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OIL COMPOSITION

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This invention relates to improvements in oil and grease compositions and to a treatment of mineral oils and greases and vegetable and animal oils to give compositions of greater stability than ordinary oils and greases.

According to the present invention, there is added to and compounded with the oil or grease composition, a small amount of a condensation product of an aldehyde with an alkylene diaryl diamine, for example, a condensation product of aldol with ethylene diphenyl diamine. The addition of a small amount of such a product materially improves the aging properties of the composition and retards deterioration thereof at high temperatures or under the influence of electric current and also retards deterioration of the compositions when exposed to the action of the air.

When mineral oil lubricants, for example, are used in internal combustion engines, the high temperature to which the oils are subjected results in more or less rapid deterioration with loss of lubricating properties, particularly where air comes in contact with the oils at the same time that they are subjected to heat, and the oils undergo more or less decomposition, with the attendant formation of carbon or sludge-like ingredients. Lubricating oils generally are hydrocarbon oils, although they may have small amounts of vegetable or animal oils compounded therewith. The addition of a small amount of a condensation product of an aldehyde with an alkylene diaryl diamine to a lubricating oil used under such conditions, tends to stabilize the oil and retard deterioration.

In the case of transformer oils, the addition of a small amount of an alkylene diaryl diamine increases the period of usefulness of the oil and prevents or retards its deterioration. By preventing or retarding the deterioration, the oil may be used over a greater period of time and the expense of frequent replacement, etc., is eliminated. The saving in oil is appreciable and there is a further saving incident to the use of a good grade of oil rather than a partially decomposd oil.

Oils used for saturating cable wrappings are kept at high temperature over a long period of time in a saturating bath, during saturation of the wrapping, which produces deterioration, and further deterioration results from the electrical stresses set up when the cable is in use. The addition of a small amount of a condensation product of an aldehyde with an alkylene diaryl diamine stabilizes the saturating oil, giving it longer life and increasing its efficiency as an insulator.

The invention is applicable to vegetable and animal oil compositions containing fatty acids or glycerides, including cutting oils and other compositions containing fatty oils. Cutting oils, for example, may be composed entirely of fatty oils, or of a mixture of animal or vegetable oils and mineral oils. When not stabilized against deterioration, these tend to become rancid rapidly, particularly during use at elevated temperatures. Deterioration produces an undesirable condition in the oil, which may cause irritation when the oil comes in contact with the hands or other parts of the body of the workmen. By incorporating in the cutting oil composition a small amount of a condensation product of an aldehyde with an alkylene diaryl diamine, it is possible to use a greatly increased amount of fatty oil in the composition and still maintain stability of the composition and its resistance to rancidity.

The condensation products employed in the process of the present invention to prevent or retard the decomposition or deterioration of oils or greases or compositions containing oils or greases, are made by condensing an aldehyde, such as formaldehyde, acetaldehyde, butyraldehyde, adol, etc., with an alkylene diaryl diamine, such as ethylene, propylene, trimethylene, tetramethylene, or pentamethylene diaryl diamines of which the aryl groups may be penyl, or substituted penyl, such as tolyl or naphthyl, etc. The alkylene diaryl diamines can be made, for example, by condensing an alkylene diahalide, such as ethylene dichloride, with an aromatic amine, such as aniline, to produce, for example, ethylene diphenyl diamine. The alkylene diaryl diamines can be condensed with the aldehydes, to form the condensation products

employed in the present invention. The condensation products of aldol with the alkylene diaryl diamines, are particularly valuable for use in the present invention, for example, the condensation product of ethylene diphenyl diamine.

The condensation products are employed in the oil or fat compositions in small amounts, usually less than one percent, for example, 0.2 to 0.5 of one percent, although the amount may be increased or decreased.

For example, 0.5% of the product obtained by condensing aldol with ethylene di-para-tolyldiamine may be added to a refined mineral oil of specific gravity of 0.915. The condensation product may be gradually stirred into the mineral oil, which is heated somewhat to thoroughly dissolve the condensation product in the oil. If an oil of this type such as is commonly used for lubricating the cable wrappings of high voltage cables is thus treated, an improved saturant will be obtained.

Further, if 0.5% of a condensation product obtained by condensing aldol with ethylene di-para-tolyldiamine is added to olive oil with stirring and heating, the tendency of the resulting product to absorb oxygen is reduced and the oil remains sweet under oxidizing conditions which would turn untreated olive oil rancid.

The action of the condensation products as stabilizing agents, is somewhat obscure, but apparently its value lies in the fact that it retards oxidation at the elevated temperatures or under the electrical conditions to which the oil compositions are subjected in use, and particularly where air or oxygen comes into contact with the oil or greases.

In the claims "mineral hydrocarbon" is used to include mineral oils and greases, and "fat" is used to include fatty oil glycerides and fatty acids.

We claim:

1. An oil or grease composition comprising in addition to the oil or grease a small quantity of a condensation product of an aldehyde with an alkylene diaryl diamine, which tends to retard or inhibit the deterioration or decomposition of constituents of the oil or grease composition.

2. An oil or grease composition comprising a mineral hydrocarbon and a fat and a small quantity of a condensation product of an aldehyde with an alkylene diaryl diamine.

3. An oil or grease composition comprising a mineral hydrocarbon and a fat and a fraction of a percent of a condensation product of aldol with an alkylene diaryl diamine.

4. An oil or grease composition comprising a mineral hydrocarbon and a fat and a small quantity of the condensation product of aldol with ethylene diphenyl diamine.

5. An oil or grease composition comprising a mineral hydrocarbon and a fraction of a percent of a condensation product of an aldehyde with an alkylene diaryl diamine.

6. A mineral oil or grease composition which is intended for use under conditions tending to accelerate deterioration, due to heat or electrical influences, which contains a condensation product of an aldehyde with an alkylene diaryl diamine, to resist such deterioration.

7. An oil or grease composition comprising a mineral oil or grease and a fraction of a percent of a condensation product of aldol with an alkylene diaryl diamine.

8. An oil or grease composition comprising a mineral oil or grease and a fraction of a percent of the condensation product of aldol with ethylene diphenyl diamine.

In testimony whereof we affix our signatures.

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