Aug. 1, 1939. D. SAMIRAN 2,167,682

PORTABLE FLUID SEGREGATING APPARATUS

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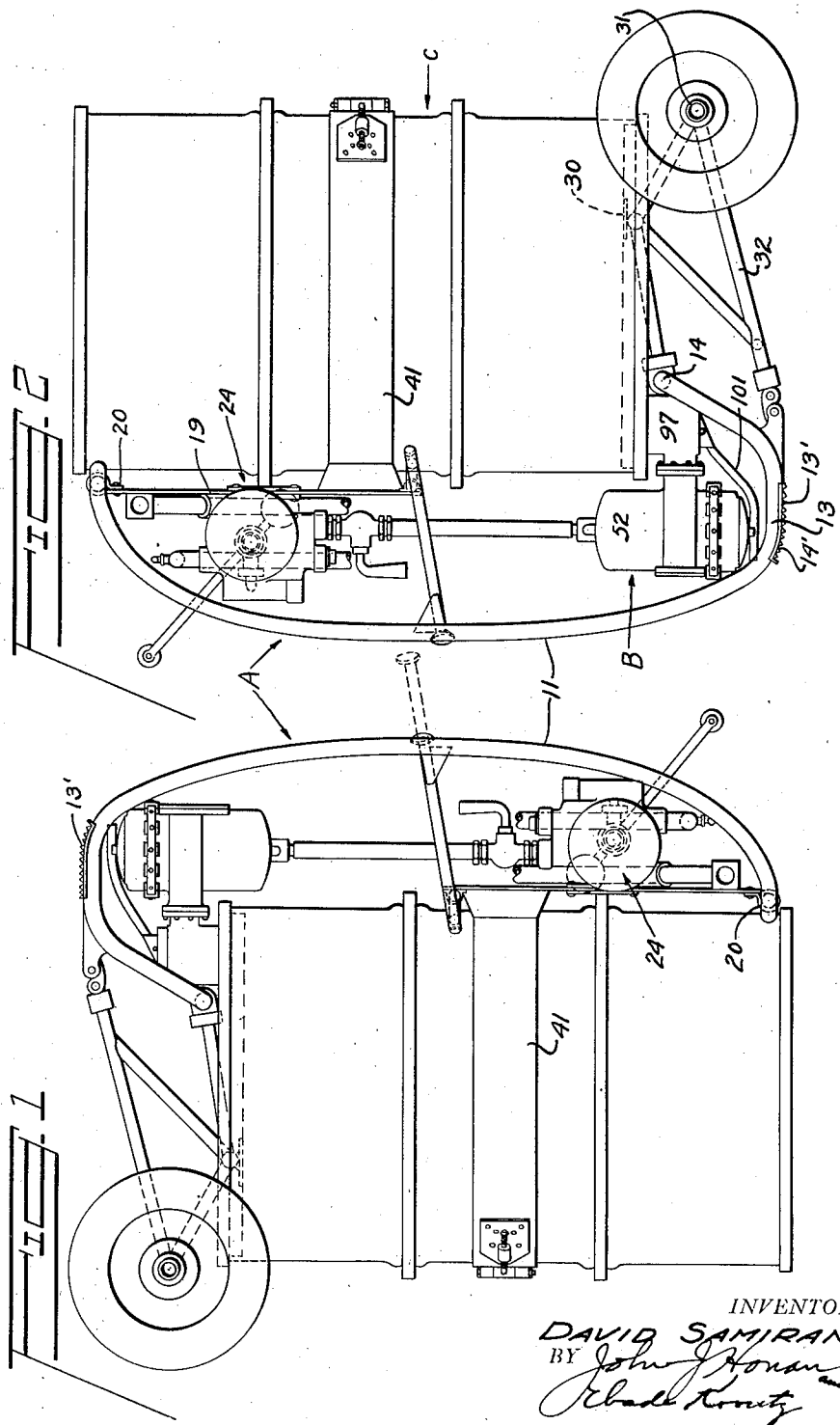


FIG. 2

FIG. 1

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Aug. 1, 1939. D. SAMIRAN 2,167,682

PORTABLE FLUID SEGREGATING APPARATUS

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FIG. 3

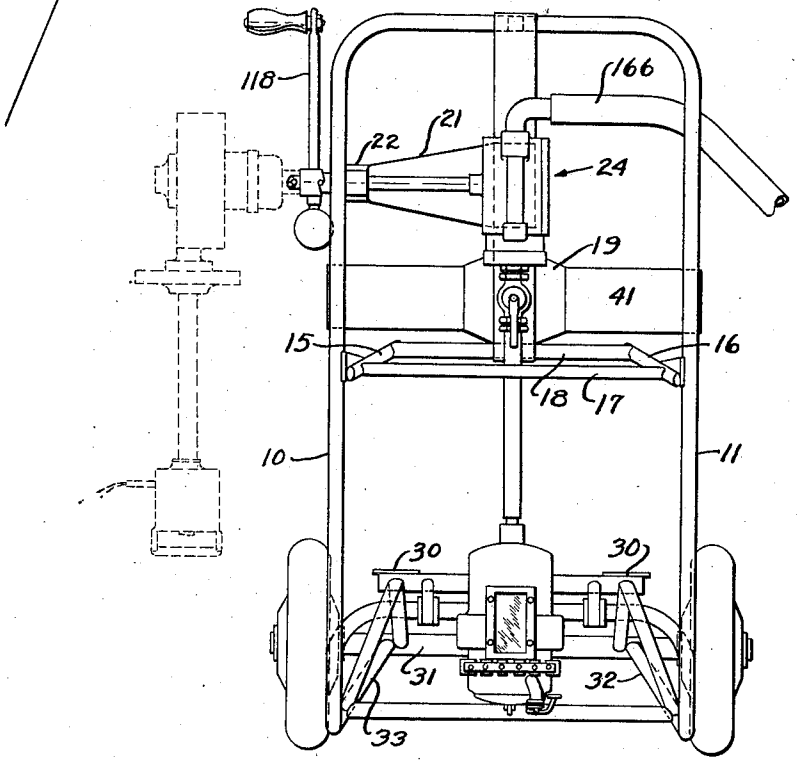
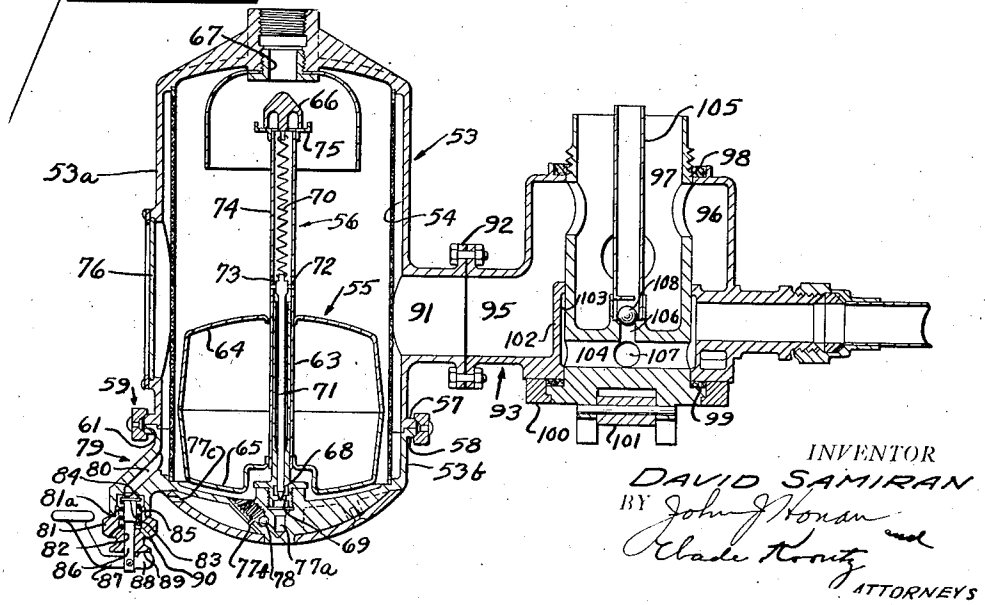


FIG. 7.



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FIG. 5

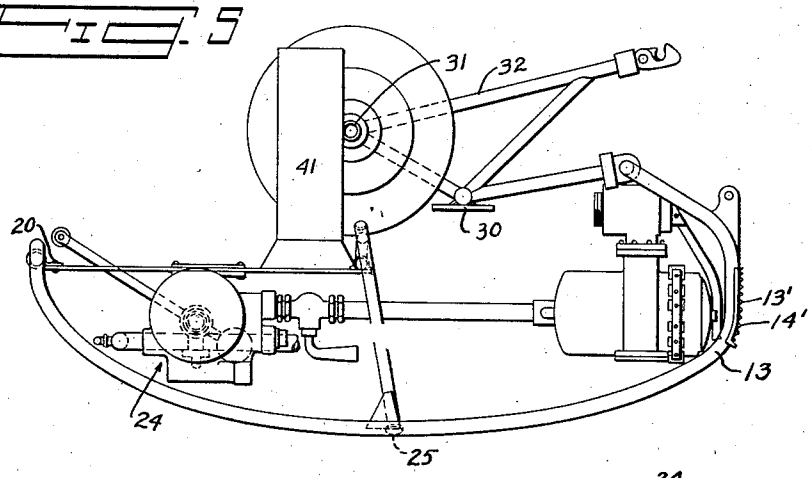


FIG. 6

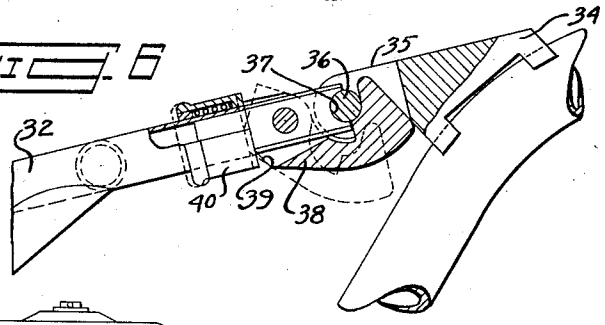
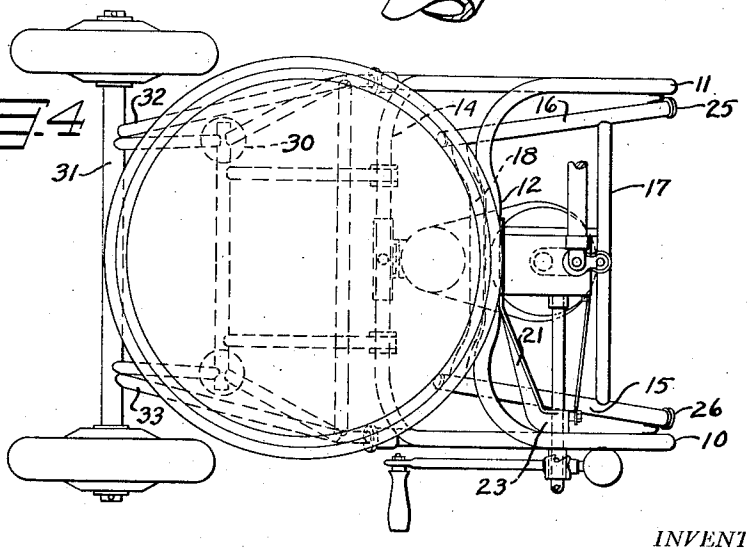


FIG. 4



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FIG. 10

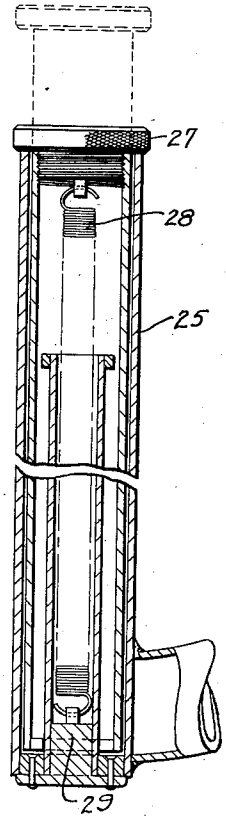


FIG. 11

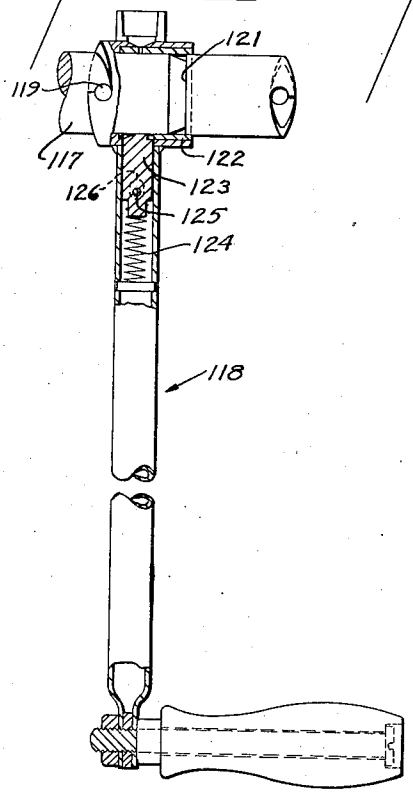


FIG. 12

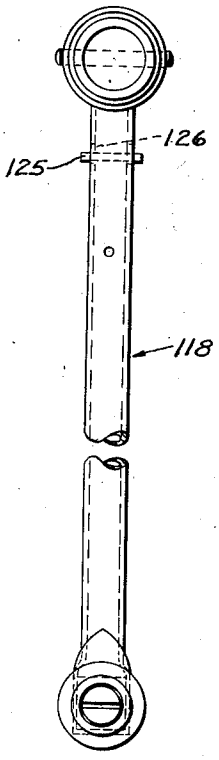
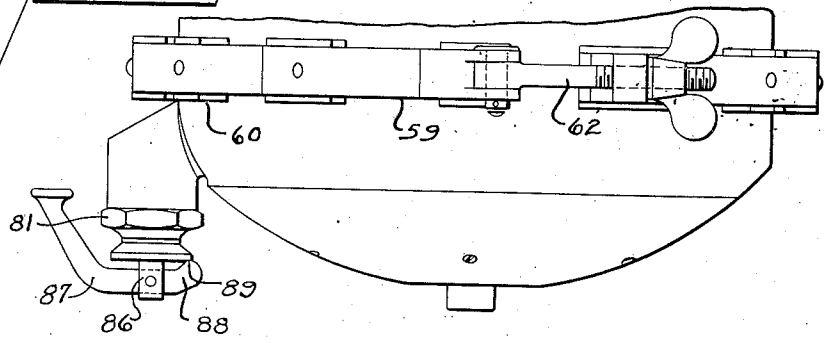


FIG. 8



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PORTABLE FLUID SEGREGATING APPARATUS

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FIG. 9

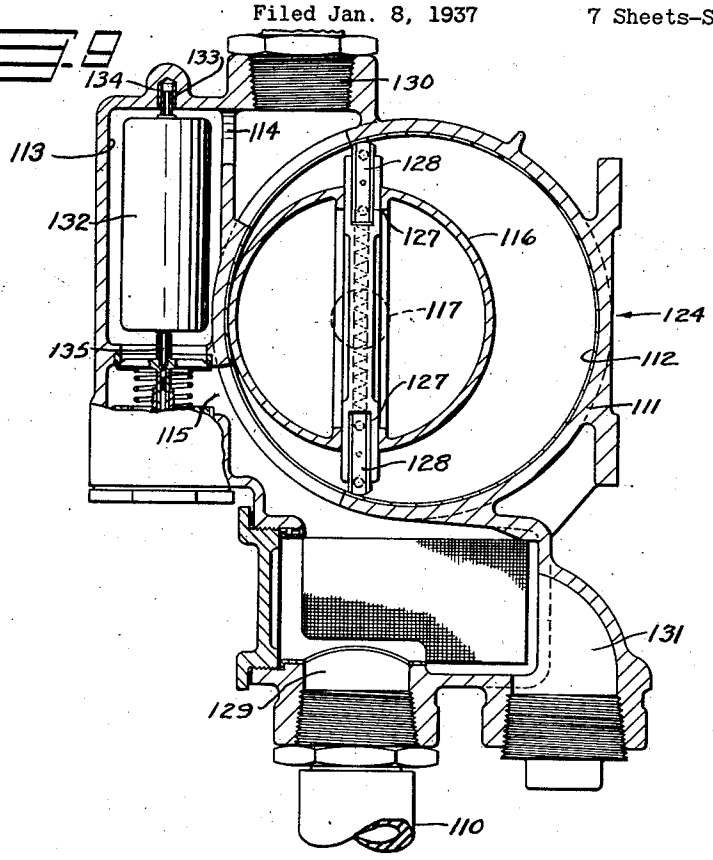
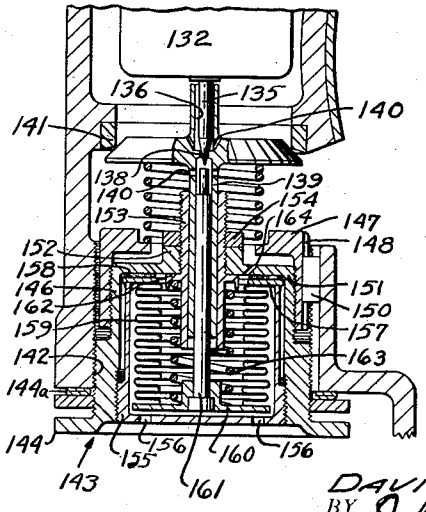


FIG. 10



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PORTABLE FLUID SEGREGATING APPARATUS

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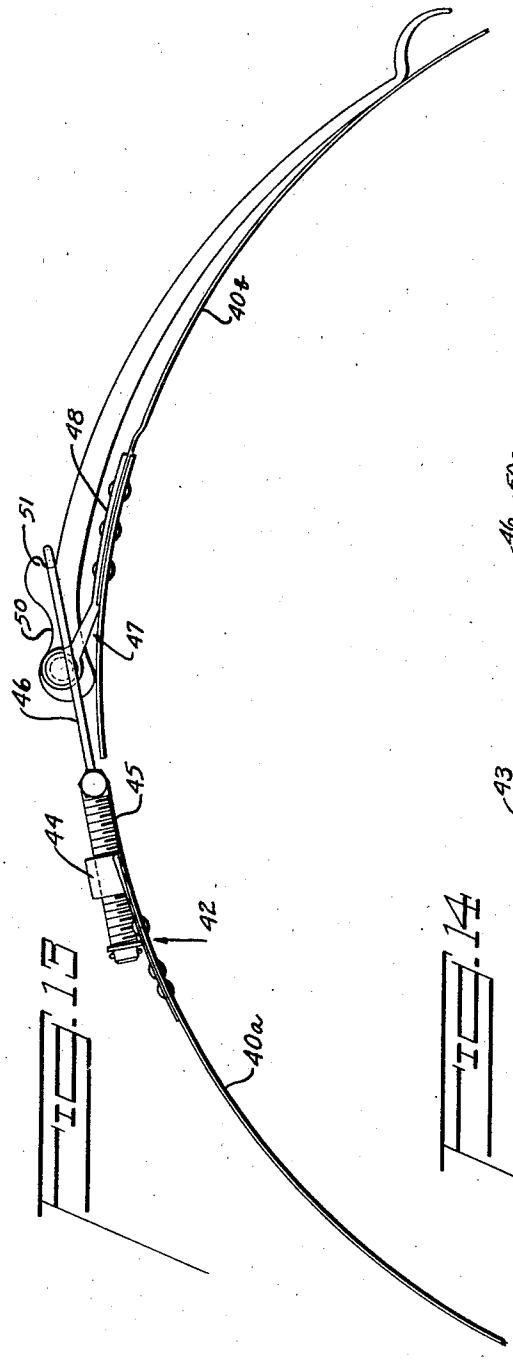


FIG. 13

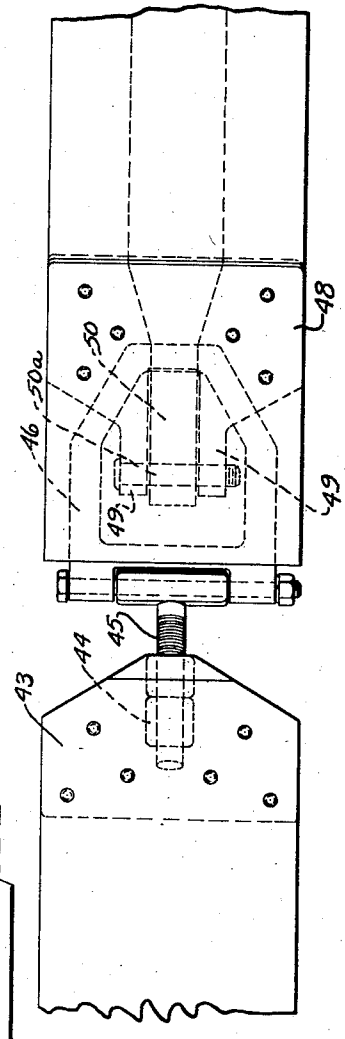


FIG. 14

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FIG. 15

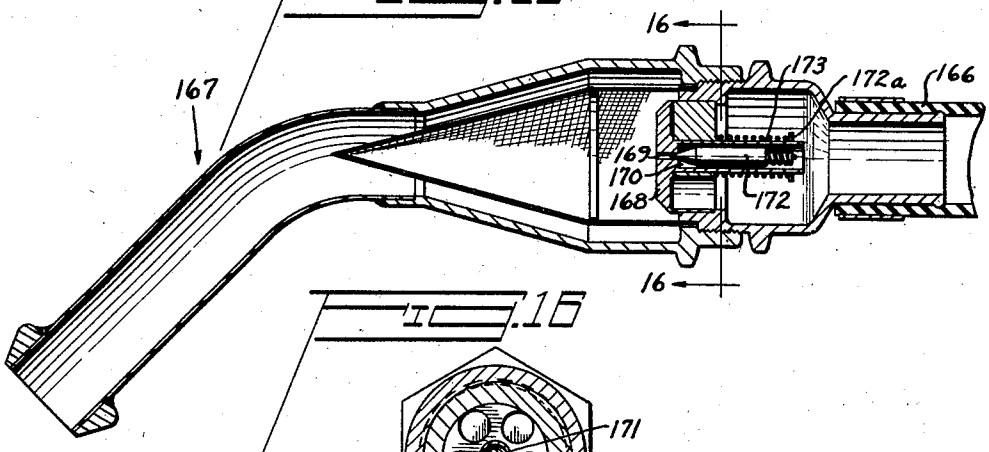


FIG. 16

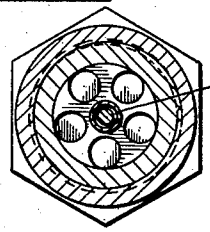
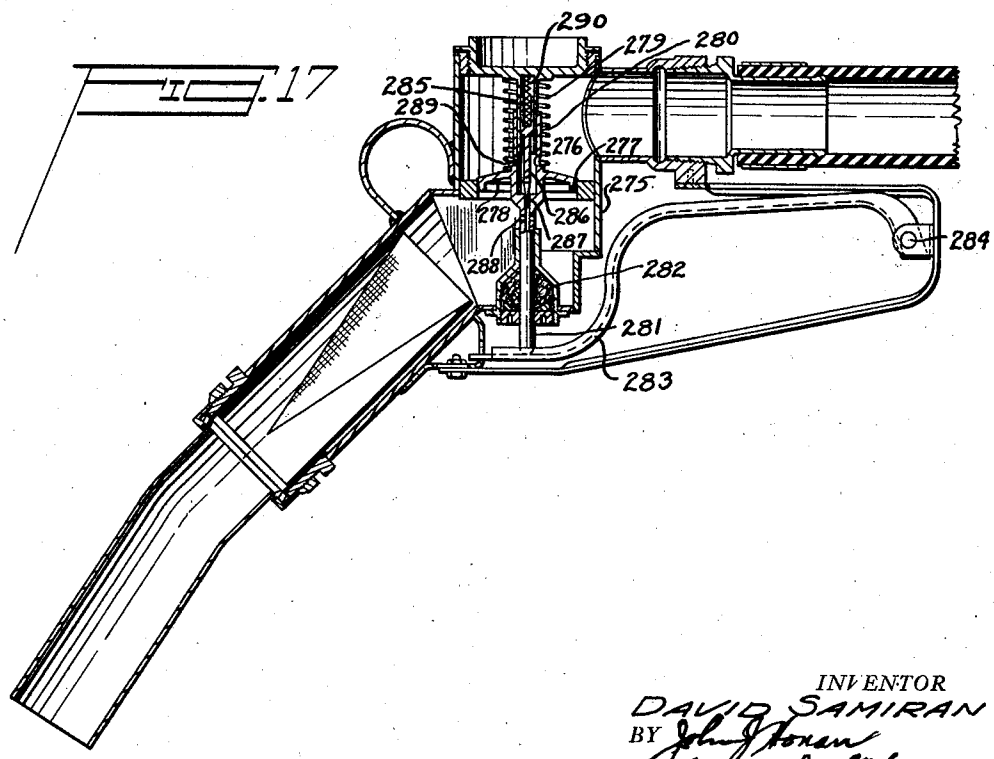


FIG. 17



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Patented Aug. 1, 1939 2,167,682

UNITED STATES PATENT OFFICE

2,167,682

PORTABLE FLUID SEGREGATING APPARATUS

David Samiran, Dayton, Ohio

Application January 8, 1937, Serial No. 119,643

17 Claims. (Cl. 221—67)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates generally to fluid segregators for the automatic segregation and/or isolation of fluids of different specific gravities, and more particularly to force feed segregators in which a separation of non-miscible fluids of different specific gravities is obtained.

The present invention is especially adapted to the segregation of fluids in which the source of the supply is readily accessible, as in the case of commercial drums of a mobile character, which, from their particular nature, necessitate removal on numerous occasions from place to place. Such an arrangement is not only essential in warehouses for the storage of gasoline or other liquids in drums, but particularly desirable from a military standpoint in times of war, where supply dumps are established at strategic points and the exigencies of the occasion may require not only a rapid evacuation or redistribution of supplies to different and other points at a moment's notice, but require equipment of a readily portable nature that may be carried with the servicing crews. Especially is this true in the case of military flying fields where the nature of the service to be performed requires overnight transportation to a new base of operation, not only of flying equipment but also of the servicing equipment of the ground crew.

To this end, one of the primary objects of the present invention is to provide a portable fluid segregating and dispensing apparatus of a unitary structure embodying a carrier which permits of the loading and carrying of fuel receptacles; and in which fuels of different specific gravities contained within said receptacles may be readily segregated and dispensed while loaded on said carrier.

A further object of the present invention is to provide a portable fuel servicing truck of novel construction; one which is collapsible when not in use; one which is readily attachable to a fuel receptacle prior to the loading of the receptacle thereon, said truck being so constructed and arranged as to permit swinging or tumbling of the fuel receptacle and truck into operative position for carrying and/or dispensing fluid with a minimum of effort on the part of the operator.

A further object of the present invention is to provide in a truck of this character, a built-in fluid segregating apparatus which is wholly disposed within the limits defined by the length and breadth of the truck, said fluid segregating apparatus incorporating fluid impelling means, and a fluid segregator interposed between the fuel receptacle and impelling means for automatically effecting a separation of the undesirable components from the fluid prior to its passage through the impelling means, and immediately after it leaves the fuel receptacle; to provide in a servicing truck incorporating means for effecting a segregation of fluids of different specific gravities, fluid impelling means, and means forming a part of said fluid impelling means for creating suction effects in said segregator, said last mentioned means being so constructed and arranged that the vacuum established in said segregator means by operation of said impelling means, is maintained to permit a flow of the fluid from said fluid segregator as long as said impelling means is in operation, said impelling means including additional means for destroying the suction effects when said impelling means is inoperative and thereby obtain an intermittent segregation of fluid; to provide a segregator having a float operated needle valve and means cooperating with said valve to control the flow of fluid into and out of the float chamber.

A still further object of the present invention is to provide in a dispensing apparatus of this character, suction impelling means, a fluid segregator incorporating a float controlled valve mechanism for controlling the passage of undesirable fluid into said impelling means, and pressure responsive means controlled by the suction effects of said impelling means for destroying said suction should said valve mechanism fail to respond and thereby prevent the undesirable liquid from reaching said impelling means.

A still further object of the present invention is to provide a unitary dispensing unit of compact form incorporating a fluid segregator for the isolation of fluids of different specific gravities, said unit being readily attachable to a fuel drum of standard construction by means of a single servicing coupling which latter incorporates a minimum of operating parts.

With these and other objects in view, the invention consists in the novel arrangement and combination of parts, all of which will be particularly pointed out and afterwards defined in the amended claims.

In the drawings Figure 1 is a side elevation of the truck in inverted position upon a fuel drum.

Figure 2 is a view illustrating the truck with

the drum attached and swung into a servicing position.

Figure 3 is a front elevation of the truck with fuel drum removed.

Figure 4 is a top plan view of the servicing truck with the drum attached.

Figure 5 is a view of the truck per se, in folded position.

Figure 6 is an enlarged detail view, partly in section, of the locking mechanism for the folding portion of the truck.

Figure 7 is a vertical sectional view of the segregator mechanism and the coupling for attachment of the same to a fuel drum.

Figure 8 is a part detail view of the lower portion of the segregator illustrated in Figure 7.

Figure 9 is a part sectional view of the fuel pump and suction control mechanism.

Figure 10 is an enlarged vertical sectional view of the float operated control mechanism generally illustrated in Figure 9.

Figure 11 is a part sectional view of the fuel pump operating handle.

Figure 12 is a front elevation of Figure 11.

Figure 13 is an enlarged side elevation of a clamping device for holding the fuel drum on the servicing truck.

Figure14 is a top plan view of Figure 13.

Figure 15 is an enlarged sectional view of the dispensing nozzle used in my invention.

Figure 16 is a sectional view taken on the line 16—16 of Figure 15.

Figure 17 is a sectional view of a modified form of dispensing nozzle and

Figure 18 is an enlarged detail sectional view of the telescoping handles of the fuel truck.

Referring more particularluy to the drawings wherein corresponding parts are designated by like numerals throughout the several views, the apparatus in one of the present preferred embodiments of my invention herein illustrated generally comprises a truck body portion A, a segregating and dispensing mechanism B and a source of fluid supply C.

The truck body portion A comprises a framework of general tubular construction and specifically includes a pair of upstanding rocker members 10 and 11, of modified C shape, which are disposed in spaced parallel relationship. These rocker members at their upper free ends are suitably bent inwardly to form therebetween an arcuate portion 12, the radius of curvature of which is substantially equal to the adjacent radius of the attaching drum C. At their lower ends the rocker members are suitably bent to provide horizontally disposed base forming portions 13 and continuing laterally disposed bracing portions 14, forming a partial support for the bottom of the fuel drum. The base portions 13 are further provided with shoes 13' having serrated lower edges 14' to prevent skidding or slipping of the truck when moving the same from the position illustrated in Figure 1 to that position illustrated in Figure 2.

Intermediate the upper and lower ends of the rocker elements 10 and 11, there is positioned inwardly extending tubular brace members 15 and 16 which are suitably welded or otherwise fixedly secured at their outer ends to the said rocker elements. These brace members incorporate lateral arms 17 and 18, the inner of which, identified by the numeral 18, is of arcuate shape, the radius of curvature of which is substantially equal to the adjacent radius of the supply drum. Interposed between the arm 18 and the arcuate portion 12 of the rocker elements, I provide a backing plate 19 which is fixedly secured at its lower ends to the arm 18. The upper end of the backing plate embodies a strap 20 which is looped around the upper free ends of the rocker elements 10 and 11. This backing plate is provided with a lateral extension 21 having its outer portion, shown at 22, suitably bent to provide a bearing portion 23, said portion being secured, as by welding to the one rocker element. A pump 24, forming a part of the dispensing mechanism B, to be hereinafter described in detail, is carried upon the backing plate.

Each of the brace members 15 and 16 are provided with handles to assist in moving of the truck over the ground when so desired. To this end, I provide telescoping tubular sections 25 and 26, each of which are slidable longitudinally within a companion brace member. These handles are closed at their outer ends by means of knurled plugs 27 to which inwardly disposed springs 28 are attached at their outer ends, the inner ends of said springs being suitably anchored to stationary bearings 29 which are inserted in the inner end of said brace members.

The truck A is provided with running wheels to facilitate transportion over the ground, as shown in Figure 5. The lateral bracing portions 14, heretofore mentioned, have pivotally attached thereto the inner ends of a wheel mount which incorporates an arrangement of tubular strut members, including a pair of horizontally disposed supporting plates 30 upon which the base of the drum C is adapted to rest. The wheel mount also includes main strut members 32 and 33 which are fixedly secured at their outer ends to an axle 31 upon which the running wheels are rotatably mounted. At their inner ends, the strut members 32 and 33 are provided with separable coupling devices for detachably engaging the inner ends of the said strut members with the rocker elements 10 and 11, heretofore mentioned. As shown more particularly in Figure 6, the rocker elements are provided with brackets 34, each bracket having an outer clevis portion 35 carrying a coupling pin 36 adjacent the end thereof. The inner end portions of the strut members 32 and 33 are formed with semi-spherical grooves 37 adapted to be engaged by the coupling pins 26.

To effect coupling engagement between the coupling pins 36 and the inner ends of the strut members 32 and 33, I provide hook shaped locking elements 38 which lockingly engage with the pins 36, as illustrated in the full line position in Figure 6. These locking elements are pivotally mounted adjacent the ends of the strut members and are formed with clamping portions 39 adapted for being operatively engaged by spring loaded sleeves 40 that are slidable upon the strut members and which operate to maintain said elements in locking position. By providing a mounting arrangement for the wheels in the above described manner, the truck may be readily collapsed as shown in Figure 5, so as to occupy a minimum of space when not in use.

The backing plate 19, heretofore mentioned, has secured thereto a metallic strap, generally indicated by the numeral 41, adapted for being tightly strapped about the mid-portion of the drum to securely hold the drum in servicing position upon the truck. Referring more particularly to Figure 13, it will be noted that the free end of the one strap section 40a is provided with a coupling member 42 which includes a base portion 43 that is riveted or otherwise fixedly se-

cured to the outer free end of the said strapped section. This base portion has formed integrally therewith a centrally disposed lug **44** having a longitudinally disposed threaded bore in which is received the threaded end of a T-shaped screw **45**. The T end of this screw has pivotally attached thereto a loop member **46**. The other strapped section **40***b* is provided with a clamping member **47** adapted for detachable clamping engagement with the coupling member **42**. This clamping member includes a clamp base **48** that is riveted or otherwise fixedly secured to the other free end of the strapped section **40***b*. The end of the clamp base **48** is provided with a pair of spaced ears **49**, interposed between which there is a clamp **50**, the latter being pivotally secured to said ears by means of a suitable hinge pin **50***a*.

The clamp **50** is provided with a hook shaped clamping portion **51** adjacent its pivoting end, adapted for engaging the loop member **46**. This clamping portion is so disposed with respect to the pivoting end of the clamp that upon engagement of said loop in said clamping portion, the ends of the strapped sections **40***a* and **40***b* respectively, are drawn toward one another and into intimate clamping engagement with the walls of the supply drum to maintain said drum immovable on the truck frame.

The fluid segregating and dispensing system hereinabove mentioned, comprises a fluid segregator, generally illustrated by the numeral **52**, which is adapted to segregate fluids of heavier specific gravity from fluids of lighter specific gravity, and fluid impelling means such as a suction pump indicated at **24**, said fluid segregator being interposed between the fuel supply drum C, preferably adjacent thereto, and the suction pump **24**, and being adapted to segregate the undesirable from the desirable components prior to the pumping of the desirable component from the source of supply to the point of delivery. The improved fluid segregator generally embodies those principles disclosed in my reissue United States Letters Patent, No. 19,227 granted to me on June 26, 1934, and includes a container **53** having a float chamber **54**, a float **55** disposed within such chamber and a needle valve assembly, generally indicated by the numeral **56**.

The container **53** is constructed of two separable sections **53***a* and **53***b*, the open meeting ends of which are formed with flanged portions **57** and **58**, said portions being held together in united relationship by means of a split ring-shaped clamping band **59**. This clamping band, shown more particularly in Figure 8, is provided with a plurality of radially arranged, peripherally spaced clamping members **60**, each being provided with a wedge-shaped groove **61** adapted for embracing similarly shaped shoulders formed on the flanged portions of the separable sections. The extreme outer ends of the band **59** are suitably held together in clamping relationship by means of a clamping device, generally indicated by the numeral **62**.

In accordance with the principles set forth in my above identified reissued patent, the float **55** is slidably mounted upon a hollow guide member **63** that is screwed into the bottom section **53***b* of the float container, and is constructed of two cylindrical sections **64** and **65** having their open ends joined together preferably by brazing or welding along their abutting edges. The float may be adjusted by a liquid ballast in substantially the same manner disclosed in my above referred to reissued patent, or in accordance with the teachings of my co-pending application Serial No. 448,391, filed April 29, 1930, wherein I have taught of a new and novel method of adjusting a float of this character, and to this extent reference is made to my prior teachings as to the specific methods and means for effecting such adjustment.

The needle valve assembly **56** comprises an upper needle valve **66** which cooperates with a valve seat **67** formed in the upper end of the container section **53***a* to control the flow of liquid through the outlet of the float chamber, a lower needle valve **68** which cooperates with a lower valve seat member **69** provided in the lower end of the section **53***b* to permit segregation of the heavier liquid from the float chamber, and yieldable means, such for example as a coiled spring **70**, which is operatively connected to said upper and lower needle valves.

The needle valve assembly has a limited vertical floating movement relative to the float, such movement being effected by providing the stem **71** of the lower needle valve with a laterally disposed pin **72** which is guided in oppositely disposed elongated slots **73** provided in a central collar **74** forming a part of the float, said collar being adapted for slidable movement upon the float guide member **63**. To permit the upper needle valve **66** to be properly seated upon its valve seat **67**, the upper end of the collar **74** is provided with an enlarged circular flange portion **75** sufficiently large to permit of a small amount of side clearance between the walls of the flanges and the base diameter of the upper needle valve. In so doing, any slight misalinement between the valve member **67** and the upper needle valve may be automatically corrected by a slight relative lateral motion between the upper needle valve and the collar **74**, and thereby effect a proper seating of the said valve.

As shown in Figure 7, the upper section **53***a* of the float container is provided with a window **76** to permit visual inspection of the contents of the float chamber when so desired.

Since, as hereinabove stated, it is desirable to segregate the heavier fluid from the lighter fluid after such fluid leaves the supply drum C and before entering the pump **24**, and to effect an intermittent discharge of the heavier liquid from the segregator unit, the base end of the lower section **53***b* is formed with a primary discharge outlet which incorporates a series of intercommunicating passages **77***a*, **77***b* and **77***c*, the intermediate of which identified by the numeral **77***b*, is provided with a ball check valve **78** which operates in a manner such as to permit of a flow of liquid therethrough from the float chamber but prevents atmospheric air from entering into such chamber through the said valve.

There is also provided in the lower section **53***b*, a secondary discharge device, generally indicated by the numeral **79**, which is manually operable to permit of a more rapid discharge of the heavier liquid should the amount of such heavier liquid that accumulates within the float chamber become excessive and a rapid drainage thereof be desired. As shown more particularly in Figure 7, the lower section **53***b* of the float chamber is provided with an offset fluid discharge outlet indicated at **80**, which has mounted therein the discharge device hereinabove mentioned. This device comprises a housing **81** screwed into the open or threaded end of the outlet **80**, means being provided, such as a gasket **81***a*, to effect a fluid-tight connection between the housing **81** and the

upper end of the discharge outlet 80. This housing incorporates a central bearing portion 82 in which is slidably arranged the stem of a valve 83, the latter being adapted to engage a valve seat 84 which is associated with the outlet 80. The upper end of the housing 81 is provided with a chamber for receiving a spring 85 which surrounds the stem of the valve 83, said spring bearing at its upper end against the bottom of the valve 83 and at its lower end against the end wall of the chamber 85. Such an arrangement operates to normally maintain said valve in intimate seating engagement with its valve seat 84. The stem 86 of the valve 83 extends exteriorly of the housing 81 and has suitably attached thereto a foot operated lever 87, the inner end of which, indicated by the numeral 88, is formed with a camming portion 89 adapted to bear against the outer face of the housing. Suitable fluid passageways 90 extend through the walls of the housing 81 and communicate with the chamber outlet 80 to permit of a rapid drainage of the fluid therethrough upon depression of the valve 83 to its open position.

On its one side, the upper container section 53*a* is provided with an inlet passage 91 for the entering fluids, the walls of said passage being formed with a flanged portion 92 to which is connected the similarly flanged end of an adapter housing 93 provided with a coupling member which latter is adapted for removable connection with the supply drum.

As shown more particularly in Figure 7, the adapter 93 comprises a fluid passageway 95 which communicates with a main chamber 96 formed in the body of the adapter, the ends of said main chamber being suitably apertured to provide oppositely disposed bearing portions for rotatably receiving therein a coupling member 97, provided with an outer threaded end to permit screwing the same into the end of the fluid drum. A gasket 98 is suitably interposed between the outer walls of the chamber 96 and the drum to provide a fluid tight joint therebetween.

The opposite end of the coupling member is formed with an outer flanged portion. A sealing gasket 99 is interposed between this flanged portion and the adjacent outer walls of the chamber 96 to provide a fluid tight connection. The coupling member 97 is maintained in position within the chambered portions of the adapter by means of an annular ring 100 which is fixedly secured to the adapter and which engages the flanged portion of the coupling member 97 in such a manner as to permit rotational movement of the latter within said adapter housing but prevent linear movement thereof.

It will be noted that I have provided an attaching wrench 101 on the outer end of the coupling member 97 to assist in securing the said member to the fuel drum.

The adapter 93 is further provided with an integral upstanding sleeve portion 102 which extends into the interior of the main fluid receiving chamber 96. This sleeve portion serves as a guide for the coupling member 97. It will also be noted that the intermediate portions of the walls of this sleeve are sufficiently enlarged to provide an air passageway 103 which extends about the coupling member and which communicates with a lateral port 104 provided in the end well of the adapter. This port is in operative communication with the air column in the rocker elements 10 and 11, heretofore mentioned.

The coupling member 97 is provided with a centrally disposed stand-pipe 105, the upper end of which communicates with the fuel drum C. At its opposite or inner end, the stand-pipe terminates in a transverse wall or partition formed adjacent the base end of the coupling member. Suitable passageway 106 and 107 effect communication between the standpipe and the air passageways 103. A ball check valve 108 is positioned adjacent the inner end of the stand-pipe, the purpose of which is to permit air to pass through the stand-pipe and into the fuel drum C but prevent any fluid passing therethrough.

The operation of this portion of the segregator unit hereinabove described in detail, is as follows:

When it is desired to attach a truck and segregator unit to the supply drum, the truck is inverted into the position indicated in Figure 1 and thereafter mounted upon the fuel drum, after which connection is made between the drum C and the segregator unit by threading the service coupling into the threaded opening provided in the fuel drum. The mounting or drum holding straps, heretofore mentioned, are thereafter tightly clamped about the mid-portion of the fuel drum. The truck, with the drum so attached, is thereafter tumbled into the position illustrated in Figure 2. In so doing, it will be noted that the segregator unit is positioned at the bottom of the drum. Obviously with the drum in the position indicated in Figure 2, it is essential that air be admitted to the top of the drum. Since the stand-pipe 105, heretofore mentioned, is in operative communication with the air column which is present in the rocker elements 10 and 11, it will be obvious that such air will readily pass through the stand-pipe 105 and rise through the liquid contained within the drum through the medium of the air passageways 103, 106 and 107. With the liquid in the supply drum under atmospheric pressure, the fluid contained therein may be readily drained or pumped to the segregator unit through the service coupling 97, into the main chamber 96, and thence through the fluid passageway 95 into the float chamber of the segregator unit. Obviously the fluid in the supply drum is prevented from entering the passageways 106 and 107 by operation of the check valve 108.

As long as the fluid entering the float chamber is of a desired specific gravity, the float will be in a position of rest at the bottom of the float chamber and the incoming liquid may be readily pumped into the pumping unit 24. If, however, the specific gravity of the incoming liquid corresponds to that for which the float has been adjusted (which in this instance is the undesirable or heavier component) the float, in responding to such liquid, will rise within the float chamber and the upper needle valve 66 will be seated on its valve seat 67 and prevent the further passage of any liquid from the segregator unit. As long as the float is in its displaced upward position, the heavier liquid which has collected in the bottom of the float chamber may be readily drained therefrom through the passageways 77*a*, 77*b* and 77*c*. Should the accumulation of the heavier liquid in the float chamber become excessive, such excess of liquid may be more rapidly drained from the float chamber by depression of the valve 83 to an open position. Since it is desirable to segregate the heavier fluid from the lighter fluid after such fluids leave the supply drum and before entering the suction pump, the segregator must be rendered air tight to permit efficient and instantaneous withdrawal of the fluid from the source of supply.

Inasmuch as the fluid is pumped from the source of supply by suction means, it is imperative that the vacuum in the float chamber be destroyed when the pump is inoperative in order that the heavier fluid which accumulates in the float chamber may be gravity discharged or drained therefrom. Accordingly the present invention includes means for not only rendering the segregator fluid tight but additional means for destroying the suction when the pump is inoperative. As shown more particularly in Figure 11, the suction pump 24 is operatively connected to the upper outlet opening of the segregator by means of a flexible rubber hose, indicated at 110. This suction pump comprises a casing 111 formed with a main pumping or suction chamber 112 and an auxiliary or by-pass chamber 113 which is separated from the main pumping chamber by an intervening wall but in operative communication therewith through the medium of an upper fluid passageway 114 and a lower fluid passageway 115.

The main pumping chamber 112 incorporates a rotary pumping member 116 which is provided with a drive shaft 117 projecting through the casing on its one side, said shaft being adapted for receiving a hand crank 118 to effect manual rotation of the said rotary member. Near its outer end, the drive shaft has inserted therethrough a transverse pin 119 adapted for being engaged by clutching dogs formed on the shaft engaging end of the handle. At its extreme outer end, the crank is provided with similarly arranged crank dogs 120 adapted for being engaged by suitable power driven means. Intermediate its outer end and the pin 119 heretofore mentioned, the drive shaft is formed with a peripheral groove 121. The shaft engaging end of the crank 118 is formed with a bearing portion 122 into which projects a locking lug 123 adapted for engaging in the peripheral groove 121, upon disengagement of the said crank with the drive shaft pin. This locking lug is slidably mounted within the hollow shank portion 123 of the crank and is backed up by a spring 124 which operates to cause the locking lug to be forced outwardly and into the path of the groove 121 when the crank is moved longitudinally of the drive shaft and thereby prevent accidental removal of the crank. It is desirable however, that the crank be readily removable from the drive shaft. To this end the locking lug 123 carries a transverse pin 125 which operates in suitable elongated openings 126 formed in the side walls of the shank portion 123. The ends of the pin 125 extend beyond the walls of the shank portion a distance sufficient to permit grasping of the pin by the fingers to thereby withdraw the locking lug from engagement with said peripheral groove.

The rotary pumping member 116, heretofore mentioned, is positioned off-center with respect to the center of the pumping chamber 112 and is provided with a plurality of radially arranged slots 127 having vanes 128 slidably mounted therein, the outer ends of which are maintained in intimate sliding engagement with the walls of the pumping chamber, so that upon rotation of the said rotary member in a counterclockwise direction, fluid is pumped from the source of supply into said pumping chamber through the intake port 129 and thence toward the point of delivery through the exhaust port 130.

As shown in Figure 9, an auxiliary intake port 131 is formed in the pump casing adjacent the primary intake port 129 to permit attachment of an additional supply drum to the pump if desired.

The by-pass chamber 112, heretofore mentioned, has positioned therein a float 132 provided at its upper end with a pin 133 which is guided vertically in an opening 134 formed in the upper wall of said chamber. A needle valve 135 is secured to the lower end of the float. This valve is positioned in a bored opening 136 provided in the upper end of a lower bleeder valve member 137, the lower end of said opening being provided with a valve seat 138 against which the needle valve 135 is adapted to seat. The stem 139 of the bleeder valve member is provided with a plurality of fluid orifices 140 which afford communication between the opening 136 and the lower outlet fluid passageway 115.

The face of this bleeder valve member is adapted to seat against a valve seat member 141 provided in the lower end of the by-pass chamber. As shown in Figure 9, the by-pass chamber 113 is provided at its lower end with a threaded opening 142 into which is threaded a valve housing 143 formed with an outer flanged portion 144, suitable means, such as a gasket 144a, being provided to render the connection between said flanged portion and the outer wall of said by-pass chamber fluid tight. The upper portion of the valve housing terminates in an inner sleeve portion 146 which is of reduced diameter, said sleeve portion being externally threaded and being adjustable linearly relative to said valve housing. A coiled spring 148 is supported against movement at its lower end by the upper closed end of a collar 147, the upper end of said spring member bearing against the body of the valve member 137.

It will also be noted that the collar 147 is provided on its one side with a keyway 148 which slidably engages a key 150 suitably positioned within the inner side wall of the opening 142. The foregoing arrangement is such as to permit of a relative linear adjustment between the collar 147 and the valve housing to increase or decrease the effective tension on the spring 148 and thereby control the pressure required to effect an opening of the bleeder valve member 137.

The valve housing is further provided with an inner web portion 151 including an integral central threaded bearing portion 152. A tubular member 153 is screwed into this threaded portion and is adapted for being locked in any one of a number of adjusted positions by a lock nut indicated by the numeral 154. The stem 139 of the bleeder valve member 137 is guided in its up and down movement by this tubular member.

The valve housing at its outer end is hollow, said hollow portion being provided with internal threads adapted for receiving a bushing 155, the exposed outer end of which is provided with a plurality of air openings 156. The inner end of this bushing is closed by an end plate 157 which is suitably secured thereto as by brazing, welding or the like, and provided with a central opening into which the lower end of the tubular member 153 is adapted to extend. A gasket 158, interposed between the end plate 157 and the web portion 151, prevents air leaks upon assembly of the bushing within the valve housing. Any suitable pressure responsive element, such for example as a bellows 159, may be disposed within the bushing 155 and has its inner end fixedly secured, as by welding or the like, to the end plate 157. The outer or free end of the bellows is closed by means of a base plate 160. This plate carries an upright plunger 161 that is arranged

for slidable movement within the hollow stem 139 of the bleeder valve member 137. Under normal conditions, the upper or free end of the plunger 161 is positioned in close proximity to, but spaced from, the tip end of the needle valve 135.

Intermediate its ends, the tubular member 153 is provided with a collar 162 against which the inner end of a compression spring 163 is adapted to bear, the outer end of said spring bearing against the base plate 160. From the foregoing detailed description, it will be apparent that by loosening the lock nut 154, the tubular member 153 may be adjusted linearly along the stem of the bleeder valve member 137 and in so doing, the tension on the spring 163 may be increased or decreased and thus control the contraction or expansion of the bellows. The web portion of the housing is suitably provided with a plurality of openings 164 through which the liquid which is present in the by-pass chamber may enter the bellows to subject the latter to such liquid pressure as may be present in the said chamber.

The operation of the pump mechanism hereinabove described in detail is as follows:

When the segregating and pumping apparatus is initially installed upon a fuel supply drum, the pumping unit will be void of any liquid. If the pump is thereafter operated, for the obvious purpose of pumping liquid from the drum to effect a discharge of the liquid at the point of delivery, the segregator and appurtenant mechanism must be rendered air tight to obtain instantaneous pumping action. The pumping unit being void of any liquid, no liquid will be present in the by-pass chamber. Consequently, the float 132 will be in a position of rest in the lower end of said by-pass chamber and the lower needle valve 135 will be seated against its valve seat 138 and prevent air from entering the intake end of the suction chamber 112. Under these circumstances liquid may be readily pumped from the source of supply through the segregator unit and toward the point of delivery. Should operation of the pump continue, and fuel discharging from the pump be prevented from issuing at the point of delivery, the incoming fluid will readily bleed around the pump through the by-pass chamber 113 and the bleeder valve member 137, it being understood that during this period of operation, the pressure of the liquid trap in the pump will automatically open the lower bleeder valve member 137 and permit circulation of the trap liquid around the suction chamber and the by-pass chamber through the upper and lower fluid passageways 114 and 115.

Obviously when the suction and the by-pass chambers of the pump are filled with liquid, the float 132 will be displaced upwardly thus raising the needle valve 135 from its seat 138. Under these circumstances, when a predetermined head of the heavier liquid has accumulated in the float chamber, to raise the float upwardly, there is available a continuous column of liquid represented by the summation of those columns extending from the point of delivery, through the by-pass chamber in the pump and the connection between the pump and the segregator unit, to destroy the vacuum in the float chamber and thereby effect a rapid and gravity segregation of the heavier liquid from the segregator float chamber.

The construction of the float 55, heretofore mentioned, is such that under ordinary circumstances a proper seating of the upper needle valve 66 against its valve seat 67 should be obtained so that, when so seated, the pumping of any liquid from the float chamber into the pump, will be prevented. It is recognized, however, that situations may arise where slight leakage of liquid, due to defective seating of the needle valve on the valve seat 67, may occur. Should such a condition arise, and should the float chamber under such circumstances, become completely filled with the liquid of heavier specific gravity, there would result a slight discharge of the heavier liquid from the segregator into the hose connection leading toward the pumping unit. Such a condition of affairs is to be highly avoided under any and all circumstances if the apparatus is to have its intended high degree of proficiency in the dispensing of liquids having a predetermined or desired specific gravity. Such being the case, and in the event of faulty seating of the needle valve 66 in the manner set forth hereinabove, when the needle valve 66 is seated, the suction effects in the suction chamber of the pumping unit will be materially increased, such increase in pressure automatically operating to effect a partial collapse of the bellows 159. The bellows, in collapsing, will move the plunger 161 into contactual relationship with the tip end of the needle valve 135 and will move the said valve away from its seat 138. Immediately upon the happening of such a contingency, the pressure drop at the intake of the pump will be diminished and consequently prevent the undesirable heavier liquid that has leaked past the outlet passage of the segregator unit from reaching the pump.

As shown more particularly illustrated in Figure 15, the outlet passage of the pump is provided with a servicing hose 166 having at its outer end a dispensing nozzle 167. This nozzle incorporates a spring controlled, pressure-operated check valve 168 for controlling the pressure of the liquid to be discharged therethrough. It will also be noted that this check valve is formed with a centrally disposed air orifice 169 having a valve seat 170 which is controlled by a needle valve 171, the latter comprising a cylindrical body portion 172 that is mounted for slidable movement in a tubular member 173 carried by the check valve 168. This needle valve is backed up by a light spring 172*a* which is moved into open or closed position, depending upon the relative position of the dispensing nozzle. For example, if the dispensing end of the nozzle is uppermost, the valve 171 will be actuated into an open position by the atmospheric pressure which is acting upon it, it being understood that the spring 172*a* is under just a sufficient tension to normally maintain the needle valve 171 closed during operation of the pumping unit. Consequently, the static head of pressure of the continuous column of liquid extending from the point of delivery to the segregator chamber, is immediately available to quickly destroy the vacuum in the float chamber and permit a gravity discharge of the liquid of heavier specific gravity from the float chamber. When the position of the dispensing nozzle is reversed, a spring actuation of the needle valve 171 into seated position on the valve seat 170 will be obtained so as to render the segregator and pumping unit air tight and permit of their subsequent operation.

A modification of the nozzle arrangement is illustrated in Figure 17. This nozzle incorporates a body portion 275 which includes a chamber 276 in which is conveniently positioned a primary

valve seat 277. A valve 278 for the release of fluid from the nozzle is normally maintained in seated relationship on the valve seat 277 by means of a coil spring 279 which surrounds the upper stem 280 of the said valve. The primary valve 278 is formed with a lower stem 281 which passes through a stuffing box 282 provided in the body portion 275 to prevent leakage of any liquid at the point where the lower stem passes through the housing.

The outer end of the lower stem 281 is adapted for being engaged by the free end of a manually operated lever 283 which is pivotally mounted to the housing by a clevis and pin arrangement, indicated at 284.

The upper stem 280 of the primary valve is tubular in cross section and guided in its up and down movements upon the end of a valve guide member 285 that is screwed into the upper end of the housing 275. The lower end of the valve guide is hollow to slidably receive therein the upper end of a secondary valve 286 which seats upon a valve seat 287 formed in the lower valve stem 281. This valve seat communicates with the atmosphere through the medium of a plurality of fluid passageways 288 and with the inlet end of the housing by means of a fluid orifice 289. The secondary valve 286 is normally closed by means of a light weight spring shown at 290.

From the foregoing detailed description of the modified nozzle arrangement, it will be apparent that as long as the nozzle is not used in dispensing fluid from the apparatus, the atmospheric pressure which is acting upon the secondary valve 286 will open said valve against the relatively slight resistance offered by the spring 290 to destroy the effects of suction in the float chamber of the segregator and permit the liquid of heavier specific gravity to be gravity segregated from the segregator.

What I claim is:

1. A device of the character described, comprising, a normally horizontally disposed load supporting portion and a substantially vertically arranged rocker portion extending above and below the point of support of said supporting portion, said rocker portion having a curvature such that said device and the load to be carried thereby will produce moments of inertia of sufficient magnitude, when the device and the load is tilted forward from an inverted position through the center of balance, as to be capable of lifting said load during the rocking movement and bring the load into an elevated upright position.

2. A device of the character described adapted to be detachably connected to a given load comprising, an upright rocking portion and a horizontal load supporting portion disposed in substantial continuation of one another, said upright portion being provided with an arcuate ground engaging surface so constructed and arranged as to enable said device to rock through an angle substantially equal to 180° and said load supporting portion being provided with a load contacting portion so disposed with respect to said load and said arcuate ground engaging surface such that tumbling of the device from a substantially inverted position will cause the load to be elevated and said device brought into an upright position.

3. A device of the character described, comprising, a normally horizontally disposed load supporting portion, having a wheel at the forward end thereof, and a substantially vertically arranged rocker portion extending above and below the point of support of said supporting portion, said rocker portion extending a substantial distance below the point of support for the load and having a curvature such that said device and the load to be carried thereby will produce moments of inertia of sufficient magnitude, when the device and its load is tilted forward from an inverted position through the center of balance, as to be capable of lifting said load during the rocking movement and bring the load into an elevated upright position.

4. A servicing apparatus of the character described comprising in combination, a rocker portion on which the truck may rock from substantially inverted position to substantially upright load carrying position, a load supporting portion pivotally connected to said rocker portion and having a pair of wheels mounted thereon, and fluid impelling means for withdrawing the fluid from said container comprising a pump carried by said rocker portion and a segregator communicatively connected with said pump and adapted to be communicatively connected with said container and supported by said rocker portion.

5. A servicing apparatus of the character described comprising in combination, a rocker portion on which the truck may rock from substantially inverted position to substantially upright load carrying position, a load supporting portion pivotally connected to said rocker portion and having a pair of wheels mounted thereon, and fluid impelling means for withdrawing the fluid from said container comprising a pump carried by said rocker portion and a segregator communicatively connected with said pump and adapted to be communicatively connected with said container and supported by said rocker portion, said segregator being provided with means to permit the entry of air into container and to prevent the escape of the fluid from said container through said means during the withdrawal of fluid therefrom.

6. A device of the character described, comprising, a normally horizontally disposed load supporting portion and a substantially vertically arranged rocker portion, said rocker portion having its upper end at or near the upper end of the load and its lower end extending a substantial distance below the point of support for the load and having a curvature such that said device and a load to be carried thereby will produce moments of inertia of sufficient magnitude, when the device and its load is tilted forward from an inverted position through the center of balance as to be capable of lifting said load during the rocking movement and bring the load into an elevated upright position.

7. A servicing apparatus of the character described, comprising in combination, a truck for supporting a liquid container including a vertical load engaging portion and a horizontal load engaging portion, said vertical portions having a U-bend at the lower end thereof constituting a ground engaging support for the rear end of said truck, liquid impelling means adapted to be communicatively connected with said container for withdrawing the fluid therefrom and disposed substantially within the confines of and carried by said vertical portion.

8. A truck of the class described comprising a rocker portion normally in contact with the ground, a load supporting portion normally disposed at substantially right angles to and having

its point of support positioned substantially above the lower end of said rocker portion, said rocker portion having a curvature such as to produce a smooth curve of the center of gravity locus substantially throughout the act of inversion and means mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated from an inverted position into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof.

9. A truck of the class described comprising a rocker portion normally in contact with the ground, a load supporting portion normally disposed at substantially right angles to and having its point of support positioned substantially above the lower end of said rocker portion, said rocker portion having a curvature such as to produce a smooth curve of the center of gravity locus substantially throughout the act of inversion and a pair of wheels mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated from an inverted position into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof.

10. A truck of the class described comprising a rocker portion, a load supporting portion normally disposed at substantially right angles to and constituting an extension of said rocker portion with the point of support materially above the lower end of the rocker portion in the normal position thereof and connected thereto in such a manner as to enable said portions to be readily folded together and a pair of wheels mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof.

11. A truck of the class described comprising a rocker portion, a load supporting truss frame normally disposed at substantially right angles to and constituting an extension of said rocker portion with the point of support materially above the lower end of the rocker portion in the normal position thereof pivotally connected to said rocker portion at one point and releasably connected to said rocker portion at another point to enable said frame and rocker portion to be folded together, and a pair of wheels mounted on said frame and sufficiently forward of the points of connection between said frame and said rocker portion to prevent rocking of said truck beyond the load carrying position.

12. A truck of the class described comprising a rocker portion, a load supporting portion normally disposed at substantially right angles to and constituting an extension of said rocker portion, said rocker portion having a curvature such as to produce a smooth curve of the center of gravity locus substantially throughout the act of inversion and means mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof.

13. A truck of the class described comprising a rocker portion, a load supporting portion normally disposed at substantially right angles to and constituting an extension of said rocker portion said rocker portion having a curvature such as to produce a smooth curve of the center of gravity locus substantially throughout the act of inversion and means mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof.

14. A truck of the class described comprising a rocker portion, a load supporting portion normally disposed at substantially right angles to and constituting an extension of said rocker portion, said rocker portion having a curvature such as to produce a smooth curve of the center of gravity locus substantially throughout the act of inversion, means mounted on said load carrying portion sufficiently forward of the center of gravity of said truck such that when said truck is rotated into the load carrying position it will oppose the forces set up in said truck and prevent further rotation thereof and a pair of handles normally disposed within the confines of said rocker portion and extensible laterally therefrom.

15. A servicing apparatus of the character described, comprising in combination, a truck for supporting a sealed liquid container including a vertical load engaging portion and a horizontal load engaging portion, and a liquid impelling means carried by said truck and adapted to be communicatively connected with said container and having air intake means adapted to be communicatively connected with said container and with said impelling means to enable the dispensing of fluid from said container.

16. A servicing apparatus of the character described, comprising in combination, a truck for supporting a sealed liquid container including a vertical load engaging portion and a horizontal load engaging portion, and a liquid impelling means adapted to be communicatively connected with said container at the bottom thereof and a normally closed air intake means connecting said container with atmosphere thereat, said vertical load engaging portion having a tubular frame element connected with said venting conduit.

17. A servicing apparatus of the character described, comprising in combination, a truck for supporting a sealed liquid container including a vertical load engaging portion and a horizontal load engaging portion, and a liquid impelling means supported by said vertical load engaging portion and a segregator communicatively connected with said impelling means and adapted for communication with said container, said segregator having air intake means adapted to be communicatively connected with said container and said segregator.

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