Patented Aug. 8, 1939 2,168,666

UNITED STATES PATENT OFFICE

2,168,666

PROCESS FOR TREATING MINERAL OILS

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No Drawing. Application February 20, 1937, Serial No. 126,835

9 Claims. (Cl. 87—9)

This invention pertains generally to the improvement of oils and pertains particularly to the stabilization thereof.

This invention pertains more particularly to the stabilization of lubricating oils intended for motor car use.

The result of improvements in the automobile motor to develop more power at higher operating temperatures with units occupying smaller space, has been to place a much greater demand upon motor oils.

While commercial motor oils as a rule and particularly those made from Pennsylvania grade crudes are composed of highly inert substances capable of heavy duty performance without substantial change in chemical composition, yet extreme service conditions, particularly when accompanied by high temperatures, are sometimes capable of causing undesirable chemical and/or physical changes as evidenced, for instance, by the corrosion of certain types of bearings.

This invention is based upon the discovery that the stability of oils in general, and particularly those derived from Pennsylvania grade crudes is materially improved upon the addition to said oil of a relatively small amount of a new stabilizing substance made by sulfonating a mineral oil and then treating said sulfonated oil with a compound such as urea.

The following will illustrate the manufacture of this new stabilizing substance.

A Pennsylvania bright stock was first subjected to solvent extraction and the raffinate thus obtained was treated with 10 percent by weight of fuming sulfuric acid at room temperature. After standing several hours 10 percent by weight of urea was added followed by heating to 150° C. This was followed by filtration.

When the filtrate is added to a lubricating oil for instance to the extent of 2 percent it prevents the corrosion of cadmium alloy bearings and copper-lead bearings as shown by the following test.

150 cubic centimeters of oil to be tested is placed in a glass test tube and raised to 341° F. Bearing sections are placed in the oil on glass hooks and a strip of copper having an area of 21 square centimeters is added to catalyze oxidation of the oil and thereby increase the severity of the test. 5 liters of air are passed through the oil per hour. At definite time intervals the bearings are removed, cleaned and weighed. The loss in weight after cleaning is taken as a measure of the degree of corrosion.

To illustrate the stabilizing qualities of my new stabilizing substance an untreated oil was subjected to the foregoing test in the presence of two bearing sections. One bearing section was made of a cadmium-nickel alloy and had a surface area of 21 square centimeters. The other was made of a copper-lead alloy and had a surface area of 9.5 square centimeters.

At the end of 24 hours the cadmium-nickel bearing section lost 370 milligrams and the copper-lead bearing section lost 80 milligrams.

This same oil was treated with 2 per cent by weight of my stabilizing substance and when subjected to the same test the stabilizing substance reduced the corrosion of the cadmium-nickel bearing section to zero and the corrosion of the copper-lead bearing section to 12 milligrams for the 24 hour period.

Similarly under exactly the same oxidizing conditions corrosion of a cadmium-silver-copper alloy bearing section having a surface area of 16 square centimeters was reduced from 330 milligrams to 1 milligram for the 24 hour period.

The stabilizing effect of the stabilizing substance is thus made clearly evident.

In view of the fact that the above test is extremely severe it follows that good results may be produced upon the addition of smaller quantities. However, if desired, larger quantities may be added.

No difficulties have been experienced in bringing larger quantities of the stabilizing substance into solution in the oil. However, if desired, solubilizing agents may be added should this be desired for any reason.

It is to be strictly understood that the foregoing description of a manner of making the stabilizing substance is by way of illustration and not of limitation.

A variety of oils have been used as starting materials in the manufacture of the stabilizing substance. For example a Pennsylvania bright stock which was not subjected to solvent extraction was sulfonated and then treated with urea and the resulting product exhibited excellent stabilizing properties.

Any other substance capable of sulfonating the oil used as starting material in the manufacture of the stabilizing substance may be substituted for sulfuric acid. Generally speaking any substance containing the sulfoxyl group ($HOSO_2$) may be employed and for the purposes of the claims this term will be regarded as including sulfuric acid.

The following is an example of the action of

a reagent (other than sulfuric acid) containing the sulfoxyl group.

A Pennsylvania neutral oil was treated with chlorosulfonic acid in place of sulfuric acid as the sulfonating agent and the product was finished by the addition of urea and filtering in the manner above set forth.

The stabilizing substance thus obtained showed excellent stabilizing qualities.

The presence of chlorine in the molecule of this reagent adds to its effectiveness.

The conditions of treatment with any of these agents or reagents are subject to wide variations and good results have been obtained with various concentrations of sulfonating agents, various lengths of contact, various temperatures, etc.

Further evidence of stabilizing properties appears to reside in an improvement in other qualities of the finished product.

Oils treated in accordance with this invention may be used for any other purpose such as insulating oils for transformers, cables, etc., or for other lubricating purposes.

In the claims the term "sulfonating agent" when referred to is employed generically and includes a mixture containing a "sulfonating agent" in sufficient quantities to be effective as such. The term also includes a mixture wherein the "sulfonating agent" is for practical purposes the sole active component.

Also in the claims the term "lubricating oil" when referred to is intended to mean a petroleum oil of a viscous character, that is, an oil having a viscosity of the order of 50 Saybolt seconds at 100° F. or more, and regardless of the use to which such oil is put.

While procedure for the purpose of carrying out the invention has been particularly described, it is to be understood that this is by way of illustration. Therefore changes, omissions, additions, substitutions, and/or modifications may be made within the scope of the claims without departing from the spirit of the invention which is intended to be limited only as required by the prior art.

For instance the stabilizing substance itself may be used directly as a lubricant since it is of an oil base. In such case the degree of sulfonation may vary to any desired extent. For instance it may be sufficiently small to correspond in percentage to the very small quantity of sulfonated substance present in a lubricating oil after my new stabilizing substance has been added thereto.

I claim:

1. A process for making an oil stabilizing substance comprising subjecting a lubricating oil to the action of a sulfonating agent and then reacting said sulfonated oil with urea.

2. A process for making an oil stabilizing substance comprising subjecting a heavy lubricating oil to the action of a sulfonating agent and then heating said sulfonated oil with urea to a temperature of approximately 150° C.

3. A process for stabilizing a lubricating oil against corrosion comprising adding to said oil a small quantity of a stabilizing substance made by reacting a lubricating oil with a sulfonating agent followed by reaction wtih urea.

4. A process for stabilizing a lubricating oil against corrosion comprising adding to said oil a small quantity of a stabilizing substance made by reacting a lubricating oil with sulfuric acid followed by reaction with urea.

5. A process for stabilizing a lubricating oil against corrosion comprising adding to said oil a small quantity of a stabilizing substance made by reacting a lubricating oil with chlorosulfonic acid followed by reaction with urea.

6. A lubricating oil having in solution therein a small quantity sufficient to stabilize against bearing corrosion of a substance resulting from the reaction of an oil with a sulfonating agent followed by reaction with urea.

7. A lubricating oil having in solution therein a small quantity sufficient to stabilize against bearing corrosion of a substance resulting from the reaction of a lubricating oil with sulfuric acid followed by reaction with urea.

8. A lubricating oil having in solution therein a small quantity sufficient to stabilize against bearing corrosion of a substance resulting from the reaction of a lubricating oil with chlorosulfonic acid followed by reaction with urea.

9. A lubricating oil of Pennsylvania grade having in solution therein in quantity sufficient to stabilize against bearing corrosion a substance resulting from the reaction of a lubricating oil of Pennsylvania grade with sulfuric acid followed by reaction with urea.

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