

[54] **VEHICLE INTERNAL COMBUSTION
ENGINE LUBRICATING OIL COOLING
AND FILTERING CIRCULATION SYSTEM**

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[58] Field of Search 184/104 A, 104 B, 1 C,
184/1.5, 6.22, 6.24; 123/196 A, 196 AB

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[57] **ABSTRACT**

A system including a calibrated oil measuring tube which partially extends into the oil crank case. An oil cooling heat exchanger is provided and means connects the calibrating tube to the heat exchanger. A pump circulates oil from the crank case via the calibrating tube through the heat exchanger to the oil fill tube. An oil filter filters the oil discharged from the pump prior to the same being transferred to the oil fill tube.

2 Claims, 2 Drawing Figures

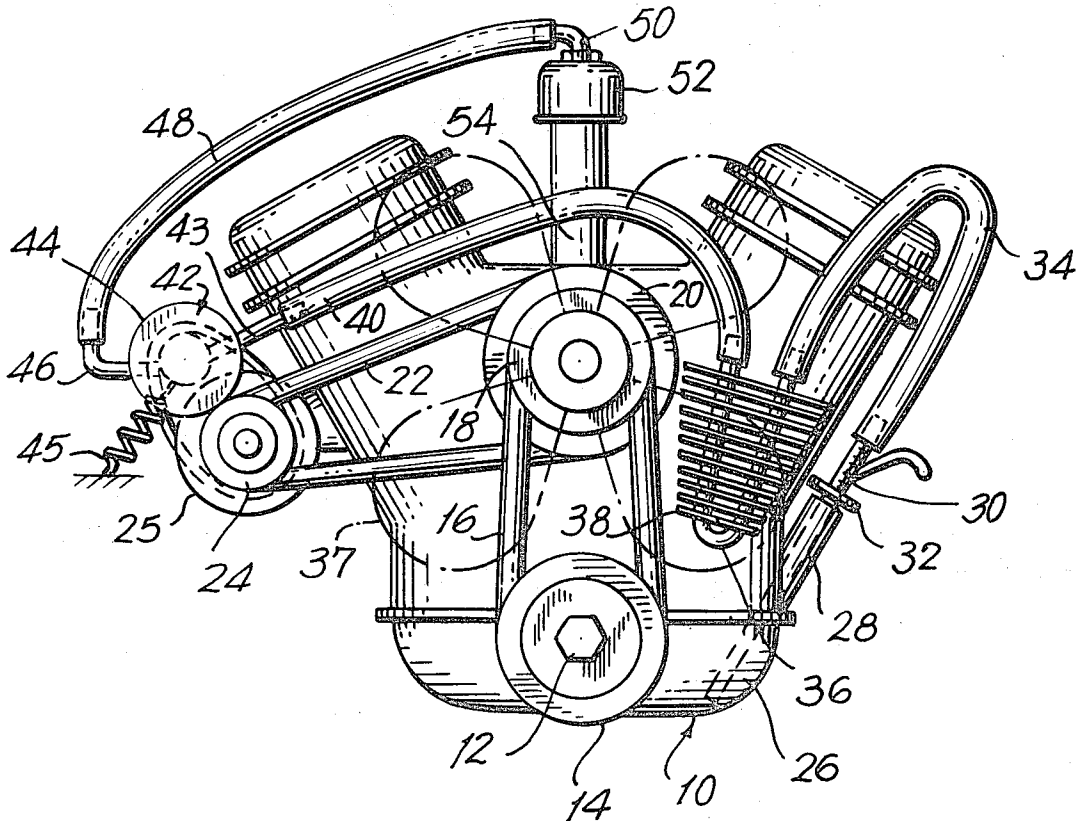


FIG. 1

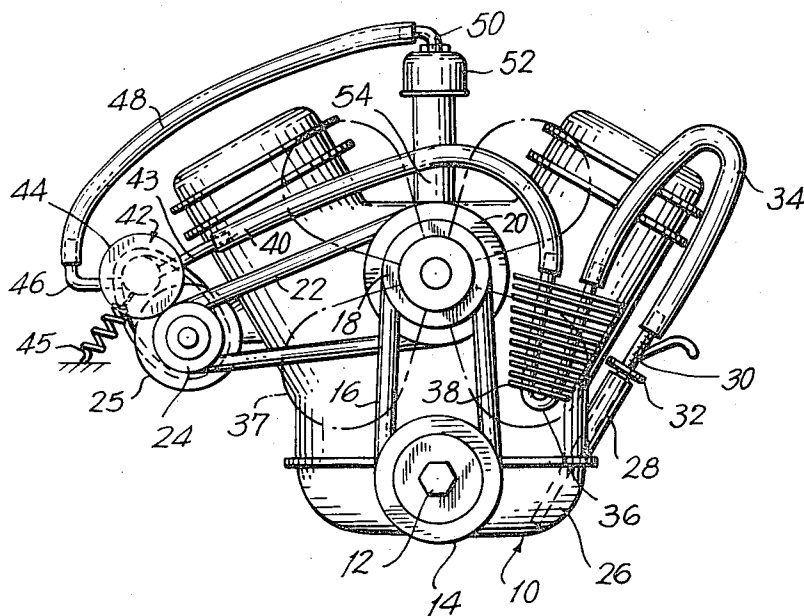
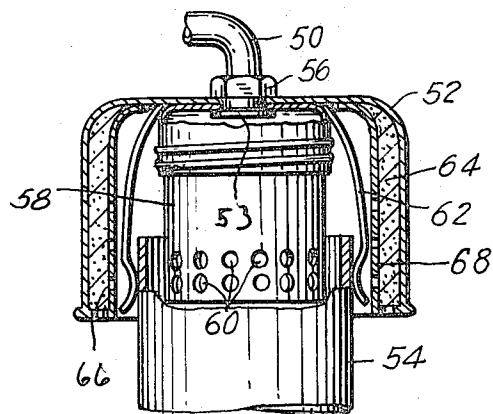


FIG. 2



VEHICLE INTERNAL COMBUSTION ENGINE LUBRICATING OIL COOLING AND FILTERING CIRCULATION SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

A system for cooling the lubricating oil in an internal combustion engine and circulating the same.

2. Description of the Prior Art

Due to recent design changes in vehicle internal combustion engines, many of said engines operate on low test gasoline and use non-automatic spark advance. Additionally, many of the internal combustion engines include anti-pollution devices in an attempt to minimize the discharge of harmful emissions during their operation. As a result of all of the foregoing, many of today's engines operate at much higher temperatures than the past. Consequently, the lubricating oil for the engine reaches higher temperatures than in the past.

One of the disadvantages of the lubricating oil reaching an elevated temperature is that the lubricating effectiveness of the oil decreases so that the engine parts which the oil is intended to lubricate do not receive the required lubrication. An inevitable result of the lack of proper lubrication is the deterioration of these parts.

A further difficulty in having the lubricating oil at elevated temperatures is that more oil fumes are generated. With pollution control valves oil fumes are now drawn to the combustion chambers from the crank case and not directed to the atmosphere as previously happened with prior art combustion engines. By increasing the amount of oil fumes that are directed to the combustion chambers the amount of carbonization of the piston heads, the valve seats and the spark plug electrodes increases. As a consequence, there is increased misfiring of the spark plug electrodes, loss of cylinder compression through unevenly carbonized valve seats, loss of engine power and rough engine operation, in addition to increasing the emission of unburned fuel. The inevitable result is frequent spark plug replacement, valve seat grinding and cylinder head and cylinder compression chamber cleaning.

Most internal combustion engines include an oil filter which is basically a can stuffed with an absorbent material. The oil filter is attached to the crank case. Very frequently the can is so stuffed with filtering material that the oil cannot freely circulate therethrough. This, of course, is undesirable since a blockage impairs the efficient operation of the internal combustion engine. When the oil filter is provided with a bypass means, such as a relief valve, the oil while circulating may not be filtered so that its lubricating capabilities are reduced.

SUMMARY OF THE INVENTION

Purposes of the Invention

It is an object of the present invention to provide an improved oil lubricating cooling and filtering circulation system for a vehicle internal combustion engine.

Still another object of the present invention is to provide an improved oil lubricating cooling and filtering system which controls the lubricating oil temperature.

Yet another object of the present invention is to provide an improved oil lubricating cooling and filtering system which can be installed on internal combustion

engines already in use (the after market) with a minimum amount of expense.

Another object of the present invention is to provide an improved oil cooling and filtering system for a vehicle internal combustion engine which reduces the amount of oil fumes generated during operation of the internal combustion engine.

A further object of the present invention is to provide an improved oil lubricating cooling and filtering system which is reliable in operation and relatively inexpensive.

Brief Description of the Invention

According to the present invention the foregoing as well as other objects are achieved by using a calibrated oil measuring tube, the lower portion of which is adapted to be placed in the vehicle internal combustion engine oil crank case. Attached to the calibrated tube is a first flexible conduit which leads to a lubricating oil cooling radiator. The lubricating oil cooling radiator consists of a rigid tube which is connected to the first flexible conduit. Cooling fins are secured to the outside surfaces of the rigid tube and the oil cooling radiator is fixed in a position to receive the flow of air created by the rotation of the conventional radiator cooling fan.

A second flexible conduit connects the remaining end of the rigid tube to an oil pump. The discharge of the oil pump is connected to an oil fill tube cap which is mounted on the oil fill tube. Located in the oil fill tube cap is an oil filter. The filtering material in the oil filter may consist of knitted or woven mesh material made of synthetic yarns or other suitable filtering materials not adversely affected by lubricating oil or lubricating oil detergents. As an example, nylon may be used.

In operation, as a result of the oil pump running, oil from the crank case is drawn through the calibrating tube, through the first flexible conduit to the rigid tube. The fins secured to the rigid tube cool the same and oil passing through the rigid tube as the result of the air directed over said fins by operation of the radiator cooling fan. The second flexible conduit transfers oil from the oil cooling radiator to the oil pump and from there the oil is directed to the oil fill tube cap. The oil directed to the oil fill tube cap passes therethrough, through the oil filter in the oil fill tube cap and the oil fill tube to the internal combustion engine.

Other objects of the invention will be pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the combustion engine lubricating oil cooling and filtering circulation system hereinafter described and of which the scope of application will be indicated in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a schematic illustration of the present invention; and

FIG. 2 is a sectional view illustrating how the oil fill tube cap is secured to the oil fill tube and how the oil filter is attached to the oil fill tube cap.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the Figures a conventional internal combustion engine 10 is illustrated and while a V engine has been shown it is to be understood that this is for purposes of illustration only. Quite obviously, the present invention can be used with straight line engines, rotary engines and other types of engines as will be apparent to those skilled in the art.

Internal combustion engine 10 includes a crank shaft 12 with a pulley 14 being driven thereby. Rotatable with pulley 14 is a belt 16 that rotates a pulley 18 which is suitably journaled. Rotatable with pulley 18 is a pulley 20 which drives a belt 22 which in turn drives a pulley 24. Pulley 24 drives vehicle internal combustion engine alternator 25.

Located at the bottom of internal combustion engine 10 is an oil crank case 26. An elongated cylindrical opening 28 in vehicle internal combustion engine block 10 provides communication to crank case 26. A calibrated oil measuring tube 30 includes a flange 32 located intermediate its length to limit the insertion of said tube into cylindrical opening 28. Secured to the upper end of calibrated tube 30 is a flexible conduit 34. Flexible conduit 34 is secured at its remaining end to a rigid radiator tube 36 which is located to the rear of engine fan 37. A plurality of cooling fins 38 are attached to the outside surfaces of the converging sections of radiator tube 36 and a heat transfer capability thus exists between the fins and oil flowing through radiator tube 36. It is to be appreciated that while radiator tube 36 is shown in the drawings as being substantially U-shaped that this is for purposes of illustration and the configuration of said tube can be varied as will be apparent to those having ordinary skill in the art. The means of securing radiator tube 36 relative to internal combustion engine 10 is conventional.

A flexible conduit 40 and tube 43 connect radiator tube 36 to an oil pump 42 which includes a friction wheel 44 rotatable with the oil pump drive shaft. Friction wheel 44 is in contact with the portion of belt 22 which is in contact with pulley 24 so as to be driven thereby. A strap surrounds oil pump 42 and alternator 25 to hold the oil pump in close proximity thereto. A spring biasing means 45 biases oil pump 42 to a position so that friction wheel 44 is maintained in contact with the portion of belt 22 surrounding the alternator pulley.

Oil pump 42 includes a discharge 46 and a flexible conduit 48 is connected to the oil pump discharge. Flexible conduit 48 is also connected to a tube 50 which extends through oil fill tube cap 52. Oil fill tube cap 52 is secured to oil fill tube 54 as is hereinafter described. As will be apparent to those having ordinary skill in the art, when additional oil is required for operation of vehicle internal combustion engine 10 oil fill tube cap 52 is removed from oil fill tube 54 and the additional oil is poured into oil fill tube 54.

As can be seen in FIG. 2, tube 50 extends through oil fill tube cap 52 with a stop 53 surrounding and being secured to said tube inside the cap. The portion of tube 50 above cap 52 is threaded and a nut 56 is in engagement with said threaded portion. Located inside cap 52 is an oil filter 58 with said oil filter including a plurality of openings at the periphery of the bottom portion thereof. The top of oil filter 58 includes a central open-

ing through which tube 50 extends. Stop 53 is in abutment with the inside surface of the top of oil filter 58. The oil passing through tube 50 is discharged into the interior of oil filter 58. The upper portions of spring fingers 62 are attached to the bottom inside surface of the top of cap 52 and grip tube 54. An annular chamber 64 is located within the interior of cap 52 and located therein is filtering material for filtering air. Air breather ports 66 extend through portions of annular chamber 10 wall 68 of cap 52.

Located inside oil filter 58 is a filtering material which may consist of knitted or woven mesh made of synthetic material or other types of filtering material that are not adversely affected by lubricating oil or lubricating oil detergents. The mesh must be closely knitted or woven so that the same will act as a filtering unit but will not block the flow of oil therethrough.

When it is desired to check the level of oil in crank case 22, calibrating tube 30 is removed from cylindrical opening 28, wiped, replaced in said cylindrical opening until the abutment of flange 32 prevents further insertion. Calibrated tube 30 is then removed and the level of oil in the crank case determined. If additional oil is required, oil fill tube cap 52 and the filter attached thereto are removed from oil fill tube 54 and the additional oil is directed into said oil tube after which the oil fill tube cap and filter are reinstalled into the top of said oil fill tube.

With the internal combustion engine 10 operating, the drive of belt 22 causes friction wheel 44 to rotate so that pump 42 is operative. Engine fan 37 directs air past fins 38 so as to cool said fins. As a consequence thereof, oil is drawn from the crank case through calibrated measuring tube 30, through flexible conduit 34 and through rigid radiator tube 36. The air directed at fins 38 by engine fan 37 maintains the fins at a relatively low temperature so that oil which is passed through radiator tube 36 is cooled. By varying the size of the oil cooling radiator the amount of cooling of the oil directed through said radiator tube 36 can be controlled. From radiator tube 36 the cooled oil is transferred via flexible conduit 40 and tube 36 to oil pump 42 and via oil discharge 46 and flexible conduit 48 through tube 50. The oil which passes through tube 50 is transferred through oil fill tube cap 52, through oil filter 56 to oil tube 54 to perform its lubricating functions.

The existing oil filter system now on automobiles may be maintained in using the present invention.

If desired, the oil filter in the oil fill tube may be eliminated without departing from the present invention.

It thus will be seen that there is provided a vehicle internal combustion engine lubricating oil cooling and filtering circulation system which achieves the various objects of the invention and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described the invention there is claimed as new and desired to be secured by Letters Patent:

1. A vehicle combustion engine lubricating oil circulation system comprising a vehicle internal combustion engine, an oil crank case, said internal combustion en-

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gine including an engine block and an engine cooling fan, a passageway extending through said engine block to said oil crank case, an oil calibrating tube extending through said passageway and to said oil crank case, said oil calibrating tube having a hollow interior through which oil can flow, an oil cooling radiator, said oil cooling radiator being located in the motor vehicle engine compartment and slightly to the rear of the engine cooling fan, a first conduit means communicating said oil calibrating tube to said oil cooling radiator, an oil pump, a second conduit means communicating said oil radiator to said oil pump, an oil fill tube, a third conduit means communicating said oil pump to said oil fill tube, oil filtering means being located in said oil fill tube, a

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friction drive wheel, said oil pump rotatable with said friction drive wheel, a belt driven accessory and means for keeping said friction wheel in contact with said belt driven accessory whereby said belt driven accessory rotates said friction wheel thereby driving said oil pump.

2. A vehicle combustion engine lubricating oil circulating system according to claim 1 wherein said oil radiator comprises a flow tube, said flow tube in communication with said first conduit means and with said second conduit means and a plurality of fins attached to said flow tube.

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