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FUEL FOR INTERNAL COMBUSTION ENGINES

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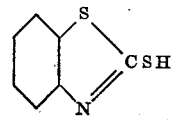
2 Claims. (Cl. 44—9)

This invention relates to compression-ignition fuels and is concerned particularly with compounded fuels containing agents which enhance the ignition qualities and other properties of fuels used in high speed engines of the Diesel type.

Many addition compounds which have been recommended for accelerating ignition of hydrocarbon oils in Diesel engines have characteristically contained nitrogen and sulfur in highly unstable groupings. While it is true that many of these proposed compounds are very effective in shortening the delay period between injection and spontaneous ignition of the fuel, particularly when the fuel is freshly made up, a reduction of their effectiveness tends to occur during storage owing to their inherent instability. These unstable compounds, furthermore, tend to develop corrosive decomposition products in storage and in operation of the engines. This is particularly true in the case of sulfur and compounds containing sulfur, many of which are among the most effective ignition promoters which have been discovered. Nitrogen tetrasulfide, N_4S_4, is one of the most valuable of such compounds; but this and other ignition promoters of the sulfur type are noted for their instability on storage.

An object of this invention is to provide an improved Diesel fuel composition with a novel stabilizing agent, which, added to a fuel containing nitrogen tetrasulfide, tends to prevent the normal deterioration of the ignition qualities or the increase in knocking characteristics of the fuel containing such ignition promoter. It is a further object of the invention, also accomplished by adding the said novel stabilizing agent, to lessen the corrosive effect of such sulfur-containing fuels on metals with which they are in contact, particularly metals containing iron or copper. It is a further object of the invention to provide a stabilizing agent which does not diminish the ignition promoting qualities of the ignition promoting agent present in the fuel.

The new stabilizing addition compound, which has been found to accomplish all of the objects above set forth when compounded in petroleum Diesel fuels containing nitrogen tetrasulfide as an ignition promoter, is 1-mercaptobenzothiazole, which has the formula



To prepare the Diesel fuel compositions of improved ignition qualities, which can be stored for long periods without deterioration or corrosion, the nitrogen tetrasulfide is added in quantities of 0.1% to 5%, usually 0.1% to 0.5%. The quantity of 1-mercaptobenzothiazole required is usually only about 0.001% to 0.005%.

An example of a Diesel fuel containing the new addition agent in advantageous proportions is shown by the following formula:

	Per cent
Nitrogen tetrasulfide	0.1
1-mercaptobenzothiazole	0.001
Lower alkyl esters of wax oxidation acids	0.25
Base oil, to make	100

In this formula the base oil is a gas oil of 40 cetane number and has a viscosity of 37 (Saybolt Universal) at 100° F. The esters of wax oxidation acids are added as an oiliness agent.

Every hydrocarbon oil suitable as a fuel for Diesel engines may be improved in the described manner. Ordinarily, the hydrocarbon fuel to be used has a boiling range above that of gasoline, and, more particularly, has the boiling range and viscosity of hydrocarbons present in a gas oil which boils from about 400° to about 700° F. Under some circumstances, a more narrowly cut fraction such as one distilling from about 400° or 450° to 600° F. may be used.

Other agents for enhancing various other qualities without detracting substantially from the ignition qualities of the fuel may be admixed with the hydrocarbon oil, such as oiliness agents, dyes, pour point depressants, viscosity modifiers, oxidation inhibitors and other knock suppressing agents.

The above description and example are to be taken as illustrative only and not as limiting the scope of the invention. Any modification or variation therefrom which conforms to the spirit of the invention is intended to be included within the scope of the claims.

We claim:

1. A compression-ignition engine fuel comprising a hydrocarbon Diesel fuel oil, 0.1% to 5% of nitrogen tetrasulfide, and an amount of 1-mercaptobenzothiazole effective to substantially lessen the normal deterioration of the said nitrogen tetrasulfide.

2. A compression-ignition engine fuel comprising a hydrocarbon Diesel fuel oil, 0.1% to 0.5% of nitrogen tetrasulfide, and 0.001% to 0.005% of 1-mercaptobenzothiazole.

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