PROCESS FOR MAKING LUBRICATING GREASE

This invention relates to the process of manufacturing a lubricating-grease by incorporating the aluminum salts of fatty acids with mineral oil. The object of the invention is the production of a superior lubricating-grease which is stable to mechanical agitation as found in gear cases, differentials and the like in use on automobiles. The grease produced by this process is particularly suitable for use in the lubrication of chassis-bearings, journals and a wide variety of bearings where the lubricant is forced to the wearing surfaces by means of high pressure, as it works thru grease guns or grease cups easily, and at the same time its lubricating qualities are such that it stays in place and gives satisfactory lubrication for prolonged periods of time. The grease is not subject to oxidation and does not leave hard or soapy residues in small oil grooves as found in automobile, spring, shackle-bolts.

Another object of this invention is the production of a lubricating-grease which is not affected by or soluble in water. In the known processes for manufacturing lubricating-greases various soaps or metallic salts of fatty acids, derived from vegetable or animal oils and fats, are employed for thickening mineral lubricating oils. The proportion and grade of mineral oil used usually depends on the consistency required in the finished grease and the service to which the grease is to be put. In many cases greases are produced by boiling together fat or fatty oil, caustic soda solution and an appropriate quantity of mineral oil. It is of importance that these greases containing sodium soaps or other alkali salts of fatty acids, are affected greatly by the presence of water. If during storage or in use, sodium soap greases come in contact with moisture, they acquire an unsatisfactory appearance, lose their original consistency and become thin and subject to leakage from differentials and gear cases.

While it has long been known that various mineral oils have been used to thicken mineral oils it should be understood that the methods used in the past produced liver-like jellies which when dissolved in large quantities of mineral oil were known as "mineral castor oil," "viscom," "oil-pulp," "oil thickener," "gelatin," etc. These products may be recognized in all cases by their peculiar stringy texture, forming viscous threads when the oily cork is removed from a bottle of the material. They are also characterized by their non-homogeneous appearance and the property of rapidly losing their viscosity, particularly when heated. These viscous or liver-like lubricants should not be confused with the product produced by the following process, although in some cases the constituents may be almost identical.

The term aluminum soap as used in this specification and hereafter in the following claims, refers to the aluminum salt of such as stearic acid, such as aluminum tri-stearate, which may contain small quantities of aluminum tri-palmitate. By the term aluminum stearate ordinary commercial or technical grade which usually contains an appreciable quantity of aluminum palmitate is meant. The aluminum salts of naphthenic acids are not applicable to my process, however the use of a small quantity of naphthenic acids derived from petroleum and converted to aluminum naphthenate has no detrimental effects.

As the result of much experimental work it has been discovered that if aluminum stearate is heated together with paraffine base lubricating oil to a temperature of 335° F. to 550° F. until the mixture has become substantially dehydrated and the product then cooled without appreciable agitation to normal room temperature that a lubricating-grease of smooth, butter-like texture, transparent in appearance and having the properties already described will be produced.

It is not possible to make very definite specifications of the percentages of ingredients as the quantity of aluminum soap used varies with the type of grease desired according to the use for which it is intended, and the grade of mineral oil employed. A soft grease may be made with 5% of aluminum soap, although as much as 80% of soap may be used for compounding greases for special purposes. The following formula is intend-
ed as a typical example and if the process is carried out as directed a satisfactory product will be produced:

7.5% by weight, technical grade, aluminum stearate.
92.5% by weight, 300 paraffine oil.

The 300 paraffine oil preferred has the following physical characteristics, and is obtained from Pennsylvania or Midcontinent crude oil:

Flash point: 410° F.
Fire point: 470° F.
Saybolt viscosity at 100° F: 290 seconds
Cold test: 40° F.
Color: No. 6 N. P. A.

While this oil has been found to give very good results, paraffine oil of higher viscosity or lower viscosity such as paraffine oil of 100 seconds Saybolt viscosity at 100° F. may be used with satisfactory results. Asphalt base lubricating oils and black oils do not lend themselves to the process as well as the oil of paraffine base. The term paraffine oil will be used hereafter to indicate a mineral oil known to the oil trade by that name and obtained from crude oils produced in Pennsylvania and neighboring States and Midcontinent fields, and may have a viscosity of 80 to 3000 seconds Saybolt at 100° F.

In carrying out the process a grease kettle equipped with paddles for agitating and jacketed for high pressure steam or hot oil for maintaining the kettle contents at a temperature of approximately 425° F. is required. A kettle set in a brick furnace and heated by means of gas, oil or coke fire may also be used. The object of heating the oil and aluminum stearate to this temperature is not only that of causing the soap to go into solution in the oil but to dehydrate the soap to such an extent that the normal stringy texture of the mixture is destroyed and a smooth product obtained.

The aluminum stearate is charged in the kettle with approximately three quarters of the mineral oil and heated to 425° F. and maintained at this temperature for about two minutes when the balance of the oil is run in. Heating is then discontinued and the mixture in a liquid state is run into chilling pans or other containers to solidify without further agitation. Agitation is carried on while the kettle is being heated. If desired the total amount of the oil may be mixed with the aluminum stearate at the start of the process but a darker colored product is produced.

After the grease has acquired a temperature of approximately 100° F. it may be packed in containers for use. The liquid grease may also be drawn off from the kettle thru a series of cooling pipes to obtain a smooth product, but the method of drawing the grease into iron pans about ten feet square and six inches in depth is preferred. A still different method of cooling the hot grease without appreciable agitation is to bring it into contact with a revolving, refrigerated drum, from which it may be scraped after cooling.

Having now described my new lubricating grease and the process for manufacturing it, what I claim as new and desire to protect by Letters Patent is:

1. The process of manufacturing lubricating grease which comprises mixing aluminum stearate with paraffine oil, heating the mixture to 335° F. to 550° F. and maintaining this temperature until the mixture is practically dehydrated and the normal stringy texture destroyed, then cooling without appreciable agitation, substantially as described.

2. The process of manufacturing lubricating grease which comprises mixing aluminum soap with paraffine oil, heating the mixture to 335° F. to 550° F. and maintaining this temperature until the mixture is practically dehydrated and the normal stringy texture destroyed, then cooling without appreciable agitation, substantially as described.

3. The process of manufacturing lubricating grease which comprises mixing 7.5% by weight of aluminum stearate with 92.5% of paraffine oil, heating the mixture to 425° F. and maintaining this temperature until the mixture is practically dehydrated and the normal stringy texture destroyed, then cooling without appreciable agitation, substantially as described.

4. The process of manufacturing lubricating grease which comprises mixing from 5 to 25% by weight of aluminum soap with 95 to 75% of paraffine oil, heating the mixture to 335° F. to 550° F. and maintaining this temperature until the mixture is practically dehydrated and the normal stringy texture destroyed, then cooling without appreciable agitation.

5. The process of manufacturing lubricating grease which comprises mixing from 5 to 25% by weight of aluminum stearate with 95 to 75% of paraffine oil, heating the mixture to 335° F. to 550° F. and maintaining this temperature until the mixture is practically dehydrated and the normal stringy texture destroyed, then cooling without appreciable agitation.

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