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MOTOR LUBRICATING OIL

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This invention relates to a motor lubricating oil and more particularly to a crank case oil for use in internal combustion engines.

It has heretofore been proposed to incorporate various metallic compounds in lubricating or transformer oils for the purpose of preventing sludge formation in these oils during storage. The present invention, however, contemplates the incorporation of different metallic compounds into motor lubricating oils for the purpose of preventing the formation of hard carbon deposits in the combustion chamber of the engines with which our oils may be used.

It is well known that the formation of carbon in the engines of automotive vehicles and the like causes leaky valves, lost compression, sticky valves, and other conditions tending to diminish the efficiency of the engine. The formation of hard carbon deposits within the engine, however, reduces the engine efficiency to a much greater degree than does the presence of soft or flaky carbon deposits.

It is therefore an important object of this invention to incorporate into motor lubricating oils oil-soluble compounds of metals capable of preventing or retarding the formation of hard carbon deposits in the combustion chambers of engines.

Other and further important objects of this invention will become apparent from the following description and appended claims.

The present invention relates particularly to the treatment of a motor lubricating oil having a viscosity suitable for use in the crank case and cylinders of an internal combustion engine. Such viscosities are, in general, lower than about 75 seconds Saybolt at 210° F. To such an oil there is added a soluble compound selected from the group consisting of compounds of platinum, palladium, nickel, uranium, molybdenum, tungsten, iron, cerium, thorium, vanadium, cesium, boron, lanthanum, silicon, zirconium, beryllium, barium, chromium, columbium, phosphorus, praseodymium, neodymium and titanium.

While the effect of these compounds in the oil upon the formation of carbon deposits is not entirely understood, it is believed that the action is mainly a catalytic one. In some instances, such as where platinum, palladium or nickel is used, these metals appear to act as hydrogenation catalysts in effecting the hydrogenation of constituents of the oil or of carbonaceous residues normally formed therefrom within the combustion chamber. In other instances the activity of the metals may be that of oxidation catalysts,

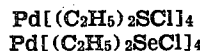
aiding in the more complete combustion of the carbon residues of the oil and thus preventing or reducing the formation of carbon deposits within the combustion chambers of the motor.

We prefer to use compounds that are soluble in the lubricating oil in the desired concentrations and that decompose to liberate the free metal, an oxide or other active body under the conditions obtaining in the engine cylinder. In general, the most satisfactory compounds to use are the metal derivatives of beta-diketones having the general formula, $R-CO-CH(R_1)-CO-R_{11}$, wherein R and R_{11} are hydrocarbon radicals which may also carry halogen atoms as substituents, and R_1 is such a hydrocarbon radical or a hydrogen atom. We prefer to use a metallic derivative of acetyl acetone or propionyl acetone, but various other beta-diketones may be used, such as benzoyl acetone, or the alkyl, aralkyl or aryl homologues of these beta-diketones.

In addition to the metal derivatives of the beta-diketones, metal compounds or derivatives of succinic, malic, malonic and naphthenic acids and of phenols and their homologues may be used.

It is likewise feasible to use the alkyl and aryl derivatives of the metals or elements listed above, such as boron tri-ethyl, boron tri-amyl, silicon tetra-ethyl, silicon tetra-amyl, boron tri-phenyl, silicon tetra-phenyl, and the like. Metal derivatives of compounds of the type of acetyl-acetaldehyde may also be used. Many other specific compounds, such as tri-iso-aryl borate, tri-cresyl phosphate, tri-phenyl phosphate, etc. can likewise be employed, as will be understood by those skilled in the art.

Complex addition products of palladium and of platinum with diethyl sulphide and with diethyl selenide are likewise available for use, the formulae of these complex compounds being most probably the following:



The metals that we find most active for our purposes are palladium, platinum and nickel. In the case of palladium and platinum, concentrations as low as 0.001 gram of metallic content per quart of oil have been found to be effective, probably due to the much greater hydrogen absorptive power of these metals as compared with the other metals of the group. In general, concentrations of the other metals or elements between 0.1 and 5.0 grams per quart of oil give satisfactory results.

Since the compounds above enumerated are all soluble in lubricating oils such as are commonly employed as crank case oils, it is not necessary to use a blending or emulsifying agent, although the use of such agent is not excluded from the scope of our invention. The use of emulsifying agents, such as soaps, triethanolamine oleate, or the like, is recommended where the particular metal compound to be used is not sufficiently soluble to give the desired concentration in the motor lubricating oil.

It will be understood that the incorporation of elements of the group indicated into motor lubricating oils will show the greatest advantages where the lubricating oil is to be used in the crank cases and cylinders of high compression engines, that is, where the compression ratio is greater than 6 to 1. The effect of hard carbon formation in high compression engines is more noticeable and results in greater loss of efficiency than in the case of low compression engines. Consequently, the reduction or elimination entirely of the hard carbon deposits by the use of motor lubricating oils of our invention is particularly advantageous in the case of high compression engines.

This advantage is realized in the case of both cast iron and aluminum head engines. Our oils have shown up favorably in cast iron head engines having compression ratios of from 6.5 to 7, to 1, and in aluminum head engines having compression ratios as high as 10.1 to 1.

We are aware that numerous details of the process may be varied through a wide range without departing from the principles of this invention, and we, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

We claim as our invention:

1. A motor lubricating oil containing a beta-diketone compound of an element selected from the group consisting of platinum, palladium, nickel in sufficient amount to prevent or retard the formation of hard carbon deposits in the combustion chamber of an engine in which said oil may be used.

2. A motor lubricating oil containing dissolved therein a platinum derivative of a beta-diketone in sufficient amount to prevent or retard the formation of hard carbon deposits in the combustion chamber of an engine in which said oil may be used.

3. A motor lubricating oil containing dissolved therein a palladium derivative of a beta-diketone in sufficient amount to prevent or retard the formation of hard carbon deposits in the combustion chamber of an engine in which said oil may be used.

4. A motor lubricating oil containing dissolved therein a nickel derivative of a beta-diketone in sufficient amount to prevent or retard the formation of hard carbon deposits in the combustion chamber of an engine in which said oil may be used.

5. A lubricant having a viscosity of less than 75 seconds Saybolt at 210° F. for use in the crank case and cylinders of a high compression internal combustion engine, comprising an oil containing dissolved therein a beta-diketone compound of an element selected from the group consisting of platinum, palladium, nickel in sufficient amount to prevent or retard the formation of hard carbon deposits in the combustion chamber of an engine in which said oil may be used.

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