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MOTOR FUEL

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This invention relates to motor fuels for use in internal combustion engines and their preparation and more particularly to securing in such fuels a reduction of the knocking tendencies, particularly under high compressions, by the addition or blending of suitable novel agents or compounds as hereinafter set forth.

In accordance with my invention, I have found that an enhanced anti-knock property is imparted to hydrocarbon motor fuels such as straight-run gasoline, cracked gasoline or mixtures thereof by the addition thereto of varying proportions of unsaturated aliphatic alcohols and ethers in which at least one unsaturated aliphatic radical is bonded to the oxygen of the characteristic alcohol or ether group, and in general those which are readily volatile, boiling approximately in the range from about 30° C. to about 200° C.

Thus, I may blend with the hydrocarbon motor fuel suitable proportions of olefin alcohols or ethers or diolefin alcohols or ethers, the proportion ranging from about 5% upwardly, suitably 5 to 50% or more, if desired. Mixtures of these compounds, providing a graduated range of boiling points may also be used, if desired. For example, to secure substantial reduction of knocking tendencies I may employ olefin alcohols such as allyl alcohol, methyl-vinyl-alcohol, allyl carbinal, vinyl-ethyl-carbinol, methyl-allyl-carbinol, B-allyl-ethyl alcohol, and crotonyl alcohol and the like; or diolefin alcohols, such as diallyl carbinol or its homologues, such as diallyl ether, propyl or isopropyl alcohols.

I may also employ unsaturated aliphatic ethers of which one or both hydrocarbon groups are unsaturated, such as allyl ether, methyl allyl ether, ethyl allyl ether, ethyl isopropenyl ether, allyl isoamyl ether, and the like. It will be noted that the hydrocarbon radical in the case of the alcohols, or one or both of them in the case of the ethers, may have a branched chain.

In general, the alcohols and ethers employed in accordance with the present invention may be blended with straight-run gasolines, cracked gasolines or mixtures thereof in any desired proportions; for example, from about 5% to 50 to 60% or more of the alcohols or ethers can be blended with the motor fuel to produce a fuel having a desired anti-knock rating, the increase in rating or octane number being approximately proportioned to the amount of the blending agent added. I prefer to utilize alcohols and ethers of the character described which are substantially free from peroxides as the latter tend to accelerate the development of gum-forming constituents, color instability and anti-knock determination. Thus, as a specific example, 30% of allyl alcohol, freed from peroxides by treatment with sulfites, was added to a commercial gasoline motor fuel having an octane number of 70 and the octane number of the blend was thereby increased to about 81. The addition of 40% of allyl alcohol to a similar commercial motor fuel increased the octane number of the blend to about 84.5. If less than 30 or 40% of allyl alcohol is used a correspondingly lower octane number is attained, and if more than 30 or 40% of allyl alcohol is used a correspondingly higher octane number is attained.

The blended fuels resulting from the use of the novel anti-knock agents in accordance with my invention are found to have a high lead susceptibility, and the addition of a small quantity of tetra ethyl lead, say ½ to 2 cc. per gallon, to the motor fuel containing the allyl alcohol or other unsaturated aliphatic alcohol or ether markedly increased the octane number thereof.

The alcohols and ethers employed by me in accordance with the present invention have been found to blend with hydrocarbon motor fuels or mixtures thereof in substantially all proportions. They are compatible and may be used with small proportions, say 0.005 to 0.05% of antioxidant inhibitors or stabilizing agents normally employed in cracked motor fuels to prevent the formation of undesirable gums and color instability such as phenylene diamine, B-methyl-amine, benzyl-para-aminophenol, and the like and hence may be used in admixture therewith in a motor fuel.

Although the present invention has been described in connection with specific details and examples thereof, it is not intended that these shall be regarded as limitations upon the invention except in so far as included in the accompanying claims.

I claim:

1. A gasoline comprising principally volatile hydrocarbons selected from the class consisting of straight-run gasoline, cracked gasoline, and mixtures thereof together with sufficient volatile oxygenated organic compound of the class consisting of the unsaturated aliphatic alcohols and of the unsaturated aliphatic ethers, to increase the anti-knock properties of the gasoline.

2. A gasoline in accordance with claim 1 wherein the proportion of the oxygenated organic compound is from about 5 to about 50%.

3. A gasoline comprising principally hydrocar-

bons in the gasoline boiling point range selected from the class consisting of straight-run gasoline, cracked gasoline, and mixtures thereof, together with a sufficient quantity of an unsaturated aliphatic alcohol, to increase the anti-knock properties of the gasoline.

4. A gasoline in accordance with claim 3 wherein the alcohol is an olefin alcohol.

5. A gasoline in accordance with claim 3 wherein the alcohol is allyl alcohol.

6. A gasoline in accordance with claim 3 wherein the alcohol is a diolefin alcohol.

7. A gasoline in accordance with claim 3 wherein the alcohol is diallyl alcohol.

8. A gasoline comprising hydrocarbons in the gasoline boiling point range, together with a sufficient quantity of an unsaturated aliphatic ether, whereby enhanced anti-knock properties are secured.

9. A gasoline according to claim 8 wherein the ether is diallyl ether.

10. In combination, a gasoline and an improver of the octane number thereof consisting of an oxygenated, organic, peroxide-free compound of the class consisting of the unsaturated aliphatic alcohols and of the unsaturated aliphatic ethers in an amount sufficient to enhance the octane number of the gasoline.

11. In combination, a gasoline and an improver of the octane number thereof comprising peroxide-free allyl alcohol in an amount sufficient to enhance the octane number of the gasoline.

12. A motor fuel product comprising principally volatile hydrocarbons selected from the class consisting of straight-run gasoline, cracked gasoline, and mixtures thereof together with sufficient volatile oxygenated organic compound of the class consisting of the unsaturated aliphatic alcohols and unsaturated aliphatic ethers to increase the anti-knock properties of the fuel, and a small quantity of tetraethyl lead whereby the anti-knock value of the fuel is higher than motor fuels of corresponding lead content.

13. A motor fuel product comprising principally volatile hydrocarbons selected from the class consisting of straight-run gasoline, cracked gasoline, and mixtures thereof together with sufficient allyl alcohol to increase the anti-knock properties of the fuel, and a small quantity of tetraethyl lead whereby the anti-knock value of the fuel is higher than motor fuels of corresponding lead content.

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