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LIQUID-SEPARATING DEVICE

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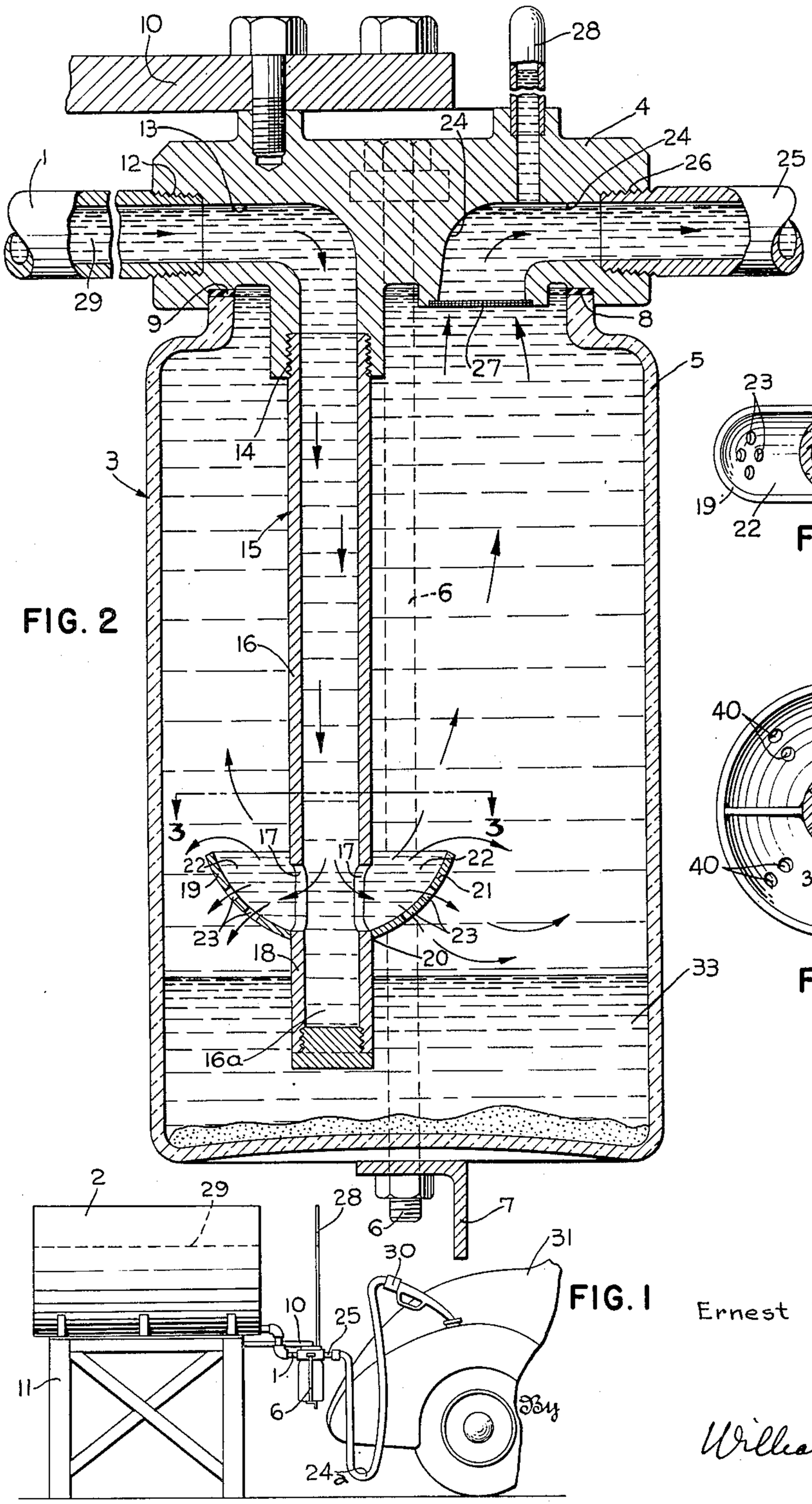

FIG. 2

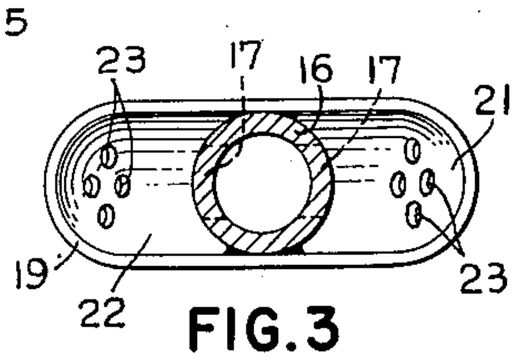

FIG. 3

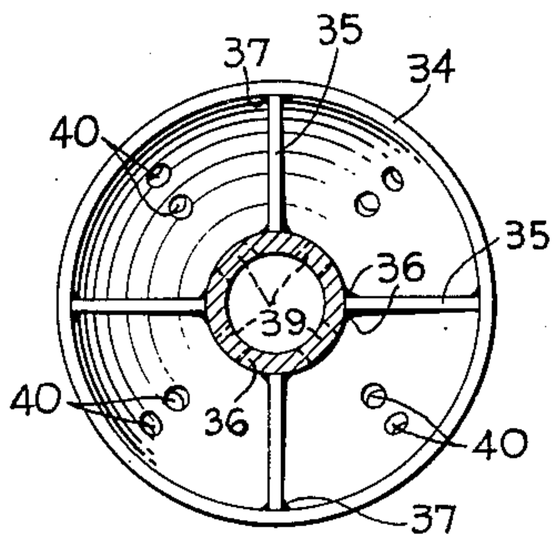

FIG. 4

FIG. 1

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LIQUID-SEPARATING DEVICE

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4 Claims. (Cl. 210—57)

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This invention relates to improved means for separating liquids having different specific gravities.

Gasoline and oil often become contaminated with foreign matter including water and heavy sludge residue. This foreign matter must be removed before the gasoline or oil can be used in an efficient manner. Many devices have been developed for removing the contaminants from gasoline and oil but find disadvantages in one respect or another depending upon the particular use under which they are employed.

A simple and economical device has now been discovered which may be used as a simple attachment in a line conducting the desired liquid fuel to a fuel-burning or other source.

An object of the present invention is to provide a means for separating liquids having different specific gravities in a facile, efficient and economical manner.

Another object of this invention is to separate liquids of different specific gravities using a liquid cushion as a means of reversing the flow of contaminated liquids, and thereby permit separation of the liquids from each other.

A further object of this invention is to provide a device for separating liquids of different specific gravity that may be easily and quickly installed in a liquid conducting line.

A still further object is to provide the device of this invention with a chamber adapted to arrest flow of liquid from movement in one direction into movement in a plurality of directions.

These and other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

Figure 1 is a plan view showing a source of contaminated liquid in position for dispensing the liquid through a liquid-separating device embodying the features of the invention and into the gasoline tank of an automobile.

Figure 2 is a vertical cross-section through said liquid-separating device.

Figure 3 is a view taken on line 3—3 of Figure 2.

Figure 4 is a top plan view illustrating a modified form of the portion of the device best shown in Figure 3.

The improved liquid-separating device of this invention is shown in detail in Figure 2, in which the numeral 1 indicates a conduit leading from the liquid storage tank 2 and connected to the separating device indicated generally at 3. For the purposes of the present invention, the liquid under consideration is gasoline and the contaminant is water.

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The device 3 is provided with a head 4, which may be a metal casting, and a vessel or container 5, preferably of transparent material such as glass. The container 5 is clamped against the head 4 as by adjustable hanger means 6 extending downwardly from the head on both sides of the container and an angle iron 7 bearing against the bottom of the container. A gasket 8 is disposed between the upper lip of the container 5 and a recessed seat 9 in the head 4, to seal the head and the container 5 against the loss of liquid through this juncture.

The head 4 is supported on a bracket 10 which is connected to any suitable relatively fixed support 11.

The conduit 1 is threaded into the head 4 at 12, in cooperation with an inlet passageway 13 therein extending toward the bottom face of the head 4.

A tube 15, providing a liquid-separating chamber 16 therein, is threaded into the head 4 at 14 in cooperation with the inlet passageway 13, to extend downwardly within the container 5 to substantially closely adjacent the bottom of the container. The lower end of the tube is closed, as shown, and at a point approximating two-thirds of the length thereof from the top, opposed openings 17 are provided in the wall 18 thereof, the portion 16*a* of the chamber 16 below these openings constituting a liquid-cushioning well, the purpose of which will be described later. Spoon-shaped liquid deflectors 19, integrally connected to the tube 15 at 20, over-lie each opening 17 and open upwardly with the rims thereof in a plane adjacent the tops of said openings. A plurality of relatively small apertures 23 may be provided in the lowermost portions of the deflectors 19, also for a purpose to be described later.

A liquid is adapted to leave the container 5 through an outlet passageway 24 disposed in the head 4 and a conduit 25 threaded into head 4 at 26. A screen or filter device 27 is disposed across the opening leading into the outlet passageway 24. A hose extension 24*a* from the conduit 25 may, for example, be utilized for dispensing gasoline to a vehicle gasoline tank.

A liquid level gauge 28 of known type is mounted on the head 4 in cooperation with the outlet passageway 24 for indicating the amount of liquid in the storage tank 2.

In normal use of the improved liquid-separating device it may be assumed that there is gasoline in all parts of the system, including the separating chamber 17 and container 5. When it is desired to dispense the filtered gasoline, through outlet conduit 25, contaminated gasoline

29 from tank 2 is caused to flow by gravity into container 5, through inlet conduit 1 and separating-tube 15.

The downward movement of the contaminated gasoline 29 is arrested by the liquid contained in the well 16*a* and caused to reverse its flow without undue turbulence, through the openings 17 in tube 15, and then to be deflected in an upward arc by the deflectors 19. During this reversal of flow, the motion of the liquid is slowed down in a manner which allows the heavier liquids and solids to settle out and seek the openings 23 toward a zone 33 of relative quiet below the deflectors 19, and the comparatively lighter liquids deflected upwardly will tend further to separate into upwardly arched streams of uncontaminated gasoline and downwardly arched streams of water, for example. The uncontaminated gasoline flows from the container 5 outwardly through the conduit 25. Separation of water from gasoline takes place continuously as the uncontaminated mixture is moved through the device and into the gasoline tank of the automobile.

When the amount of heavier liquid at the bottom of container 5 reaches the lower edge of the chamber 19, the flow of gasoline from tank 2 may be stopped to permit removal of the container 5 for cleaning purposes. The amount of water and sediment accumulated in container 5 is readily observed through transparency of the same.

Figure 4 shows a modified form of liquid-separating deflector means 34 which may be provided on a tube 36, corresponding to tube 16. A deflector 37 is cup-shaped and connected to the lower open end of tube 36 by narrow spokes 35. The bottom of the deflector may open, through openings 39, into a downwardly extended tubular part of tube 36 which is closed at the bottom thereof to provide a well of substantial depth below said openings for cushioning the gravitational flow of gasoline, substantially as described above in connection with Figures 2 and 3. Apertures 40 are provided in the bottom of deflector 37 for purposes similar to the apertures 23 in deflectors 19. The function of deflector means 34 is otherwise as previously described in connection with Figures 1, 2 and 3.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in this art that various changes and modifications may be made therein without departing from the spirit or scope of the invention.

What is claimed is:

1. A device for separating liquids, comprising a closed container having inlet and outlet passageways at the top thereof for passage of liquid into and out of the container, a hollow member opening from said inlet passageway and extending to a substantial depth within the container, said member having discharge means including at least one discharge opening adjacent its lower end, and deflector means positioned on said hollow member in cooperation with said discharge means for deflecting the flow of incoming liquid upwardly within the container without substantial turbulence of liquid contained therein, whereby relatively heavier contaminates in the incoming liquid flow toward the relatively quiet region of the container below said deflector and lighter decontaminated liquid flows toward the upper portion of the container toward said outlet passageway, a downward extension from said hollow member providing a liquid-retaining well below the level of said discharge means, said well being of substantial depth below the level of said discharge means to provide a liquid cushion for retarding reverse flow of liquid passing down said hollow member.

2. A device for separating liquids, comprising a closed container having inlet and outlet passageways at the top thereof for passage of liquid into and out of the container, a hollow member opening from said inlet passageway and extending to a substantial depth within the container, said hollow member having discharge means including at least one discharge opening adjacent its lower end, and deflector means positioned on said hollow member in cooperation with said discharge means for deflecting the flow of incoming liquid upwardly within the container without substantial turbulence of liquid contained therein, whereby relatively heavier contaminates in the incoming liquid flow toward the relatively quiet region of the container below said deflector and lighter decontaminated liquid flows toward the upper portion of the container toward said outlet passageway, said deflector means including at least one dished wall portion overlying said discharge means and opening upwardly thereof, said dished wall portion having relatively small apertures therein opening downwardly of said container.

3. A device for separating liquids, comprising a closed container having inlet and outlet passageways at the top thereof for passage of liquid into and out of the container, a hollow member opening from said inlet passageway and extending to a substantial depth within the container, said hollow member having discharge means including at least one discharge opening adjacent its lower end, and deflector means positioned on said hollow member in cooperation with said discharge means for deflecting the flow of incoming liquid upwardly within the container without substantial turbulence of liquids contained therein, whereby relatively heavier contaminates in the incoming liquid flow toward the relatively quiet region of the container below said deflector and lighter decontaminated liquid flows toward the upper portion of the container toward said outlet passageway, a downward extension from said member providing a liquid-retaining well below the level of said discharge means, said well being of substantial depth below the level of said discharge means to provide a liquid cushion for retarding reverse flow of liquid passing down said hollow member, said deflector means including at least one dished wall portion overlying said discharge means and opening upwardly thereof, said dished wall portion having relatively small apertures therein opening downwardly of said container.

4. A device for separating liquids, comprising a closed container having inlet and outlet passageways at the top thereof for passage of liquid into and out of the container, a hollow member opening from said inlet passageway and extending to a substantial depth within the container, said hollow member having discharge means including at least one discharge opening adjacent its lower end, and deflector means positioned on said hollow member in cooperation with said discharge means for deflecting the flow of incoming liquid upwardly within the container without substantial turbulence of liquid contained therein, whereby relatively heavier contaminates in the incoming liquid flow toward the relatively quiet

region of the container below said deflector and lighter decontaminated liquid flows toward the upper portion of the container toward said outlet passageway, a downward extension from said hollow member providing a liquid-retaining well below the level of said discharge means, said well being of substantial depth below the level of said discharge means to provide a liquid cushion for retarding reverse flow of liquid passing down said hollow member, said deflector means including a dished wall portion overlying said discharge means and opening upwardly thereof, said dished wall portion having adjacent the bottoms thereof relatively small apertures.

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