

April 3, 1956

H. M. HANKS
FLUID EVACUATING APPARATUS

2,740,420

Filed March 12, 1951

2 Sheets-Sheet 1

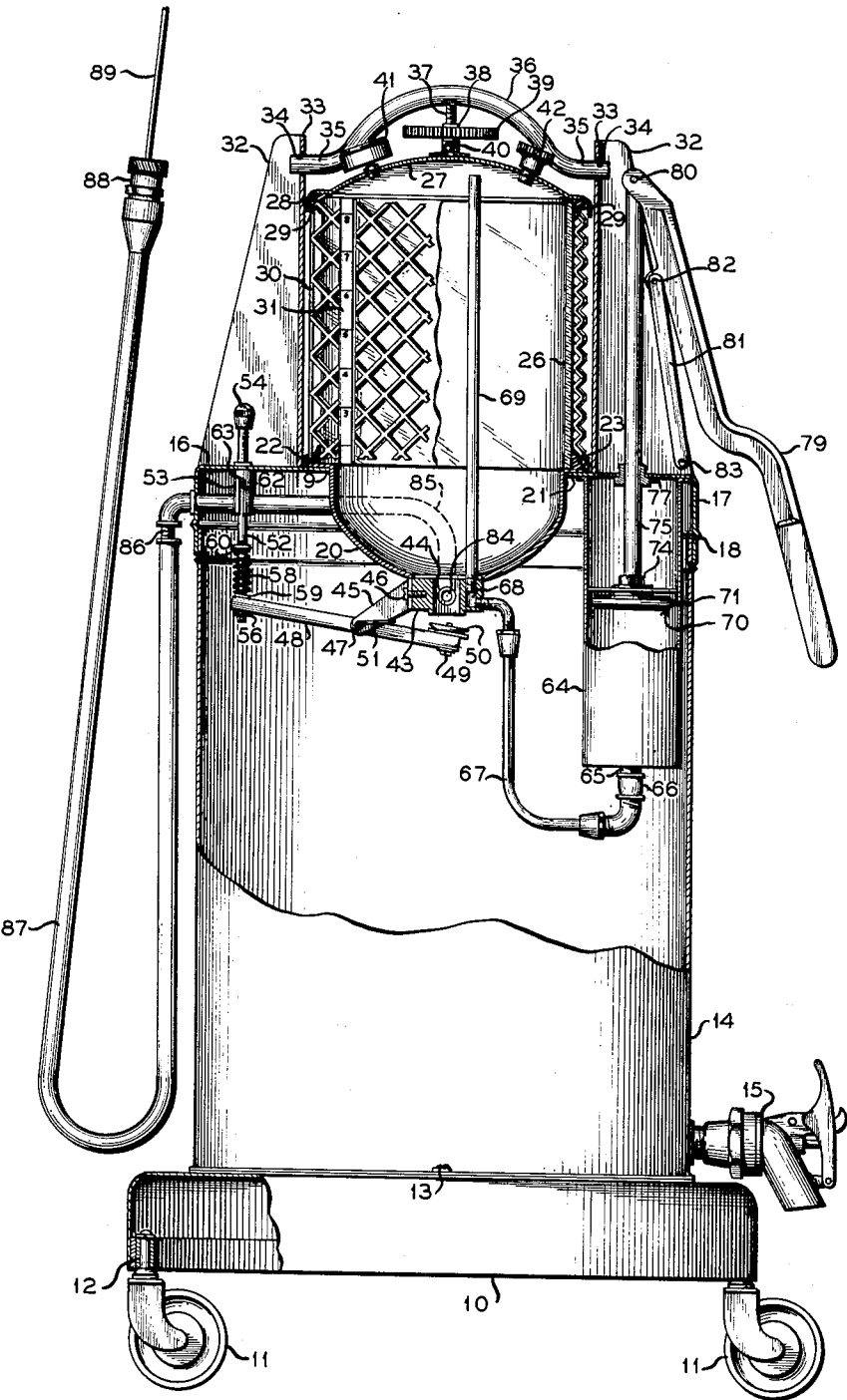


FIG. 1

BY

INVENTOR.
H. M. HANKS

Hyatt D. Dowell
ATTORNEY

April 3, 1956

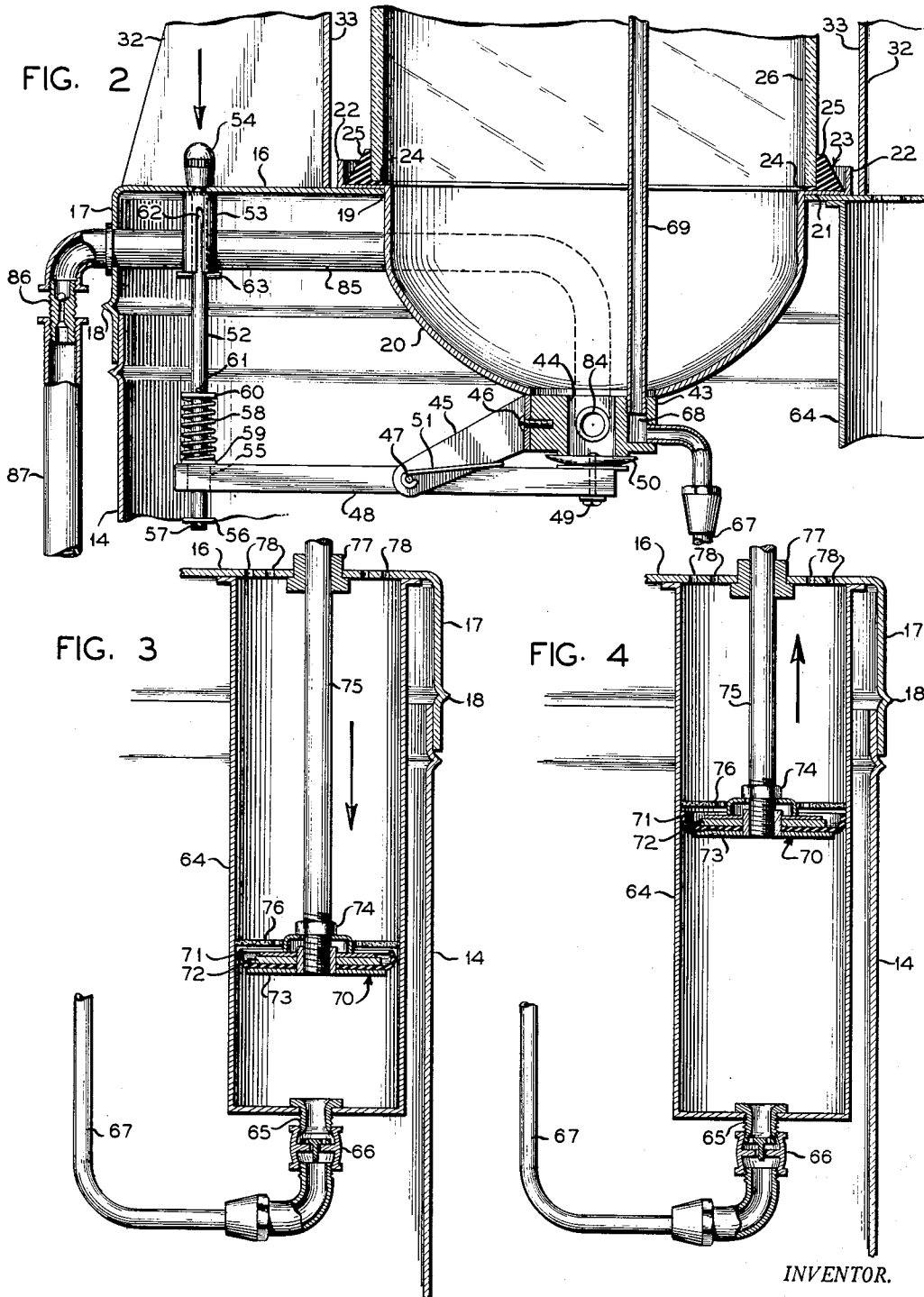
H. M. HANKS

2,740,420

FLUID EVACUATING APPARATUS

Filed March 12, 1951

2 Sheets-Sheet 2



INVENTOR.

H. M. HANKS

BY

A. Yates Dowell
ATTORNEY

1

2,740,420

FLUID EVACUATING APPARATUS

Harold M. Hanks, Oakland, Calif.

Application March 12, 1951, Serial No. 215,146

11 Claims. (Cl. 137—205)

This invention relates to the handling and storage of fluids and more particularly to an apparatus for evacuating or removing such fluids from repositories thereof and storing the same until such time as the fluid may be conveniently disposed of.

While the apparatus of this invention is primarily intended to be utilized in removing the lubricating oil from the crank cases of internal combustion engines such as those commonly found in automobiles and in marine installation and from gear cases nevertheless it is contemplated that the apparatus may conveniently find utility in removing fluids from any repositories which are relatively inaccessible. Consequently any reference to the application of this apparatus for removing lubricating oil from such internal combustion engines is to be considered as illustrative only and not as in any way limiting the use or application of the apparatus.

As is commonly known the operation of removing oil from the crank case of the engine of an automobile is a rather time consuming and dirty operation and normally necessitates either the mechanic crawling under the car and removing the drain plug from the crank case and catching the oil in a pan or other container or the automobile is raised on a hoist or lift and the drain plug is removed and the oil drained into a container. Such an operation usually results in the mechanic receiving a fair supply of the oil on his hand and arm thus detracting from his appearance and causing him to avoid such jobs whenever possible and consequently any apparatus which permits performance of this operation in a faster and more convenient manner finds wide acceptance. Likewise the necessity of removing and replacing a drain plug or the raising of the car on a lift entails a considerable consumption of time and normally the owner of an automobile does not care to sacrifice such time unless it is absolutely necessary. The apparatus of this invention precludes the necessity of such prior distasteful operations and at the same time materially reduces the time required for the necessary draining of the lubricating oil and replacing the same with new oil thus promoting sales of such oil.

The apparatus of this invention finds particular utility in removing the lubricating oil from the engines installed in small and medium sized cruisers. These engines are installed relatively close to the bottom of the boat and consequently there is normally insufficient room in which to remove the drain plug and place a container beneath the same for receiving the oil to be drained from the crank case. The result of this situation has been that the oil in such installations has not been changed as frequently as it should be and is very often only changed when the engine is removed from the boat for overhaul which may normally take place only once in several seasons. Such a practice results in abnormal wear on the parts of the motor and consequently use of the apparatus of this invention materially contributes to the life of such installations since the lubricating oil may be conveniently removed in a very short time and the oil replaced in the crank case to assure proper lubrication of the parts.

2

A further troublesome problem in this art has been the removal and replacement of the lubricant from gear cases since such lubricant is normally relatively heavy and the viscosity thereof is such that flow from a drain plug is relatively slow and therefore such removal requires an abnormal amount of time and very often results in incomplete removal of the lubricant and consequent incomplete replacement thereof. Also in this connection as well as in the case of the crank cases of internal combustion engines there is an appreciable quantity of metallic particles and sludge which accumulates at the bottom of the crank case or the gear case and very frequently a large percentage of these particles and sludge remain in the cases due to the fact that they are relatively heavy with respect to the lubricant and consequently settle to the bottom of the cases and do not drain out with the fluid lubricant. The only particles and sludge which are removed by this method are those which are in suspension in the fluid. With the apparatus of this invention an appreciable suction is utilized in the draining process and this suction results in removing a large percentage of the sludge and foreign particles which are present in the crank cases or gear cases. It will therefore be seen that by use of this invention the life of the lubricated parts will be materially increased since the foreign matter which causes abnormal wear thereof is substantially completely removed.

In the past apparatus for performing this operation has been proposed and utilized but this apparatus has either comprised a permanent installation which is relatively expensive and which does not permit the flexibility required in modern servicing operations, or such apparatus has included power operated pumps and the like which either require a supply of electrical power thereto thus utilizing a cable or the like which introduces shock and fire hazards as well as injury to the personnel involved due to tripping over such cables, or has required self contained power means such as a small internal combustion engine which materially adds to the cost of the apparatus and also materially adds to the cost of upkeep and the possibility of frequent failures. Likewise this prior apparatus has been relatively heavy and cumbersome and consequently cannot be conveniently used in the modern service station or for applications in marine uses where the handling of such cumbersome apparatus is extremely inconvenient and difficult. Likewise the prior apparatus has not provided means whereby the occupant of an automobile may conveniently observe the quality and quantity of lubricant removed from his car without getting out of the same and has consequently presented little advantage over the conventional method of removing and replacing the lubricating oil in a crank case or other repository.

It is accordingly an object of this invention to provide a fluid evacuating apparatus which is completely self contained and which may be manufactured from readily available parts and materials and with substantially no skilled labor.

It is a further object of the invention to provide a portable fluid evacuating apparatus which is completely self contained, requiring no external source of power and in which the evacuated fluid may be conveniently examined both as to quantity and quality.

It is a further object of the invention to provide a portable fluid evacuating apparatus which is entirely self contained and operated and in which the evacuated fluid may be retained in a transparent container for as long as desired and subsequently drained into a tank for storage until the same can be conveniently disposed of.

It is a further object of the invention to provide a fluid evacuating apparatus in which a vacuum pump is utilized to induce flow of fluid to such apparatus and in which means is provided for preventing access of such fluid to the vacuum pump.

3

It is a further object of the invention to provide a fluid evacuating apparatus in which the parts permitting visual inspection of the fluid may be quickly dismantled for cleaning purposes and rapidly reassembled to permit further utilization of the apparatus.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is an elevational view of the apparatus of this invention with certain parts broken away and with certain parts in section for greater clarity;

Fig. 2, a fragmentary sectional view showing the drain valve for the visual container in closed position;

Fig. 3, a fragmentary sectional view showing the vacuum pump utilized in the apparatus of this invention with the piston thereof approaching the lowermost limit of its stroke and with the intake valve in closed position; and

Fig. 4, a fragmentary sectional view similar to Fig. 3, and showing the piston of the vacuum pump approaching its uppermost position and with the intake valve in open condition.

With continued reference to the drawing there is shown in Fig. 1 a base 10 having ground engaging or caster wheels 11 swivelly secured to the base 10 at 12. Also secured to the base 10 by screw threaded fastening means or the like 13 is a sump tank 14 having a conventional drain valve 15 attached thereto adjacent the bottom thereof. Tank 14 is provided with a top wall 16 having a downturned rim 17 secured to the tank 14 by a seam 18 which may be secured thereto by welding or the like.

Top wall 16 is provided with an opening 19 which serves to receive a bowl 20 having a flange 21 overlying the top wall 16 and an integral upstanding annular rim 22 the function of which will presently be described. The bowl 20 is supported by the flange 21 overlying the top wall 16 and upon this flange is disposed a resilient gasket 23 having a horizontal flange 24 and an upstanding portion 25. The gasket 23 is confined by the annular rim 22.

Horizontal flange 24 provides a seat for the lower edge of a transparent cylindrical casing 26 and the upstanding portion 25 of the gasket 23 contacts a limited portion of the outer wall of the casing 26. Casing 26 may be closed at its upper end by a dome shaped closure 27 having a downturned rim 28 and encompassing a resilient gasket 29 which engages the upper edge and adjacent cylindrical surface of the casing 26. In order to protect the transparent casing 26 a grille 30 is received within the rims 22 and 28 and surrounds the same to provide adequate protection therefor. The transparent casing 26 may be formed of any material which will resist the heat and pressure which the casing may be subjected to.

In order to conveniently and quickly ascertain the quantity of fluid within the casing 26 there may be provided a vertical scale 31 secured to the outer surface of the grille 30 this scale being calibrated in any desired units, as shown in Fig. 1, such as quarts or pints.

Since the transparent casing 26 must be tightly clamped between gaskets 23 and 29 in order to form a fluid tight container, clamping means is provided for exerting a sufficient clamping force to produce this result and also to permit relatively quick removal of the casing 26 for cleaning purposes. The clamping means as shown in Fig. 1 comprises spaced channel shaped uprights 32 secured to the top wall 16 of the tank 14, the uprights 32 terminating at a point slightly above the top of dome shaped closure member 27. The web 33 of the uprights 32 is provided adjacent the upper ends thereof with apertures 34 which serve to slidably receive the ends 35 of a clamping bar 36.

As shown in Fig. 1, bar 36 extends across the top of the dome shaped cover member 27 and adjacent the mid point of the bar there is provided a downwardly depend-

4

ing screw threaded stud 37 which may be secured to the bar 36 by welding or the like. Threadedly received on the stud 37 is a nut 38 having an enlarged hand wheel 39 and swiveled on the nut 38 is a clamping foot 40 which engages the upper surfaces of dome shaped closure member 27 and upon actuation of the nut 38 the foot 40 will move the closure 27 downwardly to tightly clamp the casing 26 between the gaskets 23 and 29.

When it is desired to remove the casing 26 for cleaning purposes it is only necessary to rotate the nut 38 by means of hand wheel 39 to retract the foot 40 away from the closure 27 at which time the bar 36 may be moved longitudinally thereof until one end 35 thereof is disengaged from its associated aperture 34 at which time the bar may be moved angularly and in the opposite direction to disengage the opposite end 35 from its associated aperture 34. The closure 27 may then be lifted off and the casing removed and cleaned after which it is resealed on the gaskets and the bar replaced and closure 27 clamped in position.

Also provided in the closure member 27 is a vacuum gauge 41 which indicates the degree of vacuum within the casing 26 and a vent valve 42 is also provided in the closure member 27 in order to permit the entry of air thereto and thus speed draining of fluid therefrom in a manner to be later described.

As best shown in Figs. 1 and 2 the bowl 20 is provided with a fitting 43 secured to the lower surface thereof and this fitting has a central aperture 44 communicating with the interior of the bowl 20 to form a drain port therefor and permit draining of any fluid in the bowl 20 and casing 26 into the tank 14. A bracket 45 is secured to the fitting 43 by screw threaded fastening means or the like 46 and bracket 45 serves to pivotally support at 47 a rocker arm 48 upon one end of which there is secured by screw threaded fastening means or the like 49 a valve washer 50 which, in its uppermost position as shown in Fig. 2, engages the surface of the fitting 43 about the aperture 44 to close the same and prevent flow of fluid from the bowl 20 into the tank 14. The valve washer 50 and rocker arm 48 are resiliently urged toward open position, as shown in Fig. 1, by a spring 51 disposed about the pivot 47 one leg of the spring 51 engaging the bracket 45 and the other leg, not shown, engaging the rocker arm 48.

Actuating means for the rocker arm 48 and valve washer 50 is provided in a form of a push rod 52 slidably mounted in a bushing 53 secured to the top wall 16 by welding or the like. Push rod 52 is provided at its upper end with a finger engaging knob 54 which may be conveniently grasped by the hand of the operator in order to actuate the same. The lower end of push rod 52 is slidably received in an aperture 55 adjacent the end of the rocker arm 48 opposite to the end on which valve washer 50 is secured, the push rod 52 having a washer 56 secured against removal therefrom by a cotter key or the like 57, washer 56 serving to prevent removal of the push rod 52 from the aperture 55 in rocker arm 48.

Disposed about the push rod 52 above the rocker arm 48 is a compression spring 58 bearing at its lower end on a washer 59 which in turn engages the upper surface of rocker arm 48 the upper end of spring 58 engaging a washer 60 received about the push rod 52, upward movement of the washer 60 in relation to the push rod 52 being prevented by a cotter key or the like 61 disposed in an aperture in the push rod.

The bushing 53 is provided with a downwardly opening slot 62 and push rod 52 is provided with a cross pin 63 of a size suitable to slidably engage the slot 62. With the valve washer 50 in open position as shown in Fig. 1 the cross pin 63 is disposed in the slot 62 adjacent the upper end thereof the valve being held open by the spring 51 engaging bracket 45. When it is desired to close the valve 50 the operator pushes down on the finger engaging knob 54 which exerts a downward force on the spring 58 this spring in turn resiliently urging the rocker arm 48

5

in a counterclockwise direction as viewed in Figs. 1 and 2 until such time as the valve washer 50 engages the fitting 43 and further downward movement of the push rod 52 compresses the spring 58 and applies such compressive force to the valve washer 50. The valve is locked in closed position by turning the knob 54 after the pin 63 has moved downwardly out of the slot 62, pin 63 then engaging the lower edge of bushing 53 to prevent upward movement of the push rod 52 and consequent opening of the valve.

When it is desired to open the valve to drain the contents of the bowl 20 and casing 26 into the tank 14 it is only necessary to rotate the knob 54 until the cross pin 63 reengages in slot 62 at which time the rod 52 will move upwardly as a result of the action of spring 51 and the rocker arm 48 will move in a clockwise direction and the valve washer 50 away from the fitting 43 to open the drain port therein. This structure provides a remarkably simple yet highly efficient valve mechanism which may be conveniently locked in closed position and which must be positively actuated by the operator in order to open the valve thus preventing inadvertent release of the contents of the bowl 20 and casing 26.

Since the fluid evacuating apparatus of this invention is entirely self contained and utilizes vacuum in the operation thereof a vacuum pump is provided in the form of a cylinder 64 disposed within the tank 14 and supported by the top wall 16 thereof. If desired, however, the pump might be disposed externally of the tank 14 but in order to conserve space the pump is shown in the drawings as disposed within the tank. The cylinder 64 is provided with an inlet at the bottom thereof comprising a fitting 65 to which is secured a check valve 66 the valve 66 being shown closed in Fig. 3 and open in Fig. 4. Secured to the check valve 66 by suitable fittings is a conduit 67 which communicates with an air passage 68 formed in the fitting 43. Also communicating with the air passage 68 is an upwardly extending tubular member 69 which terminates adjacent the upper end of the casing 26 at a point above the level of any fluid which is drawn into the casing 26 thus preventing the entry of such fluid into the vacuum pump.

Slidably disposed in the cylinder 64 is a piston 70 which may comprise a cup washer 71 secured between disks 72 and 73 these disks being clamped in place by screw threaded means or the like 74 received on a piston rod 75. Also disposed about the rod 75 and above the disk 72 and cup washer 71 is a felt or other absorbent disk 76 which may be saturated with lubricant and serves to keep the inner surface of the cylinder 64 properly lubricated. Piston rod 75 extends through a bushing 77 in the top wall 16 and this top wall may likewise be provided with a plurality of apertures 78 to permit escape of air above the piston 70 within the cylinder 64.

A pump actuating handle 79 is pivotally secured at 80 to the piston rod 75 there being a fulcrum link 81 pivotally secured to the handle 79 at 82, the opposite end of the link being secured to one of the uprights 32 at 83. With the piston 70 at its upper limit of travel as shown in Fig. 1 the relative position of pivots 80, 82 and 83 is such that the piston 70 is locked against downward movement thus preventing movement of the handle 79 under the action of vacuum below the piston 70 in the cylinder 64. This is an important feature since an operator is thus enabled to induce a sufficient vacuum within the casing 26 at which time he merely moves the handle 79 to its lowermost position where it is automatically locked in place. The operator is then free to perform other duties while the evacuating apparatus is in operation.

The fitting 43 is also provided with an inlet opening 84 communicating with the drain port 44 and to this inlet opening 84 is connected an inlet conduit 85 which extends to a point exteriorly of the tank 14. Connected to the outer end of inlet conduit 85 is a ball type check valve 86 which serves to prevent flow of fluid from the casing 26 and bowl 20 outwardly through the inlet conduit 85.

6

Also connected to the check valve 86 is a flexible conduit 87, the opposite end of which is provided with coupling means 88 for detachably securing a relatively small diameter tubular member 89 which may be inserted through a restricted opening such as the opening normally receiving the oil measuring stick in an internal combustion engine, member 89 reaching to the bottom of the crank case and permitting all of the oil therein to be removed through this tubular member. Different sized tubular members may be provided for different applications and also flexible members may be provided in order to reach normally inaccessible locations.

The operation of the fluid evacuating apparatus of this invention for removing the lubricating oil from the crank case of the internal combustion engine of an automobile or from the crank case of a marine engine installation is as follows. The apparatus is moved into position adjacent the automobile and the proper reduced tubular member 89 for that particular automobile selected and coupled to the flexible conduit 87 by means of the coupling 88. If necessary in certain installations a flexible reduced member 89 may be employed. The oil measuring rod, or oil stick as it is commonly called, is removed from the engine and the reduced tubular member 89 inserted through the opening normally occupied by the oil stick, the member 89 penetrating the crank case to adjacent the bottom thereof in order that all of the contents may be removed.

The drain port valve 50 is closed by moving the finger engaging knob 54 downwardly and upon completion of such downward movement rotating the same to position the cross pin 63 beneath the edge of bushing 53 to lock the valve 50 in port closing position. The vent valve 42 in the dome shaped closure 27 should also be closed and the apparatus is now in condition for operation. The vacuum pump handle 79 is next operated to induce a vacuum in the chamber 26 by means of air removed through tube 69 and air passage 68 and conduit 67 into the pump cylinder 64. A vacuum of 15 to 20 inches of mercury, as indicated on the vacuum gauge 41, is sufficient for most operations but any desired vacuum within the limits of the apparatus may be produced by a sufficiently prolonged actuation of the pump handle 79.

As the vacuum builds up in the casing 26, fluid will begin to flow through the reduced tubular member 89, flexible conduit 87, inlet conduit 85, inlet 84 and port 44 into the bowl 20 the level of this fluid rising within the transparent casing 26 until the entire contents of the crank case have been removed. The quantity of fluid in the casing 26 is indicated by the scale 31 and in order to ascertain that the entire contents of the crank case have been removed by the apparatus it is only necessary to know the normal contents of such crank case and check this against the reading on the scale 31. In view of the relatively high vacuum produced in the casing 26 a considerable quantity of sludge and fine particles of metal and other foreign material normally present in the crank cases of internal combustion engines is removed and this operation is relatively more efficient than the normal draining operation since the particles and the like need not be in suspension in the fluid, the suction being sufficient to draw this material from the bottom of the crank case where it has settled during operation of the engine.

Upon completion of the fluid evacuating operation the reduced tubular member 89 is removed from the oil stick hole, the oil stick replaced and the proper quantity of lubricating oil poured into the engine. Substantially the same operation would take place in removing fluid from any relatively inaccessible repository it only being necessary to provide the proper reduced tubular member 89 to enter any restricted opening and reach the lowermost point of the container. The fact that the air tube 69 terminating adjacent the upper end of the casing 26 is always above the level of fluid in such casing precludes entry of such fluid to the vacuum pump and therefore

7

materially contributes to the life of such pump since entry of this fluid together with metallic particles and the like suspended therein would materially increase the wear of the pump parts.

After completion of the operation the finger engaging knob 54 is rotated to reengage the cross pin 63 with the slot 62 in bushing 53 at which time the push rod 52 moves upwardly and the valve washer 50 away from the port 44 opening the same to permit drainage of the fluid in the bowl 20 and casing 26 into the sump tank 14. If it is desired to hasten this draining process the vent valve 42 in the closure 27 may be opened to permit the entry of air into the top of the casing and thus relieve the partial vacuum present therein, thereby materially hastening the drainage of the fluid into the tank 14.

Since the fluid normally drawn into the casing 26 is relatively dirty and since it is desired to maintain the transparency of such casing relatively high, occasional cleaning operations are necessary and these may be conveniently carried out by loosening the clamping foot 40 from the closure 27 by operation of the clamping nut 38 after which the clamp bar 36 may be removed from the uprights 32, the closure 27 removed and the casing 26 thoroughly cleaned in any desired or suitable manner. Replacement of the casing 26 and closure 27 is relatively simple and a mere operation of clamping nut 38 will serve to provide an air tight container in which sufficient vacuum may be maintained to accomplish the draining operation. The capacity of the tank 14 is sufficient to accommodate many draining operations and when necessary this tank may be emptied into a convenient receptacle by operation of the drain valve 15.

It will thus be seen that by the above fluid evacuating apparatus there has been provided a relatively simple mechanism for accomplishing the desired result, which is entirely self contained, requires no external power and may be conveniently moved to any desired position of use. Likewise the apparatus may be manufactured from readily available material requiring little skilled labor in the fabrication thereof and the same may be operated by unskilled labor and easily maintained in operating condition the simplicity thereof materially contributing to extremely low upkeep costs and failures in operation.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A portable fluid evacuating apparatus comprising a base, a sump tank supported by said base and having a drain adjacent the bottom thereof, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a resilient gasket disposed around the upper edge of said bowl, a transparent cylindrical casing seating at its lower edge on said gasket, a closure for said casing and having a resilient gasket engaging the upper edge thereof, spaced uprights secured to said top wall and extending above said closure, clamping means attached to said uprights and engaging said closure whereby said casing may be clamped between said gaskets to form a fluid tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve extending exteriorly of said tank, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said bowl, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

8

2. A portable fluid evacuating apparatus comprising a sump tank having a drain adjacent the bottom thereof, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a resilient gasket disposed around the upper edge of said bowl, a transparent cylindrical casing seating at its lower edge on said gasket, a closure for said casing and having a resilient gasket engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said gaskets to form a fluid tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve extending exteriorly of said tank, a vacuum pump mounted on said tank, a conduit connecting said pump and the upper end of said casing, an inlet connection to said bowl, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

3. A portable fluid evacuating apparatus comprising a sump tank, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a transparent cylindrical casing seating at its lower edge on said top wall, a closure for said casing engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said closure and top wall to form with said bowl a fluid tight container, an aperture in said bowl forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said container, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

4. A portable fluid evacuating apparatus comprising a base, ground engaging wheels mounted on said base, a sump tank supported by said base and having a drain valve adjacent the bottom thereof, a top wall on said tank, an opening in said top wall, a bowl having a marginal flange and an upstanding annular rim, said bowl being disposed in said opening with said flange overlying said top wall, a resilient gasket disposed on the upper surface of said flange and confined by said rim, a transparent cylindrical casing seating at its lower edge on said gasket, a grille surrounding said casing and seating at its lower edge within said rim, a closure for said casing and having a resilient gasket engaging the upper edge thereof, a depending rim on said closure surrounding the upper edge of said grille, a vent valve in said closure, a vacuum gauge in said closure, spaced uprights secured to said top wall and extending above said closure, a clamping bar removably secured to said uprights, a screw threaded stud depending from said bar, a clamping nut received on said stud and a closure engaging foot swiveled on said nut whereby said casing may be clamped between said gasket to form a fluid tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve extending exteriorly of said tank, means to locate said valve in port closing position, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said bowl, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

5. A portable fluid evacuating apparatus comprising a base, ground engaging wheels mounted on said base, a sump tank supported by said base and having a drain valve adjacent the bottom thereof, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening and supported by said top wall, a resilient gasket disposed on the upper surface of said top wall, a transparent cylindrical casing seating at its lower edge on said gasket, a closure for said casing and having a resilient gasket engaging the upper edge thereof, spaced uprights secured to said top wall and extending above said closure, a clamping bar removably secured to said uprights, clamping means engaging said bar and said closure whereby said casing may be clamped between said gaskets to form a fluid tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve extending exteriorly of said tank, means to locate said valve in port closing position, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said bowl, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

6. A portable fluid evacuating apparatus comprising a sump tank, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a transparent cylindrical casing seating at its lower edge on said top wall, a closure for said casing engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said closure and top wall to form with said bowl a fluid-tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port comprising a rocker arm pivotally mounted on said fitting, a valve washer mounted on said arm adjacent one end thereof and engageable with the lower surface of said fitting to close said port, resilient means engaging said arm for urging said washer away from said fitting to open said port, actuating means for said arm comprising a push rod slidably received in a bushing mounted in said top wall, said push rod extending above said top wall and having a finger engaging knob on the upper end thereof, an aperture in said arm adjacent the opposite end from said washer slidably receiving the lower end of said push rod, a compression spring received on said push rod above said arm, means on said push rod engaging the upper end of said spring to prevent upward movement thereof with relation to said push rod, a downwardly opening slot in said bushing and a cross pin in said push rod slidably received in said slot whereby upon movement of said push rod downwardly said spring will resiliently urge said washer into engagement with said fitting to close said port and said pin will move out of said slot and upon partial rotation of said push rod said pin will engage the lower edge of said bushing to lock said washer in port closing position and upon partial rotation of said push rod to re-engage said pin with said slot, said washer will be urged away from said fitting by the action of said resilient means to open said port, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said container, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

7. A portable fluid evacuating apparatus comprising a sump tank, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a transparent cylindrical casing seating at its lower edge on said top wall, a closure for said casing engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said closure and top wall to form with said bowl a fluid-tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port comprising a rocker arm pivotally mounted on said fitting, a valve washer mounted on said arm adjacent one end thereof and engageable with the lower surface of said fitting to close said port, resilient means engaging said arm for urging said washer away from said fitting to open said port, actuating means for said arm comprising a push rod, an aperture in said arm adjacent the opposite end from said washer slidably receiving one end of said push rod, a compression spring received on said push rod above said arm, means on said push rod engaging the upper end of said spring to prevent upward movement thereof with relation to said push rod, means on said push rod whereby upon movement of said push rod downwardly said spring will resiliently urge said washer into engagement with said fitting to close said port and upon partial rotation of said push rod said washer will be locked in port closing position and upon further partial rotation of said push rod said washer will be urged away from said fitting by the action of said resilient means to open said port, a vacuum pump mounted on said apparatus, a conduit connecting said pump and the upper end of said casing, an inlet connection to said container, a flexible conduit connected to said inlet connection and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

8. A portable fluid evaporating apparatus comprising a sump tank, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a transparent cylindrical casing seating at its lower edge on said top wall, a closure for said casing engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said closure and top wall to form with said bowl a fluid-tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve, a vacuum pump comprising a cylinder disposed in said tank and supported from said top wall, a piston slidably received in said cylinder, a piston rod connected to said piston and extending upwardly through said top wall, an actuating handle pivotally connected to said piston rod, a fulcrum link pivotally connected to said handle and said top wall, said pivotal connections being so located as to lock said piston against downward movement at the upper limit of its stroke, an air passage in said fitting, a tube extending upwardly from said passage within said casing and terminating adjacent the upper end thereof, a conduit connecting said passage and said pump, an inlet in said fitting communicating with said port, an inlet conduit connected to said inlet and extending exteriorly of said tank, a flexible conduit connected to said inlet conduit and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

9. A portable fluid evaporating apparatus comprising a sump tank, a top wall on said tank, an opening in said top wall, a bowl disposed in said opening, a transparent cylindrical casing seating at its lower edge on

11

said top wall, a closure for said casing engaging the upper edge thereof, clamping means engaging said closure whereby said casing may be clamped between said closure and top wall to form with said bowl a fluid-tight container, a fitting secured to the lower surface of said bowl, an aperture in said fitting communicating with the interior of said bowl and forming a drain port for permitting flow of fluid from said bowl into said tank, a valve for said port, actuating means for said valve, a vacuum pump supported from said top wall, an actuating handle for said pump, an air passage in said fitting, a tube extending upwardly from said passage within said casing and terminating adjacent the upper end thereof, a conduit connecting said passage and said pump, an inlet in said fitting communicating with said port, and inlet conduit connected to said inlet and extending exteriorly of said tank, a flexible conduit connected to said inlet conduit and a relatively small diameter tubular member detachably connected to said flexible conduit for insertion in a restricted opening to conduct fluid to said container upon actuation of said pump.

10. A portable liquid evacuating apparatus comprising a liquid receiving tank provided with an opening at the top thereof, a bowl shaped member mounted in said opening and having an opening in the bottom thereof providing communication between said bowl and the interior of said tank, an apertured fitting mounted in said opening in said bowl shaped member providing a discharge opening for the passage of liquid from said bowl to said tank, said fitting being provided with an inlet opening and a vacuum conducting passage, a tube secured at one end to said fitting communicating with said inlet opening and extending from said fitting for conducting liquid into said bowl, a compartment closed at the top and having at least some transparent wall portions mounted on said bowl, an upwardly extending tubular member mounted in said fitting and communicating with said vacuum conducting passage and extending adjacent the top of said compartment, a vacuum pump mounted on said tank, a conduit extending from said vacuum pump to said vacuum conducting passage in said fitting for carrying a vacuum from said pump to said compartment, a valve mounted on said fitting for controlling the aper-

12

ture in said fitting for controlling communication between said tank and said compartment, and means on the exterior of the tank for operating said valve whereby the vacuum pump may provide suction on said tube for causing liquid to flow into said compartment and such liquid may be emptied from said compartment into said tank, and a manually operable vent valve in the upper portion of said compartment for breaking the vacuum in the compartment to permit drainage of liquid into said tank.

11. A portable liquid evacuating apparatus comprising a base, a liquid receiving container having an opening in the bottom thereof, means mounting said container on said base, a fitting mounted in the opening of said container and including an inlet passage from the exterior into said container, a liquid conducting tube communicating with said inlet passage and connected to said fitting and terminating in a reduced tubular member for insertion in a small opening of a crankcase to be drained, a vacuum pump mounted on said apparatus, a vacuum conducting means extending from the top of said container to the suction connection of said vacuum pump for applying a vacuum to said container whereby liquid may be drawn into said container without passing into the said vacuum pump, said fitting being provided with an outlet passage for the removal of liquid therefrom, manually operable valve means for controlling said outlet passage, and a manually controlled vent means at the top of said container for relieving the vacuum therein for permitting drainage of the liquid through said outlet passage when said manually operable valve is open.

References Cited in the file of this patent

UNITED STATES PATENTS

1,308,713	Kilpatrick	July 1, 1919
1,609,697	Collier	Dec. 7, 1926
1,955,169	Bertschinger	Apr. 17, 1934
2,020,350	Bertschinger	Nov. 12, 1935
2,105,761	Wood	Jan. 18, 1938
2,156,869	Richert	May 2, 1939
2,242,288	Davis	May 20, 1941
2,320,048	Parson	May 25, 1943