

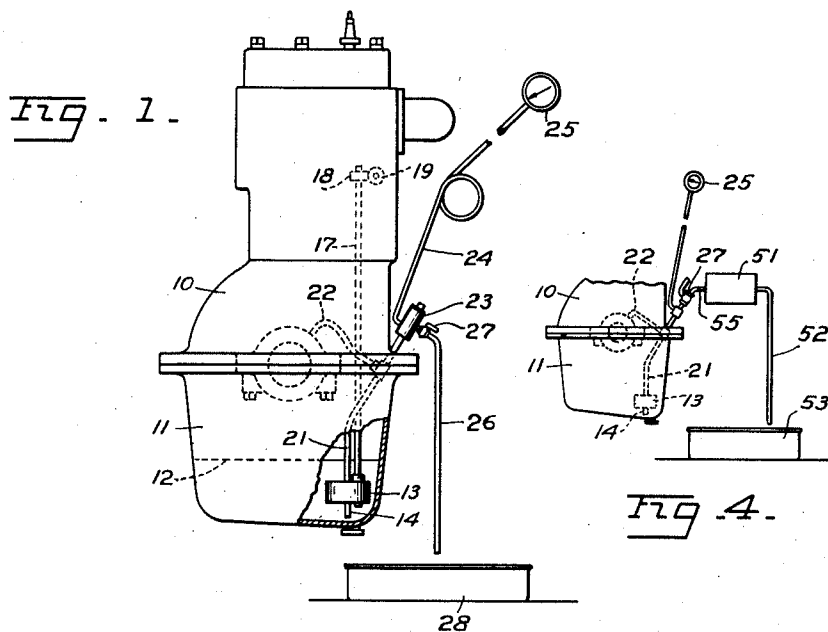
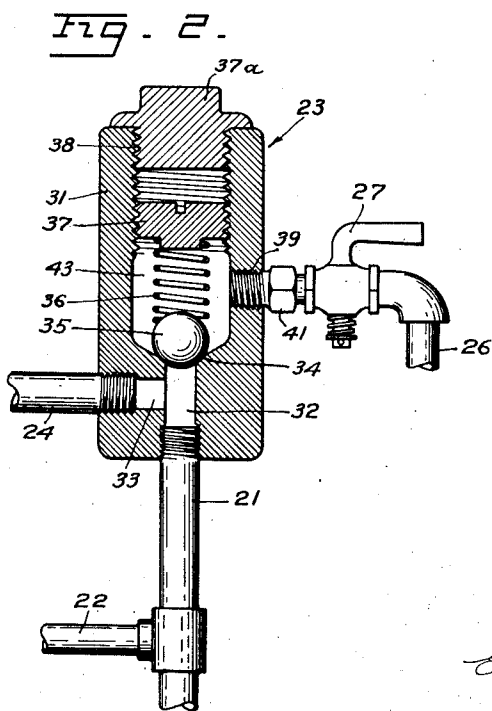
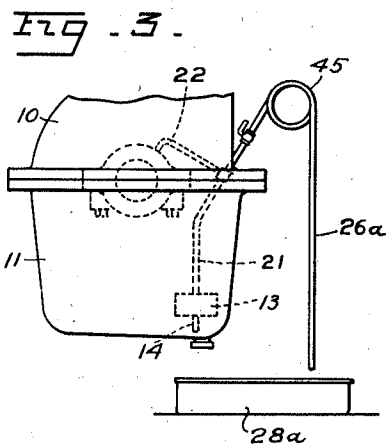
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MEANS FOR DISCHARGING OIL FROM INTERNAL COMBUSTION ENGINES

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MEANS FOR DISCHARGING OIL FROM
INTERNAL COMBUSTION ENGINES

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8 Claims. (Cl. 184—1.5)

My invention relates to means for discharging oil from the crankcases or other lubricant carrying reservoirs of internal combustion engines for the purpose of replacement or for such other purposes as may be desired. In present day internal combustion engine practice, it is the custom to use an oil circulating system whereby oil is pumped to the bearings and other moving parts of the engine from a supply carried in the engine crankcase. This is accomplished by the use of a pump which is operated by the engine and in general practice the bottom of the crankcase forms a reservoir containing several quarts of oil and the suction of the pump communicates with this body of oil and continuously delivers a stream of oil to the bearings, engine cylinders, etc. During this process the oil forced to the moving parts of the engine constantly drips back into the crankcase and is used over and over again, the supply being maintained by adding an additional quantity from time to time. Under these circumstances, the oil gradually becomes contaminated and it is desirable to remove the oil from time to time and replace it with a fresh supply. The customary manner of draining the oil in the crankcase for replacement is by the removal of a drain plug at the bottom of the crankcase whereby the used oil is allowed to drain into a receiving vessel, after which the plug is replaced and fresh oil is supplied in its place. This draining operation involves much inconvenience and it is an object of my invention to provide simple and efficient means for performing this task without the necessity of removing the drain plug. In carrying out my invention, I utilize the power of the engine and the pump used for delivering oil to the bearings as a means for discharging the oil, as will be understood by reference to the following specification and drawing.

My invention possesses other advantageous features, some of which with the foregoing, will be set forth in the following description where the forms of the invention which have been selected for illustration in the drawing accompanying and forming a part of the present specification are outlined in full. However, I do not confine my invention to the specific forms set forth in the drawing and specification nor to the specific uses of the invention herein set forth, as it is capable of many modifications which are limited only by the scope of the appended claims.

Referring to the drawing:

Figure 1 represents a conventional engine.

Figure 2 represents in detail one means I may

employ for creating resistance in the discharge line.

Figure 3 represents a modified form wherein the desired resistance is created by a coil in the discharge line.

Figure 4 represents a modified form of my invention wherein I may employ purifying means for filtering or otherwise purifying the oil while it is being pumped out of the engine.

Referring to Figure 1 in detail, 10 represents an engine block having the crankcase 11 which is customarily filled with oil up to the mark 12. 13 is the engine oil pump, the suction of which, 14, is open to body of the oil in the crankcase near the bottom thereof. The pump is driven by shaft 17 which in turn may be driven by the gears 18 and 19 either from the cam shaft of the engine or any other moving part. These parts represent a suitable arrangement for operating the pump 13 by means of the engine's own power; but it is within the purview of my invention to use other means for making connection between the pump and the moving parts of the engine. 21 is the discharge pipe from the pump 13 and 22 represents the connection from this discharge line which leads to the various parts of the engine to be lubricated. The fitting designated by the numeral 23 which is shown in detail in Figure 2 is connected with pipe 21 and is also connected with the pipe 24 which leads to the pressure gauge 25. 26 is the discharge line out of which the oil is discharged from the crankcase and 27 is a valve for opening and closing discharge pipe 26. 28 represents a receiving vessel for the discharged oil.

Referring to Figure 2 which shows the fitting 23 in detail, 31 is a casing having an opening 32 to which the pipe 21 is connected. The pipe 24 leading to the pressure gauge is connected with opening 33. At the top of the opening 32 is a valve seat 34 upon which the ball 35 is held in seated position by the compression spring 36 which in turn is held in place by the nut 37. This nut provides adjustment whereby the pressure of the spring against the ball may be varied to suit requirements. At the top of the fitting is the cap 37a which fits in the threaded opening 38 and forms a closure at the top of the fitting. Opening 39 is provided with the fitting 41 which places the valve 27 in open communication with the interior chamber 43 of the fitting 23. The pipe 26 through which the oil is discharged is connected with valve 27. From the foregoing it will be seen that the fitting 23 provides a spring controlled closure for the pipe 21 and that the

ball 35 is lifted when valve 27 is opened and the pressure in pipe 21 is sufficient to overcome the spring 36. This mechanism therefore provides an adjustable resistance means which has the effect of maintaining sufficient back pressure to insure oil being pumped to the moving parts of the engine while the contents of the crankcase is being discharged through pipe 23.

Referring to Figure 3 the construction is substantially the same as in Figure 1 and corresponding parts are marked with the same numerals as those used in Figure 1. In this modification the fitting 23 is entirely omitted and the discharge pipe 26 shown in Figure 1 is replaced by the discharge pipe 26a which is used for the same purpose. However, since the fitting 23 to create resistance in the discharge line is entirely omitted in this modification, I supply the necessary resistance by providing the coil 45. This coil serves the purpose of creating enough resistance in the discharge pipe 26a to overcome the resistance in line 22 and to insure a flow through the pipe 22 to the moving parts of the engine during the discharge of the crankcase oil in receptacle 28a.

Referring to Figure 4 which is a further modification of my invention, 13 represents the engine pump as has heretofore been described, and which discharges oil through pipes 21 and 22. In this figure the oil may be discharged from the crankcase through valve 27 into filter 51 through which it passes and is discharged through the pipe 52 into the receptacle 53. This modification is for use in cases where it is desired not to discard the discharged oil but to clean the oil by filtration, and discharge it into the receiver 53, after which it may be poured back into the engine crankcase. The filter 51 is illustrated as representative of purifying means. I may substitute in its place apparatus for distilling the lighter oils or diluents and water out of the crankcase oil, or I may use any other form of purifying apparatus.

The apparatus is used in the following manner. Assuming it is employed on an ordinary automobile engine, as illustrated in Figure 1, the pipe 26 leads to any desired point external to the engine and vehicle. A satisfactory type of installation is to lead the pipe 26 downwardly below the engine so that the oil may be received into a pan placed under the car. The valve 27 is kept closed at all times except during the time the crankcase is being pumped out. The oil is discharged preferably while the engine is warm. The automobile with the engine to be drained is parked in a suitable place and is run at idling speed. Receiving vessel 28 is placed in position and the valve 27 is opened. The engine is allowed to run until air bubbles discharging through the end of pipe 26 indicate that the crankcase is substantially empty. When this occurs, valve 27 is closed. If desired, a few quarts of a light flushing oil may be poured into the crankcase and this is pumped out as was the crankcase oil. When this is done the valve 27 is closed and the engine stopped. New oil is placed in the crankcase, and the operation is finished until after several hundred miles of running it is desired to renew the oil again. It will be understood that the fitting 23 performs an important function during this operation. The force of the spring 33 is assumed to have been adjusted by the nut 37 so that the ball 35 bears against the seat 34 with sufficient pressure to insure at least a small amount of oil being discharged through the pipe 22 during the evacuation

of the crankcase. In this manner the engine parts are kept well lubricated even though the crankcase is substantially empty near the end of the operation. The amount of pressure maintained on pipe 22 is indicated by the gauge 25 which may also serve as the regular oil gauge to indicate pressure in the oil circulatory system. The amount of pressure required in line 22 may vary in different engines and the desired adjustment may be made by the nut 27.

In cold climates where water tends to condense and settle in the bottom of the crankcase it is advisable to have pipe 14 run as close to the bottom of the sump as possible. With this arrangement the apparatus may be used to pump out the accumulated water even though it is not desired to remove the bulk of the oil.

Obviously my invention may be used for sampling the crankcase oil to determine its condition and for making such tests as may be desired.

In operating the modification shown in Figure 3 the engine is run at idling speed, the valve 27 is opened and the oil is discharged through the pipe 26a. The coil 45 may vary in length and diameter to provide the necessary resistance so that oil is discharged through pipe 22 during the evacuation of the crankcase. In this modification it is assumed that the necessary resistance in pipe 26a and coil 45 will be worked out by the manufacturer so that the car owner can be assured that the bearings are receiving oil while the crankcase is being pumped out. The coil 45 diagrammatically represents means of producing resistance in the line 26a but I do not confine myself to any particular means except as defined in the appended claims. As an example of a substitute method, the discharge pipe may be provided with a suitable constriction, or the desired result may be obtained by omitting the coil 45 and reducing the diameter of the pipe 26a so that the pipe itself creates the necessary resistance to maintain a pressure on the pipe 22 during discharging.

In the modification shown in Figure 4 the fitting 23 may or may not be used, as desired. In Figure 4 this fitting is omitted. To discharge the oil from the crankcase and filter or purify it simultaneously, the engine is run at idling speed, the filter or other purifying apparatus 51 is connected by means of the nipple 55 to the valve 27 which is open, and the oil is discharged from the crankcase through the purifying unit 51 and pipe 52 into the receiver 53, after which it may be returned to the crankcase by the usual method. In this case the necessary resistance is provided either by the purifying unit 51 or in the pipe 52.

Wherever I have used the word "pipe" in the appended claims it is intended to mean a conduit through which oil may be caused to flow, whether such conduit is in the form of pipe or tubing, or whether it consists of a drilled or cored passageway through the engine parts.

In the following claims where the terms "oil reservoir" or "storage reservoir" are used, they are intended to mean any oil-carrying container forming a part of the oil circulatory system through which the oil circulates during the normal operation of the engine. The sump in the crankcase of an engine is an example of such a reservoir.

I claim:

1. A lubricating system for engines comprising a pump; drive means connecting said pump with the moving parts of said engine; an oil storage reservoir; a suction conduit leading from said

reservoir to said pump; a pipe leading from the outlet of said pump to the engine bearings; an auxiliary pipe communicating with the outlet of said pump and leading away from said engine for the purpose of discharging the oil from said reservoir into a receiving vessel independent of said engine; means in said auxiliary pipe to create a resistance to flow thereby to develop a pressure sufficient to overcome the resistance of the engine bearings and pipe leading thereto; closure means to control the flow through said auxiliary discharge pipe.

2. A lubricating system for engines comprising a pump; drive means connecting said pump with the moving parts of said engine; an oil storage reservoir to hold the oil to supply the oil circulatory system of said engine; a suction conduit leading from said reservoir to said pump; a pipe leading from the outlet of said pump to the engine bearings; an auxiliary pipe connection leading from said pump to a point external to said engine for the purpose of discharging the oil from said reservoir into a receiving vessel independent of said engine; valve means on said auxiliary pipe; means in said auxiliary pipe to create a resistance to flow thereby to develop a pressure sufficient to overcome the resistance of the engine bearings and pipe leading thereto whereby oil will be forced to the engine bearings while the oil supply is being pumped out of said reservoir.

3. Means for discharging lubricating oil from the crankcases of engines comprising an oil reservoir in said crank case; a pump the suction whereof is connected with the body of oil in said reservoir; a discharge pipe leading from the outlet of said pump to the moving parts of said engine; drive means connecting said pump with the moving parts of said engine; a branch pipe leading from the discharge pipe of said pump to a point external to said engine; closure means to control the opening in said branch pipe; a loaded valve in said branch pipe to create resistance to the flow therethrough.

4. Means for discharging lubricating oil from the oil sump forming part of the oil circulatory system of an internal combustion engine; a pump with its suction connected with the body of oil in said sump; drive means connecting said pump with the moving parts of said engine; a discharge pipe leading from said pump to the moving parts of said engine; a downwardly directed branch pipe permanently mounted upon said engine leading from said discharge pipe to a point external to said engine circulatory system; means to control the passageway in said downwardly directed pipe; resistance means in said branch pipe to provide a pre-determined back pressure against the flow passing through said downwardly leading discharge pipe whereby oil is caused to flow to the moving parts of said engine while the oil is being pumped out of the sump thereof.

5. Means for simultaneously draining oil from an engine and purifying the same which comprises an oil pump having its suction connected

with the oil sump of said engine; a discharge pipe leading from said pump to the bearings of said engine; a branch pipe connected with said discharge pipe leading to an oil purifying mechanism; a discharge pipe leading from said oil purifying mechanism to a point exterior to said engine; resistance means in said purifying device whereby a back pressure is created in the discharge pipe from said pump leading to the engine bearings during the time the oil is being forced from said engine through said purifying mechanism.

6. An oil circulatory system for internal combustion engines which comprises a pump; a suction conduit to connect the interior of said pump with the oil carrying sump of said engine; a discharge conduit from said pump leading to the working parts of said engine; a branch conduit communicating with said pump discharge conduit and leading to a point exterior to said engine for use in discharging the contents of the oil sump of said engine into a receiving vessel exterior to and independent of said engine; means to increase resistance to flow through said conduit; means to adjust said resistance means whereby the resistance in said branch conduit may be so adjusted that a greater pressure is required to force the oil through said branch conduit into said receiving vessel than is required to cause the oil to flow to the working parts of said engine.

7. Means for simultaneously draining oil from an engine and purifying the same which comprises an oil pump having its suction connected with the body of oil in said engine oil circulatory system; a discharge conduit leading from said pump to the bearings of said engine; a second discharge conduit leading from said pump to an oil purifying mechanism; valve means to control the flow through said purifying mechanism; a discharge pipe leading from said oil purifying mechanism to a point exterior to said engine; resistance means in said second discharge conduit and purifying mechanism to exceed the resistance to flow in the discharge conduit leading to said engine bearings, arranged and constructed to cause oil to flow to said bearings and through said purifying means simultaneously while the oil is being drained from said engine.

8. A lubricating system for engines comprising a pump; drive means connecting said pump with the moving parts of said engine; an oil reservoir; a suction conduit leading from said reservoir to said pump; a conduit leading from the discharge of said pump to the engine bearings; an auxiliary pipe communicating with the outlet of said pump and leading away from said engine for the purpose of discharging the oil from said reservoir into a receiving vessel independent of said engine; a resistance coil in said auxiliary pipe; closure means to control the flow through said auxiliary pipe.

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