

[54] **AUTOMATIC OIL LEVEL REGULATOR**

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[51] Int. Cl. **F01m 11/12**

[58] Field of Search **184/103 R, 105 R, 184/103 A; 137/247.11, 247.13, 453, 454**

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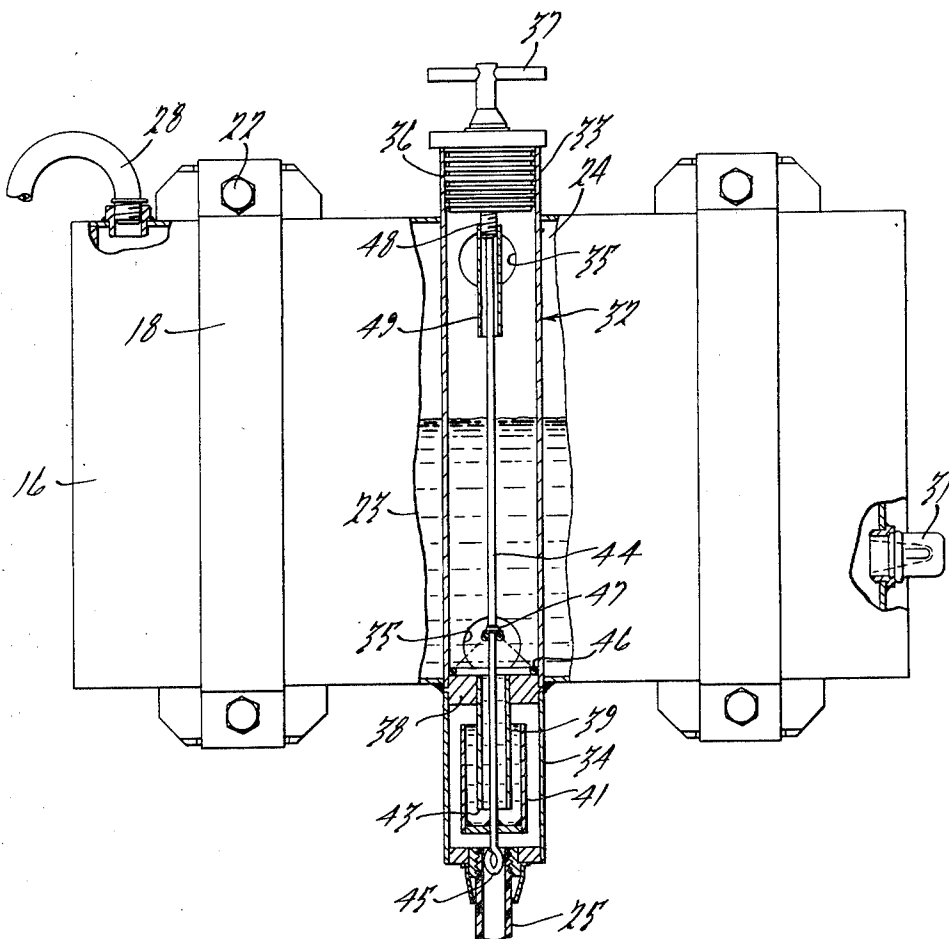
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[57] **ABSTRACT**

A device which senses the level of oil in an engine crankcase and automatically replenishes the oil supply when needed. The device comprises an oil reservoir having an oil level sensing tube and an oil feed tube leading to the crankcase. A valve automatically shuts off oil flow from the reservoir when its filler plug is removed. This valve comprises a cup surrounding a downspout from the reservoir and normally biased to closed position. A rod extends upwardly from the cup and is engageable by the filler plug to open the valve, the cup acting as an air trap.

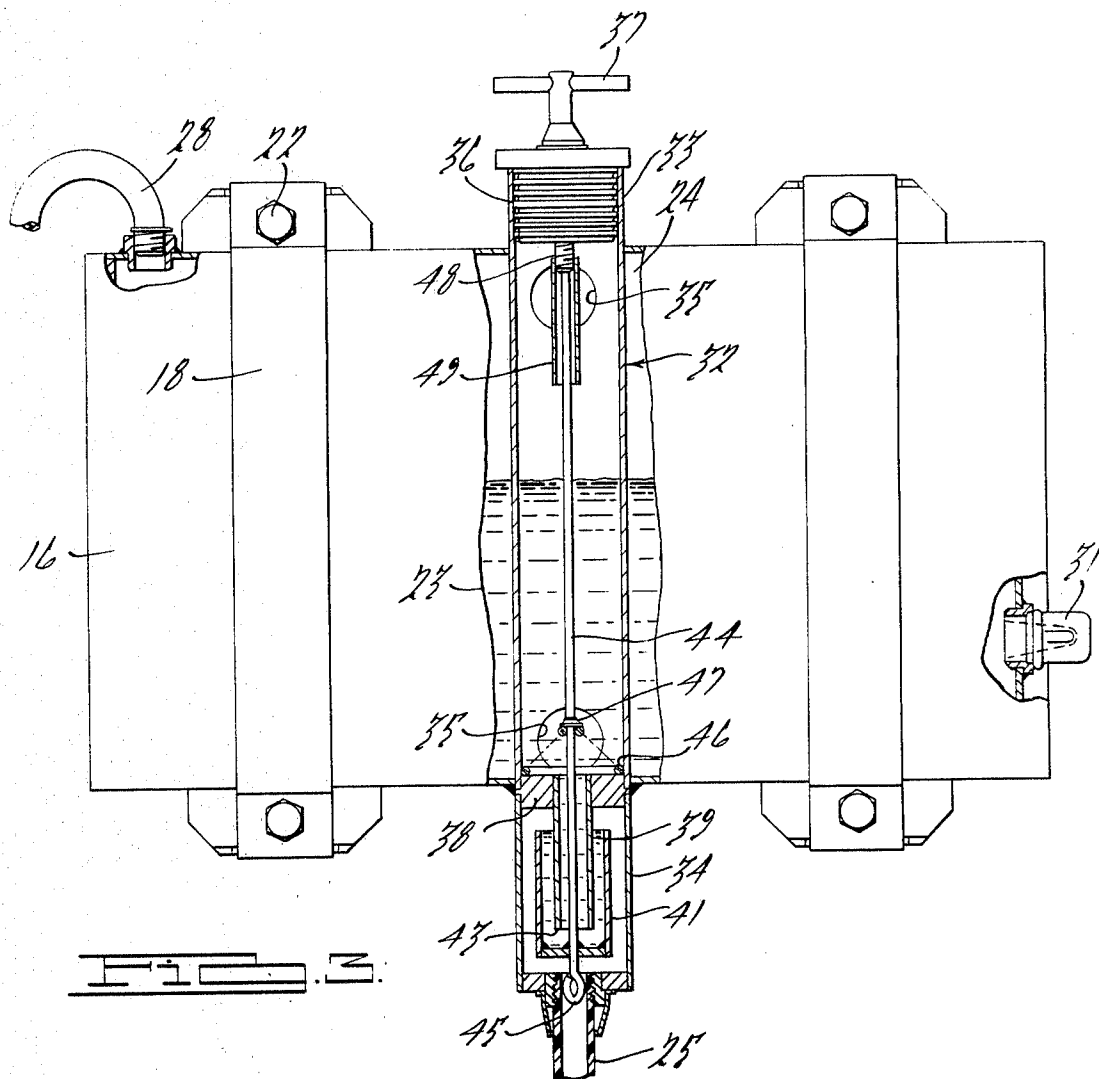
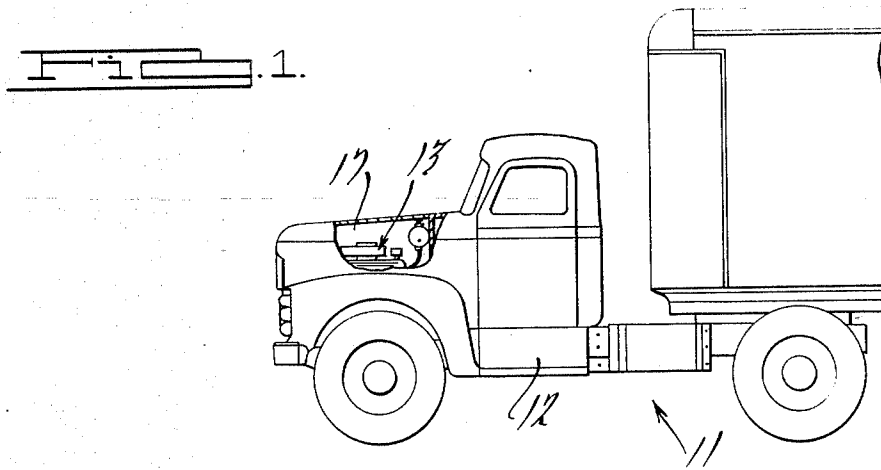
5 Claims, 5 Drawing Figures

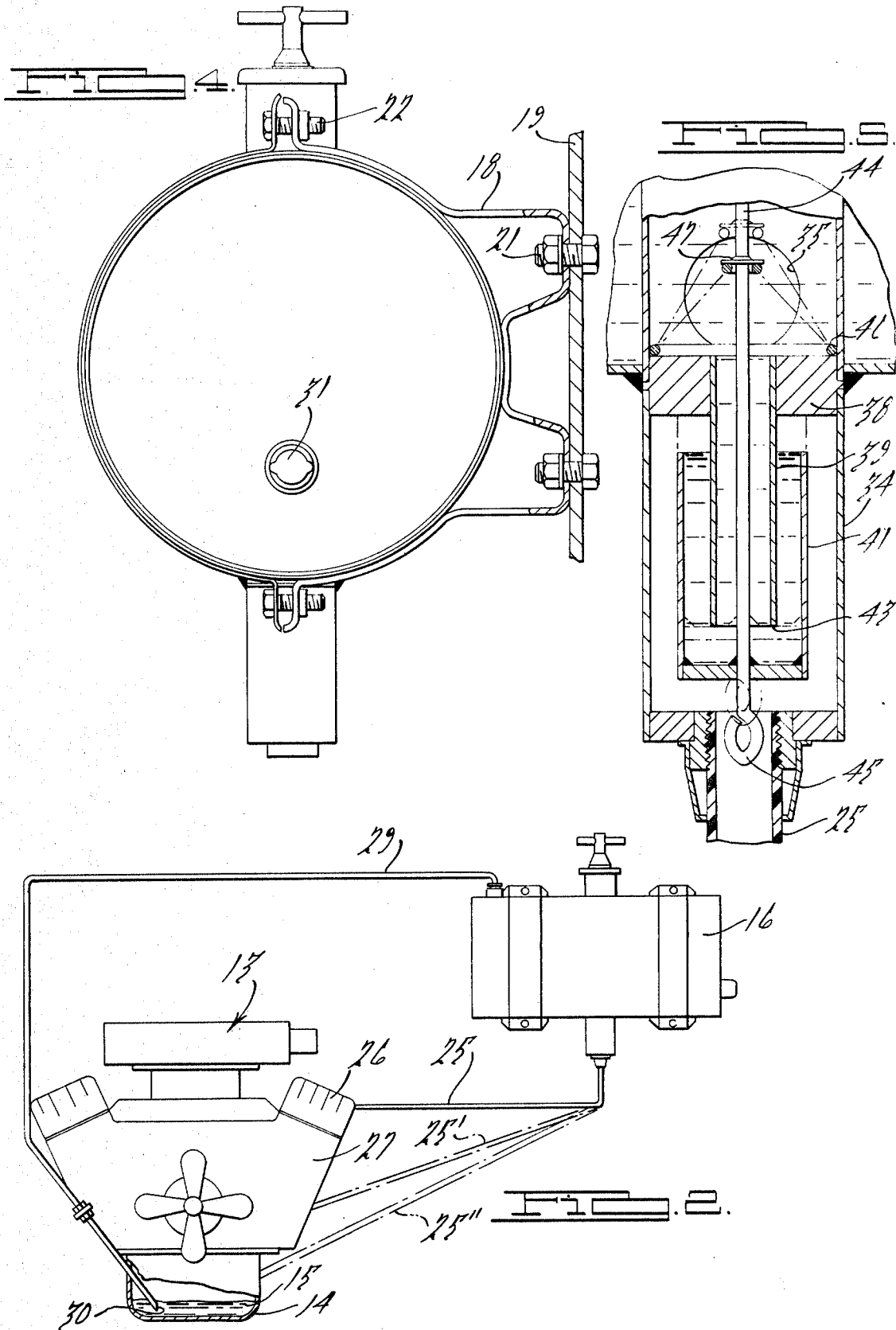


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AUTOMATIC OIL LEVEL REGULATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to oil level regulators, and more particularly to devices for automatically replenishing oil in a vehicle crankcase. It is an object of the invention to provide a device of this nature which incorporates novel and improved means for mounting the reservoir and for preventing oil flow from the reservoir to the crankcase while the reservoir is being refilled.

2. Description of the Prior Art

The following patents pertaining to this subject matter were discovered in a search: U.S. Pats. to Van Zoelen No. 943,959; Winters No. 1,096,658; Gibney No. 1,102,333; Wilburn & Butler No. 1,194,453; Howard No. 1,401,081; Wilkes No. 1,931,278; Gits No. 2,041,920; and Zachrisson No. 2,946,405.

BRIEF SUMMARY OF THE INVENTION

The invention comprises an airtight oil reservoir mounted above the level of the crankcase and having an oil feed line leading thereto as well as an oil level sensing tube leading to the crankcase from the air chamber in the reservoir. When the oil level in the crankcase drops below the lower end of the sensing tube, it will permit air to enter the reservoir so that oil may flow by gravity through the feed tube to restore the oil level in the crankcase. A valve is provided which automatically shuts off oil flow from the reservoir to the crankcase when the reservoir filler closure is removed. This valve comprises a downspout leading from the reservoir and surrounded by a cup which is spring-urged toward a position closing the downspout. The cup has a rod extending upwardly and engageable by the filler closure when inserted in the filling tube, thus opening the valve. The cup acts as an air trap in the oil feed line.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the front of a truck tractor, parts being broken away to show the mounting of the present invention in the engine compartment;

FIG. 2 is a schematic view of the system;

FIG. 3 is a front elevational view of the reservoir, parts being broken away;

FIG. 4 is a side elevational view thereof; and

FIG. 5 is an enlarged cross-sectional view in elevation of the valve construction.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention is intended to be used in conjunction with a vehicle such as a truck generally indicated at 11 and having a tractor 12 with an engine generally indicated at 13. As shown in FIG. 2, the engine has a crankcase 14 with oil 15 which it is desired to keep at a constant level. Accordingly, an airtight oil reservoir 16 is provided adjacent the engine, the reservoir being illustrated as of generally cylindrical shape and horizontally mounted in engine compartment 17 by brackets 18 secured to the firewall 19 thereof (FIG. 4). More particularly, brackets 18 are secured to the firewall by bolts 21 and extend around tank 16, being clamped thereto by bolts 22. The reservoir should be mounted high enough above crankcase 14 and sufficiently close to the engine to assure easy gravity feed of the oil to the crankcase.

Oil 23 partially fills reservoir 16 leaving an air space 24 thereabove. The reservoir has an oil feed tube 25 leading from the underside thereof to a selected location on the engine, which location may vary to suit requirements. Three such possible connections are shown schematically in FIG. 2, one being to the cylinder head 26, another alternate connection 25' leading to the engine block 27 and a third possible connection 25'' leading directly to crankcase 14. In any event, line 25 should lead to a point below reservoir 16. This point may be either above or below the level of crankcase oil, depending on the requirements of the particular installation.

An oil level sensing tube 29 leads from the top of reservoir 16 to crankcase 14, the lower end 30 of this tube being just below the desired oil level when the engine is running. End 30 is preferably cut diagonally to give greater area to the fluid, reducing surface tension.

In operation of the device as so far described, as long as oil 15 is above the level of tube opening 30, no air will be permitted to enter chamber 24 and oil 23 will thus be unable to flow downwardly into the crankcase. When the level of oil 15 does drop below the bottom 30 of tube 29, air will be admitted to the sensing tube and pass upwardly to chamber 24. Oil 23 will thus be permitted to flow by gravity through line 25 to the crankcase and will replenish the oil supply. The flow will continue until the level of oil 15 again covers end 30 of tube 29.

A sight glass 31 is provided in reservoir 16 to detect the need for replenishment of the reservoir. Novel and improved means are provided for automatically cutting off the flow of oil from reservoir 16 to the crankcase while the reservoir is being refilled. A filling tube generally indicated at 32 is provided in the central portion of reservoir 16, this tube extending diametrically through the reservoir and having a portion 33 extending above the reservoir and an extension 34 below. Oil feed tube 25 leads from the closed bottom of extension 34. The tube has a plurality of radial openings 35 at its upper and lower ends within the reservoir and a hermetically sealable filler plug 36 is insertable in tube portion 33. The plug may be of the type having a twistable handle 37 which expands the rubberized main portion of the plug as it is turned to seal the plug against the interior of tube portion 33.

A reinforcing closure member 38 is mounted within tube 32 at the bottom of reservoir 16 immediately below the adjacent openings 35, separating the tube from extension 34. A downspout 39 extends through this reinforcing member, being connected to the reservoir at its upper end and to the interior of extension 34 at its lower end. A cup-shaped valve member 41 within extension 34 surrounds downspout 39 and has a bottom portion 42 which, when raised, will engage the under-surface 43 of downspout 39 to prevent oil from flowing out through the downspout.

A rod 44 extends through portion 42 of valve 41, downspout 39 and tube 32. A portion of rod 44 extends downwardly from valve portion 42 and is looped, this end 45 of the rod being disposed in tube 25 for guidance purposes. A helical coil compression spring 46 surrounds rod 44 having a lower end supported by member 38 and an upper end engageable with a shoulder 47 secured to rod 44. Spring 46 urges rod 44 upwardly so that valve portion 42 will engage lip 43 of the downspout to shut off oil flow from the reservoir.

Rod 44 is of such length that when filler plug 36 is inserted in tube portion 33, a central element 48 on the filler plug will engage the top of rod 44 and force it downwardly against the action of spring 46. This will separate valve portion 42 from downspout lip 43, permitting oil to flow from reservoir 16 through the downspout, cup 41 and extension 34 into oil feed line 25. Element 48 has a tube 49 extending downwardly therefrom so as to properly guide the extension with respect to the rod end.

In operation, removal of filler plug 36 to fill the reservoir will free the upper end of rod 44 and spring 46 will immediately lift valve member 41 to close the downspout and prevent oil from flowing out of the reservoir while the reservoir filling is in progress. The oil level in crankcase 15 will thus not be in danger of rising to excessive levels.

It will be observed that when valve member 41 is open but oil has stopped flowing to the crankcase, cup 41 will remain filled with oil. This oil will act as a trap to prevent air from backing up through line 25 to the reservoir.

We claim:

1. In a system for automatically replenishing vehicle engine crankcase oil, an airtight oil reservoir comprising an oil carrying lower portion and an air containing upper portion, means mounting said reservoir adjacent to and above said engine, conduit means providing an oil feed path leading from the underside of said reservoir downwardly to said engine whereby oil flowing from the lower portion of the reservoir through the feed line will add oil to the crankcase, an oil level sensing tube leading from the upper portion of the reservoir downwardly to the crankcase, the lower end of this tube being substantially open at the desired crankcase oil level, a removable filler closure for said reservoir, and valve means for automatically shutting off oil flow from the reservoir to the crankcase upon removal of said filler closure, said last-named means comprising a downspout on said reservoir forming a part of said feed path, a cup-shaped valve member opening upwardly and telescopically surrounding the bottom portion of said downspout and the space between it and the downspout forming a reversely directed part of said oil feed path, a rod secured to said valve member and extending upwardly through said reservoir, and resilient means urging said cup-shaped valve member against the bottom of said downspout to cut off oil flow from the res-

ervoir to the feed path when said filler closure is removed, said rod being of such length that mounting of said filler closure on said reservoir will force said valve member away from said downspout against the action of said resilient means, said valve member retaining oil in the space between it and said downspout after flow to said oil feed line has stopped, to act as an air trap in said oil feed path.

2. The combination according to claim 1, said reservoir being provided with a tube extending vertically therethrough and having at least one opening to the reservoir, the upper portion of said tube receiving said filler closure, and said conduit means including an extension below said tube surrounding said downspout and valve member and forming a part of said oil feed path.

3. The combination according to claim 2, said rod having a lower enlarged extension in said conduit means for guidance purposes.

4. The combination according to claim 2, said filler closure comprising a plug insertable in the upper portion of said tube and having an element engageable with the top of said rod and a tube extending from said element to properly guide the element with respect to said rod.

5. In a system for automatically replenishing vehicle engine crankcase oil, an airtight oil reservoir comprising an oil carrying lower portion and an air containing upper portion, means mounting said reservoir adjacent to and above said engine, conduit means providing an oil feed path leading from the underside of said reservoir downwardly to said engine whereby oil flowing from the lower portion of the reservoir through the feed line will add oil to the crankcase, an oil level sensing tube leading from the upper portion of the reservoir downwardly to the crankcase, the lower end of this tube being open substantially at the desired crankcase oil level, a removable filler closure for said reservoir, and valve means for automatically shutting off oil flow from the reservoir to the crankcase upon removal of said filler closure, said conduit means including an oil retaining upwardly directed portion in which oil flows upwardly in flowing from the reservoir to the engine, said upwardly directed portion having a section of substantial length that retains oil at all times to act as an air trap against air backup from the engine to the reservoir through the oil feed path.

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