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FUEL FOR DIESEL ENGINES

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The present invention relates to improvements in fuels for Diesel engines.

The application of the Diesel engine to rapidly running engines in particular to vehicle motors, has rendered it necessary to weaken the hard combustion stroke of Diesel engines. For this purpose general attempts have been made to reduce the maximum pressure of combustion and to render the combustion soft. The height of the maximum combustion pressure especially depends on the tendency of the fuel to ignite spontaneously. This tendency varies with the height of the compression pressure, the state of heat of the motor and the chemical nature of the fuel.

As it is not possible generally to reduce the maximum pressure of combustion by altering the conditions of the motor (namely the geometrical measurements of the motor and the working conditions), attempts have been made to influence the fuel by additions. The incorporation of ethyl nitrate, amyl nitrite and similar substances is already known.

We have now found that the maximum combustion pressure of fuels in Diesel engines is reduced and the combustion influenced in a favorable manner by incorporating with the fuels strongly unsaturated fluid aliphatic hydrocarbons containing more than two carbon atoms and more than one multiple carbon bond, such as hydrocarbons containing a plurality of triple linkages, as for example diacetylene, divinylacetylene, and the like, or olefines having more than one double linkage, as for example allene, butadiene and the like. The liquid condensate which is obtained by cooling to low temperatures for example to below 40° below zero C. under ordinary or elevated pressure, the final gas obtained in the thermal or electrical production of acetylene from gas containing hydrocarbons, as for example in the electric arc, may be directly employed as an addition. In addition to diacetylene, this condensate contains in particular allylene, allene and other strongly unsaturated substances partly liquid at normal temperature and even at higher temperatures which likewise influence the combustion in the Diesel engine in the desired direction. The hydrocarbons to be added are gaseous or low boiling, that is to say they have a boiling point below 200° C., and in the most cases below 100° C.

The unsaturated hydrocarbons may be added in amounts from 0.5 per cent, usually from 1 per cent, up to about 20 per cent by weight but preferably not more than 10 per cent are added. The proportion which causes the maximum of the desired effect varies according to the nature of the oils and of the additions. While the addition of 5 per cent of diacetylene causes the best effect when added to a mineral coal tar oil, about 3 per cent are necessary to obtain the maximum of the

effect when employing a gas oil. In the case of the gaseous additions, the upper limit of the quantity of the additions is determined by the solubility of the said gases in the fuels.

Every oil suitable as a fuel for Diesel engines may be improved in the described manner, for example tar oils, suitable fractions from natural mineral oils or oils obtained by destructive hydrogenation of carbonaceous materials.

It has been found that the fuels can be stored for long periods without any loss of their excellent properties.

The following example will further illustrate the nature of this invention but the invention is not restricted to this example.

Example

5 parts by weight of diacetylene are added to 100 parts by weight of mineral coal tar oil. When employing the fuel thus obtained for the operation of a Diesel engine the maximum pressure of the combustion falls from 60 atmospheres (with mineral coal tar oil without addition) to the neighborhood of the compression pressure of about 35 atmospheres; the engine runs quite quietly.

The same effect is obtained by the addition of about 3 parts of the liquid condensate which is obtained by cooling to 80° below zero C. an electric arc gas containing acetylene (obtained by leading a mixture of methane and hydrogen through an electric arc).

What we claim is:—

1. A fuel suitable for use in Diesel motors comprising a hydrocarbon oil heavier than naphtha containing an addition of a sufficient amount, not exceeding 20%, of a fluid aliphatic hydrocarbon, containing more than 2 carbon atoms and having more than one multiple carbon bond, to reduce the pressure at which spontaneous combustion of the hydrocarbon oil would normally occur.

2. A fuel suitable for use in Diesel motors comprising a hydrocarbon oil heavier than naphtha containing an addition of between 1 and 10% of a fluid aliphatic hydrocarbon containing more than 2 carbon atoms and more than one multiple carbon bond.

3. Fuel according to claim 2, in which the hydrocarbon added to the hydrocarbon oil is diacetylene.

4. A fuel according to claim 2, in which the hydrocarbon added to the hydrocarbon oil is the liquid condensate obtained by cooling to 80° below zero C. a gas containing acetylene issuing from the treatment of hydrocarbon gases in the electric arc.

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