METHOD FOR RECLAIMING CRANKCASE OIL

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Filed April 9, 1943

Patent Number: 2,399,140

Application Date: April 23, 1946
This invention relates to cleaning or reclaiming oil from crankcase draining, though it may be applied to other uses. When new or virgin oil is placed in an engine, it soon becomes discolored due to the presence of oxygen, and there is an accumulation of organic salts of iron, lead, copper, etc., which accelerates oxidation. Both physical and chemical contamination of the oil proceeds together in engines at varying rates. The combination of materials thus formed in the crankcase is commonly known as sludge, which term includes compounds which differ widely. The contaminants are alcohol, soot, lead salts, fuel ends, dust, metal, and oil decomposition products.

There are generally two forms of reclaiming, one the simpler but not entirely satisfactory though perhaps answer- ing certain purposes, and the other, requiring a very elaborate and expensive installation. Neither utilize the invention about to be described.

This invention contemplates the treatment of such crankcase compounds by adding an alkali or other neutralizer and stirring the same to obtain a thorough admixture, and then subjecting the same to centrifuging, to separate the solvent with the impurities from the oil. In certain cases, alkali may be omitted, but in all cases it is preferred to use a solvent for the soluble impurities.

The invention is for a process of reclaiming crankcase or similar oil compounds, which consists in subjecting the oil compounds as they leave the crankcase and mixed with a solvent to dissolve impurities in the compounds and neutralize the acids of the compounds, to a centrifugal force and to a stirring force, both against the action of gravity, then subjecting the oil and the solvent in respective parallel surface area sheets to contact actions, moving said parallel spread out sheets over each other at varying velocities in respect to each other, and subjecting said so moving parallel spread out sheets to the action of centrifugal forces for forcing the solvent through the sheet of oil, while moving the oil sheet in surface area contact over the solvent sheet, whereby the cleaned oil freed from the solvent is separated from the solvent.

The invention will be further described with the aid of drawings showing various embodiments of apparatus practical in carrying out the invention, and the invention will be finally claimed.

In the accompanying drawings—
Fig. 1 is a central vertical section of a centrifuge apparatus, largely diagrammatic; Fig. 2 is a detail view of one form of the device; Fig. 3 is a detail view of another form of device; Fig. 4 is a central vertical section of another form of centrifuge; Fig. 5 is a similar section of another form, and Fig. 6 is a similar section of still another form. Figs. 4, 5 and 6 being also diagrammatical, to show the mode of operation embodied therein. Similar character of reference indicate corresponding parts throughout the various views.

Referring to Figs. 1, 2 and 3, a motor 10, rotates a centrifuge 13 guided by a bearing 12, the casing of the centrifuge 13 having an opening 14. The inner surfaces 11 are secured to 13 and rotate with the casing. A feed screw or blade 15 is within the tube 16 of the centrifuge so that the crankcase oil with additions thereto are forced thereby into the interior of the centrifuge. The two liquid form on the shaft or tube 16 and are carried to the rotating inner surface 11. This surface 11 may be provided with grooves 17 shown in Fig. 2, or drops 18 shown in Fig. 3, to cause further mixing or re-mixing. The crankcase oil and additions will be fed slow enough to form a film of each after having been centrifuged, thereby giving good contact between the two. If grooves are used as shown in Fig. 2, a considerable amount of water as an addition is filtered out. The added water dissolves certain of the impurities of the oilwater contents of the crankcase. If projections or drops are used as in Fig. 3, the oil will be constantly washed by surface 18 of the water, and by regulating the rate at which the two liquids enter, the amount of washing may be regulated. Hydroxides or other acid neutralizers may be added to the liquids. This may be sodium or potassium hydroxide 2 to 10 grams per liter of water.

The dotted line 20 shows where the water collects, and between the surface of the water 20 and the opening 14, the clean oil collects and this is discharged at the opening 14 as more oil and water is being introduced.

By adding water the oil is forced out at opening 14. The water will be brought close to 14 as indicated by 14a. The film of oil between 14 and 14a represents the loss of oil for any one run.

Referring to Fig. 4, a motor 10, centrifuge 12a, opening 14 is again present, with a bearing 12 for the shaft or tube 16 of the centrifuge. Steam is now used in the place of or in addition to the added water, and this is forced by fan or turbine blade 15 with the oil upwardly of the shaft 16 into the centrifuge. A filter 25 is arranged on the surface of the centrifuge tube. The centrifugal force will cause the water and
A preliminary mixing may be carried out by shaking, stirring, supersonic vibration of the oil compounds as they appear in the crankcase, either with a solvent such as water, or with an alkali as a neutralizer, or with both.

It will have been noted that in each of the modes of operations described there was a mixing of a solvent or neutralizer with the crankcase oil or like oil, and the separation by centrifugal force of the solvent or neutralizer with impurities from the oil, the impurities having a specific gravity greater than that of the oil. After purifying, additional oil can be added, to correct the viscosity.

We have discovered the capability of centrifugal force and the susceptibility of the crankcase oil compounds to that force when treated with a solvent as water, or neutralized by an alkali, and the availability of the mode of operation to that object, and to that force.

We have described several forms of the invention, but obviously various changes may be made in the details disclosed without departing from the spirit of the invention as set out in the following claim.


We claim:

The process of reclaiming crankcase or similar oil compounds, which consists in subjecting the oil compounds as they leave the crankcase and mixed with a solvent to dissolve impurities in the compounds and neutralize the acids of the compounds, to a centrifugal force and to a stirring force, both against the action of gravity, then subjecting the oil and the solvent in respective parallel surface area sheets to contact actions, moving said parallel spread out sheets over each other at varying velocities in respect to each other, and subjecting said so moving parallel spread out sheets to the action of centrifugal forces for forcing the solvent through the sheet of oil, while moving the oil sheet in surface area contact over the solvent sheet, whereby the cleaned oil freed from the solvent is separated from the solvent.

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