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GREASE COMPOSITION

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The present invention relates to improved grease compositions and particularly to stable non-sweating greases and to the method by which they may be made. The invention will be fully understood from the following description.

Lubricating greases have been made up from lime soaps for many years and it has been long noted that these greases gradually tend to sweat or bleed, that is, to lose oil during storage. The oil appears on the surface of the solid grease cake in small droplets or separates from the grease as a separate layer. It may be appreciated that this is a very objectionable property and although there have been many attempts to overcome it none have heretofore been successful.

It has been found that the bleeding or sweating can be prevented by the addition of substantial amounts of amorphous hydrocarbon waxes, in other words, petrolatum, ceresin or other petroleum waxes of high melting point and small crystal structure. While petrolatum has been used previously in greases, so far as is known, it has not been used in sufficient quantity to prevent sweating, and it is believed that the petrolatum should comprise at least 15% of the composition in order to function properly.

It has been found extremely difficult to produce a smooth, uniform grease free from lumps of soap or wax which contains as much as 15% of petrolatum. It has now been found, however, that such large quantities of petrolatum can be introduced simply to produce a highly satisfactory product by the addition of suitable wetting agents which are highly oil soluble. The most suitable compound of this type is a soda salt of an oil soluble sulfonic acid. Alkali and alkaline earth salts of alkyl and aryl sulfonates, sulfonated alcohols and sulfonated naphthenic acids may be used but it is preferred to use the soda salts of mahogany acids derived from petroleum acid sludges. It will be realized that other equivalent materials may be used, for example, the other alkali or alkali metal salts of sulfonic acids and the like.

The calcium soaps of any particular fat, fatty oil or fatty acid may be used to produce the grease such as those obtained from animal, vegetable and fish oils. Tallow soaps are excellent for the purpose. The amount of the soap may vary from about 5 to 30%, depending on the type and consistency, melting point and other properties desired in the composition.

The hydrocarbon oil used is preferably a lubricating oil which may be a distillate or a residual cylinder oil. If low viscosity oils are used it is generally deisrable to increase the proportion of soap over that which would be necessary with the more viscous oils. In some of these oils wax or petrolatum is naturally present but in too small an amount to be beneficial. Additional petrolatum must always be added so as to increase the amount to 15% or more in order to prevent sweating or bleeding, as aforesaid. In general, increasing the amount of soap raises the melting point or softening point of the grease and if the petrolatum content is raised at the expense of the oil the resulting grease becomes harder and of higher melting point.

The amount of water in the grease need only be sufficient to effect good emulsification. For example, it may be of the order of 1 or 2%, more or less, but may contain considerably more, say from 2 to 5% if desired.

The above mentioned substances, namely, the oil, lime soap, petrolatum, sulfonate and water are the only ingredients necessary to make up a smooth, uniform, nonsweating grease, but other constitutents may be added or included therein such as glycerine, oiliness agents, plasticizers which have the effect of making the grease temperature reversible, solid lubricants such as graphite and fillers of the type of talc, chalk, and the like, to adapt the grease to some particular service and which do not destroy the value of the present base.

The grease may be made up by incorporating the calcium soap with a part of the oil at a relatively high temperature, say 300° F., usually 300 to 400° F., and when this is in solution the petrolatum should be added and the mass may then be cooled to 230 to 250° F. The remainder of the oil may then be added containing the wetting agent in solution along with the water required and the mass should be quickly cooled to a temperature below 212° F. in order to prevent the loss of water. The grease emulsion is then formed at this temperature.

As an example of the composition and the method of compounding the same, the following example may be considered:

Twelve parts by weight of a lime soap produced from horse fat was incorporated with 32½ parts of the petroleum lubricating oil having a viscosity of 300 seconds Saybolt at 100° F. The mixture was heated to 350° F. and stirred to uniformity. Twenty parts of crude Ranger petrolatum is then added with 16¼ parts of the same oil previously used, and the mass is thoroughly stirred and gradually cooled to 230° F. At this temperature a further addition of 16¼

parts of the oil is made along with 2 parts of the water and 1 part of a soda salt of an oil soluble sulfonic acid obtained in the treatment of petroleum lubricating oil with fuming sulfuric acid. These later additions bring the temperature down to about 190° F. and the stirring is continued for a time to form an emulsion. The grease had the following composition:

	Percent
Calcium soap of horse fat	12
Sodium sulfonate (oil soluble)	1
Petrolatum	20
Water	2
Lubricating oil	65

This composition is an excellent cup grease, showing no tendency to separate or sweat on long standing.

The invention is not to be limited by any theory of the function of the various ingredients nor to any particular ingredient or combination or proportion but only to the following claims in which it is desired to claim all novelty inherent in the invention.

We claim:

1. A solid lubricant, comprising a major proportion of lubricating oil, a lime soap and at least 15% of petrolatum whereby bleeding or sweating of the oil is prevented.

2. A solid lubricating grease comprising a major proportion of a mineral lubricating oil, a calcium soap in quantities sufficient to solidify the oil, at least 15% of petrolatum in an amount sufficient to prevent bleeding or sweating and a small quantity of an oil soluble wetting agent and water for emulsification.

3. A solid grease composition comprising a major proportion of a mineral lubricating oil, calcium soap in proportion of 5 to 30%, petrolatum in proportion of about 15 to 25%, and a small quantity of oil soluble sodium sulfonate and water for emulsification.

4. A composition according to claim 3 in which the water content is of the order of 2% and the sodium sulfonate of the order of 1%.

5. An improved method for preparing lime soap greases comprising incorporating the lime soap in a mineral oil at a temperature above 300° F., adding petrolatum thereto in proportion of at least 15% of the final composition, cooling, adding water for emulsification and emulsifying at a temperature below 212° F.

6. An improved process according to claim 5 in which an oil soluble wetting agent is added to the anti-sweating agent before emulsification.

7. An improved process according to claim 5 in which an oil soluble sodium sulfonate derived from petroleum is added to the composition before emulsification.

8. A solid lubricant, comprising a major proportion of lubricating oil, a lime soap, at least 15% of an amorphous mineral hydrocarbon wax of high melting point and small crystalline structure whereby bleeding or sweating of the oil is prevented.

9. A solid lubricating composition of matter comprising a major proportion of a mineral lubricating oil, 5 to 30% of lime soap, at least 15% of amorphous hydrocarbon wax, a small but effective quantity of an agent selected from the class consisting of alkali and alkaline earth metal salts of alkyl and aryl sulfonates, and not more than 5% of water.

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