

# UNITED STATES PATENT OFFICE

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## LUBRICATING OIL

Ulric B. Bray, Palos Verdes Estates, Calif., assignor to Union Oil Company of California, Los Angeles, Calif., a corporation of California

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7 Claims. (Cl. 196—151)

This invention relates to lubricating oils and particularly to light lubricating oils having low pour point.

The object of the invention is primarily to produce a lubricating oil for use at low temperatures.

In general the invention resides in a blend of a highly solvent treated naphthenic type light mineral oil of the spray oil classification having a pour point below  $-50^{\circ}$  F. and a dewaxed, highly refined, highly paraffinic, viscous lubricating oil having any average pour point for this type of lubricating oil, for example  $15^{\circ}$  F. Such oil may also contain "oiliness" and pour point depressing agents if required.

In the ordinary practice of the invention, about 75% of a naphthenic type spray oil is combined with about 25% of a highly paraffinic viscous lubricating oil. For example, where the paraffinic lubricating oil is of the S. A. E. 50 type with a pour point about  $15^{\circ}$  F., the resultant blend will possess a pour point of around  $30^{\circ}$  F. below zero. Spray oils of the mentioned classification are those produced from light stocks by heavy solvent treatment such as treatment with liquid sulfur dioxide, accompanied with an additional sulfuric acid treatment, if required, to yield an oil having a viscosity of about 85 seconds Saybolt Universal at  $100^{\circ}$  F., a pour point below  $-50^{\circ}$  F. and an unsulfonatable residue of about 90.

This unsulfonatable residue value is commonly known as "deOng number" and is a designation well known in the art for highly refined agricultural spray oils. This value represents that proportion of the oil not subject to sulfonation by a well known sulfonation test described in Industrial and Engineering Chemistry, vol. 18 (1926), page 175. Briefly, the oil is treated with sulfuric acid exactly 37 normal (100%) in a water bath at  $95^{\circ}$  C. to  $100^{\circ}$  C.—ordinarily at  $210^{\circ}$  F.—for a period of one hour. The above acid is added to the oil in proportions of 20 c. c. of acid to 5 c. c. of oil in two dumps in a Babcock cream test bottle, the mix being agitated every 10 minutes. After phase separation, the unsulfonated material is the unsulfonatable residue, the percentage of which constitutes the test for the oil and is often called "deOng number".

The highly paraffinic lubricating oil indicated may be one produced by heavy solvent treatment of Mid-Continent paraffinic type oils or other paraffinic stocks to yield very highly paraffinic lubricating oil fractions from which (following dewaxing) all aromatic and other readily reactive materials are removed by the solvent treatment. This form of treatment is now well known and

includes treatment with such solvents as liquid sulfur dioxide-benzol mixtures, furfural, phenol, cresol, dichlorethyl ether and the like. Also a corresponding Pennsylvania Bright Stock sometimes may be used as the lubricating oil fraction required.

Where a 75% to 25% blend was produced as above indicated, to yield an oil of S. A. E. 10 classification and a pour point of  $-30^{\circ}$  F., the product had a viscosity index of about 92, high stability and a viscosity of about 150 seconds or less Saybolt Universal at  $100^{\circ}$  F.

Instead of employing 75% of spray oil and 25% of lubricating oil, the proportions may be varied as desired to attain the resultant physical characteristics required. For example, the content of a highly paraffinic lubricating material may be somewhat reduced, or if an oil of higher pour point is permitted, it may be increased, for example to equal parts of the two constituents. Instead of employing the highly refined paraffinic lubricating fraction mentioned (S. A. E. 50), a similar fraction of higher or lower viscosity may be employed, the proportion of spray oil being correspondingly modified, that is, being increased as the paraffinic lubricating oil grade is heavier, or decreased as the lubricating oil is lighter, where a product of the same viscosity is required.

The oil blends of this invention may also contain a so-called "oiliness" agent, to increase film strength and impart wear resistant qualities. Such agents are commonly chlorinated organic materials having boiling points high enough to avoid being boiled off in the crank cases of internal combustion engines. These materials may be added in amounts from about 0.5% to 4% or 5%, e. g. 1%. Suitable such substances include methyl dichlorostearate or palmitate, ethyl dichloromargarate, chlorinated paraffin, chlorinated diphenyl oxide, methyl chloronaphthenate and other kindred chlorinated compounds. Sulfur compounds may be used sometimes for the same purpose such as sulfurized sperm oil or lard oil, and phosphorous bearing materials such as tricresyl phosphate. Also, pour point depressing agents may be added where necessary or desirable. This type of material is known for this purpose and is represented by a group of condensation products of aromatic hydrocarbons (ring compounds) with chlorinated long chain aliphatic hydrocarbons, produced in the presence of a metallic halide by the Friedel-Crafts catalytic reaction. The chain compounds may be paraffin, petrolatum, montan wax and other heavy hydrocarbons, and the ring compounds

may be naphthalene, anthracene, diphenyl and the like as disclosed by Davis No. 1,815,022, MacLaren No. 1,963,917 and No. 1,963,918 and other patents. Such materials are added to the lubricating oil in small amounts such as from 0.2% or 0.3% to perhaps as much as 4% or 5%, ordinarily about 0.8% to 1%, according to the effect desired or the character of the lubricating oil stock used, i. e., wax content thereof.

10 It is to be understood that these disclosures are merely illustrative of the generic invention and are not to be taken as limiting.

I claim:

- 15 1. A lubricating oil comprising as important constituents a large proportion based on the total composition of a highly refined mineral spray oil having a high deOng number and low viscosity, and a highly refined paraffinic viscous lubricating oil fraction of relatively greater viscosity.
- 20 2. A mineral lubricating oil of low pour point comprising a highly refined low viscosity mineral spray oil approximating 50% or more of the composition, and a highly refined highly paraffinic viscous lubricating oil fraction approximating
- 25 50% or less of the composition.
3. A lubricating oil according to claim 2 having an S. A. E. classification of about 10 and a pour point below about 0° F.
4. A lubricating oil according to claim 2 having

a Saybolt Universal viscosity at 100° F. not exceeding about 150 seconds.

5. A lubricating oil of low pour point comprising as principal constituents large proportions based on the total composition of each of highly refined mineral spray oil fractions and highly refined highly paraffinic viscous mineral lubricating oil fractions, the blend having a pour point below 0° F.

6. A low pour point mineral lubricating oil comprising as principal constituents a highly refined, viscous, paraffinic type lubricating oil fraction and a large proportion based on the total composition of a highly refined low viscosity naphthenic mineral oil having a high unsulfonatable residue, a viscosity in the order of about 85 seconds Saybolt Universal at 100° F., and a pour point at least as low as about minus 50° F., the blend having a pour point at least as low as about minus 30° F.

7. A low pour point mineral lubricating oil comprising as principal constituents highly refined paraffinic viscous mineral lubricating oil fractions and a large proportion based on the total composition of highly refined mineral spray oil fractions, the blend having a viscosity below about 150 seconds Saybolt Universal at 100° F. and a pour point below 0° F.

ULRIC B. BRAY.