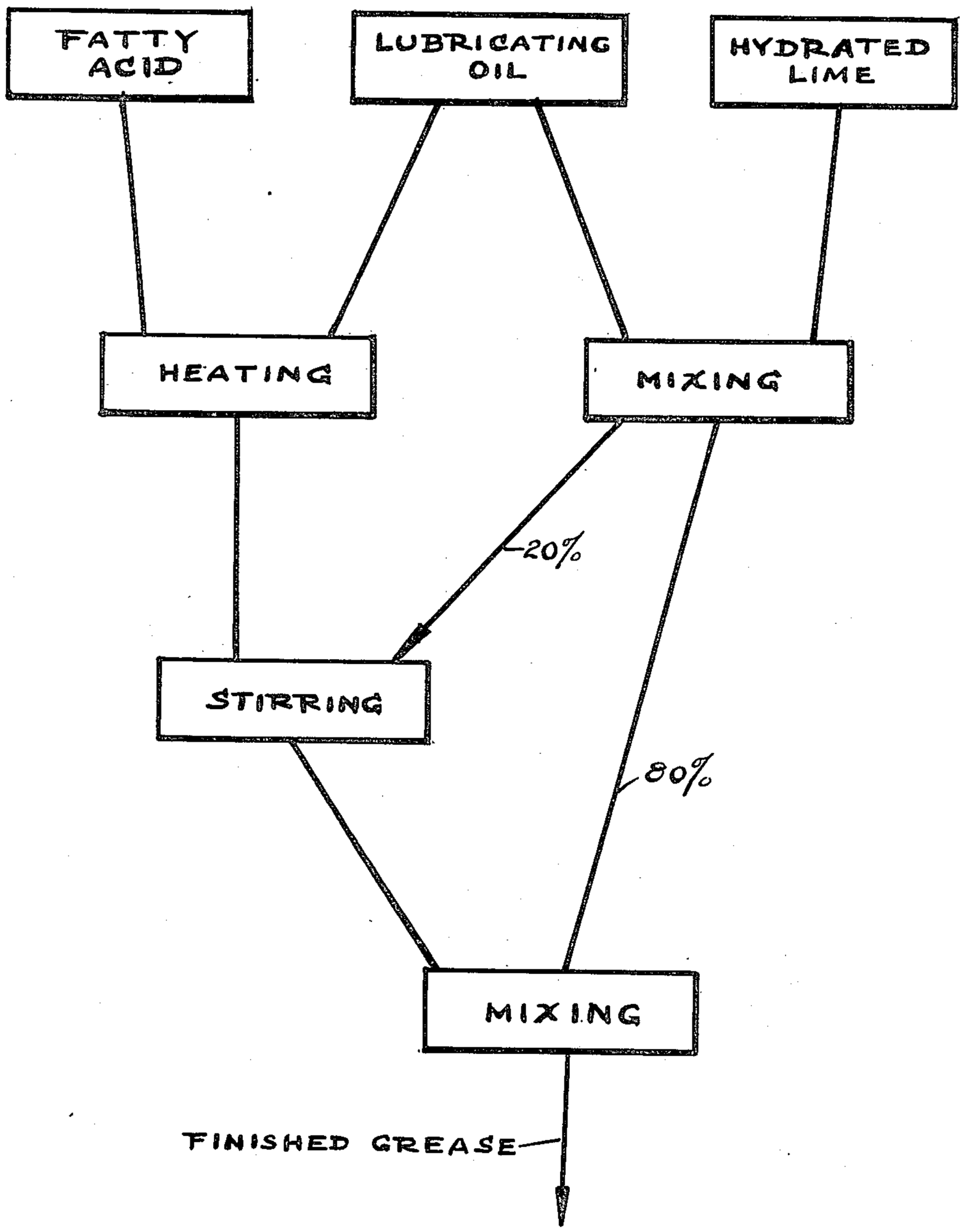

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LUBRICANT

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3 Claims. (Cl. 252—39)

This invention relates to novel lubricants and methods of preparing same, and more particularly it relates to manufacturing cold made cup greases in a two-stage process.

In making cup greases by the usual cold process, the lime is suspended in a small part of the oil, while the balance of the oil and the fatty acid are heated to about 190° F. The lime suspension is then added to the acid solution, and reaction takes place. The term "cold" refers to the fact that the material is never heated above the boiling point of water.

A troublesome feature of the above process is the fact that during the reaction a gas of some sort is released causing a thick layer of foam to form on top of the grease. This is particularly true in high viscosity oils. This foam if not removed works into the grease and spoils its appearance.

It is believed that this foam is due to the reaction of a small amount of low molecular weight fatty acids in the commercial fatty acids used, with the calcium carbonate traces found in the lime; generally all commercial hydrated lime contains traces of calcium carbonate.

It is a primary object of this invention to remove or prevent the formation of such foaming, regardless of its origin. Another object of the invention is to prepare finished cup greases which, due to being much freer from foam during the course of manufacture, are clearer and present a much better appearance.

Broadly, the invention comprises saponifying the fatty acids or other acidic material in a two-stage process by, for instance, using 10–50% of the lime in the first stage and heating the resultant reaction mixture until reaction is complete, and any small amount of foam which may have been formed has disappeared due to reaction in the presence of an excess of acid, then subsequently adding the rest of the lime to complete the saponification.

The preferred method of carrying out the invention is to dissolve a fatty acid such as stearic acid, hog fat acids, tallow acids, or other suitable acidic materials in a suitable mineral oil base stock such as one having a viscosity between the approximate limits of 40 seconds and 300 seconds Saybolt at 210° F., and heating the resultant mixture until satisfactory solution or dispersion is obtained, generally a temperature of about 80° F. to about 125° F. is required, and then adding about 10–50% of the total amount of hydrated lime to be used in the saponification, this hydrated lime being added preferably in the form of a suspension in oil, the same type as referred to above being satisfactory. Although the saponification may start and might eventually complete itself at relatively low temperatures, it is preferred to accelerate the reaction by heating the mixture to about 170–200° F. with stirring. After heating thus for a short time, generally about one quarter hour to one hour, the lime used has been substantially consumed in the saponification and the resultant partially saponified fatty solution in oil is substantially free from foam. The remaining 90–50% of hydrated lime is then added, preferably likewise in the form of a lime-oil suspension, and the heating and stirring continued until the saponification is substantially complete. The grease may then be poured directly into containers for shipping or storage.

The mineral oil to be used as base stock may be derived from paraffinic, naphthenic, or mixed base crudes and may be refined by conventional methods such as clay treating, acid treating, distillation, solvent extraction, etc. Instead of using stearic acid or the other fatty materials mentioned above, one may also use other conventional fatty materials such as oleic acid, cottonseed fatty acids, or synthetic fatty acids derived by the oxidation of paraffin wax or other high molecular weight carboxylic acid having at least 10, and preferably more than 15 carbon atoms, such as naphthenic acids obtained from petroleum hydrocarbon oils of the kerosene and higher boiling ranges.

Although the invention is intended to apply primarily to the preparation of cup greases in which lime is used as the saponifying agent, it may also be applied to the preparation of lubricating greases containing other types of saponifying agents than lime, as for instance soda greases, aluminum soap greases, etc., particularly when such saponifying agent contains traces or substantial amounts of impurities in the form of carbonates or other compounds capable of giving off a gas when reacted with fatty acids, particularly with the small amount of low molecular weight fatty acids, often present in commercial fatty acids.

In carrying out the invention, the first addition of lime may be made large and the material cooked to dryness if desired to increase the clarity of the product by the removal of water.

In the preferred continuous process, the first mixing may be done in a storage tank, with or without heating, and the second addition of lime may be mixed in continuously after the first mixture has been heated sufficiently.

As a still further alternative, the fatty acid raw material may be partially reacted with some hydrated lime, before it is dissolved or dispersed in the mineral oil base stock.

For the sake of clarity, a flow sheet of the process of this invention is shown in the accompanying drawing.

For the sake of illustration the following example is given:

Example

A 400 pound batch of cup grease is made by using the following formula:

	Per cent
Commercial oleic acid	8.0
Hydrated lime (first step)	0.2
Hydrated lime (second step)	0.8
Lubricating oil (70 seconds Saybolt Universal at 210° F.)	91.0

The lime was suspended in twice its weight of oil and the acid added to the balance of the oil. 20% of the lime suspension was added to the acid solution which was heated to 190° F. Two hours later, the two mixtures were blended in a tank.

The final completed batch of grease showed less than 3/8 of an inch of foam as compared to over 1 inch of foam on a batch of grease made with the same amount of materials but carrying out the saponification in a single step.

Thus, the essential feature of the present invention consists in heating and stirring the mixture during the partially saponified stage to permit the acid medium to break up the foam formed during the initial stage of saponification.

It is not intended that this invention be limited by the specific examples which have been given merely for the sake of illustration, nor unnecessarily by any theory as to the mechanism of the operation of the invention, but only by the appended claims in which it is intended to claim all novelty inherent in the invention as well as other modifications coming within the scope and spirit of the invention.

What is claimed is:

1. The process of manufacturing a lime-soap lubricating grease which comprises dissolving all of the fatty materials to be used in a mineral oil base stock, dispersing hydrated lime in mineral oil, adding about 10–50% of said lime dispersion to the oil-solution of fatty materials and reacting the resultant mixture until said lime is substantially completely reacted and until the foam initially formed has substantially completely broken, and finally adding the rest of the lime dispersion, and heating and stirring the mixture until saponification is complete, the entire reaction being completed at a temperature not exceeding about 170–200° F.

2. A two-stage process for manufacturing cold made cup grease which comprises dissolving high molecular weight fatty acids in a mineral oil having a viscosity of about 40 to 300 seconds Saybolt at 210° F., dispersing hydrated lime in a similar mineral oil base stock, adding about 5–50% of the lime suspension to the fatty acid solution in oil, heating the resultant mixture to about 190° F. until initially formed foam has substantially completely broken, then adding the remainder of the lime suspension and heating and stirring until saponification is complete.

3. A two-stage process for manufacturing cold made cup grease from fatty acid lubricating oil and hydrated lime which comprises mixing all of the fatty acid with 98% by volume of the lubricating oil and heating the resulting mixture, suspending all of the hydrated lime in the remaining 2% of lubricating oil into a homogeneous suspension, adding 20% by volume of said suspension to the oil-fatty acid mixture with stirring and heating until the lime therein is substantially completely reacted with the fatty acid, and then adding the remaining 80% of lime suspension with further stirring and heating until the saponification reaction is complete.

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