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AVIATION FUEL

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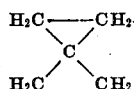
1

The present invention is concerned with an improved aviation fuel. More particularly, the invention relates to a fuel composition comprising spiropentane, which gives improved performance in the aviation motor.

The problem of producing a proper fuel for use in the aviation motor is one that has attracted a large number of workers, due to the complexity of the requirements for a perfect fuel which will perform equally well under the different conditions encountered in the motor. For example, the fuel requirements of the aviation motor are quite different under "cruising conditions" from the conditions obtaining when the motor is accelerating during "take-off" or while the airplane is climbing.

As a solution to the problem of providing a proper aviation fuel suitable for use under the different conditions of operations, it has been proposed that aromatics, naphthenes, isoparaffins, cracked gasoline components, and the like either comprise the major portion of the fuel or be added thereto in substantial amounts. Addition of tetraethyl lead and other anti-detonants such as amino toluenes and their homologues has also been proposed. All of these expedients, while improving the various aviation fuel base stocks, provide an improvement in the fuel's performance during either cruising conditions or during "take-off" or while the plane is climbing but not satisfying the fuel requirements suitable for both types of operation of the motor.

In accordance with the present invention I propose the production of an improved aviation fuel by the employment of suitable quantities of the hydrocarbon spiropentane which has the structural configuration



It is contemplated that the amount of spiro-pentane comprising the aviation fuel will vary with the type of base stock with which it is blended, but in general will not exceed 50% by volume of the fuel composition. It is contemplated that from 5% to 25% will be employed in most instances. It may be pointed out that spiro-pentane boils at a temperature in the neighborhood of 100° F. and it is desirable for the complete blend to have a Reid pressure in the neighborhood of 7 pounds at 100° F. This limitation of vapor pressure is designed to prevent vapor lock and excessive evaporation of the fuel.

The spiro-pentane may be employed in a fuel

2

composition, the other constituents of which are predominantly isoparaffinic in nature. Thus, besides spiro-pentane, the fuel may comprise isopentane, isohexane, isoheptane, iso-octane, and the like. The improved fuel of my invention may also include amounts of tetraethyl lead, iron carbonyl and other anti-detonants such as the class of compounds illustrated by the amino toluenes.

In some instances it may be desirable to prepare a fuel in accordance with the present invention which comprises spiro-pentane and quantities of the aromatics and/or naphthenes. Mixtures of the latter types of hydrocarbons with isoparaffins form suitable base stocks to which the spiro-pentane may be added.

The isoparaffins may be obtained from naturally occurring sources or may be produced synthetically as by the well known alkylation and/or isomerization reactions. Irrespective of the source of the isoparaffins, it is preferred to employ them in my fuel composition in relatively pure form.

Suitable fractions of crude petroleum from crude oils of the coastal type, which boil in the gasoline boiling range, may also form the base stock of my improved fuel. Generally, the hydrocarbon fractions will not have a boiling point which exceeds 350° F. When using crude petroleum fractions with spiro-pentane, it may be desirable to employ other blending agents such as alkylmers and tetraethyl lead to obtain maximum utilization of the qualities of the admixture. The tetraethyl lead may be employed in most instances, in amounts not exceeding 6 cc. per gallon of fuel.

As a specific example of the improved fuel composition, an aviation fuel in accordance with the present invention may be prepared by adding 20 parts of spiro-pentane to 80 parts of an alkylmer having a vapor pressure of 4 pounds Reid. The vapor pressure of this composition is slightly over 6 pounds Reid and is satisfactory for use in an aviation motor.

In another example, a fuel, in accordance with the present invention, is prepared by blending 25 parts of spiro-pentane with a mixture composed of equal parts of 2,2, dimethyl butane, commonly called neohexane and iso-octane. This composition is also satisfactory for use as an aviation fuel.

The nature and objects of the present invention having been described and illustrated what I wish to claim as new and useful and to secure by Letters Patents is:

1. An aviation fuel comprising a minor portion

3

of spiropentane and a major portion of hydrocarbons boiling in the gasoline boiling range.

2. An aviation fuel in accordance with claim 1 in which the hydrocarbons boiling in the gasoline boiling range are obtained from crude petroleum.

3. An aviation fuel in accordance with claim 1 in which the hydrocarbons boiling in the gasoline range are produced synthetically.

4. An aviation fuel in accordance with claim 1 in which the spiropentane comprises approximately 25% by volume of the fuel.

5. An aviation fuel comprising a minor amount of spiropentane and a major amount of isoparaffinic hydrocarbons.

4

6. An aviation fuel in accordance with claim 5 in which the minor amount of spiropentane comprises approximately 25% by volume of the fuel.

7. An aviation fuel in accordance with claim 1 which comprises tetraethyl lead.

8. An aviation fuel in accordance with claim 5 which comprises tetraethyl lead.

9. An aviation fuel which comprises spiropentane as a minor component and a mixture of isoparaffinic, naphthenic and aromatic hydrocarbons as a major component.

10. An aviation fuel in accordance with claim 9 which comprises tetraethyl lead.

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