

Feb. 11, 1930.

J. E. OTIS, JR

1,746,274

FILTER

Filed Nov. 30, 1925

Fig. 1.

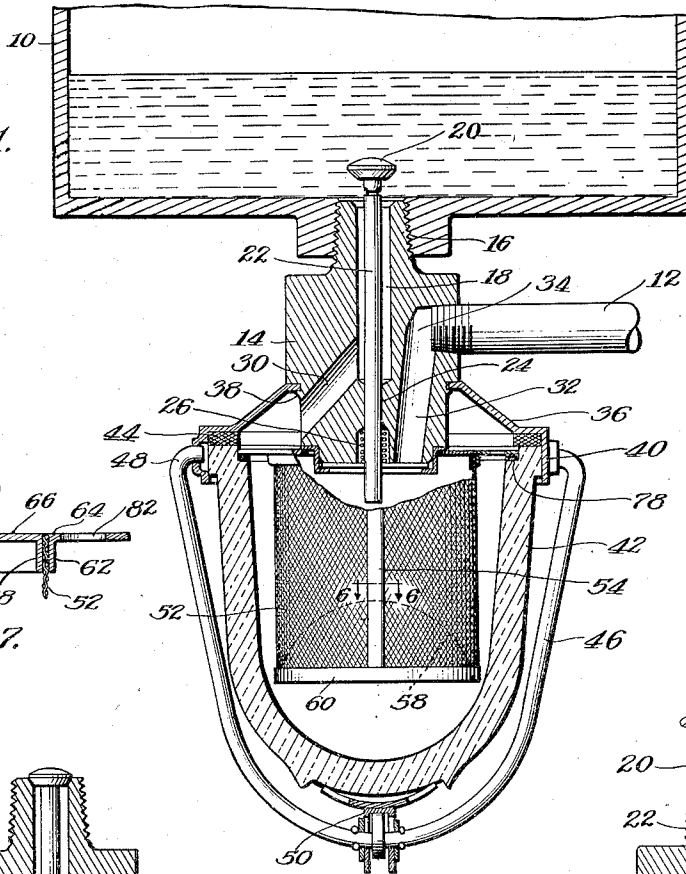
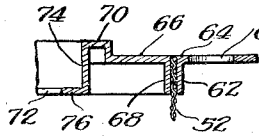


Fig. 7.

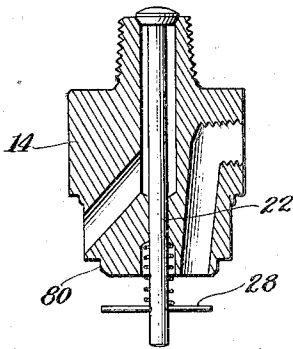


Fig. 2.

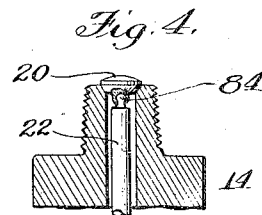


Fig. 4.

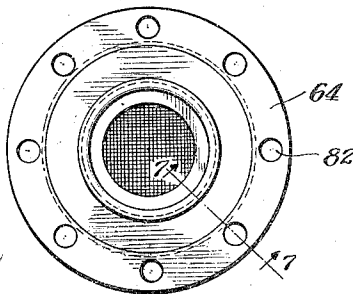


Fig. 3.

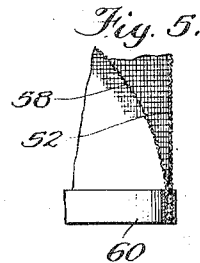


Fig. 5.

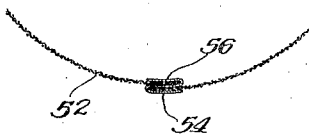


Fig. 6.

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FILTER

Application filed November 30, 1925. Serial No. 72,291.

My invention relates to the handling of liquids and more specifically to purification means forming part of a liquid dispensing or distributing system.

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

First, the subdivision of the complete structure into unitary subcombinations to obtain increased cheapness of manufacture and convenience in assembly and replacement.

Second, automatic means permitting quick removal of the purification device from the system without loss of the liquid in the system.

Third, tight and reliable closure of an automatic sealing valve constructed of parts not very accurately machined.

Further objects and advantages of the invention will become apparent as the description proceeds.

In the accompanying drawings:

Figure 1 is a sectional view of a portion of a system for delivering fuel to an internal combustion engine, indicating the application of a device according to my invention thereto.

Figure 2 is a section of the head plug with the valve assembled, but before assembly of the cover.

Figure 3 is a plan view of the filter unit.

Figure 4 is an enlarged detail of the valve structure.

Figure 5 is a detail section showing the construction of the peripheral seam at the bottom of the filter unit.

Figure 6 is a section on line 6—6 of Figure 1 showing the construction of the longitudinal seam.

Figure 7 is a section on line 7—7 of Figure 3.

In the embodiment of the invention selected for illustration, I have shown the filter as applied to a fuel feeding system for the internal combustion power plant of a motor vehicle, said system including a supply container 10 which will ordinarily be the usual vacuum tank, and a delivery tube 12 running to the carburetor.

A head 14 is threaded into the bottom of the tank 10 at 16 and receives material from

the tank through a bore 18 controlled by a valve 20 at the upper end of a valve stem 22. This stem is guided in the head at 24 and urged to a closed position by a spring 26 housed in a countersink in the bottom of the head and engaging a transverse pin 28 carried by the valve stem 22. A laterally inclined passage-way 30 communicates with the bore 18 and debouches on the side of the head near the bottom. From the bottom of the head a slightly inclined passage-way 32 runs up to the socket 34 receiving the tube 12.

An outer cover 36 is assembled on the head 14, as by swedging over a bead 38 to hold it in place. The cover terminates in a downwardly extending flange 40 forming an opening for receiving and guiding a glass cup 42 placed up into it and against a sealing gasket 44. The cup is held in place by the U-shaped bail 46 having the upper ends of its arms pivoted at 48 in the flange 40 and carrying quick releasable clamping means indicated generally by the reference character 50. This clamping means may be of any suitable nature, as, for instance, that shown and described in the co-pending application of George F. Thomas and Otto J. Herb, Serial No. 72,243, filed November 30, 1925, and, per se, forms no part of the present invention.

The filter unit comprises a cup-shaped filter element built up of a tube 52 with a longitudinal seam at 54 formed by clamping the adjacent edges of the perforated or reticulated material, preferably wire screen, in the oppositely opening U-shaped bights of an S-shaped clamping strip 56. The bottom of the cup is dished upwardly as clearly indicated at 58 in Figures 1 and 5, and the downwardly extending peripheral edge of the bottom is united to the tube 52 by an annular U-shaped clamping strip 60.

The upper edge of the tube 52 is laid inside the inner lip 62 of the flange member 64, and securely clamped there by pressing the cover 66 into place with the outer lip 68 of the cover fitting tightly inside the tube 52 reinforced by the inwardly facing lip 62. The cover 66 has an annular upwardly extending rib 70 outside the central aperture 72 defined by the downwardly extending portion 74 and the in-

turned flange 76 at the bottom of said portion. It will be seen that the filter element, cover 66 and flange 64 constitute a separable unit complete in itself.

Referring now to Figure 1, the device is assembled by fitting the filter unit inside the cup, with the joint preferably sealed by a gasket 78, shoving the cup and filter unit up into the position of Figure 1, and clamping them in place by the clamping means 50. The movement of the parts into place, will cause the pin 28 to engage the flange 76 and ride up against the bottom of the head 14, lifting the valve stem 22 and valve 20 to establish communication between the tank 10 and the passage-way 30. The portion 74 of the cover 66 fits snugly around the central projection 80 at the bottom of the head 14 leaving the interior of the filter element completely closed except for the exit passage 32. The flange 64 has a plurality of peripherally spaced openings 82 establishing communication between the space outside the filter and inside the cup, and the annular space between the cover 36 and the cup, into which the passage-way 30 discharges. There is thus established a complete closed passage-way through the system from the tank 10 to the discharge tube 12, blocked only by the filter element through which the liquid must pass. When the impurities arrested by the filter element have accumulated in the bottom of the cup to such an extent that cleaning is advisable, removal of the cup permits the valve 20 to drop into place and prevent any loss of liquid in the tank 10 while the cup is being emptied of the accumulated sediment and dirt.

To assure a tight seal for the valve 20 with parts machined by ordinary commercial production methods, I prefer to provide a ball and socket joint, as clearly shown at 84 in Figure 4, close up to the body of the valve proper 20. When this is done, it is possible to allow a slight clearance between the guide 24 and the valve stem 22, and the resulting wobble is advantageous rather than otherwise, the stem 22, when in the position of Figure 2, being practically allowed to float, to permit square seating of the valve. Alternatively, as indicated in Figure 2, the ball and socket joint may be omitted and the clearance at 24 increased to such an extent that a good seat is still obtainable. In either case, when closed, the valve has engagement only with its seat and with the spring.

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. Liquid handling means comprising a body, a cup detachably fastened to said body to form a chamber, a two-piece cover on said cup comprising a central portion having a central aperture, and an annulus having a peripheral row of apertures, a cup-shaped filter having a rim, the inner edge of said annulus engaging and supporting said rim, the outer edge of said central member engaging said rim and clamping it in place, said central member abutting said body to clamp said cover and filter in place.

2. A filter unit comprising a tube of foraminated material made up of a single flat piece with a longitudinal seam, an S-shaped binding strip gripping the edges of the piece in its oppositely facing U-shaped bights to seal the seam, an upwardly dished bottom of foraminated material with a peripheral seam joining its edge to the bottom end of said tube, and a U-shaped binding strip gripping the downwardly extending periphery of the bottom and the lower edge of the tube to seal the peripheral seam.

3. A filter unit comprising a tube of foraminated material made up of a single flat piece with a longitudinal seam, and an upwardly dished bottom of foraminated material with a peripheral seam joining its edge to the bottom end of said tube.

4. A filter unit comprising a cup of foraminated material, an annular top flange, and a cover, the rim of said cup being clamped tightly between said cover and flange with a press fit.

5. A filter unit comprising a tube of foraminated material made up of a single flat piece with a longitudinal seam, an S-shaped binding strip gripping the edges of the piece in its oppositely facing U-shaped bights to seal the seam, and a bottom of foraminated material closing the lower end of said tube.

6. A filter unit comprising a cup of foraminated material and having a cylindrical side wall, a cover therefor having a downwardly projecting annular flange fitting within the upper edge of the cylindrical wall of the cup, and a flanged annular ring fitting around the upper edge of the cup permanently to clamp the cup upon said cover, whereby said cover and ring reinforce the side wall of said cup.

In witness whereof, I hereunto subscribe my name this 20th day of November, 1925.

JOSEPH E. OTIS, Jr.