

UNITED STATES PATENT OFFICE.

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MOTOR FUEL OIL.

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To all whom it may concern:

Be it known that I, FRANK L. DIETZ, a citizen of the United States of America, residing in Brooklyn, county of Kings, and State of New York, have invented Improvements in Motor Fuel Oils, of which the following is a specification.

This invention relates to motor fuel oils and it particularly relates to that class of fuel oil which is used in internal combustion engines for the production of power.

The object of the invention is to produce a fuel oil which, mixed with air, will readily give an explosive gas and will flash in the cylinder of an internal combustion engine at the normal temperature prevailing in the various seasons of the year.

Another object of the invention is to produce a motor fuel oil giving from one gallon of same more power, and consequently, at a lower price than heretofore possible.

Notwithstanding the many efforts to substitute the relatively expensive and dangerous gasoline they were accompanied by a scant success only, as the products usually are either too expensive or inefficient to come in consideration for permanent use.

It stands to reason that a material to be considered for this proposition must be obtainable on a large scale so as to be sufficiently cheap to meet the competition of the gasoline, as far as the price is concerned. Another feature necessary for success is the ease with which it can be transformed into the motor fuel. I have now found that I can produce a motor fuel, answering the highest requirements, from the tar obtained in the distillation of coal either in the retort or gas producer, at low temperatures up to, and not substantially exceeding a temperature of 600° C., said tar comprising the whole condensate of all the oily, or non-aqueous substances collected in the receiver by cooling the gases down after the water has evaporated out of the coal.

This tar is, however, not free of drawbacks which militate against its application as a motor fuel oil. It consists of approximately equal parts of hydrocarbons and phenols, both classes of substances being represented by approximately altogether 60

different representatives so that it has been impossible to separate the individuals of each class and to determine their characteristics.

It has been ascertained that unsaturated hydrocarbons constitute a fair portion of the group of hydrocarbons and as of the phenols only the lowest members are represented in traces, this portion is made up chiefly of higher molecular phenols.

It has been observed that the main part of the phenols decomposes during the distillation at a temperature above 300° C. and turns almost immediately into a solid pitch; the same result is obtained when the tar is heated under exclusion of air, or when it is allowed to simply stand in the air.

Crude low temperature tar is liquid at room temperature, has a specific gravity of 0.96-1.06 at 25° C. is of a reddish-brown color and is free of benzene, naphthalene and anthracene. In the report of investigations issued by the Bureau of Mines during November 1921 under Serial No. 2,292, it is stated on page 4 that "as a matter of fact there is now no well established demand either in this country or abroad for low-temperature products as such or as substitutes for other materials, the development being beset with technical difficulties."

It has been known, however, for some time that crude low-temperature tar has been used as a wood preserving preparation, and also as a paint material especially for pigments of dark shades, in each of these utilizations the crude low-temperature acted like any other drying oil, the tar solidifying in a short time under the influence of the air. Even though the unsaturated hydrocarbons for themselves alone also solidify by polymerization under the influence of the oxygen of the air, this process does not go quickly; in addition unsaturated hydrocarbons usually act as a solvent on products of recinification and as furthermore also the paraffin hydrocarbons present in the tar should be expected to keep the tar for a long time in the liquid state, this capability of the crude low temperature tar to act in its entirety in every respect as a drying oil is rather remarkable and surprising. It

could not, therefore, be expected that an admixture of other solvents as for instance of alcohols, would tend to change the character of this crude tar from that of a paint material to such an extent as to render it suitable as a motor fuel. This could also not be anticipated for the further reason that crude low temperature tar approximating the upper limit of the above specified range of specific gravity is often not miscible or soluble with alcohols. Up to now, I have usually succeeded to overcome this lack of solubility by mixing about one volume of the crude tar, being in specific gravity nearer to 0.96, with an equal volume of the tar being nearer to 1.06.

This short cut of treating the various degrees of crude low temperature tar in this manner helped considerably in smoothly and effectively vaporizing this crude tar for motor fuel purposes without any trouble either in the cold parts where the air could exert its influence, or in the parts of the machine, where both air and heat would act simultaneously and could be expected to bring about trouble on the ground of the properties referred to above and the tendency of the alcohols to act as an anti-solidification agent was clearly established by many actual running tests with an automobile.

In the operation of my invention, I mix crude low temperature tar with primary alcohols, preferably ethylalcohol, in all proportions, for commercial reasons I prefer, however, any of the following proportions:

Crude low temperature tar.	Ethylalcohol.
1 part.	3 parts.
1 part.	2 parts.
1 part.	1 part.

Another combination wherein I use a mix-

ture of 2 alcohols is also giving good results; its composition is about the following:

	Per cent.
Crude low temperature tar.....	45
Ethylalcohol	45
Isopropylalcohol.....	10 50

For the production of the mixture the whole quantity of the crude tar is utilized without any refining whatever, except that solid sediments in the form of fine coal dust are filtered off; furthermore care is taken that the tar does not carry any water which can be easily avoided in any of the well known ways, and also can be greatly facilitated by connecting a freshly charged retort to the main condensing system only after the main part of the water is driven off. The total quantity of the crude tar which one obtains with the simple safeguards pointed out above is then drawn off and simply mixed with the alcohol in the desired proportions.

What I claim is:

1. A fuel oil for the generation of power in explosion engines, consisting of the crude tar obtained by the distillation of coal at temperatures up to 600 centigrades and alcohol.
2. A fuel oil for the generation of power in explosion engines, consisting of the crude tar obtained by the distillation of coal at temperatures up to 600 centigrades and ethylalcohol.
3. A fuel oil for the generation of power in explosion engines, consisting of the crude tar obtained by the distillation of coal at temperatures up to 600 centigrades and a mixture of ethylalcohol and isopropylalcohol.

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