

UNITED STATES PATENT OFFICE.

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LUBRICANT.

No Drawing.

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The present invention relates to improvements in lubricants, and more particularly to lubricants adapted for use in bearings running at high temperatures, for example, roller-mill bearings, railway car bearings (hot boxes) and the like. Such lubricants are particularly adapted for use in heated journal boxes, in the manner described in my co-pending application Serial No. 542,492, filed of even date herewith.

In preparing a lubricant in accordance with the present invention, a fatty compound, preferably an oil or fat is employed as a base for the lubricant. For example, stearic acid, tallow, linseed oil, soya bean oil and the like, either alone or in admixture with resin, have been found to be suitable. The fatty compound is admixed with from 5 to 25% of sulfur (preferably 10 to 15%) and the mixture heated to a temperature in excess of 430° F., the preferred temperature employed depending to some extent upon the character of fatty compound used and is characterized by its high viscosity at high temperatures (above 49 seconds Saybolt at 300° F.). Thus, in the case of tallow, a temperature in excess of 430° F., and preferably 450 to 460° F., has been found satisfactory, whereas with linseed oil it has been found desirable to carry the temperature of the mixture to 610° F. or higher. A chemical reaction takes place between the fatty acid compound and the sulfur, resulting in the formation of a material having a relatively high viscosity at high temperatures such as prevail in hot bearings and hot boxes. The reaction product of the fatty acid compound with from 5 to 25% of sulfur may suitably be admixed with resin, petrolatum, graphite, lamp-black, or other modifying constituents.

For example, a mixture of 12 parts tallow, 4 parts sulfur, 2 parts resin and 9 parts graphite were heated to 430° F. to cause reaction between the sulfur and the tallow, the temperature of the mixture being carried ultimately to 560° F. to complete the reaction. The mixture, although solid at ordinary temperatures, provides excellent lubrication for hot boxes, ordinary railroad packing waste, for example, being saturated with the compound and packed into the hot boxes, the cars involved immediately continuing their run. Excellent lubrication for the hot

bearings is provided, and, for the greater part, they cool during the run.

The resin in the composition above described may be omitted, if desired. The graphite, which may be replaced by lamp-black or other suitable material, aids in smoothing the journal and bearing and to that extent assists in reducing friction. It may likewise be omitted, if desired.

Linseed oil is preferred to tallow in preparing a lubricant in accordance with the present invention, since the resulting material remains liquid when cooled, has a higher flash point, and wets or adheres better to the bearing surfaces. Other fatty acid compounds, such as soya bean oil, cottonseed oil, corn oil, and the like, may be employed.

The compounds formed in accordance with the present invention are characterized in part by their high viscosity at high temperatures. For example, a lubricant containing 95% tallow and 5% of sulfur, heated to 500° F. to completion of reaction, which occurs in 20 to 30 minutes, has a viscosity of 49 seconds Saybolt at 300° F. A compound of tallow 85% and sulfur 15% heated at 465° F. to completion of reaction has a viscosity of 64 seconds at 300° F. and 50 seconds at 400° F. A compound of tallow 75% and sulfur 25%, prepared by heating at 475° F., has a viscosity of 94 seconds at 300° F. and 54 seconds at 400° F.

The viscosity of fatty compounds of the drying or semi-drying type may be raised by blowing subsequent to the incorporation of the sulfur. For example, linseed oil may be blown with air after it has been caused to react with 5 to 25% of sulfur, the blowing being carried out in the usual manner of linseed oil blowing; for example, with air for 10 hours at 480° F. A compound of linseed oil 90% and sulfur 10%, heated for 15 minutes at 560° F., has a viscosity of 180 seconds at 300° F., 94 seconds at 400° F. and 76 seconds at 450° F. A compound of linseed oil 90%, sulfur 10%, heated to 540° F. and then blown with air for 10 hours at 480° F. has a viscosity of 310 seconds at 300° F., 121 seconds at 400° F., and 87 seconds at 450° F. A compound of linseed oil 80% and sulfur 20% heated to 640° F. to completion of reaction, say 15 to 20 minutes, has a viscosity of 170 seconds at 300° F. and 79 seconds at 400° F.

- The lubricant compound in accordance with the present invention may, in use, be admixed with suitable mineral oil lubricants, such as heavy cylinder oils. Cylinder oils suitable for this purpose have been prepared having flash points of 575° to 610° F., and 184 to 350 seconds Saybolt viscosity at 212° F. Mixtures of the sulfur-combined fatty compound lubricants of the present invention with such cylinder oil have a higher load-bearing capacity over a wide range of temperatures than either constituent alone. Such mixtures may contain from 10 to 70% of the sulfur-combined lubricant.
- From 10 to 40% of carbon in the form of graphite, lamp black, carbon black, or the like, is preferably added to the lubricant before use, for the purpose hereinbefore set forth.
- I claim:
1. A lubricant composition comprising 75 to 95 parts of a fatty compound and 25 to 5 parts of sulfur, combined by reaction above 430° F. and characterized in that it is a liquid at 300° F. having a viscosity of not less than 49 seconds Saybolt.
 2. A lubricant composition comprising 75 to 95 parts of a fatty compound of the drying oil type and 25 to 5 parts of sulfur, combined by reaction above 430° F. and being a liquid at 300° F. having a viscosity exceeding 49 seconds Saybolt.
 3. A lubricant composition comprising 75 to 95 parts of linseed oil and 25 to 5 parts of sulfur, combined by reaction above 430° F. and being a liquid at 300° F. having a viscosity exceeding 49 seconds Saybolt.
 4. A lubricant composition comprising 80 to 90 parts of linseed oil and 20 to 10 parts of sulfur, combined by reaction above 430° F. and having a viscosity of not less than 130 seconds Saybolt at 300° F.
 5. A lubricant composition comprising 80 to 90 parts of linseed oil and 20 to 10 parts of sulfur, combined by reaction above 430° F. and blown with air.
 6. A lubricant composition comprising 75 to 95 parts of a fatty compound of the drying oil type and 25 to 5 parts of sulfur, combined by reaction above 430° F. and blown with air.
 7. A lubricant composition comprising 75 to 95 parts of a fatty compound and 25 to 5 parts of sulphur, said compound having a viscosity of not less than 49 seconds Saybolt at 300° F.
 8. A lubricant composition comprising 80 to 90 parts of linseed oil and 20 to 10 parts of sulphur and having a viscosity of not less than 130 seconds Saybolt at 300° F.
 9. A lubricant composition comprising mineral oil mixed with a composition consisting of 75 to 95 parts of a fatty compound and 25 to 5 parts of sulfur, combined by reaction above 430° F. and characterized in that it has a viscosity of not less than 49 seconds Saybolt at 300° F.
 10. A lubricant composition comprising an admixture of from 30 to 80 parts of heavy mineral oil lubricant with 70 to 20 parts of another composition consisting of 75 to 95 parts of a fatty compound and 25 to 5 parts of sulfur, combined by reaction above 430° F. and characterized in that it has a viscosity of not less than 49 seconds Saybolt at 300° F.
 11. A lubricant composition comprising an admixture of a heavy mineral oil lubricant, graphite, and a lubricant composition comprising 75 to 95 parts of a fatty compound and 25 to 5 parts of sulfur, combined by reaction above 430° F. and characterized in that it has a viscosity of not less than 49 seconds Saybolt at 300° F.

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