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MOTOR FUEL

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1

This invention relates, broadly to motor fuels containing pre-formed gum. It is more particularly concerned with decreasing resinous deposits in an internal combustion engine which are produced by such gum.

As is well known to those familiar with the art, virtually all gasolines, particularly those manufactured by pyrolytic processes, such as by cracking and by polymerization, have a tendency to form polymeric materials during storage. These materials are commonly known as "gum." When present in the gasoline, the gum forms hard, resinous deposits in the carburetor and the intake manifold, and on the valves of internal combustion engines, particularly on the intake valves and the intake valve ports. Obviously, such deposits are objectionable, since they decrease the operating efficiency of the engine and endanger the operational life. Notably, the intake valves are prone to stick, causing poor performance and reduced mileage, and even complete engine failure.

The exact nature of the gum-forming materials in gasolines is not well known. Gum-forming constituents may be removed by treatment of the gasoline with acids, such as sulfuric acid, with clay, and the like. Such processes are disadvantageous, since they decrease the octane value of the fuel and increase refining costs. In U. S. Patent No. 2,066,234 to Sloane and Wasson, it was proposed to add certain lubricating oil stocks to gasoline to reduce valve-sticking and the like. The patentees specified that the oil should have a Kauri-butanol number of at least 15, preferably over 20, a 100° F. Saybolt viscosity of 70–450 seconds, an A. P. I. gravity of 18–28, and a flash point of between 270° F. and 375° F. This definition points toward a naphthenic, Coastal oil and excludes paraffinic oils having a low Kauri-butanol number.

It has now been found that the addition of small amounts of a certain hydrocarbon fraction, having no Kauri-butanol number, to a gasoline decreases the formation of hard, gum deposits in an internal combustion engine in which it is used. It has now been discovered that when a small amount of a petrolatum stock is added to a gasoline containing gum, valve-sticking is eliminated and excessive hard gum deposits are reduced.

Accordingly, it is an object of the present invention to reduce the amount of hard gum deposits in an internal combustion engine. Another object is to provide a gasoline which will not cause valve-sticking and excessive gum deposits when used in an internal combustion engine. A specific object is to provide a gasoline containing pre-formed gum to which has been added a small amount of certain petrolatum stocks. Other objects and advantages of this invention will become apparent to those skilled in the art, from the following detailed description.

2

The present invention provides a gasoline, normally tending to form hard gummy deposits and to cause valve-sticking when used in an internal combustion engine, containing a small amount, sufficient to reduce said deposits and to eliminate valve sticking, of a petrolatum stock having a Saybolt Universal viscosity 210° F. of between about 95 and about 125 seconds, a melting point between about 115° F. and about 135° F., an ASTM penetration at 77° F. of between about 60 and about 110, and which is insoluble in the Kauri-butanol solution at the test temperatures.

The additive which is effective for reducing gum deposits and valve sticking when added to a gasoline is a petrolatum stock having the following properties:

A. P. I. gravity	About 30–35
Flash point	About 440° F.
Viscosity, SSU at 210° F	95–125
Melting point, °F	115–135
Penetration, ASTM cone at 77° F.	60–110

The petrolatum is also insoluble in the Kauri-butanol solution at the prescribed test temperature, usually 75–80° F., used in determining the Kauri-butanol number. A preferred petrolatum stock is one derived from a Mid-Continent crude, and having an A. P. I. gravity of about 32 and melting at 120–135° F. The other properties of this petrolatum fall within the ranges set forth hereinbefore. It will be appreciated, however, that petrolatum stocks from other sources can be used. The main requisite for any petrolatum stock applicable herein is that it have the properties set forth hereinbefore.

The amount of petrolatum stock which is added to a gasoline to achieve the aforedescribed improved results is generally a function of the nature of the gasoline employed, i. e., the amount of harmful gum therein. Ordinarily, the amount used is between about 0.05 per cent and about 0.30 per cent, by volume, and preferably between about 0.15 and about 0.25 per cent. In addition to the petrolatum stock, the gasolines of this invention can contain minor amounts of other materials well-known in the art, such as color-

ing matter, diluents, antiknock additives, and the like.

The following specific example is for the purpose of illustrating the present invention, and of demonstrating the advantages thereof. It must be strictly understood that this invention is not to be limited to the particular petrolatum and gasoline employed, or to the operations and manipulations set forth in the example. As those skilled in the art will readily understand a wide variety of other petrolatums can be used, as set forth hereinbefore.

Example

To a motor gasoline having the following properties:

ASTM distillation, ° F.:	
IBP	92
10% recovered	134
50% recovered	234
90% recovered	357
EP	406
A. P. I. gravity	56.7
Gum, mg./100 ml.:	
Cu dish	63.2
ASTM	12.4

was blended 0.25 per cent, by volume, of a petrolatum stock derived from a Mid-Continent crude. This stock had an A. P. I. gravity of 32.0 and melted at 120–135° F. It was not soluble in the Kauri-butanol solvent at the temperature prescribed for determining the Kauri-butanol number, i. e., at 83° F. The blend thus prepared was used as the fuel in a clean Wisconsin engine operated for 11 hours at 1950 R. P. M. with an air-fuel ratio of 11:1. At the end of the run, the engine was dismantled and inspected. The cleanliness of the engine was rated. The valve stem cleanliness was good and the valve head cleanliness was very good.

For comparison purposes, an identical run was made using the base fuel without the petrolatum stock. At the end of the run the valve was stuck and the valve head cleanliness was only fair. It was also noted that the deposits which were found, when using the petrolatum stock additive, were much softer than those formed in the run in the absence of the additive.

From the example, it will be apparent that the addition of small amounts of the petrolatum stock defined herein to gasolines markedly improves the gum depositing characteristics thereof. As will be apparent to those skilled in the art, such improvement will be evident in any gasoline which contains preformed gum. Accordingly, although the invention has been illustrated with one gasoline, the use of other gasolines is contemplated herein. Thus, the gasoline can be a straight-run gasoline, a catalytically cracked gasoline, thermally cracked gasoline, thermally or catalytically reformed gasoline, polyform gasoline, natural gasoline, or the like.

Although the present invention has been described with preferred embodments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope thereof, as those skilled in the art will readily understand. Such variations and modifications are considered to be within the purview and scope of the appended claims.

What is claimed is:

1. A motor fuel which comprises a gasoline, normally tending to form hard gummy deposits and to cause valve sticking when used in an internal combustion engine, containing between about 0.05% and about 0.30%, by volume, of a petrolatum stock having a Saybolt Universal viscosity at 210° F. of between about 95 and about 125 seconds, a melting point of between about 115° F. and about 135° F., an ASTM penetration at 77° F. of between about 60 and about 110, and which has no Kauri-butanol number.

2. A motor fuel as defined in claim 1, wherein said petrolatum stock is derived from a Mid-Continent crude oil.

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