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OIL REMOVAL APPARATUS

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Fig. 1

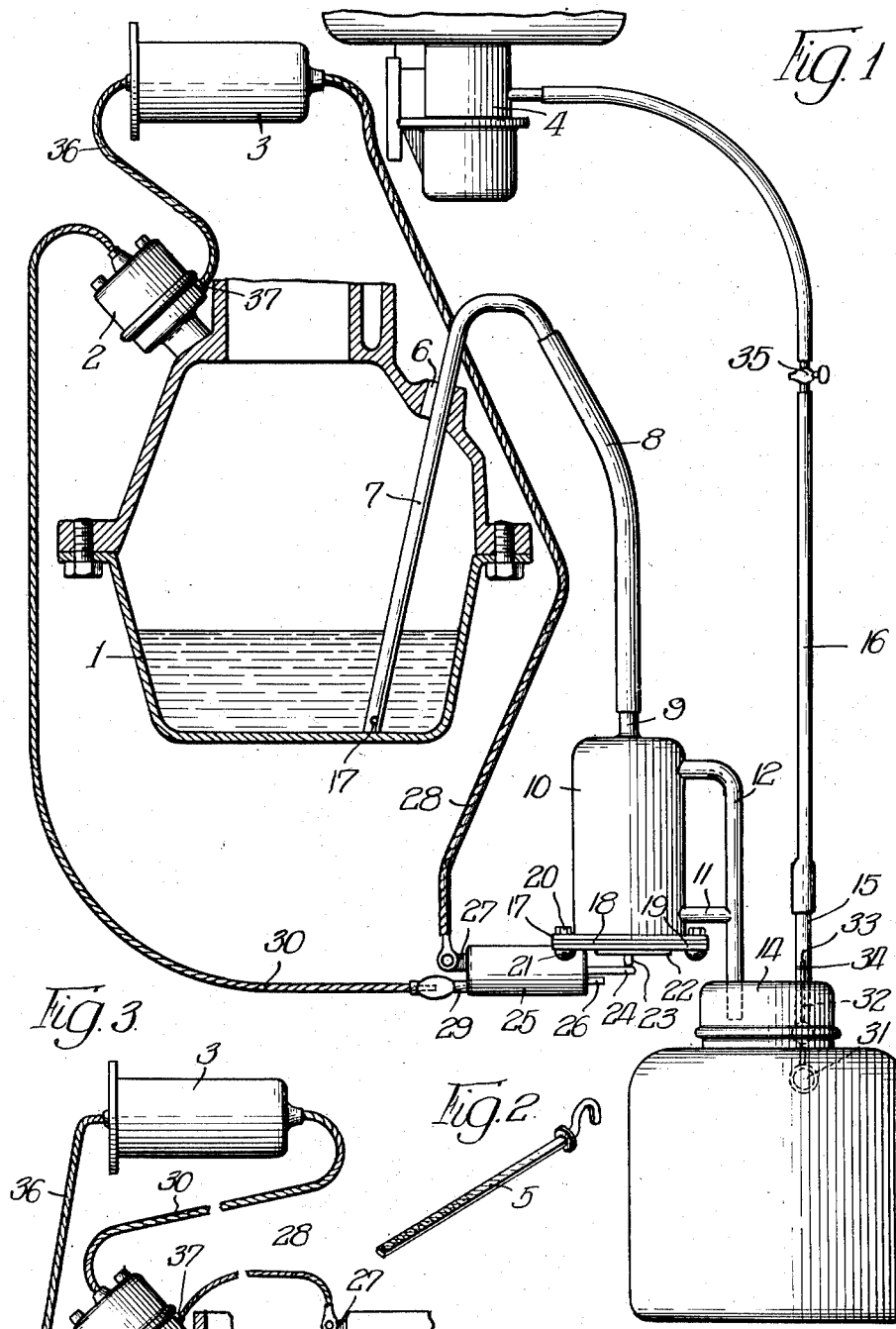


Fig. 3

Fig. 2

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OIL REMOVAL APPARATUS

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6 Claims. (Cl. 184—1.5)

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This invention relates to oil removal apparatus, and particularly to apparatus especially adaptable for draining oil from the crankcases of internal combustion engines and the like.

Broadly, the present invention contemplates the provision of apparatus for removal of oil from the crankcases of internal combustion engines without the necessity of an operator reaching or crawling under the crankcase to remove the screw plug or open a valve such as is customarily provided at the bottom thereof, or, in lieu of crawling under the crankcase, to drive the vehicle to a service station where the vehicle may be elevated, or driven over an open pit, to provide accessibility to the drain plug.

Specifically, the invention has as one of its objects the provision of means especially adaptable for actually forcing the oil from the crankcase, as distinguished from letting the oil drain from the crankcase by gravity flow.

Another object of the present invention resides in the provision of means for utilizing the suction developed in the carburetor or intake manifold of an internal combustion engine, whereby, upon operation of said engine, oil will be removed from its crankcase.

Still another object of the present invention resides in the provision of means for removing oil from an engine crankcase upon operation of said engine, and further characterized by the provision of means for interrupting operation of the engine when the oil is all, or substantially all, removed from the crankcase.

Further objects and advantages of the invention will in part be obvious and in part will hereinafter appear, and they reside generally in the features of construction, combination of elements and arrangements of parts which will be exemplified in the construction to be described, and of which the scope of application will be indicated in the appended claims.

In the drawing, in which is shown the preferred illustrative embodiment of the invention:

Figure 1 is a diagrammatic view showing in transverse vertical section a view through an internal combustion engine crankcase with the oil drainage means of the present invention, shown in elevation, associated therewith;

Figure 2 is a perspective view of the oil test rod removed from the engine crankcase; and

Figure 3 is a diagrammatic view of a modification of the electrical circuit connections of Figure 1.

Referring now in detail to the drawing, only so much of the component parts of an internal

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combustion engine is shown as is necessary to an understanding of the present invention. They comprise, essentially, the engine crankcase 1, the distributor 2, the high tension coil 3 and the intake manifold 4.

It is contemplated utilizing the suction created in the carburetor or intake manifold of the engine to accelerate and facilitate removal of oil from the crankcase thereof. To that end, the oil test rod 5 is removed from the opening 6, and a tube 7 of metal or plastic substituted therefor. One end of tube 7 rests on or is closely disposed adjacent the bottom of crankcase 1, while the other end of the tube is connected to one end of a flexible conduit 8. The other end of conduit 8 connects with an inlet fitting 9 of a diaphragm chamber 10. Adjacent its lower end, chamber 10 has an outlet fitting 11 communicating with a pipe 12, intermediate the ends of the latter. One end of pipe 12 also communicates with the upper end of chamber 10, while the other end of pipe 12 communicates with a sealed receptacle 13, the pipe being removably extended into the receptacle through the cover 14 of the latter with an air tight fit. Cover 14 also has a short length of pipe 15 sealed thereto, one end of the pipe extending into receptacle 13 and the other end of the pipe being secured to and communicating with one end of a flexible conduit 16. The other end of the conduit 16 may suitably be connected with the carburetor or intake manifold. For example, the windshield wiper tube may be removed from the vacuum line and the conduit 16 connected in its place.

From the foregoing, it will be apparent that chamber 10 may be omitted and the conduit connected directly to cover 14 of receptacle 13. Thus, a circuit may be traced from crankcase 1 through tube 7, conduit 8, receptacle 13, pipe 15 and conduit 16 to the intake manifold 4. Starting of the engine and running it at a slow or idling speed will create a vacuum in receptacle 13, whereupon atmospheric pressure in crankcase 1 will force the oil through tube 7 and conduit 8 into receptacle 13, thereby removing the oil from crankcase 1 and depositing it in receptacle 13. When conduit 8 is connected directly to receptacle 13, tube 7 is preferably closed at its lower end and provided with an opening 17 spaced slightly upwardly from that end of the tube to insure that sufficient oil will remain in the oil pan so that at no time will the oil pump be starved and run dry, or fail to show pressure. If desired, a valve 35 of any known or preferred construction may be incorporated in conduit 16.

After a few seconds running of the engine the valve 35 may be closed and then the engine may be stopped. Thus, the vacuum will be maintained in receptacle 13 to complete removal of the oil from the engine crankcase.

While the engine may be employed to remove crankcase oil in the manner just described, it is contemplated employing means to automatically interrupt operation of the engine when the oil is all or substantially all, removed from the crankcase. Hence, it is preferred to employ the diaphragm chamber 10 as previously described. It will be noted that the chamber 10 is permanently closed at the end containing the inlet fitting 9, while the opposite end is provided with an outwardly extending peripheral flange 17. A flexible diaphragm 18 of any suitable or preferred material seats on the outer surface of flange 17 and is confined therebetween and an annular ring 19, the latter being secured to flange 17 as by the nuts and bolts 20—21. Centrally, diaphragm 18 has a disk 22, preferably of plastic, suitably secured thereto. Such disk has a central depending finger 23 adapted for operating a switch arm 24 carried by a switch 25. Downward flexure of diaphragm will, therefore, move arm 24 into engagement with contact 26 to close the circuit through switch 25. The switch may be mounted on chamber 10 in any suitable or preferred manner and has a terminal 27 for connection of a conductor 28, and a terminal 29 for connection of a conductor 30.

In operation of the system employing chamber 10 and switch 25, the tube 7 is likewise inserted into the crankcase 1 through opening 6, and the conduit 16 connected with the intake manifold. The conductor 30 normally connected between the distributor 2 and coil 3 is disconnected at the coil 3 and plugged into terminal 29. The high tension wire 28 which is connected to switch 25 at terminal 27 is then plugged into coil 3 where conductor 30 was removed, or vice versa. An electrical circuit may then be traced from distributor 2 through conductor 30 to terminal 29 and contact 26, and thence through switch arm 24, terminal 27 and conductor 28 to coil 3. It will thus be apparent that the switch 25 is positioned in the secondary circuit of the coil for interruption of current flow therethrough. Alternatively, the switch may, if desired, be included in the primary circuit of the coil 3 for the same purpose. In that case, referring to Figure 3, conductor 30 retains its normal connection between coil 3 and distributor 2. Primary lead 36 of coil 3 is detached from the terminal 37 on distributor 2, and connected to the terminal 29 of switch 25. Lead 28 connected to terminal 27 of switch 25 is then connected to terminal 37 on distributor 2. Switch 25 is thus included in the primary circuit between coil 3 and distributor 2. Thus, the switch may be included in any circuit in the ignition line to interrupt current flow therethrough. In either case, i. e., whether the switch 25 is included in the primary or secondary circuit of the coil, upon manual closing of arm 24 and contact 26 a closed circuit will be established between distributor 2 and coil 3 and the engine may be started to evacuate air from receptacle 13, whereby to remove the oil from crankcase 1. As soon as sufficient oil has collected in chamber 10, the weight thereof will move diaphragm 18 downwardly and operate to hold arm 24 and contact 26 closed. It will of course be obvious that the oil being removed from crankcase 1 passes through tube 7, conduit 8 into chamber 10, and thence from chamber 10 into receptacle 13 through the medium of outlet 11 and pipe 12. In order that oil will not be forced into the engine if receptacle becomes full, a float 31 is disposed in receptacle 13 and carried on one end of a rod 32. Rod 32 extends into pipe 15 and, at the end opposite float 31, is provided with a hook 33, which is adapted to engage over a pin 34 driven transversely through pipe 15 to limit downward movement of float 31. When all, or substantially all, of the oil is removed from crankcase 1, the lessening weight of oil in chamber 10 will permit diaphragm 18 to return to its normal unflexed position, thereby to open switch 25 and break the circuit between distributor 2 and coil 3, thus stopping operation of the engine. The outlet fitting 11 may be so proportioned in diameter that outflow of oil from chamber 10 is such that only the necessary weight of oil to keep arms 24 and contact 26 closed will normally be in said chamber during a drainage operation.

While preferred embodiments of the invention have been illustrated and described by way of example, it will be obvious that changes may be made therein within the spirit and scope of the invention and, therefore, the invention is not to be limited to the precise forms, or the precise use, herein described, execpt insofar as it may so be limited by the appended claims.

I claim:

1. In apparatus for removing oil from the crankcase of an internal combustion engine having an oil test opening in the crankcase, an intake manifold, a high tension coil and a distributor, the combination of a tube for insertion in the oil test opening and into the oil in the crankcase, a diaphragm chamber, a first conduit connecting said tube with said diaphragm chamber, a sealed receptacle, a pipe connecting said diaphragm chamber with said sealed receptacle, a second conduit connecting said sealed receptacle with the intake manifold, whereby upon operation of said engine a vacuum will be created in said sealed receptacle thereby to force oil from the crankcase through said diaphragm chamber into said sealed receptacle, and means connected to said distributor and high tension coil and operable by said diaphragm chamber to interrupt the operation of said engine when substantially all the oil is removed from said crankcase.

2. Oil removal apparatus as defined in claim 1 wherein the means for interrupting operation of the engine includes an electrical switch connected in the primary circuit of the high tension coil.

3. Oil removal apparatus as defined in claim 1 wherein the means for interrupting operation of the engine includes an electrical switch connected in the secondary circuit of the high tension coil.

4. Oil removal apparatus as defined in claim 1 wherein the means for interrupting operation of the engine comprises an electrical switch having a pair of terminals one connected to the distributor and the other to the high tension coil, and means on said diaphragm chamber for operating said switch to maintain closed the circuit between said coil and distributor by the weight of the oil in the diaphragm chamber, and to open said circuit by the lessening weight of the oil in said diaphragm chamber when the oil is substantially all removed from said crankcase.

5. In apparatus for removing oil from the crankcase of an internal combustion engine hav-

ing an oil test opening in the crankcase, an intake manifold, a high tension coil and a distributor, the combination of a tube for insertion in the oil test opening and into the oil in the crankcase, a diaphragm chamber, a first conduit connecting said tube with said diaphragm chamber, a sealed receptacle, a pipe connecting said diaphragm chamber with said sealed receptacle, a second conduit connecting said sealed receptacle with the intake manifold, whereby upon operation of said engine a vacuum will be created in said sealed receptacle thereby to force oil from the crankcase through said diaphragm chamber into said sealed receptacle, an electrical switch including a switch arm and contact connected between said distributor and high tension coil, a flexible diaphragm carried by said diaphragm chamber, and a depending finger on said flexible diaphragm operable to engage said switch arm upon flexure of said diaphragm by the weight of the oil thereon to move the switch arm into engagement with said contact.

6. In apparatus for removing oil from the crankcase of an internal combustion engine having an oil test opening in the crankcase, an intake manifold, a high tension coil and a distributor, the combination of a tube for insertion in the oil test opening and into the oil in the crankcase, a diaphragm chamber, a first conduit connecting said tube with said diaphragm chamber, a sealed receptacle, a pipe connecting said diaphragm chamber with said sealed receptacle, a second conduit connecting said sealed receptacle with the intake manifold, whereby upon operation of said engine a vacuum will be created in said sealed receptacle thereby to force oil from the crankcase through said diaphragm chamber into said sealed receptacle, means connected between said distributor and high tension coil and operable by said diaphragm chamber to interrupt the operation of said engine when substantially all the oil is removed from said crankcase, and a float disposed in said sealed receptacle operable to close the second conduit when the sealed receptacle becomes full of oil.

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