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TOP CYLINDER LUBRICANT

Edward B. Beale, Evanston, Ill., assignor to
Standard Oil Company, Chicago, Ill., a corporation of Indiana

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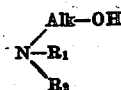
This invention relates to an improved top cylinder lubricant for internal combustion engines and particularly to top cylinder lubricants adapted to be added to the motor fuels or introduced directly into the manifold or cylinders.

In newly constructed internal combustion engines having tightly fitted pistons and valves, great care must be used to obtain effective lubrication during the early periods of operation, or the "breaking in" period. If tightly fitted pistons or other tightly fitted parts are forced to depend entirely upon crankcase lubrication during the "breaking in" period, the cylinder walls may easily be scored and the efficiency of the engine will then be materially reduced. It is common practice to run newly constructed engines at low speeds during the "breaking in" period because crankcase lubrication is inadequate for lubricating the upper part of the pistons and other tightly fitted parts. Also, it has been determined that it often takes from 3 to 8 minutes for oil to reach the upper part of the cylinders from the crankcase. With new engines, this lag in the lubrication to the upper part of the cylinders causes excessive wear of the piston rings and cylinder walls. In old engines, likewise, it is often desirable to provide additional lubrication to the pistons and valves to quiet their operation.

I have found that the alkylolamine salts of fatty acids both saturated, unsaturated and derivatives of these acids are excellent top cylinder lubricants. The sulfur and halogen derivatives of these salts are particularly good top cylinder lubricants. These compounds may be dissolved in the motor fuel contained in the supply tank, or they may be mechanically introduced into the intake manifold or cylinders, although I prefer the latter method of application. Also these alkylolamine aliphatic salts, or compounds, may be mixed with vegetable, animal or mineral oils and said mixtures may be added to the motor fuel in the supply tank or introduced into the cylinders by some suitable mechanical means such as the atomizer shown in U. S. Patent No. 1,719,254.

These alkylolamine compounds of fatty acids prevent scoring of the cylinder walls and also enable the engine to be run at high speeds without going through the so-called "breaking in" period. Also these salts or compounds insure constant lubrication for the valves, soften carbon formation around the valves and on the top of the cylinders, eliminate frequent valve sticking, and sustain the horse power of the engine for much longer periods than mineral oil lubricants supplied from the crankcase.

The compounds suitable for my invention are the fatty acid salts, both saturated and unsaturated, of an alkylolamine of the following general formula:



wherein Alk represents an aliphatic or hydroxy aliphatic radical, R₁ and R₂ represent hydrogen or an aliphatic radical or a hydroxy aliphatic radical or a polyhydroxy aliphatic radical. Also, the fatty acid residue may be sulfurized or halogenated, particularly chlorinated, before being reacted with the amine.

These alkylolamine fatty acid compounds may be prepared as follows:

The free fatty acids are combined directly with an amine or a mixture of amines. If the fatty acid is solid the preparation is aided by the application of heat. It is also possible to start from the glycerides of fatty acids, that is, olive oil, cottonseed oil, castor oil, linseed oil, and the like, and saponify the glycerides by heating with the base at high temperatures. Also, when the acids or acid glycerides are reacted with the alkylolamines or bases, the mono-acid derivatives, diacid derivative, tri-acid derivative or mixtures of the mono, di and tri-acid derivatives may be formed. The product formed is greatly influenced by the particular process used. The products resulting from the above processes have varying degrees of consistency, some are solids, particularly those prepared at high temperatures of about 200-250° C., some are semi-solids, and others are liquid. The processes for preparing alkylolamine fatty acid compounds are well known and are set forth in U. S. Patent No. 1,799,825.

The sulfurized compounds suitable for my invention are prepared by heating oleic acid, ricinoleic acid or similar aliphatic acids with about 1 to 5% of free sulfur. The sulfurized compounds may also be prepared by heating the glycerides of the fatty acids with sulfur and then saponifying the glycerides by heating the base at high temperatures. The halogenated compounds can likewise be prepared by initially halogenating the fatty acid—e.g.—oleic acid, and combining the halogenated acid with an alkylolamine. The alkylolamine compound tends to prevent the liberation of free halogen acid.

Some of the alkylolamine aliphatic acid compounds suitable for my invention are as follows: Triethanolamine ricinoleate, diethanolamine ricinoleate, triethanolamine sulfurized ricinoleate,

triethanolamine oleate, triethanolamine dichlorostearate, diethanolamine oleate, monoethanolamine oleate, triethanolamine sulfurized oleate, triethanolamine chlorostearate, triethanolamine stearate, dithanolamine stearate, tripropanolamine oleate, triethanolamine palmitate, dipropanolamine oleate, tripropanolamine stearate, tributanolamine stearate, triethanolamine iodostearate, tributanolamine oleate, dibutanolamine oleate, trimethanolamine oleate, triethanolamine diiodostearate, dimethanolamine oleate, trimethanolamine stearate, ethyl dimethanolamine stearate, ethyl diethanolamine oleate, propyl dipropanolamine oleate, diethyl ethanolamine, methyl dimethanolamine stearate, methyl diethanolamine oleate and mixtures of these compounds, such as mixtures of mono, di and tri ethanolamine oleate, mono, di and tri propanolamine stearate and the like. Mixtures of fatty acids may be treated with alkylolamines to form the salts thereof.

The alkylolamine salts of fatty acids may be added to the fuel or gasoline in the supply tank in the proportions of about 100 to 1000 cc's for each five gallons of gasoline or they may be mechanically added to the cylinders. Also, the alkylolamine salts of fatty acids may be dissolved in a vegetable, animal or mineral oil and then added to the motor fuel or mechanically added to the cylinders. The mineral oils suitable for my invention have a viscosity of about 70 to 1000 sec. Saybolt at 100° F. Also, highly refined mineral white oils with a viscosity of 70 to 1000 sec. Saybolt at 100° F. may be successfully used in combination with the above compounds, but I prefer to use mineral oils and refined mineral white oils with a viscosity of 70 to 200 sec. Saybolt at 100° F. When the amine salts are dissolved in oils as described above, the proportion of alkylolamine salts of fatty acids may vary greatly, but generally they should comprise about 5 to 50% of the composition. These mixtures of alkylolamine salts of fatty acids and oils may be added to the fuel in the supply tank in the proportion of 100 to 2000 cubic centimeters for each five gallons of fuel.

Suitable examples of mineral oils and alkylolamine salts of fatty acids are as follows:

Example I

Triethanolamine oleate	Percent
Refined mineral oil of 70 to 100 Saybolt viscosity at 100° F.	5-20
	80-95

Example II

Mixture comprising 70 to 75% triethanolamine oleate, 20 to 25% diethanolamine oleate and 0 to 5% monoethanolamine oleate	Percent
Mineral oil of 80 to 120 Saybolt viscosity at 100° F.	15
	85

Example III

Triethanolamine dichlorostearate	Percent
Refined mineral oil 80 to 120 Saybolt viscosity at 100° F.	5-15
	95-95

Example IV

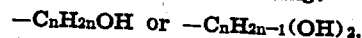
Triethanolamine ricinoleate	Percent
Castor oil	35
	65

Example V

Triethanolamine sulfurized oleic acid	Percent
Mineral oil of 80 to 150 Saybolt viscosity at 100° F.	15 to 25
	85 to 75

It should be understood that any of the alkylolamine fatty acid salts may be used in the above examples, also the proportions of alkylolamine fatty acid salts and oils may be varied greatly without departing from the scope of my invention.

By the term "alkylol", as used herein, I mean to include an alkyl radical in which one or more hydrogens are replaced by a hydroxyl group, and may be represented by the following:



Although the present invention has been described in connection with the details of specific examples, it is not intended that such details shall be regarded as limitations upon the scope of the invention, except insofar as included in the accompanying claims.

I claim:

1. A water-free composition of matter for use as a top cylinder lubricant and motor fuel, comprising a small quantity of an alkylolamine salt of a fatty acid selected from the group consisting of oleic acid, stearic acid, ricinoleic acid, sulfurized oleic acid, sulfurized ricinoleic acid, and chlorinated oleic acid, and a major quantity of gasoline, said salt being used in the proportions of 100 to 1000 cc's per five gallons of gasoline.

2. A water-free composition of matter for use as a top cylinder lubricant and motor fuel, comprising triethanolamine oleate and gasoline, said oleate being used in the proportions of about 100 to 1000 cc's per five gallons of gasoline.

3. A water-free composition of matter for use as a top cylinder lubricant and motor fuel, comprising a major quantity of gasoline, a small quantity of a mineral oil having a viscosity of 70 to 120 seconds Saybolt at 100° F. and a small quantity of an alkylolamine salt of a high molecular weight fatty acid chosen from the group consisting of the higher fatty acids naturally occurring in olive oil, cottonseed oil, castor oil and linseed oil, each of said alkylol groups containing from 1 to 4 carbon atoms.

4. A water-free composition of matter for use as a top cylinder lubricant and motor fuel, comprising a major quantity of gasoline, a small quantity of a mineral oil having a viscosity of 70 to 120 seconds Saybolt at 100° F. and a small quantity of triethanolamine palmitate.

5. A water-free composition for use as a motor fuel and top cylinder lubricant, said composition comprising a major quantity of gasoline and a small quantity of an alkylolamine salt of a higher fatty acid, the higher fatty acid being one chosen from the group consisting of the higher fatty acids naturally occurring in olive oil, cottonseed oil, castor oil and linseed oil.

6. A water-free composition for use as a motor fuel and top cylinder lubricant, said composition comprising a major quantity of gasoline and a small quantity of an alkylolamine salt of a sulfurized higher fatty acid, the higher fatty acid being one chosen from the group consisting of the higher fatty acids naturally occurring in olive oil, cottonseed oil, castor oil and linseed oil.

EDWARD B. BEALE.