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PROCESS OF LOWERING THE POUR POINT OF LUBRICATING OIL

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5 Claims. (Cl. 196—144)

This invention relates to improved lubricating oils and a process of preparing same, and especially to lubricating oils having a low pour point.

Lubricating oils, and especially lubricating oils containing wax or waxy hydrocarbons in solution tend to have a high pour point. In the case of lubricating oils containing wax or waxy hydrocarbons, the latter compounds have a tendency to precipitate when the oil is cooled, thereby causing the oil to set or gel, and causing the oil to flow sluggishly or not at all. Lubricating oils derived from the distillation of so-called Pennsylvania or Mid-Continent crudes belong generally to the waxy class mentioned.

I have discovered that by subjecting a waxy petroleum lubricating oil to ultra-violet light, such as from a mercury vapor lamp, the pour point of the oil is reduced, and this oil may be used alone, or in admixture with other oils, with excellent results.

It is also permissible to add to the above substances a polymerizable substance of an olefinic-aromatic structure, such as styrol, vinyl or propylene naphthalene, etc. These materials may be added in the proportions of 10 to 20% of the paraffinic material, and the paraffinic material and the aromatic or cyclic material both participate in the modification.

The raw material in the form of a thin film is subjected to the action of ultra-violet light at a temperature below the boiling point of the material, and up to at least 300° F. in any suitable apparatus. For example, a thin film of an oil obtained from a wax bearing Pennsylvania lubricating oil, and having a pour point of from 25° to 30° F., may be exposed for from 3 to 12 hours to the irradiation of a low vapor pressure mercury quartz lamp having ultra-violet radiations preferably below 2,800 Angstrom units. After such irradiation, the oil has a pour point of as low as 5° F. Such oil may be used alone or in admixture in any proportions with other oils. The amount of treated oil to be added depends on its potency, and only a small amount need be added to lower the pour point of the untreated oil. For example, a mixture of about 5% of such oil with untreated oil having a normal pour point of 25° F. has a pour point of as low as —10° F.

The following examples illustrate the effects of small amounts of material treated at normal temperature upon a Pennsylvania waxy lubricating oil having the following properties:—

Specific gravity	° A. P. I.	28.0
Viscosity (Say.) at 210° F	sec.	79
Flash point	° F.	450
Fire point	° F.	515
Pour point	° F.	30
Color (Lovibond ½ in. cells)		20 yellow 38 red

Upon the addition of 5% of treated oil, the following mixture was obtained:—

Specific gravity at 60° F	° A. P. I.	28.0
Viscosity (Say.) at 210° F	sec.	80
Flash point	° F.	450
Fire point	° F.	515
Pour point	° F.	10
Color (Lovibond ½ in. cells)		20 yellow 38 red

Upon the addition of 5% of oil irradiated at a temperature of 250–300° F. the following mixture was obtained:—

Specific gravity at 60° F	° A. P. I.	28.0
Viscosity (Say.) at 210° F	sec.	80
Flash point	° F.	450
Fire point	° F.	515
Pour point	° F.	—10
Color (Lovibond ½ in. cells)		20 yellow 38 red

I believe that at least a portion of the oil subjected to treatment is polymerized to compounds of higher molecular weight and viscosity than those of the original oil. The pour point depressing effect of the modified compounds asserts itself according to the generally accepted theory, viz., as soon as microscopic crystals of paraffin are formed by cooling, the modified material is adsorbed on the surface of the crystals, thereby operating to inhibit the formation of large crystals which would seriously affect the pour point of the oil and thereby operating to hold the paraffin in a state of colloidal suspension. I do not wish however to be limited by this statement of theory, but only by the appended claims.

Where in the specification and claims reference is made to the term "waxy petroleum lubricating oil" or such similar expression I mean a petroleum lubricating oil containing wax or waxy hydrocarbons in solution such as a Pennsylvania grade lubricating oil or a Mid-Continent grade lubricating oil.

I claim:

1. A lubricant consisting of a waxy petroleum lubricating oil having normally a high pour point caused by wax dissolved therein, and a waxy petroleum lubricating oil irradiated with ultra violet rays of wave length predominantly less than 2800 Angstrom units in amount of approximately 5% and potency sufficient to reduce said normally high pour point of said lubricating oil.

2. A lubricant consisting of a waxy petroleum lubricating oil having normally a high pour point caused by wax dissolved therein, and an ultra violet irradiated waxy petroleum lubricating oil in amount and potency sufficient to reduce the said normally high pour point of said first lubricating oil at least 10° F.

3. A lubricant consisting of a waxy petroleum lubricating oil having normally a high pour point of at least 15° F. caused by wax dissolved therein, and up to about 5% of an ultra violet irradiated waxy petroleum lubricating oil of potency sufficient to lower said normally high pour point of said first lubricating oil at least 10° F.

4. The process of lowering the normally high pour point of a waxy petroleum lubricating oil which pour point is caused by wax dissolved therein comprising subjecting a waxy petroleum lubricating oil in the form of a thin film to ultra violet irradiation of wave length predominantly less than 2800 Angstrom units and at a temperature below the boiling point of said lubricating oil, and blending approximately 5% of the irradiated waxy petroleum lubricating oil with a non-irradiated waxy petroleum first lubricating oil.

5. A process of lowering the normally high pour point of a waxy petroleum lubricating oil, which pour point is caused by wax therein comprising subjecting a waxy petroleum lubricating oil in the form of a thin film to ultra violet irradiation of 2800 Angstrom units and at a temperature below the boiling point of said lubricating oil, and blending a sufficient amount of the irradiated waxy petroleum lubricating oil with a non-irradiated waxy petroleum lubricating oil to thereby depress the normally high pour point of said non-irradiated oil at least 10° F.

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CERTIFICATE OF CORRECTION.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 10, claim 4, strike out the word "first"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of January, A. D. 1939.

Henry Van Arsdale

(Seal) Acting Commissioner of Patents.