Method and Apparatus for the Separation of Grease and Like Contaminants

Technical Field

This invention relates to a method and apparatus for the separation of grease and like contaminants and refers particularly, though not exclusively, to such a method and apparatus for use in commercial and industrial concerns for separating contaminants from water and relates particularly, but not exclusively, to contaminants that are lighter (less dense) than water.

Definition

Throughout this specification a reference to grease is to be taken as including grease, oil, food residue, cooking residue, detergents, soaps, and other contaminants that are less dense, or lighter, than water.

Throughout this specification a reference to a tank is to be taken as including a reference to a compartment in a tank.

Background

Commercial kitchens for the preparation of pre-packaged food, and in restaurants, bistros, cafes, and the like, have a problem of water-borne contaminants. Many are required to have commercial grease traps that consist of a large tank having a series of baffles alternately depending from the top, and upstanding from the base. The grease, being lighter, or less dense, than water will collect at the top. However, these require regular cleaning to be effective – a task that is not very pleasant. So it is often not done correctly, or as frequently as required. This diminishes performance. Furthermore, the

tanks are large and occupy valuable space. Some are embedded in the ground, making correct cleaning a difficult task.

Summary

According to an exemplary aspect there is provided apparatus for the separation of grease and like contaminants, the apparatus comprising: a receiver for receiving therein water with grease; a first outlet from the receiver to pass the water with grease to a separator to substantially separate the water and the grease; a second outlet from the separator to pass substantially separated water from the separator; and a third outlet from the separator to pass substantially separated grease from the separator to a storer for storage of the substantially separated grease.

The receiver is one of: a receiving tank and a receiving compartment; the separator is one of a separation tank and a separation compartment; and the storer is one of a storage tank and a storage compartment.

For all exemplary aspects, the first outlet may comprise: a first valve in a first pipe; the receiver having a first sensor at or adjacent a top of the receiver to detect when the receiver is full and, in consequence, to open the first valve in the first pipe to substantially empty the receiver into the separator.

The separator may comprise a second sensor at or adjacent a top of the separator to detect when the separator is substantially full. When the second sensor is able to detect when the separator is substantially full, the first valve is able to be closed.

Preferably, the separator has a form selected from the group consisting of: an inverted, truncated pyramid and an inverted, truncated cone.

The separator may comprise a lower portion and a third sensor at or adjacent the lower portion to detect the presence or absence of grease at or adjacent the lower portion. Preferably, the second outlet and the third outlet are both in the lower portion. The second outlet and the third outlet may be spaced apart. The second outlet may comprise a second valve in a second pipe, and the third outlet may comprise a pump in a third pipe.

Preferably, the pump is able to be activated in response to detection of the presence of grease by both the second and third sensors, and deactivated upon detection of the absence of grease by the third sensor.

Preferably, the second valve is able to be opened a predetermined time after the detection of grease and/or water by the second sensor, and closed upon the detection of grease by the third sensor.

The first sensor may be one of: a ball valve, and a differential conductivity sensor.
The second sensor may comprises a differential conductivity sensor.
The third sensor may comprise a differential conductivity sensor.

According to another exemplary aspect there is provided a separator for separation of grease and like contaminants from water, the separator comprising: an inlet to the

separator; a lower portion; a water outlet from the separator; a grease outlet from the separator; an upper differential conductivity sensor at or adjacent a top of the separator to detect when the separator is substantially full; and a lower differential conductivity sensor at or adjacent the lower portion to detect the presence or absence of grease adjacent the grease outlet.

The separator may have a form selected from the group consisting of: an inverted, truncated pyramid and an inverted, truncated cone.

The separator may be one of a separation tank, and a separation compartment.

Preferably, the upper differential conductivity sensor is to close the inlet when the separator is full. The water outlet is opened and the grease outlet is closed when the lower differential conductivity sensor detects the absence of grease, and the water outlet is closed and the grease outlet is opened when the lower differential conductivity sensor detects the presence of grease.

The inlet to the separator is receiver outlet from a receiver, the receiver being for receiving therein water with grease; the receiver outlet from the receiver being to pass the water with grease to the separator to substantially separate the water and the grease.

The grease outlet from the separator is to pass substantially separated grease from the separator to a storer for storage of the substantially separated grease.

The inlet may comprise a first valve in a first pipe; the receiver having a first sensor at or adjacent a top of the receiver to detect when the receiver is full and, in consequence, to open the first valve in the first pipe to substantially empty the receiver into the separator.

Preferably, the upper differential conductivity sensor is able to detect when the separator is substantially full, the first valve is able to be closed.

The water outlet may comprise a second valve in a second pipe, and the grease outlet comprises a pump in a third pipe.

Preferably, the pump is able to be activated in response to detection of the presence of grease by both the upper and lower differential conductivity sensors, and deactivated upon detection of the absence of grease by the lower differential conductivity sensor.

Preferably, the second valve is able to be opened a predetermined time after the detection of grease and/or water by the lower differential conductivity sensor, and closed upon the detection of grease by the lower differential conductivity sensor.

According to yet another aspect, there is provided a method for the separation of grease and like contaminants, the method comprising: receiving water with grease in a receiver; passing the water with grease through a first outlet from the receiver to a separator to substantially separate the water and the grease during a predetermined period; using a lower sensor to determine the presence of water at a lower portion of the separator and ,

in consequence, passing substantially separated water from the separator through a second outlet from the separator, the second outlet being at the lower portion; and using the lower sensor and an upper sensor to determine the presence of grease at the lower portion of the separator and an upper portion of the separator and, in consequence, passing substantially separated grease from the separator through a third outlet from the separator to a storer for storage of the substantially separated grease, the third outlet also being at the lower portion.

The upper sensor and the lower sensor may be both differential conductivity sensors. The first outlet may comprise a first valve in a first pipe and the receiver has a first sensor at or adjacent a top of the receiver; the first sensor detecting when the receiver is full and, in consequence, the first valve in the first pipe is opened to substantially empty the receiver into the separator.

The upper sensor may be at or adjacent a top of the separator, the upper sensor detecting when the separation tank is substantially full. When the upper sensor detects that the separation tank is substantially full, the first valve is closed.

The second outlet may comprise a second valve in a second pipe, the second valve being opened a predetermined time after the detection of grease and/or water by the upper sensor. The second valve is closed upon the detection of grease by the lower sensor.

The third outlet may comprise a pump in a third pipe, the pump being activated in response to detection of the presence of grease by both the upper and lower sensors, and deactivated upon detection of the absence of grease by the lower sensor.

For the above aspects, the receiver may comprise a fourth sensor at or adjacent a base of the receiver to detect when the receiver tank is substantially empty. The storer may comprise a fifth sensor to detect when the storer is substantially full.

According to a further exemplary aspect, there is provided an apparatus and a method for the separation of grease and like contaminants. The method comprises receiving water with grease in a receiver; passing the water with grease through a first outlet from the receiver to a separator to substantially separate the water and the grease; using a sensor to determine the presence of grease at an uppermost portion of the separator and, in consequence, passing substantially separated grease from the separator through a third outlet from the separator to a storer for storage of the substantially separated grease, the third outlet also being at the uppermost portion.

The separator may comprise a separation compartment having an angled upper surface.

The third outlet may located at an uppermost portion of the angled upper surface.

The apparatus may further comprise a water outlet from the apparatus, wherein the water outlet from the apparatus is positioned above the level of the third outlet such that hydrostatic pressure is able to be exerted upwardly on any fluid at the third outlet.

The separator may comprise a sensor adjacent the third outlet to detect the presence or absence of grease at the third outlet. The sensor may comprise a membrane pressure sensor that is activated by a float immersed in fluid at the third outlet.

The third outlet may comprise a valve that can be triggered by the sensor. The valve may be a motorized ball valve.

The apparatus may further comprise a differential conductivity sensor adjacent the third outlet to detect the presence or absence of grease at the third outlet.

Brief Description of the Drawings

In order that the invention may be fully understood and readily put into practical effect there shall now be described by way of non-limitative example only exemplary embodiments, the description being with reference to the accompanying illustrative drawings.

In the drawings:

Figure 1 is a schematic side view of an exemplary embodiment;

Figure 2 is a schematic side view of the valve and sensor arrangement of the first two tanks of the embodiment of Figure 1;

Figure 3 is a flow chart for the operation of the embodiment of Figures 1 and 2;

Figure 4 is a schematic side view of another exemplary embodiment;

Figure 5 is a schematic side view of the sensor arrangement of the embodiment of Figure 4; and

Figure 6 is a flow chart for the operation of the embodiment of Figures 4 and 5.

Detailed Description of the Preferred Embodiments

As shown in Figures 1, 2 and 3, in a first exemplary embodiment, there are preferably compartments in the apparatus. The three compartments may be separate compartments within a single tank, or may be three tanks as shown. The three compartments or tanks may comprise: a receiving compartment or tank 10, a separation compartment or tank 12 and a storage compartment or tank 14.

Water containing grease and like contaminants is inlet into the receiving compartment or tank 10 (301). The receiving compartment or tank 10 should be of sufficient size to hold a reasonable quantity of contaminated water. This will depend on the circumstances of the apparatus – in a large food-processing factory it will be a significant amount of water such as, for example, a few hours of production. For a small café, it may be only several litres.

Contaminated water is left in the receiving compartment or tank 10 to enable major contaminants that are heavier than water to settle and be removed in a known manner. The present apparatus and method are for lighter, or less dense, than water contaminants.

When a first sensor 36 mounted at or adjacent the top 8 of receiving compartment or tank 10 detects that the receiving compartment or tank 10 is substantially full (302), inlet to the receiving compartment or tank is temporarily stopped, and a valve 22 in an

outlet pipe 16 is opened (303). The outlet pipe is at or adjacent the base 18 of receiving compartment or tank 10 to enable the receiving compartment or tank to be substantially emptied upon the opening of the valve 22. The valve 22 may be of any suitable construction, and is preferably motorised. There may be a fourth sensor 38 at or adjacent the base 18 so that when the fourth sensor 38 detects that the level of contaminated water in receiving compartment or tank 10 has fallen to the level of the fourth sensor 38, the valve 22 is operated to close the valve 22 and thus close outlet pipe 16. The inlet to the receiving tank 10 can then recommence. Alternatively, the inlet to the receiving compartment or tank may continue when valve 22 is open, provided the inlet rate is less than the outlet rate.

The outlet from the receiving compartment or tank 10 is inlet into the separation compartment or tank 12 at or adjacent the top 20 of the separation compartment or tank 12. However, the inlet to the separation compartment or tank 12 may be at any location in the separation compartment or tank 12.

At this stage the separation compartment or tank 12 will be substantially full (304). It is preferred that the separation compartment or tank 12 have a capacity at least as great as that of the receiving compartment or tank 10 to prevent overflow situations. Preferably the separation compartment or tank 12 has a capacity that is greater than that of the receiving compartment or tank 10. Also, the separation compartment or tank 12 may be shaped as an inverted, truncated pyramid (as shown) or as an inverted, truncated cone. This will tend to assist in the removal of grease and other like contaminants as is explained below.

The separation compartment or tank 12 has a lower portion 24 that has two outlets: a first outlet pipe 26 with a valve 28 for the passage therethrough of water being outlet from the separation compartment or tank 12; and a second pipe 30 with a pump 34 for the passage therethrough of grease being outlet from separation compartment or tank 12. The valve 28 may be of any suitable construction, and is preferably motorised. The outlet from the separation compartment or tank 12 is inlet into the storage compartment or tank 14 at or adjacent the top 32 of the storage compartment or tank 14. However, the inlet to the storage compartment or tank 14 may be at any location in the storage compartment or tank 14. It is preferred that the two pipes 26, 30 are at or adjacent the lowermost end of lower portion 24 for more complete emptying. It is also preferred that the two pipes 26, 30 be spaced apart circumferentially, and are more preferably diametrally opposed.

When a second sensor 40 mounted at or adjacent the top 20 of separation compartment or tank 12 detects that the separation tank 12 is substantially full (304), the valve 22 in the outlet pipe 16 is operated to close the valve 22 and thus close outlet pipe 16. Second sensor 40 may be in addition to or as an alternative to the fourth sensor 38. A predetermined period of for example, thirty seconds, one minute or two minutes, is allowed for the grease and water to substantially separate (305). Due to the grease being lighter, or less dense, than water, it will rise to the top. This means substantially all grease will be at or adjacent the top 20, and substantially all water will be below the grease and thus at or adjacent the lower portion 24. The period will depend on the circumstances: if there is detergent in the water as well as grease, the separation will be

at a different rate to when there is no detergent and only grease. A third sensor 42 is provided at or adjacent the lower portion 24. After the period has expired, and if the third sensor 42 detects the presence of water and not grease (306), the water outlet valve 28 is operated (307) to open pipe 26 to enable the pipe 26 to drain away the water at the bottom of the separation tank 12 and in the lower portion 24. When the third sensor 42 detects that the level of contaminant grease in the separation tank 12 has fallen to the level of the third sensor 42 (306), the valve 28 is closed (308) to prevent the outlet of further water through the outlet pipe 30. This prevents the grease from being outlet through the water outlet pipe 26.

When, or shortly after, the valve 28 closes, the valve 22 opens to allow more of the contaminated water to flow through pipe 16 and into the separation compartment or tank 12. The procedure in the paragraph immediately above is then repeated until, after the predetermined period, the third sensor 42 and the second sensor 40 are both detecting the presence of grease (309), thus indicating the separation compartment or tank 12 is substantially full of grease. Pump 34 is then activated to pump the grease into the storage tank 14 (310). When both sensors 40, 42 indicate a lack of grease, the separation compartment or tank 12 is substantially empty of grease (311), and the pump 34 is switched off (312). If required or desired, there may be an additional motorised valve 46 in the pipe 30. Preferably, the valve 46 will be between the separation compartment or tank 12 and the pump 34. More preferably, the valve 46 is adjacent the lower portion 24 of the separation compartment or tank 12. The valve 46 would be operated at the same time as the pump 34.

The entire process can then be repeated. In this way there is a continuous processing of the waste water allowing for substantial separation of water and grease, and differential removal of them. A fifth sensor 44 may be located at or adjacent the top 32 of storage compartment or tank 14 to provide a suitable warning that the storage compartment or tank 14 is full and requires emptying or disposal.

Preferably, the pump 34 cannot operate if the valve 28 is open and, similarly, the valve 28 cannot be open when the pump 34 is in operation.

If required or desired, the separation compartment or tank 12 may include a built-in spray system for cleaning the interior of the separation compartment or tank 12, and the sensors 40, 42, after the removal of the grease as described above. The spray system may be in accordance with my published patent applications WO 2004/016988 and WO 2005/078353 , the contents of which are hereby included by reference as if disclosed herein in their entirety.

The sensors 36, 38, 40, 42 and 44 may be of any suitable form or category. For example, the sensors 36, 38 may be a single sensor in the form of a ball valve. Sensors 40, 42 may be sensors that use differential conductivity or temperature. By differential conductivity it is meant that they detect changes in conductivity. For example, air has almost no conductivity (at low voltages); water has a low level of conductivity; contaminated water has a slightly higher level of conductivity; and grease has a very low level of conductivity. Therefore, sensors 40, 42 are detecting the change in conductivity as the medium in which they are located changes from, for example, grease to air, or water to

grease. By knowing the conductivity of the different materials in which the sensors are to operate, it is possible to have the sensors detect the material being sensed, and thereby changes in material, due to the change in conductivity.

The apparatus may be controlled by a computerised control unit 46 that receives all input from the sensors, and controls the operation of the valves, pump, and any warning systems.

In another exemplary embodiment as shown in Figures 4, 5 and 6, the apparatus comprises compartments within a tank. Contaminated water is inlet into the receiving compartment 60 (601) through a strainer 62 for removing solid particles. The receiving compartment 60 preferably includes a pipe 63 with a first outlet 64 for guiding contaminated water into the separation compartment 70, in order to minimize grease accumulation on the upright walls 66 of the receiving compartment 60. An upright baffle 72 slows down the flow rate of the contaminated water.

In the separation compartment 70, the contaminated water substantially separates (602). Grease rises to the top and water which has accumulated adjacent the lower portion 74 exits the separation compartment 70 through a second outlet 76. Grease which has risen above the water is naturally guided by an angled upper surface 78 of the separation compartment 70 towards a third outlet 80. The third outlet 80 is preferably located at an uppermost portion of the angled upper surface 78.

Water that has passed through the second outlet 76 leaves the apparatus via a water outlet from the apparatus 90. The water outlet from the apparatus 90 is positioned above the level of the third outlet 80 so that hydrostatic pressure is exerted upwardly on any fluid at the third outlet 80.

The third outlet 80 preferably comprises a grease outlet valve 82 controlled by a sensor 84. The grease outlet valve 82 may be a motorized valve such as, for example, a ball valve. When the sensor 84 detects that fluid at the third outlet 80 is substantially grease (603), the grease outlet valve 82 is triggered to open (604). As a result of the hydrostatic pressure mentioned earlier, grease at the third outlet 80 flows through the open grease outlet valve 82 and is released into a grease storage tank 86. As grease flows out through grease outlet valve 82, the water level below the grease rises accordingly. If the sensor 84 detects that fluid at the third outlet 80 is no longer substantially grease but is substantially water, the motorized ball valve 84 is triggered to close (605).

As more contaminated water enters the apparatus, more separated water leaves via the water outlet from the apparatus 90. The water level in the separation compartment is pushed down when more grease in the contaminated water rises to the top and is guided towards the third outlet 80. When grease is again detected by the sensor 84 at the third outlet 80, the grease outlet valve 82 is triggered to open. The entire process can then be repeated.

Depending on the rate of separation of grease and water, the contaminated water can be inlet into the apparatus continuously, or at predetermined intervals to allow more time for the contaminated water to separate in the separation compartment 70.

The sensor 84 may be a membrane pressure sensor activated by a float. A special membrane 100 detects pressure exerted by a shaft 102 on the membrane 100. The shaft 102 is connected to a float 104 that is immersed in the fluid at the third outlet 80. The following equations explain how the membrane pressure sensor detects what fluid is at the third outlet 80.

The combined weight of the float 104 and shaft 102 is denoted by W.
The combined volume of the float 104 and the part of the shaft 102 that is submerged in the fluid at the third outlet 80 is denoted by V.

Buoyant force F_b acting on the float 104 and shaft 102 is given by:

$F_b = V\gamma$

where γ is the specific weight of the fluid at the third outlet 80.

The float 104 and shaft 102 should be designed such that W is less than F_b.
When F_b is greater than W, the float 104 and shaft 102 will rise. The shaft 102 will exert a pressure P on the membrane 100, which is given by:

$P = (V\gamma - W)/A$

where A is the known contact area between the shaft 102 and the membrane 100.

To begin with, the apparatus can be filled with clean water so that a reference pressure P_w is obtained, given as:

$P_w = (V\gamma_w - W)/A$

where γ_w is the known specific weight of water.

Subsequently, a different fluid can be used, so that another pressure P is sensed by the membrane 100. The difference in pressure ΔP between P and P_w is readily obtained by calculation from the output of the sensor 84.

However, ΔP is also given by:

$$\Delta P = P - Pw$$
$$= (V\gamma - W)/A - (V\gamma_w - W)/A$$
$$= (\gamma - \gamma_w)\, V/A$$

This allows γ to be expressed as:

$$\gamma = \gamma_w + \Delta PA/V$$

Knowing γ, by consulting a look-up table for the specific weight of various liquids, the fluid at third outlet 80 can be determined.

Alternatively or additionally, in addition to the membrane pressure sensor 84 at the third outlet 80, one or more differential conductivity sensors such as sensors 40, 42 may be provided at the third outlet 80 in order to have a second level of detection for the fluid being sensed, and therefore changes in fluid due to the change in conductivity.

Whilst there has been described in the foregoing description exemplary embodiments of the present invention, it will be understood by those skilled in the technology concerned that many variations in details of design, construction and/or operation may be made without departing from the present invention.

The Claims

1. Apparatus for the separation of grease and like contaminants, the apparatus comprising:

a receiver for receiving therein water with grease;

a first outlet from the receiver to pass the water with grease to a separator to substantially separate the water and the grease;

a second outlet from the separator to pass substantially separated water from the separator; and

a third outlet from the separator to pass substantially separated grease from the separator to a storer for storage of the substantially separated grease.

2. Apparatus as claimed in claim 1, wherein the receiver is one of: a receiving tank and a receiving compartment; the separator is one of a separation tank and a separation compartment; and the storer is one of a storage tank and a storage compartment.

3. Apparatus as claimed in claim 1 or claim 2, wherein the first outlet comprises:

a first valve in a first pipe;

the receiver having a first sensor at or adjacent a top of the receiver to detect when the receiver is full and, in consequence, to open the first valve in the first pipe to substantially empty the receiver into the separator.

4. Apparatus as claimed in any one of claims 1 to 3, wherein the separator comprises a second sensor at or adjacent a top of the separator to detect when the separator is substantially full.

5. Apparatus as claimed in claim 4, wherein when the second sensor is able to detect when the separator is substantially full, the first valve is able to be closed.

6. Apparatus as claimed in any one of claims 1 to 5, wherein the separator has a form selected from the group consisting of: an inverted, truncated pyramid and an inverted, truncated cone.

7. Apparatus as claimed in any one of claims 1 to 6, wherein the separator comprises:

a lower portion; and

a third sensor at or adjacent the lower portion to detect the presence or absence of grease at or adjacent the lower portion.

8. Apparatus as claimed in claim 7, wherein the second outlet and the third outlet are both in the lower portion.

9. Apparatus as claimed in claim 8, wherein the second outlet and the third outlet are spaced apart.

10. Apparatus as claimed in any one of claims 1 to 9, wherein the second outlet comprises a second valve in a second pipe, and the third outlet comprises a pump in a third pipe.

11. Apparatus as claimed in claim 10, wherein the pump is able to be activated in response to detection of the presence of grease by both the second and third sensors.

12. Apparatus as claimed in claim 10 or claim 11, wherein the pump is able to be deactivated upon detection of the absence of grease by the third sensor.

13. Apparatus as claimed in any one of claims 10 to 12, wherein the second valve is able to be opened a predetermined time after the detection of grease and/or water by the second sensor.

14. Apparatus as claimed in claim 13, wherein the second valve is able to be closed upon the detection of grease by the third sensor.

15. Apparatus as claimed in any one of claims 1 to 14, wherein the receiver comprises a fourth sensor at or adjacent a base of the receiver to detect when the receiver tank is substantially empty.

16. Apparatus as claimed in any one of claims 1 to 15, wherein the storer comprises a fifth sensor to detect when the storer is substantially full.

17. Apparatus as claimed in any one of claims 3 to 16, wherein the first sensor is one of: a ball valve, and a differential conductivity sensor.

18. Apparatus as claimed in any one of claims 4 to 16, wherein the second sensor comprises a differential conductivity sensor.

19. Apparatus as claimed in any one of claims 7 to 16, wherein the third sensor comprises a differential conductivity sensor.

20. A separator for separation of grease and like contaminants from water, the separator comprising:

an inlet to the separator;

a lower portion;

a water outlet from the separator;

a grease outlet from the separator;

an upper differential conductivity sensor at or adjacent a top of the separator to detect when the separator is substantially full; and

a lower differential conductivity sensor at or adjacent the lower portion to detect the presence or absence of grease adjacent the grease outlet.

21. A separator as claimed in claim 20, wherein the separator has a form selected from the group consisting of: an inverted, truncated pyramid and an inverted, truncated cone.

22. A separator as claimed in claim 20 or claim 21, wherein the separator is one of a separation tank, and a separation compartment.

23. A separator as claimed in any one of claims 20 to 22, wherein the upper differential conductivity sensor is to close the inlet when the separator is full.

24. A separator as claimed in any one of claims 20 to 23, wherein the water outlet is opened and the grease outlet is closed when the lower differential conductivity sensor detects the absence of grease, and the water outlet is closed and the grease outlet is opened when the lower differential conductivity sensor detects the presence of grease.

25. A separator as claimed in any one of claims 20 to 24, wherein the inlet to the separator is receiver outlet from a receiver, the receiver being for receiving therein water with grease; the receiver outlet from the receiver being to pass the water with grease to the separator to substantially separate the water and the grease.

26. A separator as claimed in any one of claims 20 to 25, wherein the grease outlet from the separator is to pass substantially separated grease from the separator to a storer for storage of the substantially separated grease.

27. A separator as claimed in claim 25, wherein the inlet comprises:

a first valve in a first pipe;

the receiver having a first sensor at or adjacent a top of the receiver to detect when the receiver is full and, in consequence, to open the first valve in the first pipe to substantially empty the receiver into the separator.

28. A separator as claimed in claim 25 or claim 27, wherein when the upper differential conductivity sensor is able to detect when the separator is substantially full, the first valve is able to be closed.

29. A separator as claimed in any one of claims 20 to 28, wherein the water outlet comprises a second valve in a second pipe, and the grease outlet comprises a pump in a third pipe.

30. A separator as claimed in claim 29, wherein the pump is able to be activated in response to detection of the presence of grease by both the upper and lower differential conductivity sensors.

31. A separator as claimed in claim 29 or claim 30, wherein then pump is able to be deactivated upon detection of the absence of grease by the lower differential conductivity sensor.

32. A separator as claimed in any one of claims 29 to 31, wherein the second valve is able to be opened a predetermined time after the detection of grease and/or water by the lower differential conductivity sensor.

33. A separator as claimed in claim 32, wherein the second valve is able to be closed upon the detection of grease by the lower differential conductivity sensor.

34. A separator as claimed in any one of claims 25 to 33, wherein the receiver comprises a fourth sensor at or adjacent a base of the receiver to detect when the receiver tank is substantially empty.

35. A separator as claimed in any one of claims 26 to 34, wherein the storer comprises a fifth sensor to detect when the storer is substantially full.

36. A method for the separation of grease and like contaminants, the method comprising:

receiving water with grease in a receiver;

passing the water with grease through a first outlet from the receiver to a separator to substantially separate the water and the grease during a predetermined period;

using a lower sensor to determine the presence of water at a lower portion of the separator and , in consequence, passing substantially separated water from the separator through a second outlet from the separator, the second outlet being at the lower portion; and

using the lower sensor and an upper sensor to determine the presence of grease at the lower portion of the separator and an upper portion of the separator and, in consequence, passing substantially separated grease from the separator through a third outlet from the separator to a storer for storage of the substantially separated grease, the third outlet also being at the lower portion.

37. A method as claimed in claim 36, wherein the upper sensor and the lower sensor are both differential conductivity sensors.

38. A method as claimed in claim 36 or claim 37, wherein the first outlet comprises:

a first valve in a first pipe and the receiver has a first sensor at or adjacent a top of the receiver;

the first sensor detecting when the receiver is full and, in consequence, the first valve in the first pipe is opened to substantially empty the receiver into the separator.

39. A method as claimed in any one of claims 36 to 38, wherein the upper sensor is at or adjacent a top of the separator, the upper sensor detecting when the separation tank is substantially full.

40. A method as claimed in claim 39, wherein when the upper sensor detects that the separation tank is substantially full, the first valve is closed.

41. A method as claimed in any one of claims 36 to 40, wherein the second outlet comprises a second valve in a second pipe, the second valve being opened a predetermined time after the detection of grease and/or water by the upper sensor.

42. A method as claimed in claim 41, wherein the second valve is closed upon the detection of grease by the lower sensor.

43. A method as claimed in any one of claims 36 to 42, wherein the third outlet comprises a pump in a third pipe, the pump being activated in response to detection of the presence of grease by both the upper and lower sensors.

44. A method as claimed in claim 43, wherein the pump is deactivated upon detection of the absence of grease by the lower sensor.

45. A method as claimed in any one of claims 36 to 44, wherein the receiver comprises a fourth sensor at or adjacent a base of the receiver, the fourth sensor detecting when the receiver is substantially empty to close the first valve.

46. A method as claimed in any one of claims 36 to 45, wherein the storer comprises a fifth sensor, the fifth sensor detecting when the storer is substantially full.

47. Apparatus as claimed in claim 1 or claim 2, wherein the separator comprises a separation compartment having an angled upper surface.

48. Apparatus as claimed in claim 47, wherein the third outlet is located at an uppermost portion of the angled upper surface.

49. Apparatus as claimed in claim 47 or claim 48, further comprising a water outlet from the apparatus, wherein the water outlet from the apparatus is positioned above the level of the third outlet such that hydrostatic pressure is able to be exerted upwardly on any fluid at the third outlet.

50. Apparatus as claimed in any one of claims 47 to 49, wherein the separator comprises a sensor adjacent the third outlet to detect the presence or absence of grease at the third outlet.

51. Apparatus as claimed in claim 50, wherein the sensor comprises a membrane pressure sensor.

52. Apparatus as claimed in claim 51, wherein the sensor is activated by a float immersed in fluid at the third outlet.

53. Apparatus as claimed in any one of claims 50 to 52, wherein the third outlet comprises a valve that can be triggered by the sensor.

54. Apparatus as claimed in claim 53, wherein the valve is a motorized ball valve.

55. Apparatus as claimed in any one of claims 47 to 52, further comprising a differential conductivity sensor adjacent the third outlet to detect the presence or absence of grease at the third outlet.

56. A method for the separation of grease and like contaminants, the method comprising:

receiving water with grease in a receiver;

passing the water with grease through a first outlet from the receiver to a separator to substantially separate the water and the grease;

using a sensor to determine the presence of grease at an uppermost portion of the separator and, in consequence, passing substantially separated grease from the separator through a third outlet from the separator to a storer for storage of the substantially separated grease, the third outlet also being at the uppermost portion.

57. A method as claimed in claim 56, wherein the sensor is a membrane pressure sensor.

58. A method as claimed in claim 56 or claim 57, wherein the sensor is activated by a float immersed in fluid at the third outlet.

59. A method as claimed in any one of claims 56 to 58, wherein the third outlet comprises a valve that can be triggered by the sensor.

60. A method as claimed in claim 59, wherein the valve is a motorized ball valve.

61. A method as claimed in any one of claims 56 to 60, further comprising a differential conductivity sensor adjacent the third outlet to detect the presence or absence of grease at the third outlet.