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LUBRICATING OIL COMPOSITION

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This invention relates to sulfurized lubricating compositions and has to do particularly with sulfurized lubricating oil compositions adapted for use as cutting oils, extreme pressure lubricants and the like.

A fish oil, such as sperm oil, may be sulfurized under proper conditions to obtain a suitable product containing a high sulfur content, but such a product is undesirable because of its dark color. A saponifiable wax, such as lanolin, will take up considerable quantities of sulfur, although in lesser amount than sperm oil, to form a product of light color, but this material is undesirable because of its instability. I have found that by sulfurizing a mixture of sperm oil and lanolin, a product is obtained exhibiting the beneficial qualities of both, without the undesirable characteristics obtained by sulfurizing the materials separately. In this way, I may produce a sulfur base which may be dispersed in a suitable lubricating oil to obtain an improved lubricating oil composition.

In practicing the invention, sperm oil, lanolin and sulfur are treated in suitable proportions and under proper conditions to obtain a sulfur base and then this sulfur base is dispersed in correct proportions in a lubricating oil of predetermined viscosity to obtain a lubricating composition having the desired characteristics for the purpose intended. The invention is particularly applicable to the preparation of sulfur cutting oils and for this purpose a light lubricating oil is used. Other lubricating compositions, such as extreme pressure base lubricating oils and extreme pressure gear lubricants, hypoid gear lubricants, etc., may be obtained by using mineral lubricating oils of higher viscosity. In the preparation of sulfur cutting oils, a light lubricating oil of about 60–150 viscosity range at 100° F. is employed, while in the preparation of more viscous lubricants, lubricating oils of the motor oil range, for example 180 to 400 or 500 or higher viscosity at 100° F., may be employed, while for more viscous compositions, high viscosity lubricating oils, such as heavy vacuum distillates, cylinder stocks or other residuums, ranging in viscosity from about 100 to 200 or 300, or higher, at 210° F., are useful.

The following example will illustrate the invention as applied to the preparation of a cutting oil:

Sulfur	1.80
Sperm oil	1.75
Lanolin	1.75
Lubricating oil—125 Saybolt viscosity at 100° F.	94.70

The lanolin, sperm oil and sulfur were reacted for two hours at 320–330° F. to form a sulfur base, which was homogeneous and tested ap-

proximately 33% sulfur. The product contained approximately 16% of sulfur in uncombined form. 5.3% of this base was added to a lubricating oil by heating the base and oil, together at about 275° F. for about ¼ to ½ hour to form a homogeneous dispersion and to dissolve the free sulfur in the mineral oil. The final product gave the following tests:

Gravity °A. P. I.	26.6
S. U. vis. at 100° F.	122
Sulfur %	2.05
Color—Lovibond ½" cell	100

The cutting oil so formed was tested on a Landis cutting machine with the following results:

Speed, R. P. M.	48	60
Speed, feet per minute	30	37
Threads cut	Good	good
Smoking	None	none
Chip sticking	O. K.	O. K.
Discoloration	None	none

While I prefer to prepare a sulfur base by heating about equal amounts of sperm oil, lanolin and sulfur, it is to be understood that other proportions of these materials may be used, if desired, as long as the advantages of the stabilizing qualities of the sperm oil and light color characteristics of the lanolin are obtained in the final products. Also in some cases it may be desirable to decrease the amount of sulfur and I may prepare sulfur bases in which the sulfur may range from 10–35% or more. The amount of the sulfur base which may be used is not fixed at 6% for this may vary within quite wide ranges, but in general I prefer to use sufficient to produce in the finished product about 1–3% of sulfur.

The present invention has the advantage of providing means for obtaining a sulfurized lubricating oil composition of light color and high stability as well as efficient lubrication qualities. The invention is particularly useful in the preparation of light color sulfurized cutting oils which are stable against sedimentation and have efficient cutting qualities, and yet are sufficiently light colored to permit easy observance of the thread cutting or machining operations.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A lubricating oil composition comprising petroleum lubricating oil and the product resulting from heating together sperm oil, lanolin and

sulfur to temperatures of about 320-330° F. to form a sulfurized sperm oil-lanolin base.

2. In the manufacture of sulfurized lubricating oil compositions, the improvement which comprises heating together sulfur, sperm oil and lanolin to temperatures of about 320-330° F. to obtain a sulfurized sperm oil-lanolin base, as a homogeneous product, and incorporating the resultant sulfurized sperm oil-lanolin base with a lubricating oil.

3. In the manufacture of sulfurized lubricating compositions, the improvement which comprises heating together about equal quantities of sperm oil, lanolin and sulfur to 320-330° F. for two hours to form a sulfurized sperm oil-lanolin base, and then commingling the resultant sulfurized sperm oil-lanolin base with a lubricating oil.

4. A sulfur base adapted for use in lubricating compositions, comprising essentially the product resulting from heating together sperm oil, lanolin and sulfur under conditions to form a sulfurized sperm oil-lanolin base containing about 10-35% of total sulfur and which is adapted to be commingled with mineral lubricating oil to form a stable composition of good color having cutting and extreme pressure characteristics.

5. A sulfur base adapted for addition to lubricating oils to form cutting oils, extreme pressure lubricants and the like, comprising essentially the product obtained by heating together sperm oil, lanolin and sulfur to temperatures of about 320-330° F. to form a sulfurized sperm oil-lanolin base.

6. A sulfur base adapted for addition to lubricating oils to form cutting oils, extreme pressure lubricants and the like, comprising essentially the product obtained by heating together about equal proportions of sperm oil, lanolin and sulfur to temperatures of about 320-330° F. to form a sulfurized sperm oil-lanolin base.

7. In the manufacture of sulfurized lubricating compositions, the improvement which comprises heating together sulfur, sperm oil and lanolin, to temperatures of about 320-330° F. to obtain a sulfurized sperm oil-lanolin base as a homogeneous product, and then incorporating the resultant sulfurized sperm oil-lanolin base into a lubricating oil at a temperature of about 275° F. to obtain a uniform dispersion.

8. A cutting oil consisting essentially of a blend of a light lubricating oil with a sulfurized sperm oil-lanolin base so as to provide about 1-3% sulfur in the blend, the sulfurized sperm oil-lanolin base being prepared by sulfurizing a mixture of sperm oil and lanolin under conditions to give a stable product of good color when blended with the said light lubricating oil.

9. A light colored stable cutting oil consisting essentially of a blend of a light lubricating oil with a sulfurized sperm oil-lanolin base in a

proportion to provide about 1-3% sulfur in the blend, the sulfurized sperm oil-lanolin base resulting from heating a mixture of substantial proportions of both sperm oil and lanolin with sulfur under conditions effecting sulfurization of both the sperm oil and the lanolin, providing a base containing about 10-35% of sulfur, and which forms a stable product of good color when blended with said light lubricating oil in the proportion stated.

10. A light-colored stable cutting oil consisting essentially of a light pale lubricating oil with a sulfurized sperm oil-lanolin base in a proportion providing about 1-3% sulfur in the blend, the sulfurized sperm oil-lanolin base resulting from heating together substantially equal parts of sperm oil-lanolin and sulfur under conditions to sulfurize both the sperm oil and the lanolin and provide a base containing about 33% total sulfur, some of which total sulfur is in uncombined form, the base being combined with the lubricating oil by heating at elevated temperatures to dissolve said uncombined sulfur of the base in the lubricating oil to form a stable product of light color.

11. A lubricating oil composition comprising mineral lubricating oil and a substantial amount of a sulfur base to impart cutting and extreme pressure characteristics thereto, said sulfur base resulting from heating together fish oil, lanolin and sufficient sulfur under conditions to form a sulfurized fish oil-lanolin base of such character as to produce a stable composition of good color when compounded in the mineral lubricating oil in the said amount.

12. A lubricating oil composition according to claim 11, in which the fish oil is sperm oil.

13. In the manufacture of sulfur-containing lubricating compositions, the method which comprises heating sulfur with a mixture of fish oil and lanolin under conditions of time and elevated temperature as to form a sulfurized fish oil-lanolin base which can be dissolved in mineral lubricating oil in substantial amount to produce a stable composition of good color having cutting and extreme pressure characteristics, and commingling the resultant sulfurized fish oil-lanolin base in mineral lubricating oil under conditions and in sufficient amount to produce the said composition having the properties above stated.

14. The method according to claim 13, in which the fish oil used is sperm oil, in which the sulfurized sperm oil-lanolin base contains uncombined as well as combined sulfur, and in which the said base is commingled with the mineral lubricating oil at a sufficiently elevated temperature to dissolve said uncombined sulfur of the base in the lubricating oil.

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