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# UNITED STATES PATENT OFFICE

FRANK C. GEBHARDT, OF ERIE, PENNSYLVANIA, ASSIGNOR TO UNITED OIL MANUFACTURING COMPANY, OF ERIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

## GREASE AND METHOD OF MAKING THE SAME

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The present invention is designed to form a grease using as its lubricating base a mineral oil.

I have discovered that superior greases may be formed using such mineral oils in connection, or combined with a metallic soap, such greases having properties superior for certain uses over the ordinary greases of commerce.

In carrying out my invention I preferably utilize a mineral oil having a viscosity of 90″ or 120″ to 300″ of Saybolt at 212° F. and an aluminum salt of fatty acid of general formula $C_nH_{2n}O_2$, when C is not less than 15 using from 15% to 45% by weight of the total mass of such fatty acid salt, and heating the same to a temperature above 160° to 260°. Ordinarily the conversion of a grease begins slightly above 160° F. and is usually practically complete at about 220° F. Within this range there is a complete change in the quality of the mixed materials, the change from an oil consistency to a rubbery mass being accompanied by a change in color.

The character of the mass undergoes an entire change within this temperature range and this may be fixed by a quick chilling of the mass. Chilling may be accomplished by exposing the mass to the air in a shallow layer, the chilling in ordinary air summer temperatures taking place in layers not exceeding two inches in depth. Artificial chilling may be utilized. Without such chilling the mass reverts, or at least loses its grease characteristics. Aluminum stearate, or aluminum palmitate are examples of the fatty acid salts suitable for the purpose. The amount of such fatty acid salts used may be varied in accordance with the stiffness, or body of the grease desired, a greater percentage of such fatty acid salts forming a stiffer, or heavier-bodied grease. As an example of making a desirable product the following mixture may be used: mineral oil having a viscosity of one hundred and twenty seconds Saybolt at 212° F. 85%, aluminum stearate 15%. This mixture is heated to a temperature of about 260°, the conversion usually taking place between 160° to 220° and being complete at 220°. The added temperature, however, is usually given to assure the completion of the action. The material is then quickly cooled while in a static condition at atmospheric temperatures, summer heat, in layers not to exceed two inches in depth, or may be artificially accomplished if equally rapid.

The material so formed is similar in many respects to ordinary greases but will retain its stiffness at very much higher temperatures than ordinary greases and this, among other desirable qualities, makes it superior to ordinary greases for certain uses.

It is to be observed that certain specific embodiments have been described for the purpose of carrying the present invention into practice although variations and modifications may be utilized as one skilled in the art readily understands and such variations and modifications are within the scope of the invention as defined in the appended claims. Thus, for instance, as a lubricating base a mineral oil or its equivalent may be used.

What I claim as new is:—

1. The method of forming grease which consists in mixing and heating mineral oil of a viscosity of not less than ninety seconds Saybolt at 212° F. and an aluminum salt of fatty acid of general formula $C_nH_{2n}O_2$ when $n$ is not less than fifteen, such fatty acid salt being from 15% to 45% by weight of the total mass to a temperature from 160° to 260° F., and chilling the mass rapidly enough to prevent reversion.

2. The method of forming grease which consists in mixing and heating mineral oil of a viscosity of not less than ninety seconds Saybolt at 212° F. and an aluminum salt of fatty acid of general formula $C_nH_{2n}O_2$ when $n$ is not less than fifteen, such fatty acid salt being from 15% to 45% by weight of the total mass to a temperature from about 160° F. to about 260° F., and quickly chilling the mass by exposing to air in a thin layer.

3. The method of forming grease which consists in mixing and heating mineral oil of a viscosity of not less than ninety seconds Saybolt at 212° F. and an aluminum salt of fatty acid of general formula $C_nH_{2n}O_2$ when $n$ is not less than fifteen, such fatty acid salt

being from 15% to 45% by weight of the total mass to a temperature from about 160° F. to about 260° F., and quickly chilling in a thin layer not to exceed two inches in depth at summer temperature.

4. The method of producing a solid lubricating grease which comprises mixing and heating mineral oil having a viscosity of not less than 90 seconds Saybolt at 212° F., and aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than 15 to a temperature above about 160° F. to form a mixture of grease and cooling said mixture of grease rapidly enough to prevent reversion thereof.

5. The method of producing a solid lubricating grease which comprises mixing and heating mineral oil having a viscosity of not less than 90 seconds Saybolt at 212° F. and aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than 15 to a temperature above about 160° F. and sufficiently high to change the oil-aluminum salt mixture from an oil consistency to a rubbery mixture of grease and cooling said mixture of grease rapidly enough to prevent reversion thereof to an oil consistency.

6. A solid lubricating grease composed of a mineral oil having a viscosity within a range of about 90″ to about 300″ Saybolt at 212° F. in admixture with an aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than fifteen.

7. A solid lubricating grease as set forth in claim 6 in which aluminum salt is present to extent of about 15% to about 45% by weight.

8. A solid lubricating grease compounded by heating a mass of mineral oil and an aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than fifteen and then cooling said heated mass rapidly enough to prevent reversion.

9. A solid lubricating grease compounded by heating a mass of mineral oil having a viscosity within a range of about 90″ to about 300″ Saybolt at 212° F. and an aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than fifteen to a temperature higher than about 160° F. and then cooling said mass rapidly enough to prevent reversion.

10. A solid lubricating grease compounded by heating a mass of about 85 parts to about 55 parts of mineral oil having a viscosity within a range of about 90″ to about 300″ Saybolt at 212° F. and about 15 parts to about 45 parts of an aluminum salt of a fatty acid of general formula $C_nH_{2n}O_2$ in which $n$ is not less than fifteen to a temperature higher than about 160° F. and then cooling said heated mass while in a static condition in a relatively thin layer and rapidly enough to prevent reversion.

11. A grease composed of a mineral oil of a viscosity of not less than ninety seconds Saybolt at 212° F. and an aluminum salt of fatty acid of formula $C_nH_{2n}O_2$ when $n$ is not less than fifteen, said aluminum salt being from 15% to 45% by weight of the total mass.

12. The method of forming grease which comprises heating a mineral oil and an aluminum salt of a fatty acid of the general formula $C_nH_{2n}O_2$ when $n$ is not less than fifteen to a temperature of about 160° F. to about 260° F. to form a mass of grease, and cooling the heated mass of grease rapidly enough to prevent reversion thereof.

13. A lubricating grease compounded by heating a mixture of mineral oil and an aluminum salt of a fatty acid of the general formula $C_nH_{2n}O_2$ in which $n$ is not less than fifteen to a temperature of about 160° F. to about 260° F. to form a mass of grease and cooling the heated mass of grease rapidly enough to prevent reversion thereof.

In testimony whereof I have hereunto set my hand.

FRANK C. GEBHARDT.