

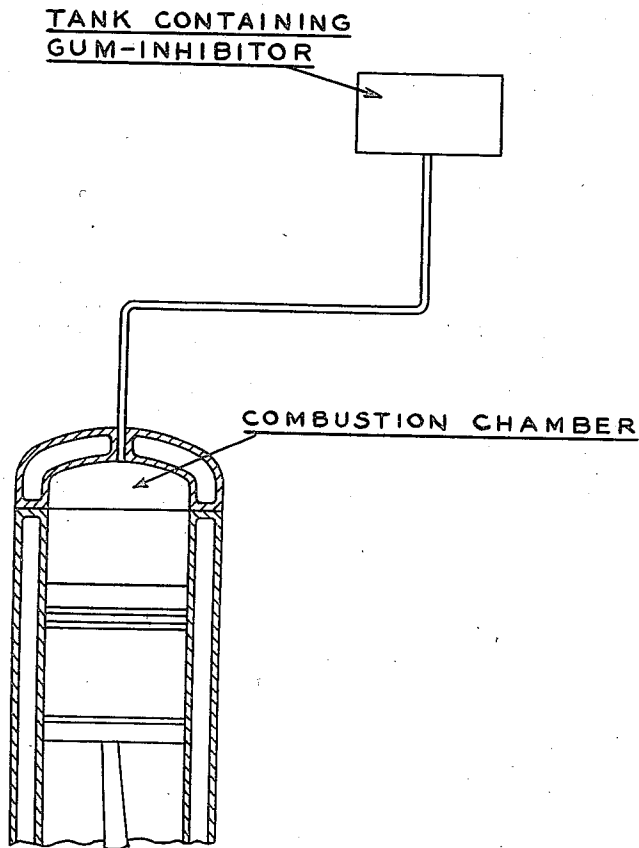
March 26, 1940.

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2,195,167

METHOD OF PREVENTING THE FORMATION OF GUMLIKE PRODUCTS IN OILS

Filed June 30, 1938



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UNITED STATES PATENT OFFICE

2,195,167

METHOD OF PREVENTING THE FORMATION OF GUMLIKE PRODUCTS IN OILS

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Application June 30, 1938, Serial No. 216,751
In Great Britain December 18, 1936

10 Claims. (Cl. 87-9)

This invention relates to a method of preventing the formation of gumlike products in oils which are subjected to an atmosphere containing oxides of nitrogen.

5 It was hitherto believed that the formation of gummy matter in oils was due to the oxidation of the oil leading directly to the production of gummy oxidation products. It has now been found, however, that the formation of gumlike products in an oil used in an engine operating at or near the detonation point is greater than when the engine is not operating under detonating conditions (see Egerton, Smith & Ubbelohde, Royal Society of London "Philosophical Transactions, 1935", vol. 234, page 433). In an engine operating under detonating conditions it was also shown, in the above publication, that the amounts of nitrogen oxides formed in the combustion chamber were abnormal.

15 Experimental observations on the formation of gums in oils have now shown that the presence of nitrogen oxides markedly increases the amounts of gummy materials formed.

20 According to this invention a method of preventing the formation of gumlike products in lubricating oils subjected to the action of oxides of nitrogen in an internal combustion engine consists in introducing into the oil or the said atmosphere a gum-inhibitor as herein defined, wherein said gum-inhibitor is an alkyl or aryl derivative of urea. The term "gum-inhibitor" is used herein to denote substances which inhibit the gum-forming action of the oxides of nitrogen on the oil or on its oxidation products. The inhibitors need not necessarily prevent the oxidation of the oil itself.

Preferably, the alkyl ureas contain at least two alkyl groups.

40 Where the lubricating oil is operating in an internal-combustion engine, it is a feature of the invention that said gum inhibitor is introduced into the combustion chamber with the engine fuel. It will be appreciated that the gum inhibitor may be admixed with the fuel.

45 Alternatively, it may be mixed with the oil, as shown by the following tests.

In one experiment, a commercial lubricating oil was heated and air, containing approximately 1% of nitric oxide and nitrogen peroxide, was passed through the oil; in one hour, the oil was wholly transformed into pitch. In another experiment using a concentration of between one thousandth and one ten-thousandth part of nitric oxide in air, the formation of gummy products was increased by 50% as compared with a control

sample through which pure air was passed. In each of the above experiments, a further test was carried out using an oil containing a small proportion of diphenylurea and the gum-formation was found to be very much reduced when compared with the same oil not containing the diphenylurea.

Among the alkyl ureas which may be used in accordance with this invention are the dimethyl and diethyl ureas and mixed aromatic-aliphatic ureas such as phenyl trimethyl urea.

The gum inhibitor may be utilised in quantities of about .05-5% by weight of the oil.

The drawing shows a diagrammatic arrangement whereby the gum inhibitor may be introduced into the combustion chamber of an internal combustion engine and shows a tank of the gum inhibitor connected by a supply line to the engine communicating with the combustion chamber through which supply line the gum inhibitor is introduced into the combustion chamber.

I claim:

1. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into the oil a gum inhibitor comprising a urea derivative containing at least two alkyl groups.

2. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into the oil a gum inhibitor comprising dimethyl urea.

3. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into the oil a gum inhibitor comprising diethyl urea.

4. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into the oil a gum inhibitor comprising diphenyl urea.

5. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into said atmosphere a gum inhibitor comprising a urea derivative containing at least two aryl groups.

6. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into said atmosphere a gum inhibitor comprising a urea derivative containing at least two alkyl groups.

10 7. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into said atmosphere a gum inhibitor comprising dimethyl urea.

15 8. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of

nitrogen in an internal combustion engine which consists in introducing into said atmosphere a gum inhibitor comprising diethyl urea.

9. A method of preventing the formation of gumlike products in lubricating oils subjected to the action of an atmosphere containing oxides of nitrogen in an internal combustion engine which consists in introducing into said atmosphere a gum inhibitor comprising diphenyl urea. 5

10 10. A lubricating oil having dispersed therein between .05 and 5% by weight of the oil a compound selected from the class consisting of dimethyl urea, diethyl urea, phenyltrimethyl urea and diphenyl urea.

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