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LUBRICANT

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This invention relates to lubricants and more particularly to a lubricant suited for use in an internal combustion engine and a method of making same.

Recent developments in the art of refining oils for the lubrication of internal combustion engines have resulted in the general acceptance or adoption of a method which may be referred to as a selective solvent extraction method. Generally the selective solvent extraction method referred to includes a treating of that oil which remains after the removal by distillation of the gasoline and other light constituents of the crude oil. By the use of certain solvents, acids, alkalis, methods of heating and cooling and/or centrifuging the oil, it is possible to separate the lubricating oil from the waxes, asphalts and other undesirable matter to produce that which is known in the art as a "de-waxed oil" characterized by the fact that it will maintain a substantially constant viscosity throughout wide variations in temperature.

Among the defects found in the "de-waxed oil" produced according to the various selective solvent extraction processes is one which relates to its "oiliness" and its power to penetrate and maintain a tough, thin film on bearing surfaces. Numerous attempts have been made to cure this defect inherent in selective solvent extraction oils. It has been proposed to restore some of the desirable oiliness characteristics of the solvent extraction oil by the use of a fatty acid. Various phosphorous and chlorinated compounds have been employed in attempts to improve the characteristics of the "de-waxed oil". In numerous instances, however, it has been found that although certain acids or other compounds may be added to restore the oiliness characteristic of the lubricant the resultant lubricant is rendered undesirable by reason of certain adverse effects upon the bearing surfaces of the motor in which the lubricant is employed. For instance solvent extraction motor oils when treated with certain fatty acids to restore the oiliness characteristic have been found to have an extremely corrosive effect upon bearing material as employed in modern internal combustion engine construction. In other instances excessive oxidation or break down and sludging of the oil in the engine has followed where fatty acids, phosphorus and chlorinated compounds were added to the solvent extraction motor oil to restore some of the oiliness characteristics.

All oils heretofore produced for use in internal combustion engines whether by the conventional fractional distillation methods or by the selective solvent extraction methods have lacked certain desirable characteristics, among which are the ability of the lubricant to act as a rust inhibitor and to act as an anti-oxident so as to prevent a sludging of the oil when subjected to the heat and agitation of operation.

It is among the objects of my invention to provide a lubricant which will possess all of the desired oiliness or lubricating qualitites, which will act as a rust inhibitor and which will not oxidize or form a sludge during operation. It is a further object of my invention to provide a lubricant for internal combustion engines which will correspond with respect to viscosity and temperature characteristics to lubricants made according to the selective solvent extraction processes and which will correspond with respect to the oiliness thereof to lubricants produced according to fractional distillation methods and which will not contain any substances such as would cause or facilitate rapid corrosion of the parts of the engine or cause or facilitate an oxidation and sludging of the lubricant while in use. It is a further object of my invention to provide a lubricant which is composed of mineral oil and sulphurized sperm oil. It is a further object of my invention to provide a sulphurized oil which is soluble in paraffin base oil such as, for instance, Pennsylvania oils. It is a further object of my invention to chemically combine and introduce sulphur in an internal combustion engine lubricant in a form wherein the sulphur is deprived of its corrosive effect and yet retains its catalytic high pressure lubricant effect. Further objects and advantages relating to simplicity of procedure and economy of manufacture will appear from the following description.

Sperm oil is a substance obtained from the head and body of the sperm whale and comprises a mixture of triglycerides and waxes. The degree of unsaturation of both the constituent fatty acids and fatty alcohols, as well as the ratio of triglycerides to wax varies considerably, depending upon whether the oil is obtained from the head or from the body of the whale. Sperm oil as known to commerce and as I have used it in this specification is a mixture of both head and body oil and the percentage of wax in the sperm oil will vary from between 60% to 80% with corresponding variations in glyceride content. The sperm oil wax is an ester of a long chain fatty alcohol. The fatty acids which are contained in both triglyceride and wax and the fatty alcohols which are found in the wax only vary in

chain lengths from 10 to 20 carbon atoms, the greater portion being of 16 and 18 carbon chain lengths. By "wax" as used herein I mean a mixture of the esters of long chain fatty alcohols of varying unsaturation and chain lengths.

As a specific example of a method of preparing a lubricant according to my invention I place any desired quantity of sperm oil in a suitable tank or vessel and raise the temperature thereof by any suitable means to about 300° F. The heated sperm oil is agitated and during the agitation thereof sulphur is added which may be in the form of flowers of sulphur until the sulphur content comprises about 8 to 10% of the contents of the tank or vessel. While I have observed that the sulphur may be added up to about 15% without seriously adversely affecting the function of the resultant product which I will refer to as a sulphurized sperm oil, I prefer to limit the quantity of sulphur to about 10% to insure that there will be no excess of sulphur in the lubricant in its final form.

It appears that the esters referred to above have the power to take up sulphur and the addition of the sulphur to the unsaturated esters, according to my method, combines the sulphur so that following the combination the sulphurized sperm oil wax functions to prevent corrosion. Although the exact nature of the chemical reaction taking place between the wax and the sulphur is not definitely known I have found that the resultant product possesses certain valuable characteristics or properties when used as or blended with a lubricant. The combination of the wax and sulphur seems to prevent oxidation and corrosion. Although I am aware that sulphurized fatty oils have been employed to improve lubricants heretofore and undoubtedly do possess certain advantageous characteristics, their disadvantages such as their tendency to oxidize and break down have rendered them unsuited for many uses. Since sperm oil may contain about 35% of triglyceride the sulphurized sperm oil also contains a considerable quantity of a material corresponding to a sulphurized fatty oil such as heretofore known in this art. It appears however that the presence of about 65% of sulphurized wax inhibits or prevents the normal adverse effects arising from the use of sulphurized glycerides.

Following the sulphurizing of the sperm oil the sulphurized sperm oil may be cooled and added to a suitable mineral oil in quantities of between ¼ of 1% and 1%. More than 1% sulphurized sperm oil may be added but I have found a lubricant containing less than 1% to have the characteristics desired and since up to 1% of the sulphurized sperm oil is insufficient to effect any appreciable change in the gravity, flash, fire, viscosity and cold tests I prefer to use less than 1%. The mineral oil which thus serves as a base for the lubricant may be mineral oil resulting from the conventional fractional distillation method or a de-waxed mineral oil made according to a selective solvent extraction method heretofore referred to. The mineral oil stock employed may be of the paraffinic base type such as Pennsylvania oil or of the asphaltic base type, or of any other type since the sulphurized sperm oil is soluble in all types so as to form a suitable combustion engine lubricant. In the event that the oil employed is of the de-waxed or selective solvent extraction type I have found that the addition of between ¼ of 1% and up to 1% of the sulphurized sperm oil restores the oil to a degree of "oiliness" which is equal to or superior to that resulting from the conventional fractional distillation.

An alternative method of preparing a lubricant according to my invention comprises mixing sperm oil and mineral oil and thereafter adding the sulphur. According to this alternative the sperm oil may comprise about ¼ of 1% up to 1% of the sperm oil and mineral oil mixture and the amount of sulphur added may correspond substantially to the amount added according to the preferred method outlined above. The sulphur and sperm oil combine in the sperm oil and mineral oil mixture to produce a sulphurized sperm oil and mineral oil mixture corresponding to that produced by the preferred method.

Regardless of the nature of the mineral oil employed in conjunction with the sperm oil and sulphur the resultant lubricant possesses a number of important desirable characteristics aside from the "oiliness" thereof which are not found in other types of lubricant and which result from the action of the sulphurized sperm oil. One of said characteristics is the action of the resultant lubricant as a rust inhibitor and in this respect the lubricant produced according to my invention supplies a long felt need in the internal combustion engine lubricant art.

A second desirable characteristic of a lubricant produced according to my invention is the function of the same as an anti-oxident. The sulphurized sperm oil as described above appears to deprive the resultant lubricant of its power of absorbing oxygen. Among the adverse results of oxidation in the crank case of a motor are the corrosive attack on the bearings and metal of the engine and the formation of a sludge compound. It is believed by those familiar with the chemical reactions taking place during operation of internal combustion engine lubricants that oxidation is the main factor in causing break down of the oil and the formation of a sludge in the crank case.

I believe that the higher alcohols in the sulphurized sperm oil act as a buffer to prevent the absorption of oxygen whereas the sulphur in the sulphurized sperm oil permits the resultant mineral and sulphurized sperm oil lubricant to take the extremely high pressures developed in an internal combustion engine. The sulphur appears to be the catalytic medium which enables the lubricant to establish and maintain a tenacious oil film on the motor bearing surfaces. While the ability of sulphur to function as a catalytic agent to enable a lubricant to withstand a high pressure has been recognized and this property of sulphur utilized in high pressure lubricants for differential gear boxes and the like, no one so far as I am aware has heretofore succeeded in introducing sulphur into a lubricant for an internal combustion engine in a form wherein the sulphur-oil combination failed to corrosively and adversely affect the bearings and other parts with which it came in contact.

Although I have described a lubricant and a preferred method of producing the same in considerable detail, I appreciate that certain modifications and changes may be made therein by those skilled in the art without departing from the spirit of the invention as defined in the following claims.

I claim:

1. A substantially non-sludging internal combustion engine lubricating oil consisting primarily

of solvent extracted de-waxed petroleum oil and not more than about 1% of sulphurized sperm oil as an oiliness agent.

2. A substantially non-sludging internal combustion engine lubricating oil consisting primarily of solvent extracted de-waxed petroleum oil and not more than 1% of sulphurized liquid sperm wax as an oiliness agent.

3. An internal combustion engine lubricant containing 99% of a solvent extracted de-waxed petroleum lubricating oil, and less than 1% sulphurized sperm oil acting to increase the oiliness and inhibit oxidation and sludging of the petroleum oil.

4. A substantially non-sludging internal combustion engine lubricant consisting primarily of a solvent extracted de-waxed petroleum oil and between ¼ of 1% and 1% of sulphurized sperm oil.

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