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LUBRICANT

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This invention relates to lubricants and particularly to internal combustion engine lubricants adapted for use with motor fuels.

According to this invention a lubricant characterized by a combined mechanical and combustion lubricating effect is obtained by mixing with castor oil the products boiling above 130° C., obtainable in the known catalytic pressure hydrogenation of oxide of carbon, and consisting primarily of higher alcohols.

Although the complete mixture of such products, consisting substantially of higher branched chain monohydric alcohols and obtainable by hydrogenation of oxide of carbon, is efficacious for admixture with castor oil according to this invention, I have found that the fraction thereof of boiling point range from about 200-275° C., is particularly advantageous.

The proportions of castor oil and higher alcohols may be varied over a range such as from about 60 parts castor oil by volume to 40 parts higher alcohols to 40-60 parts respectively, although I prefer to utilize a lubricant which contains proportions of about 60 parts castor oil and 40 parts higher alcohols.

The lubricant of this invention is added directly to the fuel in various amounts dependent on the size and type of engine.

One of its great advantages resides in the fact that a considerably smaller quantity thereof is necessary for satisfactory lubrication than is the case with the usual mineral oil lubricants. Thus, for example, in the case of the usual gasoline or benzol fuel, I have found that the superior advantages of the present lubricant are obtained when utilizing from about $\frac{1}{8}$ pt. to 1 pt. thereof per gallon of gasoline or benzol for various sizes and types of engines or, in other words, just about one-half the amount required with a good grade mineral oil. As a further advantage, a much longer engine life results when using the lubricant of the present invention, and sustained high speeds do not cause overheating of bearings or scoring of cylinder walls.

In experiments conducted with two cycle motors, when utilizing gasoline or alcohol- or benzol-containing fuels lubricated with castor oil, I have found that a minimum of about 11% castor oil of the total fuel-lubricant mixture has to be present in the case of a 30 cubic inch piston displacement racing motor to prevent bearing difficulties. I have also found, however, that by adding a quantity of the fraction of higher alcohols, which term is used to describe, generally, the mixture of products obtainable by the pressure cata-

lytic hydrogenation of oxide of carbon, boiling between 175-300° C., it is possible to obtain greater power and to reduce the quantity of castor oil utilized without involving any bearing difficulty at all. Thus, for example, I have found that, in the above type and size of engine, by adding higher alcohols, as above described, to a gasoline fuel in amounts from about 4% of the total fuel and up, the castor oil can be reduced to a minimum of about 6%, whereas if less than about 4% higher alcohols are utilized the amount of castor oil must be materially increased.

I have found further that about 5%, of the 11%, castor oil content previously referred to is normally necessary for lubricating the crank shaft bearings and moving parts other than pistons, whereas the remaining 6%, of the 11%, is used to lubricate the piston during combustion. This was determined by turning the engine at top speed in the absence of combustion or back pressure, i. e., with spark plugs removed. Under these conditions the castor oil could be reduced to 5% of the total fuel composition to lubricate the crank shaft bearings. Furthermore, the addition of higher alcohols to the fuel under such conditions shows no lubricating action on the crank shaft bearings.

It will be apparent, then, that the addition of 4% higher alcohols, or more, in the fuel supplies the lubrication required in the combustion chamber and thus performs the function of the 6% castor oil. No lubricating action from the higher alcohol is apparent until combustion has commenced, however, and hence, although I shall not be limited by the explanation, I believe that on combustion, dehydration occurs, this being the initial stage of combustion, forming a lubricant which lubricates the action of the pistons and finally burns and passes out of the exhaust. When the lubricant of this invention is added to gasoline or benzol I obtain a fuel which possesses both mechanical and combustion lubrication characteristics of an efficiency which permits much greater top speeds than when utilizing castor oil or like oil alone as a lubricant.

According to my invention, it is possible in operation of internal combustion engines, particularly in engines of the two cycle type, to obtain greater speeds than heretofore possible with gasoline fuels. Thus, for example, by addition of a mixture of about 40 parts by volume of higher alcohols of the fraction boiling between 175-300° C., and about 60 parts by volume of castor oil to a gasoline in about $1\frac{1}{2}$ to $\frac{1}{2}$ the proportions (preferably $\frac{1}{2}$ the proportion) of lubricants

usually employed in these motors, there is obtained an increase in the maximum power of about 3%. This power increase may, in turn, be translated directly into a greater number of revolutions per minute of the propeller, or, if desired,

- 5 to a larger propeller which revolves at about the same number of revolutions per minute, consequently delivering greater power and consequently more speed (about 1.5% increase in speed).
- 10 Despite the higher speed of the motor, obtainable according to this invention, one of the great practical advantages thereof resides in the fact that, by use of the present lubricant mixture, a much longer engine life results, due to the superior lubrication I believe, than heretofore obtained, and, furthermore, all these advantages
- 15 are obtainable, as has been previously set forth, by utilizing quantities of as small an amount as one-half those quantities necessary in the case of the usual mineral oil lubricant.

- 20 The advantages of the lubricant of this invention may be enjoyed not only with two cycle outboard engines but also in four cycle engines. Thus, for example, I have found that this lubricant, possessing, as I have designated it, combustion lubrication characteristics, is highly efficacious when used for top cylinder lubricant purposes in four cycle engines. Its superior lubrication of the pistons and valves in such motors results in much smoother operation, longer
- 30 life, and greater power. I have found that, although its proportions to the fuel may be varied over a wide range, highly desirable results are obtained in the case of four cycle engines if the lubricant is utilized in amounts of from about
- 35 $\frac{1}{2}$ ounce to 2 ounces per gallon of fuel.

Various changes may be made in the details and compositions of this invention without departing therefrom or sacrificing any of the advantages thereof.

- 40 I claim:

1. A motor fuel combustion lubricant comprising a mixture of castor oil and the higher alcohols mixture obtainable by the catalytic pressure hydrogenation of oxide of carbon, boiling in the range of about 200-275° C.

2. A motor fuel combustion lubricant compris-

ing a mixture in the proportions of about 40-60 parts by volume of castor oil and 60-40 parts of the higher alcohols mixture obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C.

3. A motor fuel combustion lubricant comprising a mixture in the proportions of about 60 parts by volume of castor oil and about 40 parts of the higher alcohols mixture obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C.

4. The method of improving the lubricating quality of hydrocarbon motor fuels which comprises adding thereto a mixture of castor oil and the higher alcohols obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C.

5. The method of improving the lubricating quality of hydrocarbon motor fuels which comprises adding thereto a mixture of castor oil and the higher alcohols obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C., in the proportions of about 40-60 parts by volume of castor oil and 60-40 parts of the said higher alcohols.

6. The method of improving the lubricating quality of hydrocarbon motor fuels which comprises adding thereto, in the proportions of about $\frac{1}{2}$ to 2 ounces per gallon of motor fuel, a mixture of castor oil and the higher alcohols mixture obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C.

7. The method of improving the lubricating quality of hydrocarbon motor fuels which comprises adding thereto, in the proportions of about $\frac{1}{2}$ to 2 ounces per gallon of motor fuel, a mixture of castor oil and the higher alcohols mixture obtainable by the catalytic pressure hydrogenation of oxide of carbon boiling in the range of about 200-275° C., the castor oil and higher alcohols mixture being in the proportions of about 40-60 parts by volume of castor oil and about 60-40 parts of said higher alcohols.

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