July 13, 1943. E. W. N. BOOSEY 2,324,190

GREASE INTERCEPTOR

Filed Dec. 27, 1940

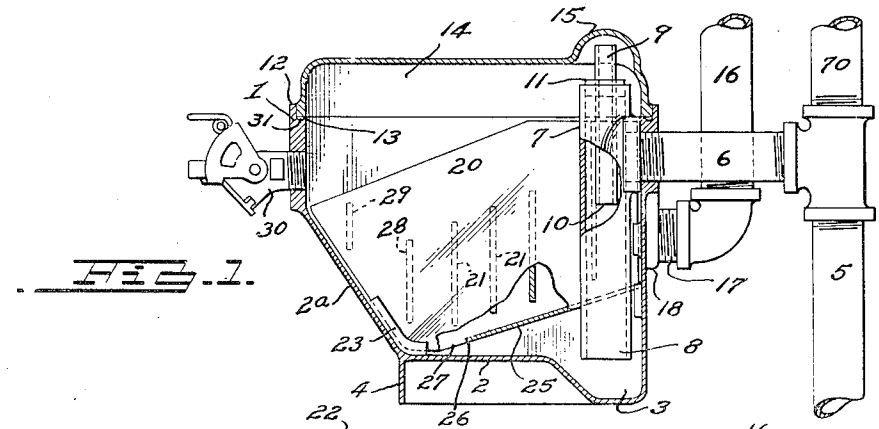


Fig. 1.

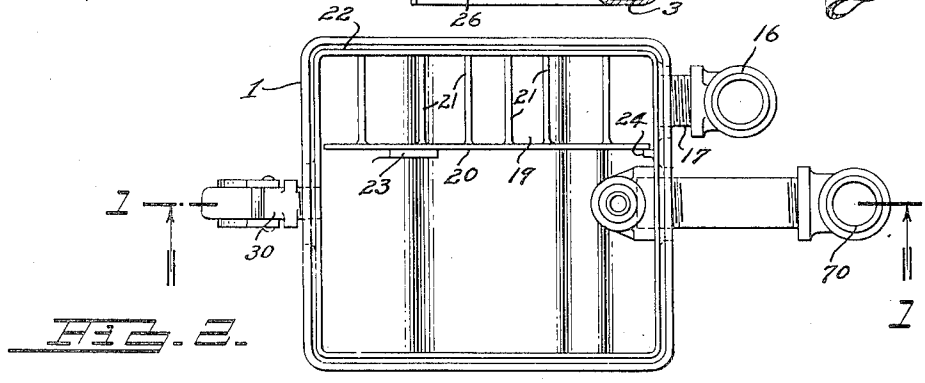


Fig. 2.

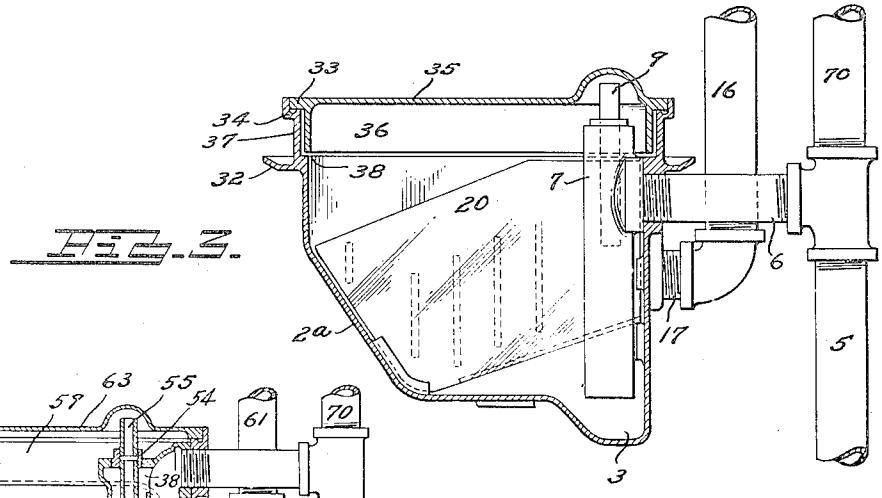


Fig. 3.

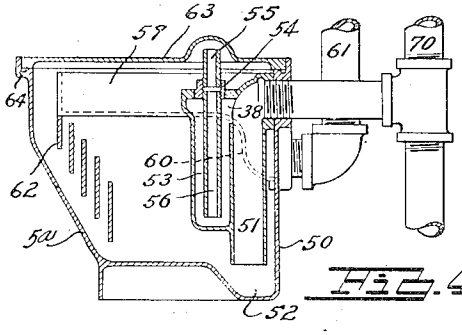


Fig. 4.

INVENTOR.
Edward W. N. Boosey

BY

Charles E. Kiener

ATTORNEY.

Patented July 13, 1943

2,324,190

UNITED STATES PATENT OFFICE

2,324,190

GREASE INTERCEPTOR

Edward W. N. Boosey, Detroit, Mich.

Application December 27, 1940, Serial No. 371,908

8 Claims. (Cl. 210—56)

This invention relates to grease interceptors, the object being to provide a new and improved form of grease interceptor of such construction that an air lock is provided whereby the flow velocity through the interceptor is controlled and a predetermined volume of air retained within the interceptor.

It is further an object and feature of the invention to provide a new and improved construction for providing an air lock which includes an open ended tube opening to air space at its upper end and discharging through the outlet at a distance below the liquid level in the interceptor body and the distance the tube extends below the liquid level is determined by the head pressure to which the inlet is subjected. By this arrangement a substantially constant liquid level is provided under flow conditions and provides uniform flow to the interceptor under varying flow velocity from the connected plumbing fixtures without surging. In conjunction with the air lock hereinafter more fully decribed the outlet conduit must be vented to atmosphere and it is by this last named vent in the structure herein disclosed that the siphonage is prevented.

In the invention herein disclosed the lowermost point of the outlet connected to the body of the interceptor determines the normal liquid level therein and the inlet discharges to the interceptor body below the liquid level and into a device providing for separation of the oils and greases from the inflowing liquid prior to discharging into the main body of the interceptor and thence to the outlet.

These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawing in which—

Fig. 1 is a vertical section taken on line 1—1 of Fig. 2 of a grease interceptor providing an air lock.

Fig. 2 is a plan view thereof.

Fig. 3 is a vertical section showing another form of body structure.

Fig. 4 is a vertical section of another form of interceptor wherein the cover plate is not recessed to a material degree and showing a different form of outlet manifold and internal vent providing an air lock.

In the structure shown in Figs. 1 and 2, the body of the interceptor is indicated at 1 and is preferably rectangular in plan view. The bottom wall 2 of the body is formed with a recess 3 below the level of the bottom portion 2 at the outlet side thereof and a flange 4 is provided for supporting the same upon a foundation. The bottom 2 is less in width than the top of the interceptor and an inclined wall 2a extends from the bottom to the vertical side wall opposite the inlet. The outlet conduit 5 has a horizontal portion 6 extending into the upper end of the interceptor body on one side and to the inner end of the conduit portion 6 is secured my new and improved outlet manifold 7 which is open at its lower end 8 to the recess 3 preferably a little below the level of the bottom 2 of the body.

This manifold 7 is of tubular form and in the upper end thereof is secured a vent tube 9 which extends downwardly into the manifold terminating at a point 10 below the liquid level in the manifold and interceptor body which level is determined by the lowermost point of the conduit portion 6. The tube 9 is sealed in the upper end of the manifold 7 as by means of a threaded plug 11.

The upper end of the body is formed with an outer flange 12 and a seat 13 for the recessed cover 14 the lower edge of which is formed to engage the seat 13 and flange 12. The upper end of the tube 9 extends to above the upper surface of the cover and the cover is provided with upwardly extending portion 15 providing a recess open to the body and into which the upper end of the tube extends.

The inlet 16 opens into the trap body on one side thereof as shown in Fig. 2 and at a point below the normal liquid level determined by the outlet portion 6 and thus provides for discharge of liquid into the interceptor body below the normal liquid level.

The inlet 16 has a threaded horizontally positioned connector 17 which passes through a hub 18 formed on the side of the interceptor body and opens at its inner end into a baffle member 19 on one side of the body as will be understood from Fig. 2. This baffle element comprises a side plate 20 and a series of vertical plates 21 preferably integral with the plate 20 and extending at a right angle thereto.

This baffle element is supported in place against the side wall 22 of the body by lug elements 23 and 24 and the inner end of the plate 20 rests on an inclined wall portion 2a of the body and the opposite edge engages the vertical wall on the inlet side of the body and thus is sustained in its vertical position due to the respective opposite ends of the plate 20 engaging the said inclined and vertical wall of the body.

The baffle plates are spaced one from the other and the unconnected ends of these baffle plates, opposite the ends connected with the plate 20, normally engage the wall 22 of the interceptor body. The lower edge of the plate 23 is inturned at 25 below the lower edge of the baffles 21 providing a downwardly inclined bottom wall 25 positioned with its upper end just beneath the inlet opening into this baffle element which provides an inlet chamber. The bottom wall 25 is spaced from the lower edge of the baffle plates and directs the flow downwardly and provides opportunity for the greases to rise between the baffles to the surface of the liquid in the interceptor body. This bottom wall 25 terminates at 26 providing an opening 27 for the liquid to pass to the bottom of the interceptor at the side opposite the inlet and thence to the outlet through the manifold 8. There are some additional vertical baffles 28 and 29 as shown in Fig. 1 which are spaced from the inclined wall 2^a and thus the greases and oils tend to rise to the surface of the liquid and liquids of greater specific gravity flow to the bottom of the interceptor and to the outlet. A valve controlled conduit 30 is provided for the drawing off of the lighter liquids while in a non-congealed state and capable of flow.

Upon discharge of liquid into the interceptor through the inlet 16 the liquid level will rise somewhat above the line of connection of the cover 14 and ledge 13, ordinarily termed the flow level and while this cover member may be secured in place in any desired manner and may be provided with a packing in the groove 31 on the ledge 13, there is sometimes not a perfect seal between the cover and body. However, by positioning the shoulder 13 at or a little below the flow level any interstices remaining between the cover and body will become sealed by floating material on the liquid.

Upon flow of the liquids into the interceptor air and gases tend to be forced through the vent conduit 9 to the outlet. Preferably the upper end of the tube 9 is a sufficient distance above the possible flow level to prevent the lighter liquids such as oils and greases from passing into the vent tube 9.

The structure shown in Fig. 3 has the same character of inlet and outlet and baffle element at the inlet and manifold or column at the outlet as is shown in Figs. 1 and 2 and bear similar reference characters. The structure, however, differs in the form of the cover member and upper end of the interceptor body. The said body is provided with a preferably integral flange 32 which may be set in the concrete floor below the surface and the cover member is formed with a peripheral flange 33 at its upper surface to seat on a ledge 34 of the body after the manner of the seating of the cover member 14 on the ledge 13 of the structure shown in Fig. 1.

The cover member 35 of Fig. 3 also has a depending flange 36 which comparatively loosely fits within the upper end 37 of the interceptor body which is of greater dimension than the main body portion and thus provides a ledge 38 adjacent which the lower edge of the flange 36 of the cover member is positioned. The interstice between the flange 36 and the upper end portion 37 and ledge 38 is quite small in dimension and as this ledge 38 is also below the flow level in the interceptor body it will likewise become filled with semi-solid matter and further tend to seal the cover in place. This arrangement adapts the device to be secured in a concreate floor or basin with the upper surface of the cover member 35 practically flush with the floor.

In both the devices thus described there is provision for a dead air space provided by the cover member which is sealed to atmosphere and from which accumulated air and gases may be discharged to the outlet through the vent 9.

In many installations it is not possible to provide for the air space in the cover member without decreasing the capacity of the interceptor and for such installations a device may be constructed as shown in Fig. 4, in which the body of the interceptor is indicated at 50 and the outlet manifold is indicated at 51 and is of a different form than that shown in Figs. 1 and 3.

It is open at the bottom to a recess 52 corresponding to the recess 3 of Figs. 1 and 3 and on one side of its upper end is provided with a chamber 53 having a threaded opening in its upper wall to receive an internally and externally threaded nut 54. A short tube 55 is threaded in the upper end of the nut to extend into the recess and a longer tube 56 is threaded in the lower end of the nut and extends downwardly into the recess 53, which is of greater diameter than the tube 56 and is open at its lower end near the bottom of the recess.

The recess 53 has an opening 38 to the upper end of the outlet manifold 51 and the tube 56 extends well below the lower edge of the opening 38. The normal liquid level in the interceptor body is above the lower edge of the opening 38 and thus the lower end of the tube 56 is sealed to the outlet as in a trap. The length of the tube 56 below the liquid level may be varied as may be determined by the head pressure at the inlet.

The manifold 59, to which the inlet discharges, is trough like in shape and has a depending portion 60 at the inlet end and into which the inlet conduit 61 discharges. This manifold end 60 provides a wall against which inflowing liquid is discharged and tends to permit the lighter liquid and oils to pass to the surface of the liquid in the manifold 59. This manifold is open at the end 61 which is spaced from the vertical end wall of the manifold as shown and in the interceptor body beneath the inlet manifold there is provided a series of spaced vertical baffle plates 62 the lower ends of which are practically in alignment parallel with and spaced from the inclined wall 5^a of the interceptor body.

The liquid passing from the inlet manifold 59 flows beneath these baffles and the lighter liquids tend to pass to the surface so that the liquid is practically free from the oils and greases as it reaches the bottom of the interceptor body and passes to the outlet. The cover 63 is seated on a ledge 64 at the upper end of the body in the same manner as the cover 14 in Fig. 1. It is necessary in each of the forms of the interceptor here shown to vent the outlet as by a conduit indicated at 70 in each case.

Preferably in my improved construction the main portion of the interceptor body is free from baffles or like obstructions to flow to the outlet which opens to adjacent the bottom of the body on the side thereof distant from the point at which flow from the oil and grease separator enters the body.

This invention differs in function from the structure disclosed and claimed in my U. S.

Patent No. 2,103,316 of Dec. 28, 1937, in that while said former structure used a similar internal venting arrangement it was so constructed as to prevent siphonage of the interceptor and the internal vent tube extended to considerable distance above the normal liquid level to prevent overflow of grease or water to the internal vent. In this present invention the internal vent functions differently and the tube therefor is not required to extend any great height above the interceptor as the air lock prevents grease or water overflowing through the internal vent. When the air lock has once been established any additional air flowing into the interceptor from the inlet is discharged to the sewer and does not increase the resistance of the air lock to head pressures nor does such additional air lower the liquid level in the interceptor.

By the arrangement herein described there is what may be termed a balanced condition existing in the interceptor practically determined by the head pressures on the inlet and in any installation to secure this balanced condition the internal vent tube is extended to a distance below the liquid level in the interceptor sufficient to resist the head pressures. Under this condition inflowing liquid which tends to increase the volume of liquid in the interceptor body will flow directly to the outlet from the inlet manifold without material change in the level of the liquid in the body. The air accompanying the inflowing liquid rises to the surface of the liquid in the air space above the liquid level until the air pressure is sufficient to break the seal of the internal vent tube and pass to the outlet through the tube **9** of Figs. 1, 2 and 3 or the tubes **55**, **56** of Fig. 4.

This arrangement of parts herein described therefor is a distinct departure in function and operation from structures heretofore known as the practice heretofore has been to so construct the interceptor with an internal vent adapted to prevent siphonage. In this present structure siphonage is prevented by means of a vent to atmosphere directly opening to the outlet and the internal vent as herein disclosed tends to at all times maintain constant volume of liquid in the interceptor and under a substantially constant pressure as any increase in air pressure causes a discharge of excess air to the outlet. Therefore surging of the liquid within the interceptor body due to velocity of inflowing liquid is avoided.

It is further desirable that the main grease retaining chamber be free from baffles or obstructions to flow from the point of discharge to the main chamber to the outlet. The baffle element **19** of Figs. 1, 2 and 3 is at one side of the main chamber and the baffle plates **62** of Fig. 4 are also all positioned at one side of the main chamber above the inclined wall on the side of the chamber opposite the inlet. It is also pointed out that the inlet can conveniently be placed on the left side of the outlet rather than on the right side as shown as may be found desirable in some installations.

To maintain the described condition of operation most effectively it is desirable that the valve **39** be opened at least daily to withdraw the floating greases and oils from the surface of the liquid while in liquid condition, otherwise the air space would eventually become decreased to a detrimental extent through solidification of the greases.

A major feature of the invention resides in the provision of a grease interceptor having means associated with the outlet adapted to resist head pressures to which the liquid is subjected by flow through the inlet to thereby maintain a substantially constant liquid level in the interceptor body under varying velocities of flow of liquid thereinto from the inlet.

Having thus fully described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is:

1. In a grease interceptor, a chambered body having an inlet opening thereto below the normal liquid level therein, an element within the body providing a secondary chamber into which the inlet directly discharges, said secondary chamber having a downwardly inclined bottom wall provided with an opening to the body opposite the inlet opening, an outlet connected with the body and positioned to determine the normal liquid level therein, a manifold within the body comprising a conduit open at its lower end to adjacent the bottom of the body and opening above its lower end to the outlet, a vent tube in the upper end of the manifold opening to the space in the body above the liquid level therein and extending into the manifold to below the liquid level in the body, the upper end of the conduit being otherwise closed to the body.

2. In a grease interceptor, a chambered body having an inlet opening thereto below the normal liquid level therein, an element within the body providing a secondary chamber into which the inlet directly discharges, said secondary chamber having a downwardly inclined bottom wall provided with an opening to the body opposite the inlet opening, an outlet connected with the body and positioned to determine the normal liquid level therein, a manifold within the body at the inlet end comprising a vertical conduit open at its lower end to adjacent the bottom of the body and opening above its lower end to the outlet, a vent tube in the upper end of the manifold opening to the space in the body above the liquid level therein and extending into the manifold to below the liquid level in the body, the upper end of the vertical conduit being otherwise closed to the body.

3. In a grease interceptor, a chambered body having an inlet opening thereto on one side below the normal liquid level therein, an element providing a secondary chamber into which the inlet directly discharges, spaced vertical baffle plates in said element tending to cause separation of the liquids of less specific gravity from the inflowing liquid, said secondary chamber having a downwardly inclined bottom wall provided wtih an opening to the body adjacent the side thereof opposite the side through which the inlet discharges, an outlet connected with the body on the inlet side and positioned to determine the normal liquid level therein, a manifold element comprising a conduit open at its lower end to the body at a point below the outlet from the secondary chamber and on the same side of the body as that to which the inlet opens, a vent tube in the upper end of the conduit opening at one end to the body above the normal liquid level therein and extending into the manifold and opening thereto at a point below the normal liquid level in the body.

4. In a grease interceptor, a chambered body having an inlet conduit opening thereto on one side thereof below the normal liquid level therein, the said body having its upper end above the

liquid level therein, a cover member positioned on the top of the said body and recessed to provide a chamber for air and gas above the liquid level in the body, an element providing a secondary chamber to which the inlet conduit discharges, said chamber having a downwardly inclined bottom wall provided with an opening for discharge of liquid to the body chamber at a point distant from the inlet, the wall of the body against which the liquid discharges being inwardly and downwardly inclined to cause the liquid to flow towards the inlet side of the body, an outlet conduit connected with the body and positioned to determine the normal liquid level therein below the line of contact of the cover with the body, a manifold at the inlet side of the body to which the outlet conduit opens comprising a vertical conduit open to the bottom of the body below the point of discharge of inflowing liquid from the secondary chamber, a tube in the upper end of the said vertical conduit opening at its upper end to the air and gas space provided by the cover and extending into the vertical conduit to a point below the point of connection of the outlet conduit therewith, and baffle means within the secondary chamber providing for separation of the material of lesser specific gravity from that of greater specific gravity whereby the material discharging from the secondary chamber to the outlet manifold is freed of oils and greases.

5. In a grease interceptor, a chambered body having an inlet opening thereto on one side thereof below the normal liquid level therein, the said body having its upper end above the flow level therein, a cover member positioned on the top of the said body and recessed to provide for a chamber for air and gas above the liquid level in the body, an element providing a secondary chamber to which the inlet conduit discharges, said chamber having an opening at the end opposite the inlet for discharge of liquid to the body proper at a point distant from the inlet, the wall of the body against which the liquid discharges being inwardly and downwardly inclined to cause the liquid to flow toward the inlet side of the body, an outlet conduit connected with the body and positioned to determine the normal liquid level therein, a manifold to which the outlet conduit opens comprising a vertical conduit open to the bottom of the body below the point of discharge of inflowing liquid from the secondary chamber, a tube in the upper end of the said vertical conduit opening at its upper end to the air and gas space provided by the cover and extending into the vertical conduit to a point below the point of connection of the outlet conduit therewith, and baffle means within the secondary chamber providing for separation of the material of lesser specific gravity from that of greater specific gravity whereby the material discharging from the secondary chamber to the outlet manifold is freed of oils and greases, and manually controlled means providing for withdrawal of the liquid of less specific gravity from the interceptor body.

6. In a grease interceptor, a chambered body having an inlet conduit opening thereto on one side thereof below the liquid level therein, a removable element within the body providing a secondary chamber into which the inlet directly discharges, said secondary chamber having an opening for discharge of liquid to the bottom of the body at a point distant from the point of discharge thereto from the inlet conduit, baffle means in said secondary chamber providing for separation of oils and greases from inflowing liquid prior to discharge thereof through the said opening of the secondary chamber, an outlet conduit connected with the body and arranged to determine the normal liquid level therein, a manifold in the body connected to the outlet comprising a vertical conduit opening to the body adjacent its bottom, a vent means comprising a tubular element secured in the upper end of the outlet manifold with its upper end above the liquid level in the body and extending into the vertical conduit to a point below the liquid level, the upper end of the body being at about the liquid level and a cover member fitting the top of the body and recessed to provide air and gas space above the liquid level to which the upper end of the vent tube is open.

7. In a grease interceptor, a chambered body having an inlet opening thereto on one side below the normal liquid level therein, a removable element within the body providing a secondary chamber into which the inlet directly discharges, said secondary chamber having an opening for discharge of liquid to the bottom of the body at a point distant from the inlet, baffle means in said secondary chamber providing for separation of oils and greases from inflowing liquid prior to discharge thereof through the said opening of the secondary chamber, an outlet conduit connected with the body and arranged to determine the normal liquid level therein, a manifold in the body connected to the outlet comprising a vertical conduit opening to the body adjacent its bottom, a vent means comprising a tubular element secured in the upper end of the outlet manifold with its upper end above the liquid level in the body and extending into the vertical conduit to a point below the liquid level, the upper end of the body being at about the liquid level and a cover member fitting the top of the body and recessed to provide air and gas space above the liquid level to which the upper end of the vent tube is open, said cover member having a secondary recess therein extending to above the cover member and into which the upper end of the vent tube opens.

8. In a grease interceptor, an outlet arranged to determine the liquid level therein and a chambered body having an inlet opening thereto below the liquid level therein, a removable element within the body providing a secondary chamber into which the inlet directly discharges, said secondary chamber having an opening to the bottom of the body at a point distant from the inlet, means in the secondary chamber providing for separation of oils and grease from the inflowing liquid prior to discharge through the said opening of the secondary chamber, the upper end of the body being above the liquid level therein, a cover member for the body, means providing for discharge of air and gases from the upper end of the body comprising a vent tube extending to above the cover member at its upper end and at its lower end discharging to the outlet at a point below the normal liquid level in the body, said cover member having a chamber extending thereabove open at its lower end to the upper end of the body and into which the said vent tube extends.

EDWARD W. N. BOOSEY.