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FLUSHING OIL

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The present invention relates to a composition new to the art of flushing oils, and more particularly to such materials that are used for cleaning bearing surfaces which contain a solvent and an extreme pressure lubricant.

When oil or grease lubricated bearings are run for sustained periods, an accumulation of gums, carbon, varnishes, fine metallic particles, along with poor lubricating oil appear on its surface. These accumulations should be removed periodically, or they may cause excessive wear on the bearing surface. Due to the tenacity of the accumulated materials to the metal, it has often been found necessary to disassemble the bearings in order to remove these materials.

In many types of bearings, such as, those found in automobile engines, it is impractical and too costly to take the engine apart in order to clean the bearing surfaces; so flushing oils of various types have been developed which attempt to clean the bearings when the engine is assembled. In cleaning an engine with bearings assembled, the best procedure is to run the engine while the flushing oil is used, as the engine will aid in cleaning, due to its rubbing action and heating of the solvent.

One type of flushing oil, such as kerosene, has been used, as it has a high penetrative power in going between bearing surfaces. It introduces a serious disability in the fact that it has very little lubricating quality, and if used on a running engine, may cause excessive wear on the bearing surfaces.

An efficient flushing oil should have the properties of penetrating between close bearing surfaces, of dissolving all accumulations on the bearing surfaces, and of lubricating the bearing surfaces in order that the engine bearings may be run during the cleaning process.

It is the object of the present invention to provide a flushing oil which has a low surface tension, high penetration characteristics, efficient solvent action, and good lubricating quality.

Another object is to present a material which can be used to effectively clean the crank case and engine bearings of an automobile.

The preferred composition is made from the following ingredients:

	Percent by volume
Commercial xylol	10
#2 fuel oil	88.9
Octyl alcohol	0.1
Sulfurized cresyl phosphite	0.5
Sulfurized cresyl phosphate	0.5

To every fifty gallons of this mixture 2 grams of a red organic dye are added in order to give a distinctive color to the mixture.

The commercial xylol is a good solvent for varnishes, gums and resins which are often formed in the crankcase and around the piston rings of an automobile engine. The xylol has good penetrating properties and a desirable surface tension to assist in dissolving gums, resins and the like in a crankcase. The commercial xylol should preferably have a comparatively low percentage of benzol and a minimum flash point of 115° F. Benzol is effective in a mixture of this kind and can be readily used in a place where it would not be dangerous to the public health. However, the public health authorities require that the commercial xylol should contain less than 5 percent of benzol.

The #2 fuel oil is preferably a mineral oil which is a good solvent for asphalts, mineral oil residues and reaction products of mineral oils which are deposited in a crank case from the lubricating oils and the gasoline which dilutes the lubricating oil in the operation of the engine. The fuel oil preferably has the following properties:

	Degrees Fahrenheit
Minimum flash point	110
Maximum flash point	190
On Engler distillation—	
10% over at	440
90% over at	[1]600
Pour point	15

[1] Maximum.

A fuel oil of this type in addition to being a good solvent is an excellent carrier for emulsions, carbon and dirt which accumulates in an engine and therefore assists in effectively flushing out foreign material in a crank case.

When the mixture of fuel oil and xylol are actively agitated in the crankcase this mixture tends to froth. The octyl alcohol is particularly effective as a froth preventer and breaker. Furthermore the octyl alcohol is a surface tension modifier and decreases the surface tension of the mixture to increase its penetrating ability.

The mixture of sulfurized cresyl phosphite and phosphate is primarily an extreme pressure lubricant or film forming material for lubrication of moving parts which are being cleaned and flushed. This phosphite-phosphate mixture furthermore has properties which help to clean and displace undesired residues that deposit in bearings.

The mixture of sulfurized cresyl phosphite and phosphate has been found to be the most effective lubricant for the cleaning compound. However, it has been found that other lubricants of the extreme pressure type may be substituted for the cresyl phosphite-phosphate mixture. For example, chlorinated fatty acids or sulfurized fatty oils may be used as the lubricant in the flushing compound.

After engine bearings have been cleaned with the preferred flushing oil, a film of the high pressure lubricant remains on the bearing surface to lubricate the bearing until the lubricating oil reaches the bearing surface.

The invention thus having been described, what is claimed as new is:

1. A flushing oil for cleaning metal bearings while the moving parts thereof are in motion and which is adapted to remove adherent gums, carbon, varnishes and fine metal particles, comprising a fluid mixture composed mainly of a mineral oil solvent and carrier having a flash point of from about 110° to about 190° F. and having good solvent power for asphalts, mineral oil residues and reaction products of the lubricant which had been used on the bearings, a substantial proportion of xylol, and a relatively small proportion of sulfurized cresyl phosphite as an extreme pressure lubricating agent present in sufficient proportion for lubricating the metal bearings while they are being cleaned with the flushing oil.

2. A flushing oil as defined by claim 1 in which said mineral oil solvent and carrier is of the fuel oil type.

3. The method of cleaning the bearings of an engine and flushing out the crank case thereof, which comprises actively agitating therein by operating the engine a fluid solvent mixture composed of a major proportion of a mineral oil solvent having a flash point of from about 110° to about 190° F., a minor proportion of xylol, and a relatively small proportion of an extreme pressure lubricating agent of the type of sulfurized cresyl phosphite, said agent being present in sufficient proportion and adapted to lubricate the moving parts of the engine while the engine bearings and crank case are being cleaned and flushed.

4. The method of cleaning and flushing out the bearings and crank case of an engine which comprises actively agitating therein by operating the engine a fluid solvent mixture composed mainly of a mineral oil solvent and carrier having a flash point of from about 110° to about 190° F., and having good solvent power for asphalts, mineral oil residues and reaction products of the lubricant which had been used in the engine, said mixture including a solvent selected from the class consisting of xylol and benzol, and a relatively small proportion of extreme pressure lubricant comprising sulfurized cresyl phosphite, said extreme pressure lubricant being present in sufficient proportion and adapted to lubricate the moving parts of the engine while the bearings and crank case thereof are being cleaned and flushed.

5. A flushing oil comprising a composition of 10% commercial xylol, 88.9% No. 2 fuel oil, 0.1% octyl alcohol, 0.5% sulfurized cresyl phosphate, and 0.5% sulfurized cresyl phosphite.

6. A flushing oil for cleaning metal bearings which is adapted to remove adherent gums, carbon, varnishes and fine metal particles, comprising a fluid mixture composed mainly of a mineral oil solvent and carrier of the type of No. 2 fuel oil having good solvent power for asphalts, mineral oil residues and reaction products of the lubricant which had been used on the bearings, a substantial proportion of xylol, and a relatively small proportion of sulfurized cresyl phosphite and sulfurized cresyl phosphate, said proportion being sufficient to lubricate the bearings while they are being cleaned.

7. The method of cleaning the bearings of an engine and flushing out the crank case thereof, which comprises actively agitating therein by operating the engine a fluid solvent mixture composed of a major proportion of a mineral oil solvent of the type of No. 2 fuel oil, a minor proportion of xylol and a relatively small proportion of sulfurized cresyl phosphite and sulfurized cresyl phosphate, said phosphite and said phosphate being present in sufficient proportion and adapted to lubricate the moving parts of the engine while the bearings and crank case thereof are being cleaned and flushed.

8. The method as defined by claim 7 in which the fluid solvent mixture is composed of approximately 10% of xylol, 89% of No. 2 fuel oil and 1% of a mixture of sulfurized cresyl phosphite and sulfurized cresyl phosphate.

9. The method as defined by claim 4 in which said fluid solvent mixture includes a substantial proportion of xylol.

10. The method as defined by claim 4 in which said fluid solvent mixture includes approximately 10% of xylol, 89% of No. 2 fuel oil, and 1% of extreme pressure lubricant.

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