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SELF WASHING OIL FILTER

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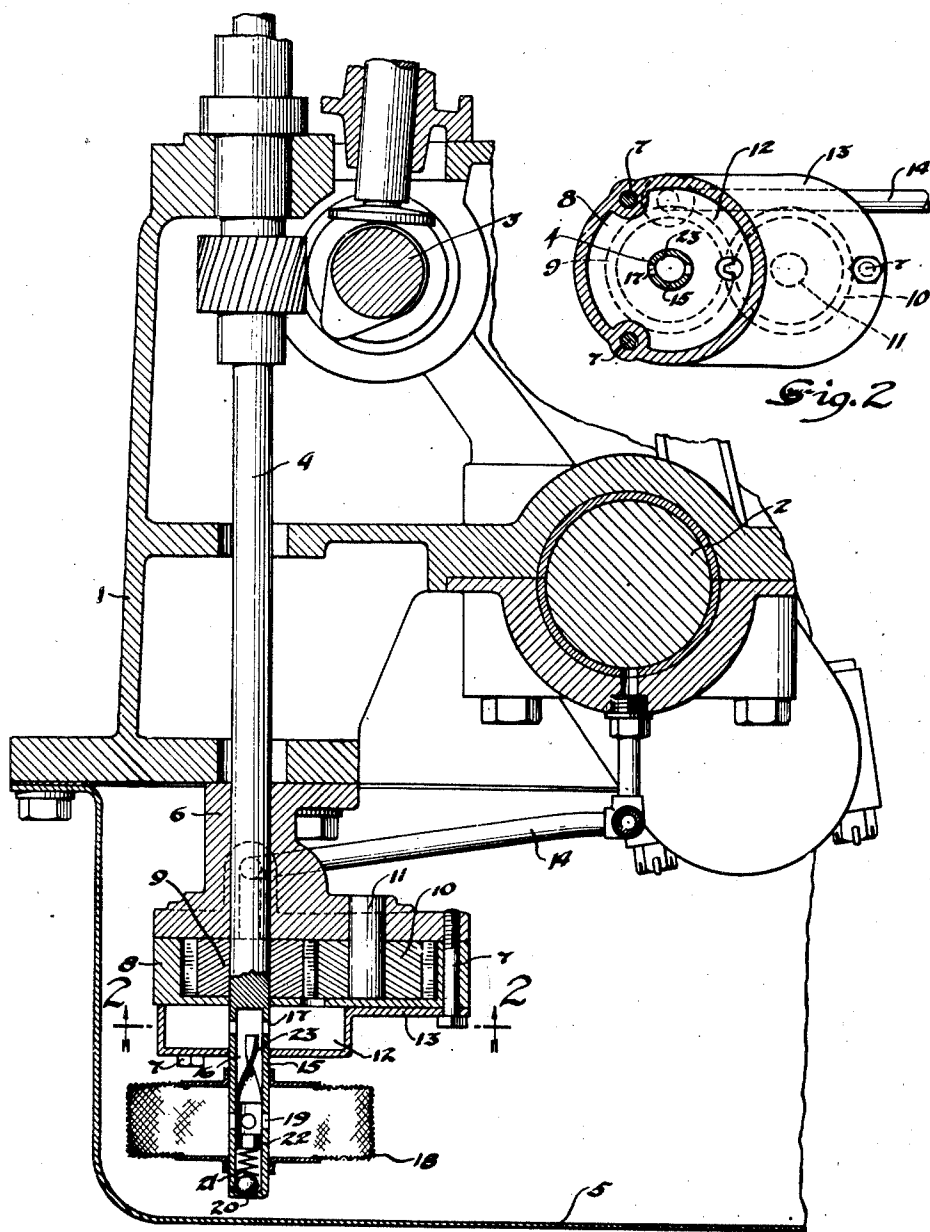


Fig. 1

Fig. 2

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SELF-WASHING OIL FILTER

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This invention relates to fluid pressure systems as, for example, force feed lubricating systems now in general use on internal combustion engines for motor vehicles, and more particularly to an improvement in filters or strainers for use with fluid pressure systems.

The type of filter commonly employed for removing dirt and foreign material from the engine lubricating oil consists of a replaceable unit which retains the dirt separated from the oil that passes through it and gradually loses efficiency as it becomes clogged. The substitution of a new filter unit at regular intervals to secure the benefit of clean oil and long life, besides being costly, demands a certain amount of attention on the part of the car owner, and this attention in most instances is neglected.

It is one of the objects of the present invention to provide the oil pump with a strainer screen to separate dirt particles from the lubricating oil, and insure delivery of clean oil to the bearings, that will be simple and economical in manufacture, efficient in operation, and which will require no attention in use or be likely to become clogged or otherwise get out of order, throughout the full life of the engine.

A further object of the invention is to provide a rotary strainer element consisting of a foraminous shell carried by a hollow extension of the pump drive shaft, the interior of which shell is brought into communication with the suction or intake side of the pump through the hollow shaft. Since the rotation of the foraminous shell will set up a circular motion of the crankcase oil the heavier dirt particles will move outward or away from the screen under centrifugal action, while the liquid entering the shell will be filtered by its passage through the perforations of the screen. Obviously, the circular or swirling movement of the oil will be somewhat slower than the rotation of the strainer, whereby any dirt particles that tend to cling to the screen will be washed off by the oil and the filter will remain clean and of uniform efficiency at all times.

Another object of the invention is to pro-

vide a check valve and bypass arrangement to allow the intake conduit to have direct communication with the crankcase in the event sufficient oil does not reach the pump from the filter to supply its full capacity requirements.

A still further object is to provide a spiral vane or pusher blade in the hollow shaft to augment the action of pumping suction in supplying oil to the pump.

Other incidental objects and advantages will be apparent from the following specification taken in connection with the accompanying drawing in which:

Figure 1 is a vertical sectional view of a portion of an internal combustion engine in which the present invention is embodied.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Referring to the drawing, wherein a preferred but not necessarily the only embodiment of the invention is shown the numeral 1 indicates the crankcase of an engine having mounted therein in suitable bearings, an engine crankshaft 2, connected by proper gearing to drive a camshaft 3 so as to control the operation of the engine valves in timed relation with crankshaft rotation.

Driven from the camshaft 3 through worm and pinion gears is a vertically disposed drive shaft 4, for operating the customary pressure pump in the crankcase pan or oil reservoir 5. In the present case, this pump is of the gear type and consists of a bracket 6 mounted on the crankcase 1, having secured thereto by bolts or screws 7, a housing or casing 8 enclosing the driving gear 9 fixed on the shaft 4 and the idler gear 10 on the shaft 11. A chamber 12 afforded by the part 13, secured in place on the underside of the housing 8 by the bolts 7, communicates with the intake or suction side of the pump, while the pipe line or conduit 14 leads from the pressure or delivery side of the pump to suitable branch conduits running to the several bearings to be lubricated.

The drive shaft 4 has an integral hollow extension 15 providing an intake conduit or passageway 16 opening into the chamber 12 through lateral ports 17. Surrounding the

hollow shaft extension 15 and fixedly secured thereto is a foraminous shell or cylindrical strainer element 18, preferably of wire screen gauze or other suitable material, the interior of which communicates with the passageway 16 through the ports or openings 19, to allow the liquid that passes through the perforations from the crankcase to reach the pump.

It will be evident that pump suction draws the liquid through the strainer screen, which rotates with the drive shaft and thereby causes a swirling action of the surrounding oil in the crankcase. Centrifugal force will cause the heavy dirt particles to move outward, and the outer surface of the screen will be continuously washed by its contact with the slower moving liquid, so that the dirt will have little or no chance to lodge in the filter screen and clog the same. Thus the strainer is self-cleaning and will not require attention in use.

As a safety factor in the event sufficient oil is unable to reach the pump through the filter to satisfy its requirement, there has been provided a bypass arrangement to permit direct communication at certain times between the passageway 16 and the oil chamber or crankcase pan 5. This consists of the open lower end of the passageway 16 that is normally held closed by the ball valve 20, seated against the turned ends of the shaft extension by a tension spring 21 bearing against a shoulder or ring 22 in the passageway.

There is also provided in the passageway about the entrance ports 17, a spiral vane or pusher blade 23, which serves as a primer for the pump and also augments the suction action of the pump by forcing the oil toward the pump.

While but one embodiment has been specifically described and illustrated, it will be understood that there is no intention to limit the invention to the exact details mentioned and that various modifications may be made such as come within the scope of the appended claims.

Having thus described my invention I claim:

1. In combination, a liquid reservoir, a pressure pump in said reservoir, to draw liquid therefrom, a hollow rotatable shaft operatively associated with the pump and constituting an intake passageway for the pump and a rotary filter element carried by the shaft at the inlet to said passageway.

2. In combination, a drive shaft, a fluid pressure pump operatively connected with said shaft, a hollow extension on said drive shaft forming an intake passageway for the pump, and a filter element carried by and rotatable with the shaft extension at the inlet thereto.

3. The structure of claim 2, and a pusher element in the hollow shaft extension adapt-

ed to augment pump suction in delivering fluid thereto.

4. In an internal combustion engine, the combination with a force feed lubricating system including an oil pump, of a drive shaft for said pump having a hollow portion extending beyond the pump, forming an intake passageway for the pump, said passageway having inlet openings, a filter element carried by and movable with said extending hollow portion of the drive shaft and associated with one of said openings, and a check valve associated with another of the openings.

5. In an internal combustion engine, the combination with a force feed lubricating system including an oil pump, of a drive shaft for said pump having a hollow portion extending beyond the pump, forming an intake passageway, and a filter element carried by said hollow portion and associated with the inlet to said passageway.

6. In an internal combustion engine, the combination with a force feed lubricating system including an oil pump, of a drive shaft for said pump having a hollow portion extending beyond the pump, forming an intake passageway leading to the suction side of said pump, and a pusher element in said passageway.

7. In an internal combustion engine, the combination with a force feed lubricating system including an oil pump, of a drive shaft for said pump having a hollow portion extending beyond the pump, and forming an intake passageway for the pump, and a spiral vane in said passage adapted to increase the oil flow to the pump.

8. In an internal combustion engine, the combination with a force feed lubricating system including an oil pump, of a drive shaft for said pump having a hollow portion extending beyond the pump, and forming an intake passageway leading to the suction side of the pump, said passageway having openings into the engine crankcase, a check valve associated with one of the openings, a filter element associated with another of said openings and carried by said hollow shaft extension for rotation therewith, and a spiral vane in said passageway to increase the velocity of the flow to the pump.

In testimony whereof I affix my signature.
JOE W. MORRISON.