

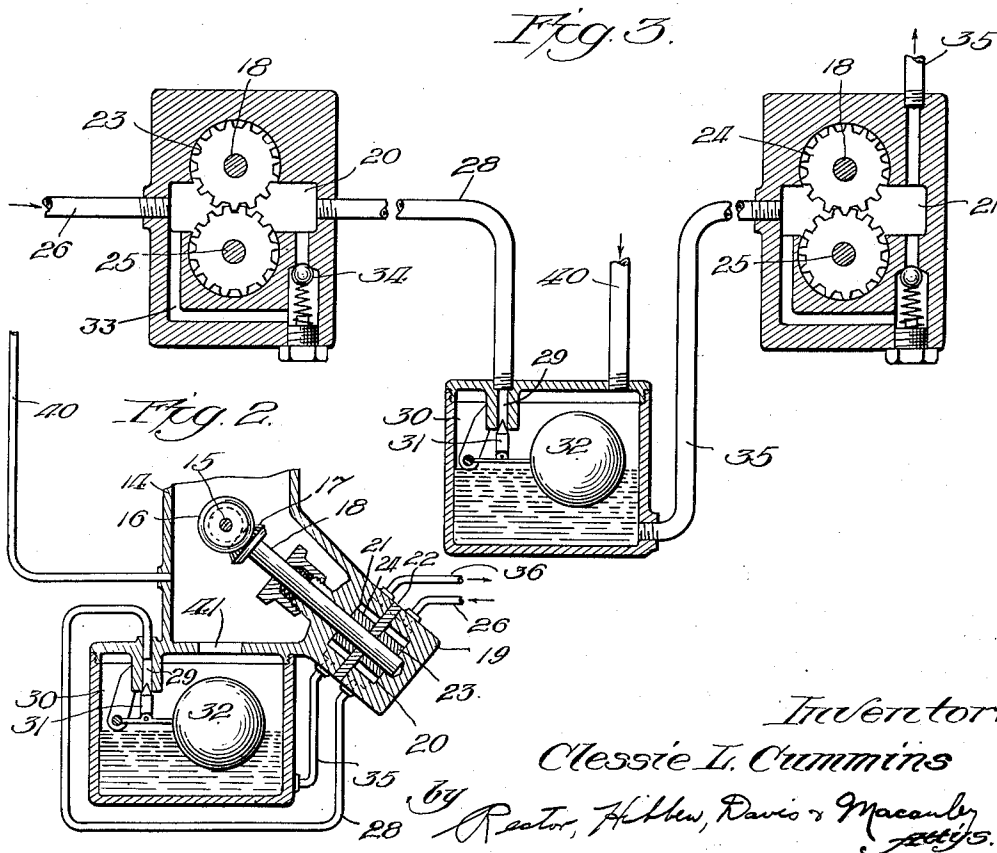
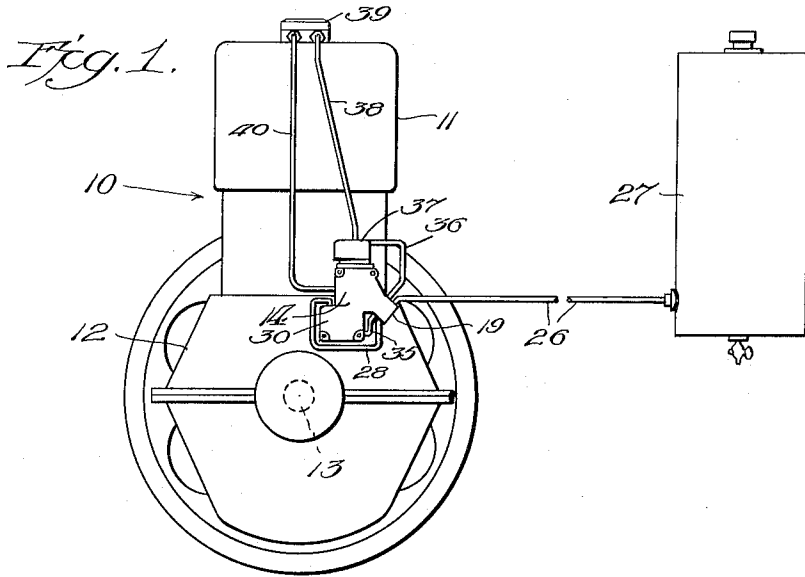
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FUEL SYSTEM FOR OIL BURNING ENGINES

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FUEL SYSTEM FOR OIL BURNING ENGINES

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3 Claims. (Cl. 158—36.4)

My invention relates to fuel systems for oil burning engines and more particularly to that type in which provision is made for collecting for re-use leakage oil that may occur in the distributing system to the cylinder injectors.

The device of the present application is intended more especially for use in connection with, and as an improvement on, the fuel pump and distributing apparatus for internal combustion engines disclosed in my co-pending application, Serial No. 438,048, filed March 22, 1930, but the essential conception is also adaptable to other operating conditions. In the indicated apparatus, the oil is delivered under pressure to the several cylinder injectors and provision is made for collecting such leakage as may occur around each injector and in the region of the distributor by causing the same to gravitate to the bottom of the distributor housing, from which the leakage is pumped back to the main tank by a suitable gear pump. This method of handling the leakage occasionally caused a building up of pressure in the main tank.

It is accordingly one of the objects of my invention to devise a fuel system which is constructed and arranged to prevent any building up of pressure in the main tank by providing for a free drainage of the leakage into an auxiliary reservoir or fuel source, from which the oil may be again pumped into the injector lines.

A further object is to devise a fuel system having the foregoing characteristics in which a common chamber is provided between the main tank and the injector lines, fresh oil from the main tank being pumped through this chamber and the latter also receiving by gravity any leakage from the injectors.

A further object is to provide a fuel system of the type indicate having a float chamber which functions as an auxiliary fuel tank by receiving leakage which drains directly into the chamber and also fresh fuel from the main tank, a pump being utilized to deliver the mixture of leakage and fresh oil to the injector lines.

These and further objects of my invention will be set forth in the following specification, reference being had to the accompanying drawing, and the novel means by which said objects are effectuated will be definitely pointed out in the accompanying claims.

In the drawing:

Figure 1 is a conventional end view of an oil burning engine showing my improved fuel system associated therewith.

Fig. 2 is an enlarged, vertical section of the

lower portion of the distributor housing shown in Fig. 1, illustrating the manner of driving the gear pumps for the system and their association with the auxiliary fuel chamber.

Fig. 3 is a diagrammatic, sectional view of certain of the elements of the fuel system, namely, the gear pump and the float or auxiliary fuel chamber, these parts being shown in displaced relation in order to more particularly illustrate their operative relation.

Referring to the drawing, the numeral 10 designates a conventional type of oil burning engine having a cylinder block 11, a crank case 12 and a crank shaft 13. A distributor housing 14 is conveniently mounted on the engine, one type of such mounting being illustrated and described in the foregoing, copending application, although it will be understood that other distributor arrangements may be adopted without affecting the general scheme of my improved fuel system.

A shaft 15 is journaled in the housing 14 and may be driven by any suitable gearing (not shown) from the crank shaft 13. A bevel gear 16 is mounted on the shaft 15 and meshes with a second bevel gear 17 that is fixed upon one end of a shaft 18 that is journaled in a pump casing 19 extending from the lower end of the distributor housing 14. The pump casing 19 is provided with pump chambers 20 and 21 which are separated from each other by a wall 22 and within which operates gear pumps, each composed of a pair of meshing gears 23 and 24, respectively. As clearly shown in Figs. 2 and 3 for each pump, the gears 23 and 24 are mounted upon the shaft 18, while the other gears of each pump are mounted upon an offset shaft 25 that is also journaled in the pump casing 19.

The inlet side of the pump chamber 20 is connected by a pipe 26 to a main fuel tank 27, while the outlet end thereof is connected by a pipe 28 with a passage 29 leading into a fuel chamber 30. The delivery end of the passage 29 is operatively related to a needle valve 31 whose position is controlled by a ball float 32 suitably mounted for pivotal action in the chamber 30 under the influence of the fuel in the chamber. A pipe 35 connects the chamber 30 with the inlet side of the pump chamber 21 and a pipe 36 connects the outlet side of the last-noted chamber with the distributor represented generically by the numeral 37 in Fig. 1. This location of the distributor follows the design shown in my copending application and from this distributor leads a pipe line 38 to a cylinder injector 39 located on the upper end of the cylinder block 11.

According to the foregoing application, provision is made for returning to the distributor housing 14 any leakage which may occur around the injectors and pump units and this return is effected by means of a return pipe 40 whose lower end delivers the leakage into the lower end of the casing 14, from which it may pass by gravity through an opening 41 into the fuel chamber 30.

In the operation of the fuel system, the fuel is pumped from the main tank 27 by the gear pump 23 into the float chamber 30 and from this chamber, the fuel is pumped by means of the gear pump 24 to the cylinder injectors through the pipe 36, distributor 37 and pipe 38. As before noted, any leakage which may occur around the injectors is returned to the float chamber 30 by means of gravity through the pipe 40. Similarly, such leakage as may occur in the region of the distributor may also drain by gravity into the chamber 30.

The height of the fuel in the chamber 30 is limited by the needle valve 31 which insures that the fuel will not rise so high as to prevent a free drainage of the leakage fuel into the chamber 30. The principal advantage of my improved system is that the leakage fuel is returned to an auxiliary chamber under gravity, instead of being pumped directly back to the main tank and, further, that this leakage is conveniently associated with fresh fuel proceeding from the main tank.

When the needle valve 31 reaches a position which closes the passage 29, provision is made in the gear pump 23 for by-passing the fuel around the pump until the needle valve again opens. This result is achieved merely by providing a by-pass 33 which connects the chamber 20 on opposite sides of the pump and locating in this passage at some convenient point a spring-actuated ball check valve 34. A similar construction is provided for the gear pump 24, as shown in Fig. 3.

I claim:

1. The combination with an oil burning engine provided with an injector for forcing fuel into the engine cylinder and a main fuel supply tank, of means for feeding fuel from the tank to the injector comprising a housing, a distributor mounted on the housing so that fuel leaking therefrom will drain into said housing, means for feeding

fuel leakage from the injector to the housing, a fuel chamber mounted on the housing and having communication therewith to drain from the housing any fuel leakage fed thereto, means for feeding fuel from the supply tank to the fuel chamber, means for feeding fuel to the distributor from said chamber, and means for conducting fuel from the distributor to the injector.

2. The combination with an oil burning engine provided with an injector for feeding fuel into the engine cylinder and a main fuel supply tank, of means for feeding fuel from the tank into the injector comprising a housing, a distributor mounted on the housing so that any fuel leaking therefrom will drain into said housing, means for feeding fuel leakage from the injector to the housing, a fuel chamber mounted on the housing and having communication therewith to drain from the housing any fuel leakage fed thereto, a pump driven from the engine, means for causing said pump to feed fuel from the supply tank to the fuel chamber, a float valve for controlling feeding of fuel into said chamber by said pump, means for bypassing fuel around said pump when the float valve is closed, means for feeding fuel to the distributor from said chamber, and means for conducting fuel from the distributor to the injector.

3. The combination with an oil burning engine provided with an injector for forcing fuel into the engine cylinder and a main fuel supply tank, of means for feeding fuel from the tank to the injector comprising a housing, a distributor mounted on the housing so that any fuel leaking therefrom will drain into said housing, means for feeding fuel leakage from the injector to the housing, a pair of pump units supported on the housing so that leakage therefrom will be fed to the housing, a fuel chamber mounted on the housing and having communication therewith to drain from the housing any fuel leakage fed thereto, means for causing one of said pumps to feed fuel from the supply tank to the fuel chamber, means for causing the second pump to feed fuel to the distributor from said chamber, and means for conducting fuel from the distributor to the injector.

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