

# UNITED STATES PATENT OFFICE

2,448,720

## NOVEL GREASES

Francis J. Licata, West Caldwell, N. J., assignor to Nopco Chemical Company, Harrison, N. J., a corporation of New Jersey

No Drawing. Original application August 14, 1942, Serial No. 454,825, now Patent No. 2,431,760, dated December 2, 1947. Divided and this application March 14, 1946, Serial No. 654,529

5 Claims. (Cl. 252-36)

1

This invention relates to improved aluminum base greases.

Aluminum base greases are widely used for lubrication purposes on account of their water-proof characteristics, their heat resistance within certain limitations and their attractive appearance. However, these greases have certain disadvantages, notably their tendency to assume a jelly-like, rubbery texture upon heating above a certain critical temperature; their tendency towards syneresis, or bleeding out of oil in storage and use; and their somewhat granular and crumbling structure. Further, the oils contained in aluminum base greases must be of relatively high viscosity in order to form a stable grease.

Accordingly, it is an object of this invention to provide aluminum base greases which will have a smooth, unctuous and greasy texture, and which will retain this texture when heated to elevated temperatures.

Another object is to provide an aluminum base grease which will not separate oil upon standing.

Still another object is to provide an aluminum base grease in which a larger proportion of soap base may be incorporated than has hitherto been possible.

The above and other objects are attained by this invention in aluminum base greases which contain, in addition to aluminum soaps of saturated higher fatty acids, a small proportion of a barium soap of a higher fatty acid. The added barium soap serves to stabilize the colloidal structure of the grease, preventing syneresis thereof during storage and use, and restraining the tendency of the grease to assume a rubbery texture at high temperatures. Further, greases prepared according to this invention are characterized by having a smoother and more unctuous texture in comparison to aluminum base greases heretofore prepared and likewise are capable of holding a substantially greater amount of soap for a given consistency than is possible with aluminum base greases heretofore prepared. The expressions "aluminum base greases" and "aluminum soaps" as used herein are qualified in that, in each instance, the aluminum base or soap is that of an aluminum soap of a saturated higher fatty acid.

Except for the nonaluminum soap additive just mentioned, the greases of this invention will be constituted substantially the same as the aluminum base greases hitherto manufactured, containing in general between about 2% and about 15% to 20% of aluminum soaps of saturated

2

higher fatty acids, comprising essentially lubricating oils. The percentage of aluminum soap incorporated into the greases of this invention may be slightly higher than in the usual aluminum base greases in view of the softening tendency of the nonaluminum soap additive. The aluminum content of the aluminum soap may be varied between the usual limits and will generally be such that the washed ash determined upon the soap will lie between about 4% and about 12%. The fatty residues in the aluminum soap may be of the types customarily used in aluminum base greases, i. e., higher saturated fatty radicals on the order of palmitic, stearic, margaric, etc., radicals.

The fatty radicals in the barium soap may be any of the higher fatty acids having molecules containing upwards of 8 carbon atoms, and preferably upwards of 16 carbon atoms. Preferably, but not necessarily, the fatty acids should be saturated. A list of suitable fatty acids, the barium soaps of which may suitably be employed in the greases of this invention, includes palmitic, stearic, arachidic, lauric, margaric, oleic, elaidic, erucic, and the like, fatty acids. Instead of the soaps of pure fatty acids, there may be employed soaps of suitable mixed fatty radicals coming within the requirements above set forth, such as the mixed fatty radicals derivable from the animal and vegetable oils, fats and waxes such as tallow, corn oil, cottonseed oil, hydrogenated fish oils, and the like. Likewise, the naphthenic acids are suitable components of the nonaluminum soaps incorporated into greases according to this invention. The mol ratio of metallic and of fatty radicals present in the said soaps may vary; in general, at least one of the valencies of the metal should be combined with fatty radicals, but a higher ratio may desirably be employed. Usually, the neutral soap will be employed.

The amount of barium soap incorporated into the grease of this invention may vary, depending on the properties desired in the final product, but in general this amount will be only a small fraction of the amount of the aluminum soap present. Roughly, the objects of this invention can be attained by the addition of from about 0.1% to about 5% of the barium soap, based upon the total weight of grease. In general, the higher the percentage of barium soap, the softer the resulting grease will be for any given percentage of aluminum soap, and advantage can be taken of this fact to add a considerably greater total

amount of soaps to the grease than has heretofore been possible with aluminum base soaps.

The manner of preparing greases of this invention can follow any conventional practice, this not being critical to the invention. Conveniently, the aluminum soap, barium soap, lubricating oil and any other desired ingredients may be mixed and heated to a temperature sufficiently high to effect homogeneous blending thereof. Thereafter the product may be cooled and packaged for use.

Aluminum base greases prepared according to this invention are compatible with all the usual additives and modifying agents, such as latex, alkylated aromatics, etc., customarily added to such greases, and are improved and modified in the usual respects by such additives.

With the above discussion in mind, there is given herewith an example of a grease prepared in accordance with this invention. All parts given are by weight:

Example

	Parts
Aluminum stearate (8% washed ash) -----	11
Barium soap (neutral stearate) -----	1
Paraffin oil (100 sec. viscosity @ 100° F.) ----	88
	100

The above ingredients were heated to 150° C. with stirring, and slowly cooled to room temperature. The resulting grease was soft with a smooth texture and free from bleeding. On reheating, it melted without passing through the rubbery stage.

From the above, it will be seen that the greases provided by this invention are distinguished from similar greases heretofore prepared in that they do not become rubbery upon heating. This is highly advantageous since the greases do not lose their lubricating properties upon overheating of the surfaces to which they are applied. Further, greases according to this invention possess a smoother and more unctuous texture than aluminum base greases heretofore prepared. Still further, the greases of this invention may have a higher net soap content, can be made from less viscous oils without danger of bleeding out of the oil, and exhibit a higher degree of water-resist-

ance than aluminum base greases of the prior art. Finally, greases according to this invention are highly stable in storage and use against any separation or syneresis of the oils contained therein.

This application is a division of my application Serial No. 454,825 filed on August 14, 1942, now Patent No. 2,431,760, dated December 2, 1947.

I therefore claim:

1. A lubricating grease comprising mineral oil, 2% to 20% of an aluminum soap of a saturated higher fatty acid and 0.1% to 5.0% of a barium soap of a higher fatty acid, the quantity of the barium soap being only a fraction of that of the aluminum soap.

2. A lubricating grease comprising mineral oil, 2% to 20% of an aluminum soap of a saturated higher fatty acid and 0.1% to 5.0% of a barium soap of a saturated higher fatty acid, the quantity of the barium soap being only a fraction of that of the aluminum soap.

3. A lubricating grease comprising mineral oil, 2% to 20% aluminum stearate and 0.1% to 5.0% of a barium soap of a higher fatty acid, the quantity of the barium soap being only a fraction of the aluminum soap.

4. A lubricating grease comprising mineral oil, 2% to 20% aluminum stearate and 0.1% to 5.0% of a barium soap of a saturated higher fatty acid, the quantity of the barium soap being only a fraction of that of the aluminum soap.

5. A lubricating grease comprising mineral oil, 2% to 20% aluminum stearate and 0.1% to 5.0% barium stearate, the quantity of the barium soap being only a fraction of that of the aluminum soap.

FRANCIS J. LICATA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,625,969	Willock et al. -----	Apr. 26, 1927
2,266,544	Freuler -----	Dec. 16, 1941
2,332,247	Morway et al. -----	Oct. 19, 1943
2,379,245	Morway et al. -----	June 26, 1945
2,397,956	Fraser -----	Apr. 9, 1946