Patented Oct. 29, 1935 2,018,979

UNITED STATES PATENT OFFICE

2,018,979

MOTOR FUEL

Le Roy G. Story, Glenham, N. Y., assignor to The Texas Company, New York, N. Y., a corporation of Delaware

No Drawing. Application December 8, 1933, Serial No. 701,540

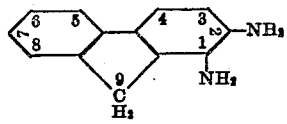
8 Claims. (Cl. 44—9)

This invention relates to motor fuels and more particularly to the provision in a motor fuel, normally tending to form gum on storage, such as cracked gasoline, of an antioxidant or gum inhibitor.

It is well known in the art that cracked gasolines or other motor fuels containing unstable unsaturated hydrocarbons are often adversely affected by light, heat or air and tend to depreciate in color and anti-knock properties and to form gum on standing. The present invention has for its object the production, from such unstable materials, of a stabilized motor fuel containing an improved gum inhibitor.

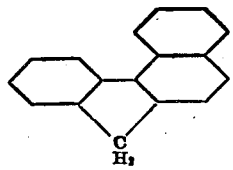
The invention will be more fully understood from the following description and examples thereof.

According to the invention there is provided in the motor fuel certain derivatives of fluorene, and specifically fluorene compounds containing at least one amino or hydroxy constituent, such as 1,2-diamino-fluorene which has the following structural formula:

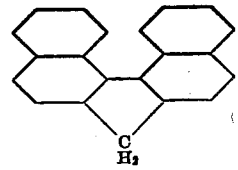


It is possible, however, that one or more amino or hydroxyl groups may be substituted at the nine various positions indicated. Usually the diamino, dihydroxy or aminohydroxy derivatives are the most active inhibitors. Among the useful compounds are included 1-amino-, 2-amino-, 4-amino-, 9-amino-, 2,7-diamino-, 1,9-diamino-, 9,9-diamino-, 2,9-diamino-, 3,6-diamino-, 9-hydroxy-, 2-hydroxy-, 3-hydroxy-, 1,9-dihydrovy-, 1-amino-9-hydroxy-, 9-hydroxy-1-amino-, 2-amino-9-hydroxy-, 2,3,7-triamino-9-hydroxy-fluorene.

Other compounds closely related to fluorene and containing the fluorene structure are chryso-fluorene and picene-fluorene which contain a condensed ring with a naphthalene nucleus instead of one or both of the benzene rings:



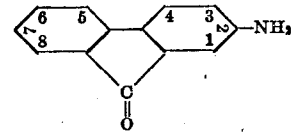
Chryso-fluorene



Picene-fluorene

The amino and hydroxy derivatives of the above compounds are useful as inhibitors and are included in the invention.

Also contemplated within the scope of the invention are derivatives of fluorenone, such as 2-amido-fluorenone having the following structural formula:



The fluorene hydrocarbons are found in that fraction of coal tar boiling between about 270° and 300° C. which affords an available source of supply of raw materials for preparing the compounds useful for the invention.

The methods of preparation and the properties of the fluorene compounds are described in the literature to which reference is made particularly to Beilstein, vol. XII, and Richter, vol. II. In general it may be said that many of the amino and hydroxy compounds are readily prepared from the corresponding nitro and sulfonic acid derivatives by the usual procedures of reduction and caustic fusion respectively.

In practicing the invention, about 0.005% to 0.1% by weight of one or more of the inhibitors is incorporated into the gasoline to be treated. It is preferable to add the inhibitor to the freshly distilled gasoline either by dissolving the compound directly in the gasoline or with the aid of mutual solvents, such as acetone, benzol, etc.

As an example of the operation of the invention, there is dissolved in a cracked gasoline showing about 100 mg. of gum per 100 cc. by the copper dish method (U. S. Bureau of Mines method 530.1) 0.01% by weight of 1,2-diamino-fluorene. The copper dish gum on the treated sample is about 10 mg. per 100 cc. of the gasoline. Another sample of the gasoline treated similarly with 1,9-dihydroxy-fluorene gives substantially the same results.

It is to be understood that I do not limit myself to compounds of the type disclosed in which only amino or hydroxy substituents are present in the molecule. Obviously, many other substituents, such as alkyl, aryl, arylalkyl, halogen, etc., may be present in addition to the amino and hydroxyl groups. In some cases it may be a distinct advantage to have one or more of the above groups present in addition to the amino or hydroxyl radicals; for instance, such an auxiliary substituent adjacent to an active amino or hydroxyl radical often increases the activity thereof and enhances

the general effectiveness of the resulting compound as an inhibitor.

This application is a continuation-in-part of my copending application, Serial No. 660,035, filed March 8, 1933.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A low boiling cracked hydrocarbon distillate, normally tending to deteriorate and form gum on storage, and containing, in sufficient amount to substantially retard such deterioration and gum formation, a compound having the flourene structure and carrying a substituent of the class of amino and hydroxyl groups in the 9 position.

2. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, to which has been added in sufficient amount to substantially retard such deterioration and gum formation, a derivative of fluorene containing one or more substituents from the group consisting of amino and hydroxyl radicals, at least one of said substituents being located in the 9 position of the fluorene nucleus.

3. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing a polyhydroxy fluorene in sufficient amount to substantially retard such deterioration and gum formation, said polyhydroxy fluorene carrying a hydroxyl group in the 9 position.

4. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing a polyamino fluorene in sufficient amount to substantially retard such deterioration and gum formation, said polyamino fluorene carrying an amino group in the 9 position.

5. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing a fluorene compound substituted by amino and hydroxyl groups, in sufficient amount to substantially retard such deterioration and gum formation, said fluorene compound carrying one of said groups in the 9 position.

6. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing 1,9-dihydroxy fluorene in sufficient amount to substantially retard such deterioration and gum formation.

7. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing 1,9-diamino fluorene in sufficient amount to substantially retard such deterioration and gum formation.

8. A cracked hydrocarbon distillate of the class of gasoline and kerosene, normally tending to deteriorate and form gum on storage, and containing 1-amino-9-hydroxy fluorene in sufficient amount to substantially retard such deterioration and gum formation.

LE ROY G. STORY.