

- [54] **APPARATUS FOR CLEANING ENGINES**
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Primary Examiner—Robert L. Bleutge

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123/198 A
[51] Int. Cl..... B08b 3/08, B08b 9/00
[58] Field of Search..... 134/22 R, 21, 102, 167 R,
134/168 R, 169 A, 30; 123/1 A, 198 A

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[57] **ABSTRACT**

An apparatus for cleaning automobile engines or the like wherein solvent is forced into the lubrication system of the engine and drained through the bottom of the oil drain pan. Following the forcing of a fluid solvent through the engine a vaporized solvent is then used to reach portions not penetratable by liquids. The fluid and vapor are alternated until the engine is clean at which time oil is forced into the entire engine. The oil is introduced by the same apparatus used for cleaning and assures the introduction of lubrication to all parts when the engine is again started.

3 Claims, 2 Drawing Figures

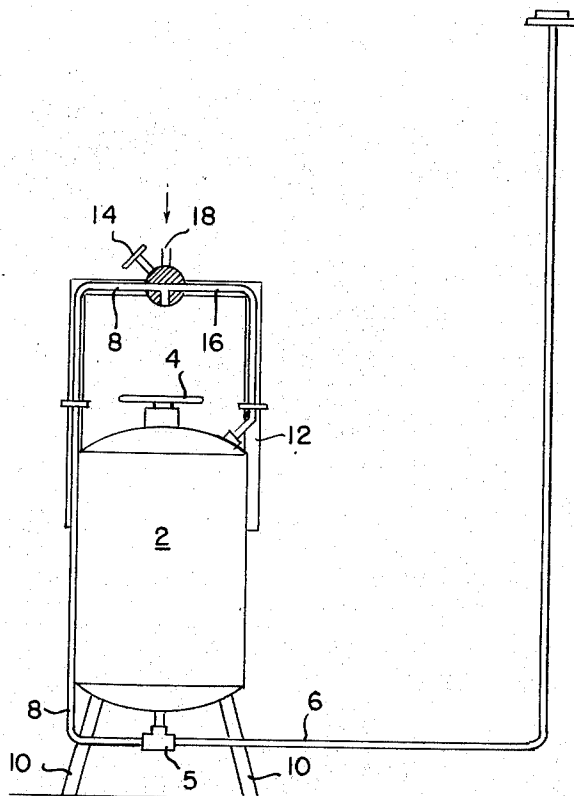


FIG. 2

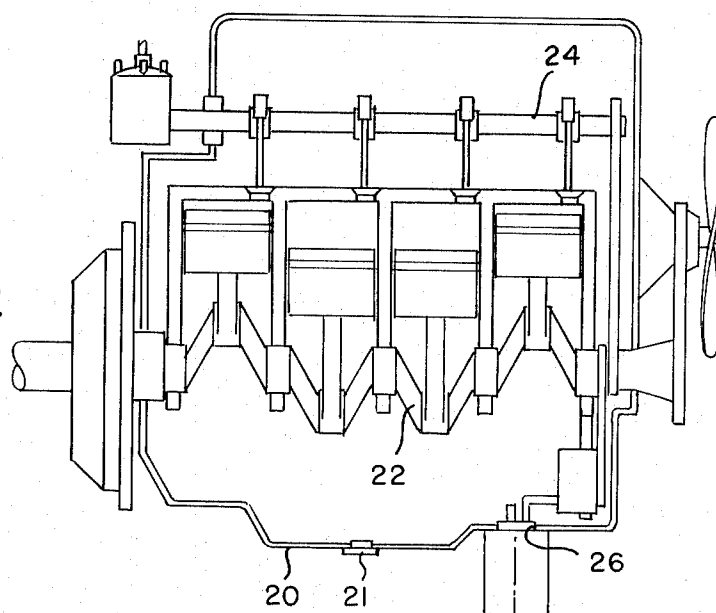
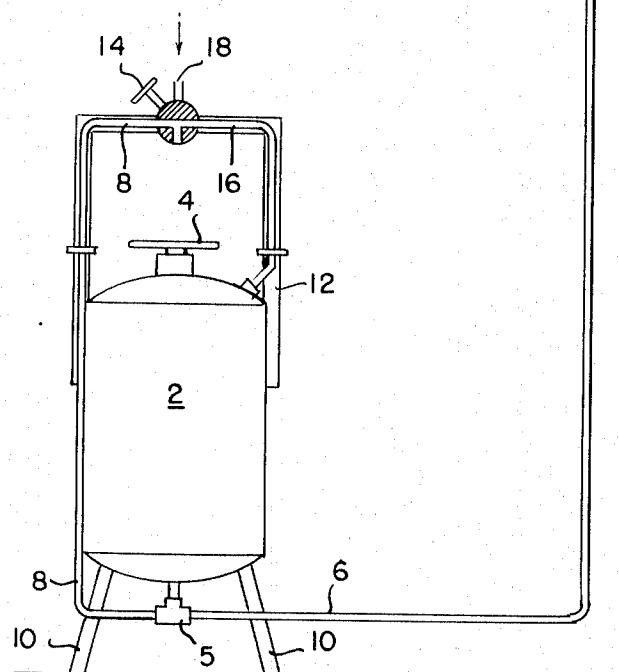


FIG. 1



APPARATUS FOR CLEANING ENGINES

BACKGROUND OF THE INVENTION

It is well known that an internal combustion engine builds up foreign material such as the byproducts of oil or gasoline decomposition in the form of sludge thus decreasing the efficiency of the engine as well as eventually causing a mechanical breakdown thereof. It is desirable to be able to clean the engine without completely dismantling it, which is an extremely time consuming and expensive operation.

In the past two alternate methods have been generally used for the cleaning of engines. The first method is represented by the U.S. Pat. No. 2,366,073 granted to Vallerie on Dec. 26, 1944 and U.S. Pat. No. 2,201,774 granted to Hofele on May 21, 1940. In general, the method of cleaning the engine in both of the above noted references involves introduction of a cleaner or solvent into the intake side of the manifold or the carburetor. The solvent is then flushed out through the oil pan. This method has the disadvantage in that the solvent never actually enters the oil lines and therefore does not pass through the same areas which are normally traversed by the lubricating oil, areas nevertheless subject to sludge buildup. If the solvent does not reach an area it is axiomatic that the solvent can have no cleaning effect in that portion. Further, both of these hereinabove disclosed methods have required the engine to be turned over by means of an external force to assure that the solvent is circulated as much as possible. The necessity of turning the engine is a disadvantage in the fact that, first, the external source must be provided and secondly, the engine is moving without lubrication thereby possibly damaging closely fit parts.

Another method which is currently in use for cleaning engines involves the introduction of a detergent into the oil circulation system following which the engine is started. This method utilizes the oil pump to circulate the detergent from the oil reservoir through the engine and then back into the oil reservoir to be recirculated. This method is not desirable in that any sludge which is collected as the fluid is circulated is repumped through the system. Pumping the sludge through the engine may cause a blockage in one of the narrower portions of the system. Further, the engine must be turned over while the oil is removed thus causing frictional damage to the moving parts. The entire engine, if it is run for too long a period could be ruined beyond repair.

As can be seen, it is desirable to have a means for cleaning the engine without the necessity of running the engine and without requiring external apparatus of the type necessary to independently rotate the engine.

Further, it is desirable to have a method of cleaning the engine where the solvent or cleanser is forced under pressure to all of those parts which are subjected to wear, portions where the buildup of sludge or the like prevents proper lubrication and eventual breakdown.

With the above noted problems in mind it is an object of the present invention to provide an apparatus for cleaning an automobile engine wherein the engine remains stationary during the entire operation and solvent is forced to all interior portions of the engine whereat sludge may be built up.

It is another object of the present invention to provide apparatus for cleaning an engine which is simple, inexpensive and easy to operate whereby the operator of a small service station may easily perform this service for his customers and still not have a great deal of his capital tied up in further equipment.

Still another object of the present invention is to provide an apparatus to control the flow of solvent into the engine including a tank to contain a liquid solvent and an air flow control valve whereby the solvent may be introduced under pressure alternatively as a liquid or as a vapor.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the preferred apparatus for use in the hereinafter described method.

FIG. 2 is a schematic view of an automobile engine showing the areas penetrated and cleaned by the hereinafter described method.

DETAILED DESCRIPTION OF THE DRAWINGS

As can be seen in FIG. 1 the apparatus necessary for performing the hereinafter described cleaning function consists of a reinforced tank 2 adapted to safely receive pressure greater than that required to force the solvent into the engine. It is believed that pressure in the vicinity of 150 psi is sufficient. The tank 2 will have a cap 4 allowing introduction into a tank of the solvent as well as the later introduced oil. The bottom of the tank has a port having a nipple leading to a tee 5. The tee 5 permits flow either from the bottom of the tank outwardly through lines 6 which is connected to the oil line of the engine or alternatively from line 8 which, as described hereinabove is the recipient of air under pressure.

For convenience, the tank is set upon a platform such as legs 10 such that it will be stable in use and protect the hose connections. At the upper portion of the tank there is provided a handle 12 allowing for easy transport of the tank from position to position and also for providing support for the air intake three-way valve 14. The valve 14 is a three-way valve including a first or off position, a second position wherein air will be passed through line 8 for reasons to be hereinafter described and a third position wherein the air will be transferred through line 16 to the interior of the tank.

Air under pressure sufficient to introduce it to all parts of the engine is supplied to the three-way valve 14 via line 18. It is to be understood that the source of air under pressure may be from a compressor or any other suitable source.

For purposes of discussion a typical automobile engine is shown in the schematic form in FIG. 2 wherein the oil pan is designated as 20, the drain plug 21, the crank shaft 22, the cam shaft 24 and a port for a typical oil filter of the spin on type at 26. The rocker arms or arms and associated shaft although cleaned by the hereinafter described method are not shown, it being felt that they were well known in the art.

In operation, the oil is drained from the crank case leaving the oil drain plug removed. The oil filter is then removed and the outlet hose 6 from the pressurized tank is connected to the engine normally used for securing the filter. Solvent is then placed in the tank and the cap replaced.

The input hose 18 is connected to a source of air under pressure of approximately 150 lbs with the three-

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way valve 14 in its closed position. To flush the engine the valve 14 is turned to its third position such that air under pressure passes through line 16 into the tank 2 forcing solvent, in a liquid form, through line 6 into the engine through the filter port 26 and then upwardly passing through the crank shaft 2 and out the main and rod bearings. At the same time fluid is also traveling through the oil passages into the cam shaft 24 and its bearings, the valve lifters and on to the top of the engine, not shown in the schematic drawing, to the rocker arm shaft and rocker arm bushings. The fluid is forced past the rocker arm bushing and travels over the cylinder head down the oil return to the crank case and out the drain plug. It is important to note here that the fluid is not recirculated.

The control valve may then be turned to its second position and the air under pressure is directed through line 8 to the tee 5 at the bottom of the tank and then through line 6 to the oil line connection. As the air pressure passes through the tee it then gathers fluid from the tank 2 and a spray of air and vaporized solvent passes through the engine oil system in the same manner as the fluid portion.

These two alternate systems are used until the engine is clean and the solvent is flushed out of the tank. Following the engine cleaning process a pint of oil is introduced into the tank 2 and the valve is turned to its second position wherein air under pressure goes into tank 2 and the oil is forced into the engine thus lubricating all of the parts and preparing the engine for use. Following introduction of the oil the line 6 is removed, a new filter is placed upon the engine, the drain cap is replaced in the oil pan and sufficient oil is introduced to the engine.

It is to be fully understood that the preferred attaching point is through the port for the oil filter but if the engine does not incorporate this type of filter attachment may be made at any place assuring introduction into the oil circulation system.

As can be seen, the hereinabove described method and apparatus allows a rapid and inexpensive cleaning of the engine and assures that all of the parts of the engine will be clean. The solvent is introduced not only in liquid form but also in a vapor form assuring deep penetration. Use of this method eliminates any danger of wear damage to the engine since the engine parts are

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stationary during the entire operation and yet the solvent is introduced into, as noted above, all of the oil lines and lubricated parts. Following the cleaning of the engine it would be detrimental to start the engine since there would be no lubrication available and thus the hereinabove described apparatus further allows the introduction of oil under pressure assuring penetration of all of the newly cleaned parts and preventing damage to the engine.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Mechanism for use in cleaning the interior of an internal combustion engine comprising;

a portable tank comprising a pressure resistant shell of a tested capacity greater than the projected maximum usage, a relatively large sealable port at its upper portion adapted to receive fluid to be introduced to the engine, an air inlet port in its upper section adapted to sealingly receive an air transmission hose and an outlet portion at the lowermost portion of the tank,

a fluid transmission tee having one leg secured to the bottom of the tank and in communication with the interior of the tank,

a fluid transmission line adapted to be interconnected with a source of air under pressure and a control valve means,

said control valve means functionally connected to the line adapted to transmit fluid under pressure from a source and adapted to direct air under pressure either into the tank or through a second leg of the tee at the bottom of the tank,

fluid delivery means secured to the third leg of the tee and adapted to be interconnected with the oil circulation system of the engine to be cleaned whereby liquid held within the tank may be injected into the engine in either a liquid or vapor form by appropriate settings of the control valve.

2. Mechanism as in claim 1 wherein the tank includes a handle for ease of transportation said handle serving also as a mounting place for the control valve.

3. Mechanism as in claim 1 wherein the tank includes supporting means to retain the tee spacedly from the ground.

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