Sept. 21, 1926.

A. T. DUDLEY

1,600,404

MEANS FOR LUBRICATING INTERNAL COMBUSTION ENGINES

Filed March 24, 1926

Fig. 1.

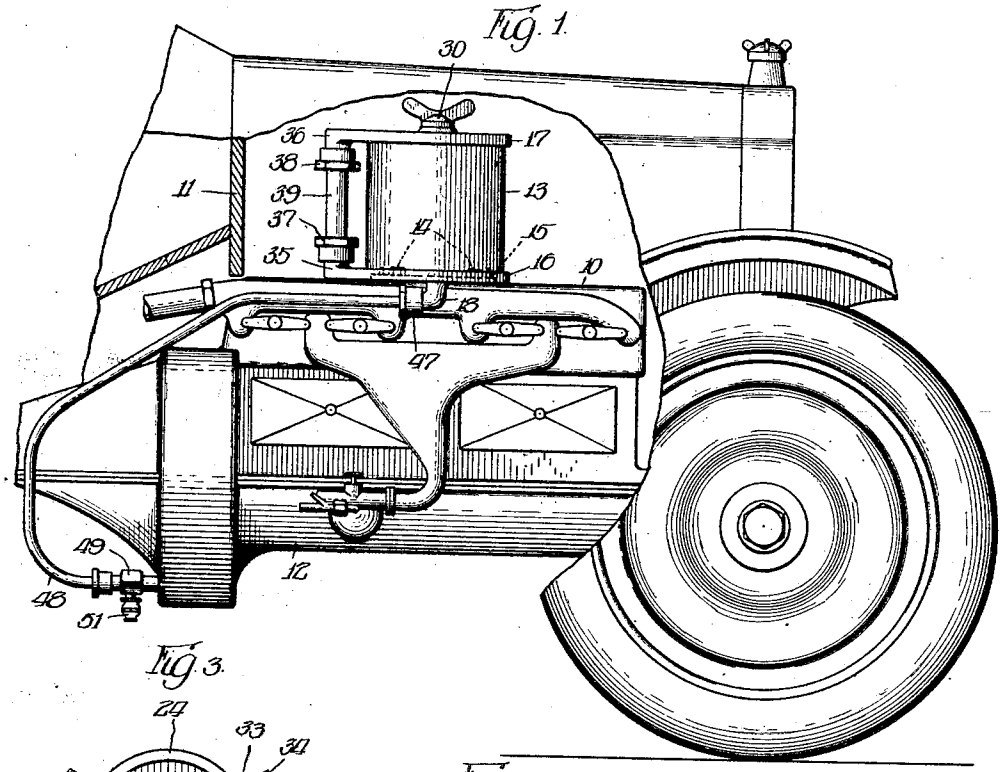


Fig. 3.

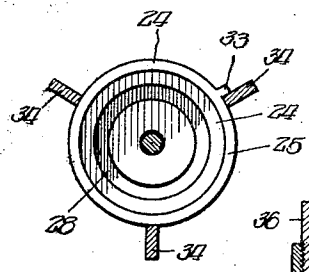


Fig. 2.

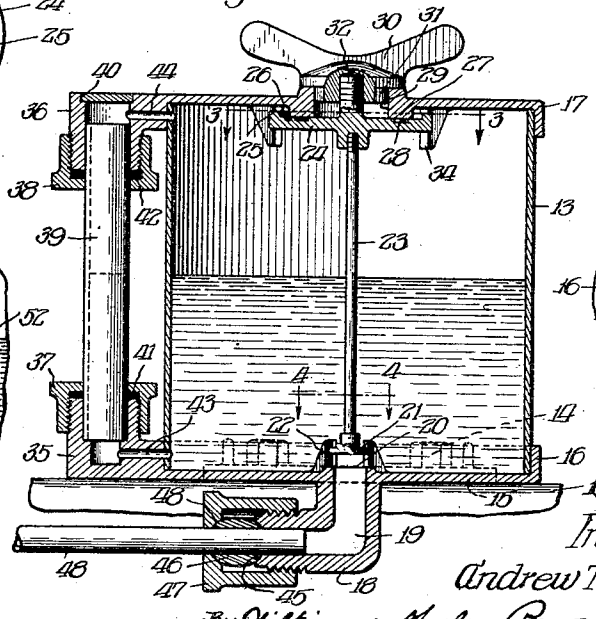


Fig. 4.

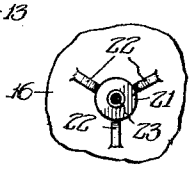
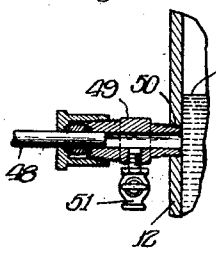


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MEANS FOR LUBRICATING INTERNAL-COMBUSTION ENGINES.

Application filed March 24, 1926. Serial No. 96,928.

This invention relates to means for lubricating internal combustion engines.

One object of the invention is to provide simple, reliable and efficient means for lubricating internal combustion engines whereby relatively great quantities of oil and gasoline are saved, and the engine cylinders and spark plugs are maintained in a clean condition.

Another object is to provide means whereby oil is automatically supplied to an internal combustion engine in accordance with actual requirements.

Another object is to provide an oil supply tank operatively connected to the crank case of an internal combustion engine whereby a free circulation of warm oil from the crank case to the oil supply tank may be maintained whereby oil may be supplied from said tank to said crank case freely in cold weather.

Another object is to provide an oil supply system for an internal combustion engine which is air-tight to insure efficient and successful supply of oil.

These and other objects are accomplished by means of the arrangement disclosed on the accompanying sheet of drawings, in which—

Figure 1 is a fragmentary side elevation of an auto vehicle having an internal combustion engine with an oil supply system embodying my invention;

Figure 2 is an enlarged vertical sectional view through the oil supply tank forming a part of the invention;

Figure 3 is a fragmentary sectional view taken in the plane of line 3—3 of Figure 2;

Figure 4 is a fragmentary sectional view taken in the plane of line 4—4 of Figure 2; and

Figure 5 is an enlarged fragmentary sectional view of means for connecting the oil supply tank to the crank case of an engine.

The various novel features of the invention will be apparent from the following description and drawings and will be particularly pointed out in the appended claims.

Referring to the figures of the drawings, it will be noted that my invention is illustrated in connection with an internal combustion engine 10 mounted in the frame of an automobile 11, the crank case 12 of the engine being connected to an oil supply tank 13, which preferably is secured to the engine by cylinder block bolts 14 passing through apertures in a bracket 15 forming a part of the lower head 16 of the tank 13. The lower head 16 and the upper head 17 of the lubricant tank 13 preferably are made of cast brass brazed to a sheet brass barrel, the latter forming the body 13 of the tank. In this way, the tank is made air-tight.

The lower head 16 has a right angled extension 18 having an oil discharge passageway 19 therethrough, said extension at one end terminating at a point in the middle of the lower tank head. A slightly raised ring 20 surrounds the point where this passageway 19 enters the tank and provides a seat for the lower valve 21. Surrounding this valve seat are a plurality of vertically arranged circumferentially spaced valve guides 22 which insure the valve resting squarely on its seat. This discharge control valve 21 is rigidly secured to one end of a rod 23, to the other end of which an inlet control valve 24 is rigidly secured. The valves 21 and 24 and rod 23 therefore constitute a control unit in which there is no flexibility between the parts. The inlet control valve 24 has an outer ring 25 which projects above the valve seat 26 formed on a depending portion 27 of the upper cover 17. This ring 25 forms a cup-like receptacle for the purpose of holding a given quantity of liquid, such as oil. The valve 24 in its upper face is provided with an annular grove 28 which is completely closed by the depending portion 27 of the cover when the valve 24 is in its normal closed position. More strictly speaking, the upper cup-shaped portion of the valve 24 retains a certain amount of oil which is poured thereinto as the tank 13 is being supplied with oil through the opening 29 in the upper cover thereof. Accordingly, when the valve 24 is pressed into its closed position, the oil in the annular groove 28 serves, by capillary attraction, to maintain a viscous film of oil between the metal faces of the valve 24 and its seat 27. This film prevents the leakage of any air into the tank. The valve 24 or sealing member is pressed into its closed position by a winged thumb nut 30 having a plug portion 31 for filling the opening 29 and having a tapped opening for receiving an upwardly extending threaded portion 32 formed on the valve 24. A light pressure is sufficient to enable the oil seal to resist very high pressures and

positively insures an air-tight joint. The valve 24 is provided with a laterally extending ear 33 for engagement with one or another of valve guides 34 which extend downwardly from the cover 17. Such prevents the valve from turning when the screw plug 30 is screwed onto the stud or threaded part 32 of the upper valve 24.

Extending laterally outwardly from the lower and upper tank heads 16 and 17 respectively are extending portions 35 and 36 which are provided with packing nuts 37 and 38 respectively. A transparent tube 39 is inserted through a hole 40 in the top of member 36 and placed in a manner to extend above and below the packing glands. The hole 40 is then closed by brazing the tube 19 in place as shown. The packing nuts 37 and 38 are then screwed down to force the packing rings 41 and 42 out against the walls of the tube. The packing rings preferably are of cork and covered with pipe cement before the packing nuts are screwed in place. Passageways 43 and 44 connect the bottom and top of the sight tube with the interior of the tank 13.

The outer face of the extension 18 is rounded out, as shown at 45, to receive one end of a sleeve 46 which preferably is of copper, and the associated nut 47 has its inner face rounded out, as at 48, to receive the other end of the sleeve 46. When nut 47 is screwed up tightly the beveled faces 45 and 48 operate to compress the ends of the sleeve 46 against the connecting tube 48 and thereby make an air-tight joint. The lower end of the tube 48 is attached to a coupling 49 in the same manner as the upper end is connected to the tank outlet 18. The coupling 49 is screwed into a tapped hole 50 in the crank case 12 of the internal combustion engine and positioned at the lowest point to which the oil level is to be permitted to fall. A pet cock 51 is connected to the under side of the coupling 49 to be used for the purpose of testing the level of the oil in the crank case.

In connection with the operation, the screw plug 30 is removed from the stud 32 whereupon the valve 24 falls into an open position and the valve 21 falls into a closed position thereby preventing a discharge of oil from the oil supply tank 13 while the latter is being filled. Oil is now poured through the filling opening 29 in the top of the oil tank 13 and during the filling operation oil flows over the valve 24 directly below the opening 29 and in so doing, leaves the cup-like portion of the valve 24 filled. As the oil tank 13 is being filled, oil flows through the passageway 43 into the sight tube to a corresponding height for indicating the height of the oil in the tank. The air displaced by the oil as it rises in the tube 39 escapes through the passageway 44 into the interior of the tank. The tank having been filled, the plug screw 30 is screwed down over the stud 32 on the valve 24 and thereby brings the face of the valve 24 against its seat on the under side of the top head of the tank. As mentioned hereinabove, the oil entrapped on the upper side of the valve fills the concentric groove 28 and when the valve 24 is firmly seated, oil in the groove serves, by capillary attraction, to maintain a viscous film of oil between the metal faces of the valve 24 and its seat, forming an air-tight joint. When the plug nut 30 is screwed down on the stud 32, the valve 24 not only is lifted but the rod 23 and discharge valve 21 are lifted, the latter being lifted from its seat 20 for permitting oil to flow through tube 48 connecting the tank with the engine crank case.

When the motor is stationary, the level of the oil in the crank case may be assumed to be as shown at 52 (Figure 5). This high level is caused by the oil on the moving parts of the motor and in process of circulation having run back into the crank case. When the motor is started, a certain quantity of oil is picked up by the fly wheel of the motor and caused to circulate to the front end of the motor and back again to the crank case thereby lowering the level in the crank case. When enough oil has been consumed by the motor to lower the level of the oil in the crank case to a point where air can enter the tube 48 through the coupling 49, a quantity of oil of equal volume to volume of air admitted will be permitted to flow down from the supply tank 13 through the tube 48 and into the crank case, and will continue to flow until the oil level again is raised to a point where the end of coupling 49 is below the surface of the oil. The air flows up through the oil in the pipe connection 48 in the form of bubbles and of course the flow of oil will be interrupted by incoming bubbles so that flow of oil through the pipe 48 will be intermittent.

The pipe or tube 48 connecting the tank 13 and crank case 12 preferably is about ½" inside diameter but of course could be of other sizes. The object in providing a large tube is to permit the free circulation of warm oil from the crank case to the tank so that oil will flow from the tank to the crank case freely in cold weather.

The actual use of this device on a large number of cars has demonstrated the fact that cars equipped with it run nearly twice as many miles on a gallon of gasoline and five times as many miles on a gallon of oil as cars do using the common lubricating methods provided by the manufacturers.

My invention serves to automatically maintain the level of the oil in the crank case at the proper point to insure an ample sup-

ply of oil for lubricating the motor. It also prevents the piston and cylinders of the motor from pumping oil which otherwise would result in the fouling of the plugs and valves.

A further advantage resides in the convenient means provided for indicating the reserve supply of oil in the tank and eliminates the necessity of reaching underneath the car to test the oil level with the pet cocks that are provided for that purpose.

In this system it is essential that the oil supply tank 13 and all of its connections be air-tight and that no air may enter the tank 13 except from the crank case through the tube 48.

My invention is intended for use on motors having the "splash" system of lubrication.

It is my intention to cover all modifications of the invention falling within the spirit and scope of the following claims.

I claim:—

1. Oil supply means for an internal combustion engine comprising a tank having an oil discharge opening, an oil filling opening, and inflexibly connected control valves operable within said tank whereby when one opening is closed the other is open to control the supply and discharge of oil with respect to said tank, one of said valves acting as a seal normally to prevent leakage of air through the filling opening into said tank.

2. Oil supply means for an internal combustion engine comprising a tank having an oil discharge opening and an oil inlet opening, inflexibly interconnected valves for controlling said openings, one of said valves acting as a seal normally to prevent leakage of air through said inlet opening into said tank, a member secured to one of said valves for normally holding the latter in closed position and the other valve normally in open position for permitting a supply of oil to the engine.

3. Oil supply means for an internal combustion engine comprising a tank having an oil discharge opening and an oil inlet opening, inflexibly interconnected valves for controlling said openings, the oil inlet control valve having a grooved surface for the reception of a liquid to form an air-tight seal, and a member operable with respect to said last mentioned valve for drawing said valve into an air-tight position.

4. Oil supply means for an internal combustion engine comprising an oil tank having an oil discharge opening and an oil inlet opening, inflexibly connected control valves for said openings, a sight glass connected with the upper and lower ends of said tank whereby the level of the oil may be ascertained and whereby as oil rises in said sight glass air may be discharged therefrom into said tank, and means whereby when the discharge valve is held open the inlet valve is held closed to form an air-tight seal.

Signed at Tulsa, Oklahoma, this 20th day of March, 1926.

ANDREW T. DUDLEY.