

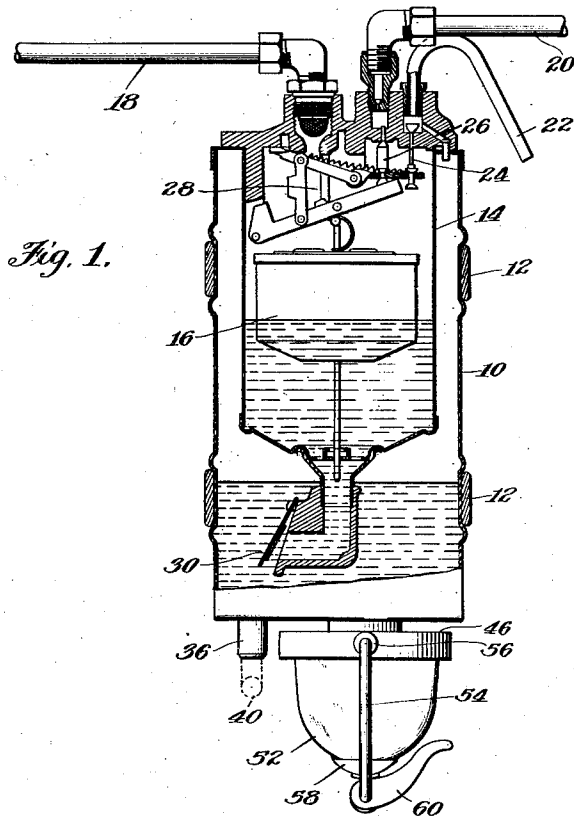
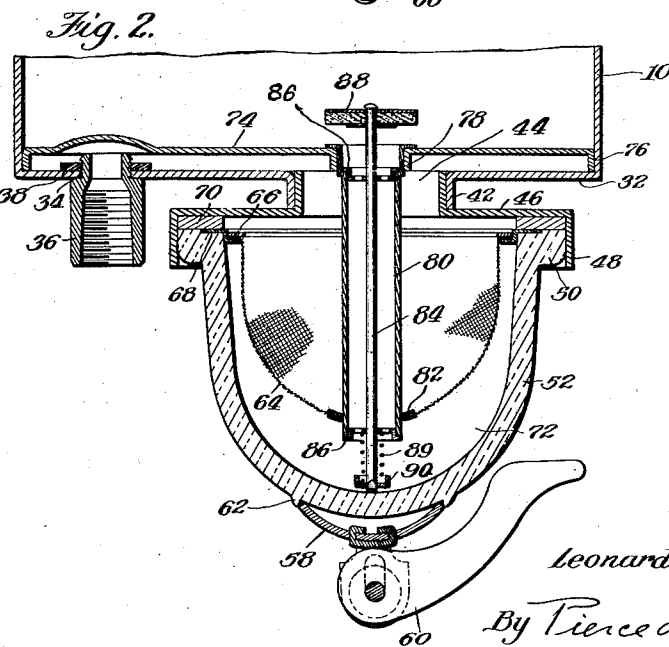
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LIQUID HANDLING DEVICE

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UNITED STATES PATENT OFFICE

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LIQUID-HANDLING DEVICE

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My invention relates to liquid handling devices and more specifically to improved means for purifying a stream of liquid. My invention has been illustrated in connection with a fuel feed system for the internal combustion engine of a motor vehicle.

Among the objects and advantages of the invention may be enumerated:

10 First, to locate a removable fuel filter in a more advantageous position than heretofore, both as to protection from accidental injury, and as to accessibility and freedom from interference with other parts.

15 Second, to unite the filtering means for a gasoline supply system with the vacuum feed tank, and preserve both the ready removability of the former, and the reliability of fuel supply afforded by the storage capacity of the latter.

20 Further objects and advantages of the invention, including structural features of advantage as to cost of manufacture and durability, will become apparent as the description proceeds.

25 In the accompanying drawings:

Figure 1 is a central section, partly in elevation, of a complete fuel feed tank, indicating the application of my invention there- to; and

30 Figure 2 is an enlarged section of the lower portion of the same structure, showing the filter and its connections.

In the embodiment of the invention selected for illustration, the fuel feed tank comprises 35 a container 10 beaded for better engagement with supporting straps 12 by means of which it is mounted on the dash board or any other convenient support. Within the tank 10 is the inner, or vacuum chamber 14, containing the automatic mechanism for maintaining a 40 supply of fuel in said chamber at all times. As the mechanism inside the chamber 14 is old and well known in the art, and per se, forms no part of the present invention, detailed description thereof is deemed unnecessary. It comprises briefly, a float 16, a gaso- 45 line inlet 18, a vacuum connection 20, an air vent 22, a valve 24 for the air vent, another valve 26 for the vacuum connection, and a spring biased linkage designated generally

by the character 28 and intermittently actuated by the float to disconnect the air vent and connect the vacuum for filling the chamber by suction through the inlet 18, and for reversing the connections to close the vacuum 55 and open the air vent and permit the contents of the chamber to flow out into the tank 10 through the flap valve 30.

According to the invention, the substantially circular bottom 32 of the tank 10 60 is provided with a small outlet opening 34 near its periphery. This is equipped with any suitable outlet connection such as the short tube or connector 36 clamped in place by the locking nut 38, and an elbow 40, or a straight 65 nipple as the case may be. Opposite the discharge connection 36, and preferably with its center in line with the centers of the bottom and the discharge connection, there is a larger circular opening, preferably with a 70 downwardly turned lip 42. The upper tubular portion 44 of the cap 46 is suitably fastened in place in this opening, to produce a liquid tight joint. The cap shown is circular and has a downwardly turned flange 48 75 around its periphery to receive the bead 50 of the filter cup 52.

I have illustrated suitable means for removably clamping the filter cup in place and forming a liquid tight seal between it and the 80 cap 46. These comprise, in this instance, a bail 54 having its upper ends pivoted at 56 on opposite sides of the cap, and carrying a shoe 58 actuated by an eccentric and lever 60 to clamp the parts in the position shown 85 in the drawings. Upon rotation of the lever through approximately 180 degrees in a clock-wise direction, the eccentric will lower the shoe 58 enough to clear the retaining flange 62 on the bottom of the cup, whereupon 90 the entire bail can be swung to one side and the cup and its contents permitted to drop out.

A suitable filter element 64, preferably of wire gauze, is mounted inside the cup 52 as by 95 a reinforcing ring 66 around its upper edge, having an outwardly extending flange 68 clamped between the lip 50 and a sealing gasket 70, when the parts are assembled. The relative sizes of the filter and cup are such 100

that there is a chamber 72 of generous proportions for the accumulation of sediment and the distribution of the liquid stream to give it access to the entire surface of the filter.

I have illustrated suitable connections for forcing the liquid from the tank 10 to pass through the filter 64 en route to the connection 36. In the embodiment illustrated, these connections are passageways extending partly below and partly above the bottom 32. The false bottom 74 fits snugly in the bottom of the container 10, being preferably provided with a peripheral downwardly turned flange 76 for convenience in keeping it properly spaced from the real bottom 32. Above and in line with the opening 42, it is provided with a smaller opening surrounded by a downwardly turned lip 78. In this opening I mount the tube 80 with a liquid tight joint at the lip 78, which tube extends downward through the opening 42 and axially of the filter and cup past the bottom of the filter, which is provided with a small reinforcing ring 82 to make contact with the tube.

It will be apparent that liquid leaving the tank 10 is forced to travel down the tube 80 into the lower chamber 72, through the filter 64 and up again through the opening 42; and then across between the false and real bottoms to the outlet connection.

I have provided suitable means for sealing the tank 10 at the bottom to prevent loss of the contents thereof through the tube 80 when the cup 52 is removed, for cleaning it of accumulated sediment, and for cleaning and replacing the filter.

A central valve stem 84 is guided near its ends by spiders 86 mounted in the tube 80. At its upper end it carries a suitable valve 88 for closing the upper end of the tube 80. The extreme lower end of the stem 84 abuts the bottom of the cup 52 when the parts are assembled to hold the valve and stem in the open position shown in the drawings. A light compression coil spring 89, having abutment with the spider 86 and the cap 90, is preferably provided to insure prompt closing and tight sealing of the valve when the cup is removed.

Whenever it becomes necessary to remove the accumulation from the filter chamber, the only manipulation required is to remove the filter cup and clean it. The removal of the filter cup results in automatic closure of the valve 88 and retention of the fuel in the tank so that the return of the filter cup to the assembled position results in immediate delivery of fuel to the carburetor.

It will also be apparent that the complete assembly of the connections from the fuel tank to the carburetor, which assembly is preferably of a relative permanent nature, is entirely independent of the filter and its connections with the tank. Thus, cars can be assembled in the factory without the filter

and allowed to remain in this condition as long as may be desirable on account of possible risk of breaking the glass cup 52. It is not necessary to add these parts to the assembly until the fuel tank is being filled with fuel to start the engine. Furthermore, while the filter cup is very easy of access for removal and cleaning, its removal does not require the loosening of any pipe connections. When the filter is in place in actual service, it is as completely housed, and protected by its proximity to the dash or other support and by its position close up under the bottom of the tank, as the necessity for access thereto will allow.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service, without eliminating certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. The combination with a vacuum fuel feed tank having a bottom and an opening therein, of a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through said opening, an annular filter element telescoped over said tube, an upwardly opening cup forming a closed space below said filter element, a downwardly opening cup fastened to said bottom and encircling said opening, detachable means for clamping said cups together to form a closed space above said filter element in open communication with the space between said bottoms, an outlet connection for the space between said bottoms, and a check valve in said tube unseated by clamping said cup in place.

2. The combination with a vacuum fuel feed tank having a bottom and an opening therein, of a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through said opening, filtering means for the liquid passing through said tube, said filtering means including a detachable cup, and a check valve in said tube unseated by attaching said cup.

3. The combination with a fuel feed tank having a bottom and an opening therein, of a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through said opening, a filter element for the liquid passing through said tube, a detachable cup housing said filter element, an outlet connection for the space between said bottoms, and a check valve in said tube unseated by attaching said cup.

4. The combination with a fuel feed tank having a bottom and an opening therein, of

a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through said opening, filter means interposed between the end of said tube and the space between said bottoms, an upwardly opening cup forming a closed space below said filter element, and an outlet connection for the space between said bottoms.

5. The combination with a fuel feed tank having a bottom and an opening therein, of a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through said opening, detachable filter means interposed between the end of said tube and the space between said bottoms, and a check valve in said tube unseated by attaching said filter means.

6. The combination with a cylindrical fuel feed tank having a bottom, said bottom having two openings spaced on opposite sides of the tank axis, of a false bottom spaced above said bottom, an outlet tube carried by said false bottom and projecting downwardly through one opening, a detachable filter element interposed between the end of said tube and the space between said bottoms, and an outlet connection mounted in said other opening.

7. Fuel handling means comprising a casing, partitions dividing the interior of said casing into two superposed compartments, an outlet from the lower compartment, and filter means in a passageway leading from the upper to the lower compartment but structurally outside and below said lower compartment.

8. Fuel handling means comprising a casing, partitions dividing the interior of said casing into two compartments, an outlet from the lower compartment, filter means in a passageway leading from the upper to the lower compartment but structurally outside and below said lower compartment, and means permitting the removal of said filter means for cleaning or replacement.

9. Fuel handling means comprising a casing, partitions dividing the interior of said casing into two compartments, an outlet from one of said compartments, filter means in a passageway leading from the other of said compartments to said first-named compartment but structurally outside and below the latter compartment, means permitting the removal of said filter means for cleaning or replacement, and automatic means operative upon removal of said filter means for closing one of said compartments to prevent loss of its contents when said filter is removed.

10. The combination with a fuel tank having a circular bottom, of a filter unit below said bottom and offset from the vertical axis thereof, said bottom being of larger diameter

than said filter and extending entirely over the same, a downwardly opening discharge connection on said bottom beside said unit, and passage-ways extending partly above and partly below said bottom for forcing the contents of said container to travel through said filter unit en route to said discharge connection.

11. The combination with a fuel tank having a circular bottom, of a filter unit below said bottom and offset from the vertical axis thereof, said bottom being of larger diameter than said filter and extending entirely over the same, a downwardly opening discharge connection on said bottom beside said unit, and passageways for forcing the contents of said container to travel through said filter unit en route to said discharge connection.

12. The combination of a cylindrical container having a bottom and a discharge connection near the periphery of said bottom, of a relatively fragile filter housing, means for removably mounting said housing directly below said bottom within a geometrical continuation of said container to be covered and protected by said bottom, and passage-ways connecting said housing in series with said container and discharge connection.

13. The combination of a cylindrical container having a bottom and a discharge connection near the periphery of said bottom, of a filter housing, means for removably mounting said housing directly below said bottom within a geometrical continuation of said container to be covered and protected by said bottom, and passage-ways connecting said housing in series between said container and discharge connection.

14. The combination of a cylindrical container having a bottom and a discharge connection near the periphery of said bottom, of a cup-shaped filter housing, means for removably mounting said housing below and adjacent said bottom within a geometrical continuation of said cylinder to be covered and protected by said bottom, and connections for forcing the contents of said container to pass through said filter housing en route to said discharge connection.

15. The combination of a cylindrical container having a bottom and a discharge connection near the periphery of said bottom, of a filter housing, means for removably mounting said housing below said bottom within a geometrical continuation of said container to be covered and protected by said bottom, connections forcing the contents of said container to pass through said filter housing en route to said discharge connection, and automatic means for closing said container to prevent loss of the contents when said housing is removed.

16. The combination with a fuel feed device having a discharge opening, of a filter chamber and a filter in said chamber for in-

tercepting and filtering fuel at a point interposed in the course of its flow through said device to said discharge opening, said filter chamber and filter being positioned outside
5 of said device and removable therefrom, and means for preventing loss of fuel from said device when said filter chamber is removed.

17. The combination with a fuel feed device having a discharge opening, of a filter
10 chamber and a filter in said chamber for intercepting and filtering fuel at a point interposed in the course of its flow through said device to said discharge opening, said filter chamber and filter being positioned outside
15 of said device.

18. The combination with an internal combustion engine fuel pumping device having a fuel chamber and a discharge opening, of means for filtering the fuel pumped by said
20 device, said means comprising a bowl and a filtering element separating the interior of said bowl into two compartments, a passageway from the fuel chamber of said device to the lower of said compartments, means for
25 connecting the upper of said compartments to the discharge opening of said device, and means for removably securing said bowl to said device.

In witness whereof, I hereunto subscribe
30 my name this 23rd day of March, 1926.

LEONARD H. WHEELER.

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