United States Patent

[11] **3,601,285**

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[54] **METHOD AND SYSTEM FOR DISPENSING METERED AMOUNTS OF FLUID SUBSTANCES FROM BULK CONTAINERS**
8 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **222/20,** 222/66, 222/334
[51] **Int. Cl.** **B67d 5/30**
[50] **Field of Search** 222/326, 14, 20, 52, 66, 260, 261, 334

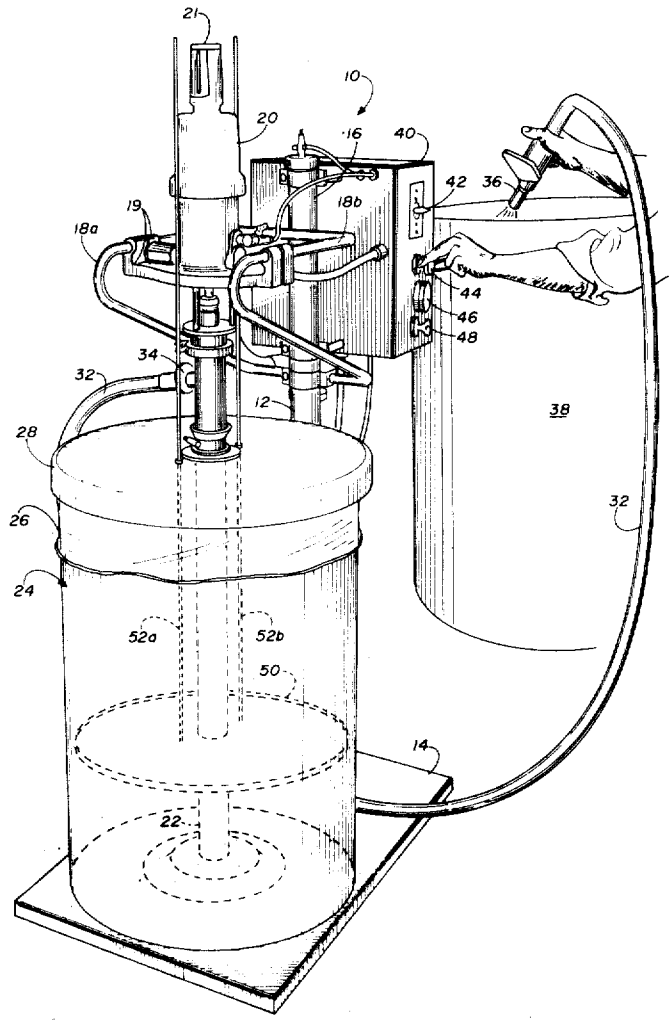
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ABSTRACT: A metered fluid-pumping system includes an upright support which may be selectively raised or lowered between two extreme positions. An air-operated pump is attached to the upper portion of the support and is adapted to be lowered within an open-topped bulk fluid container. A flexible hose is attached to the output of the pump to enable selective dispensing of metered amounts of fluid from the bulk container. Structure is provided to meter selected amounts of fluid pumped from the container according to a preselected stored count and then to automatically shut off the pump. Structure is also provided which continuously senses the level of the fluid within the bulk container while providing a nonimpinging wiping action on the interior walls of the bulk container, and then automatically shuts the pump off when the fluid is substantially exhausted from the container without losing the stored count.



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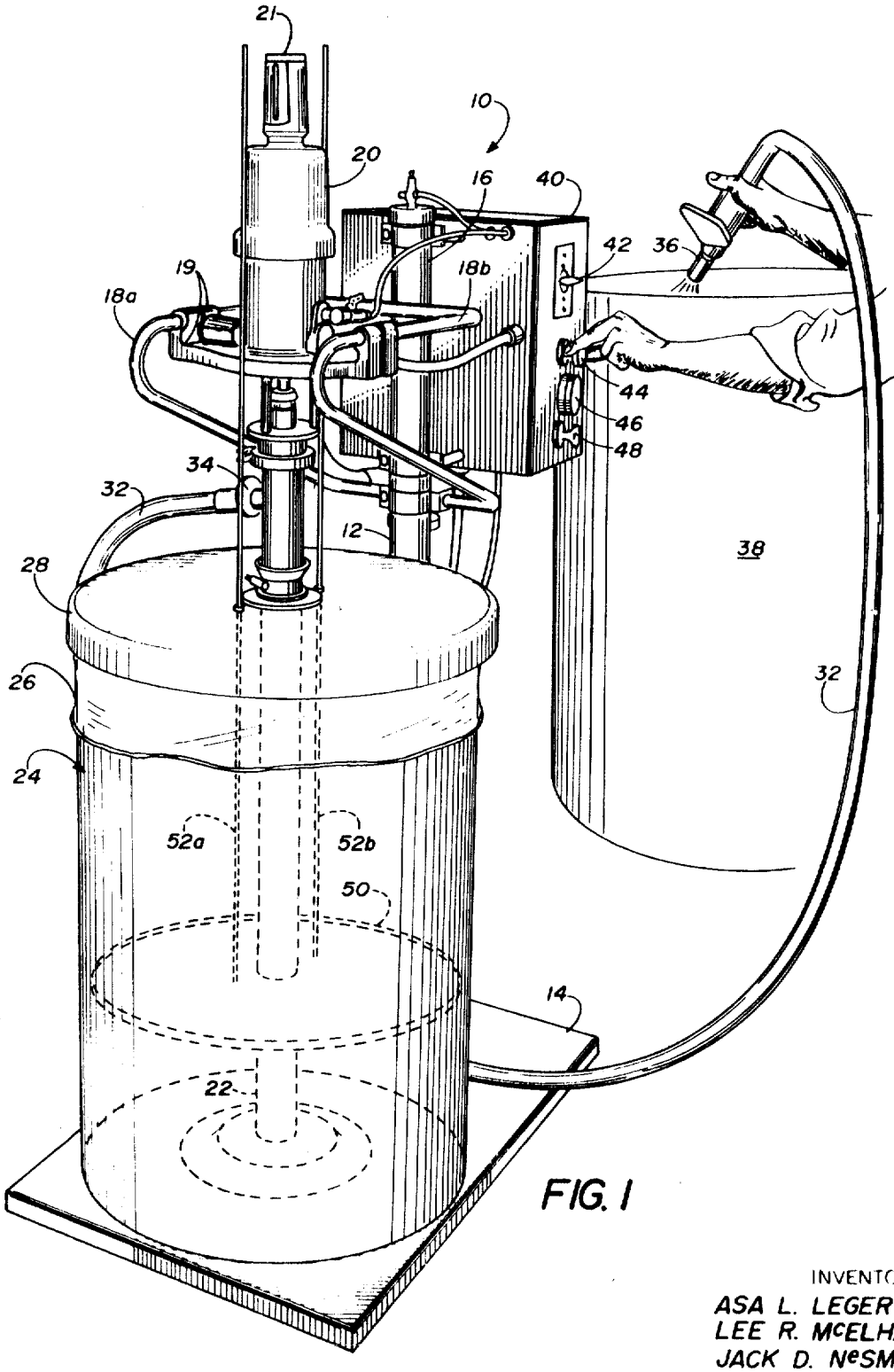


FIG. 1

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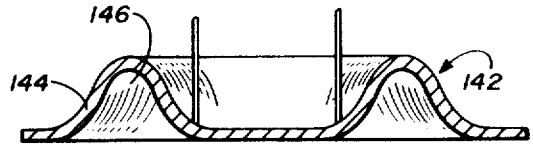


FIG. 8

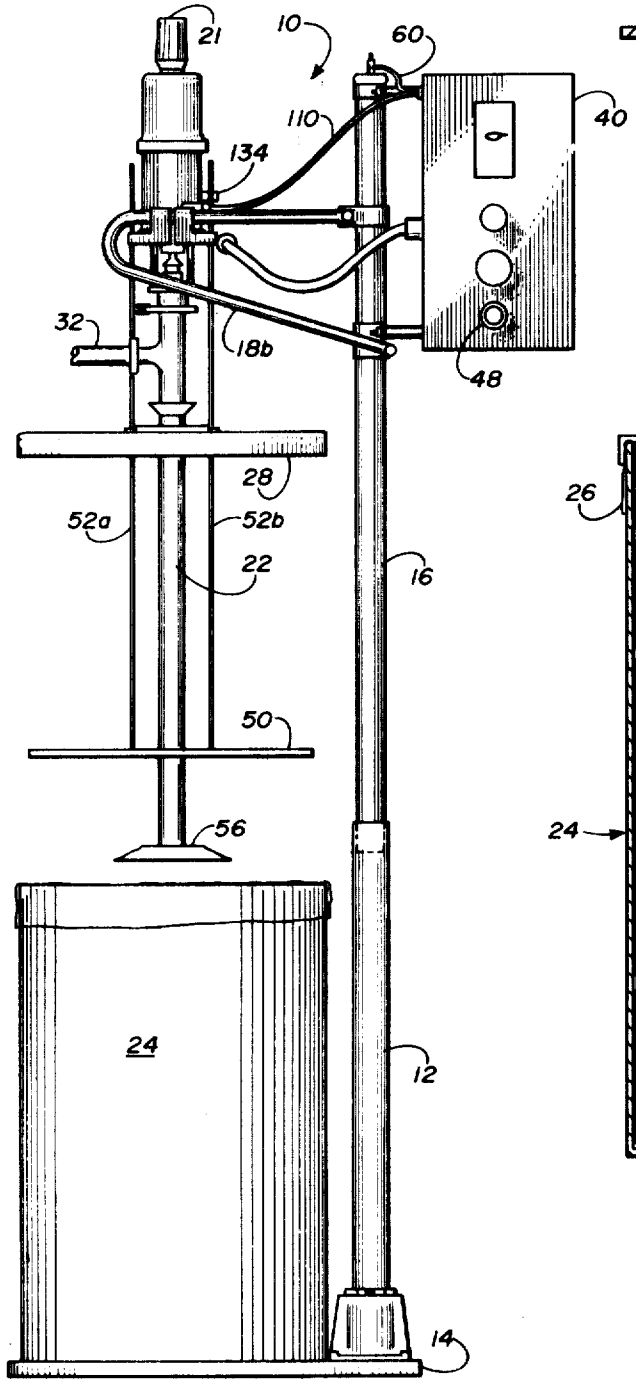


FIG. 3

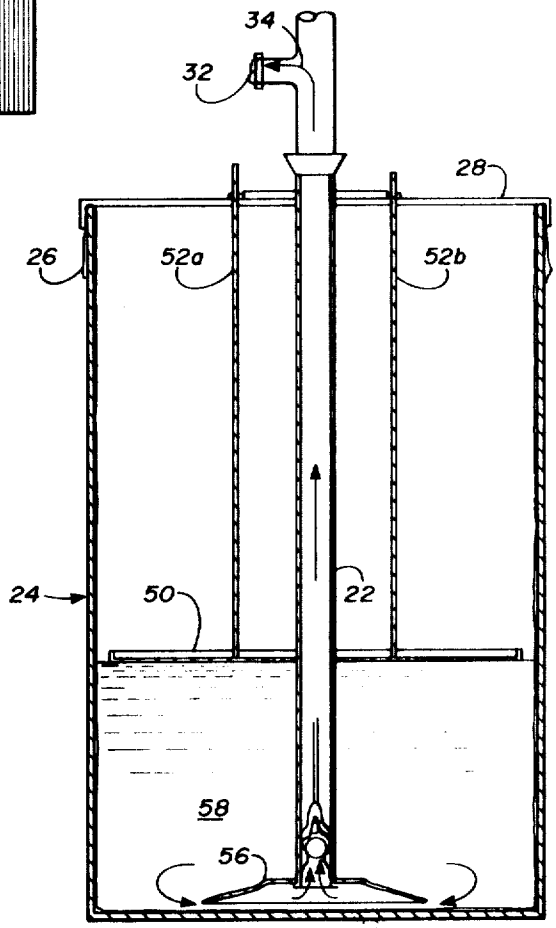


FIG. 2

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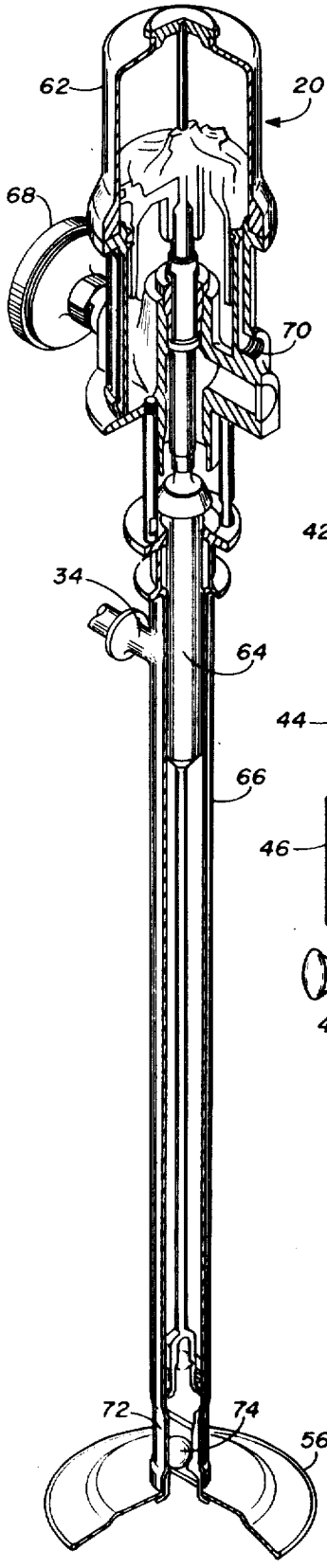


FIG. 4

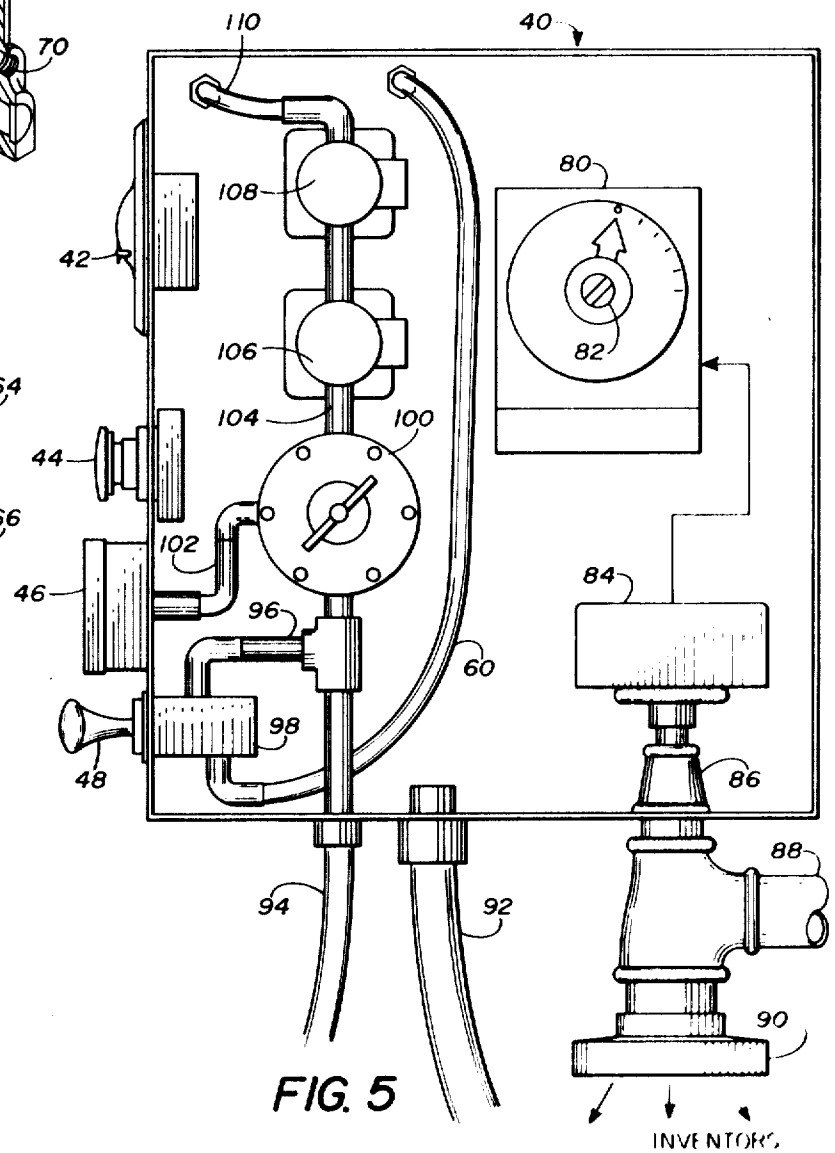


FIG. 5

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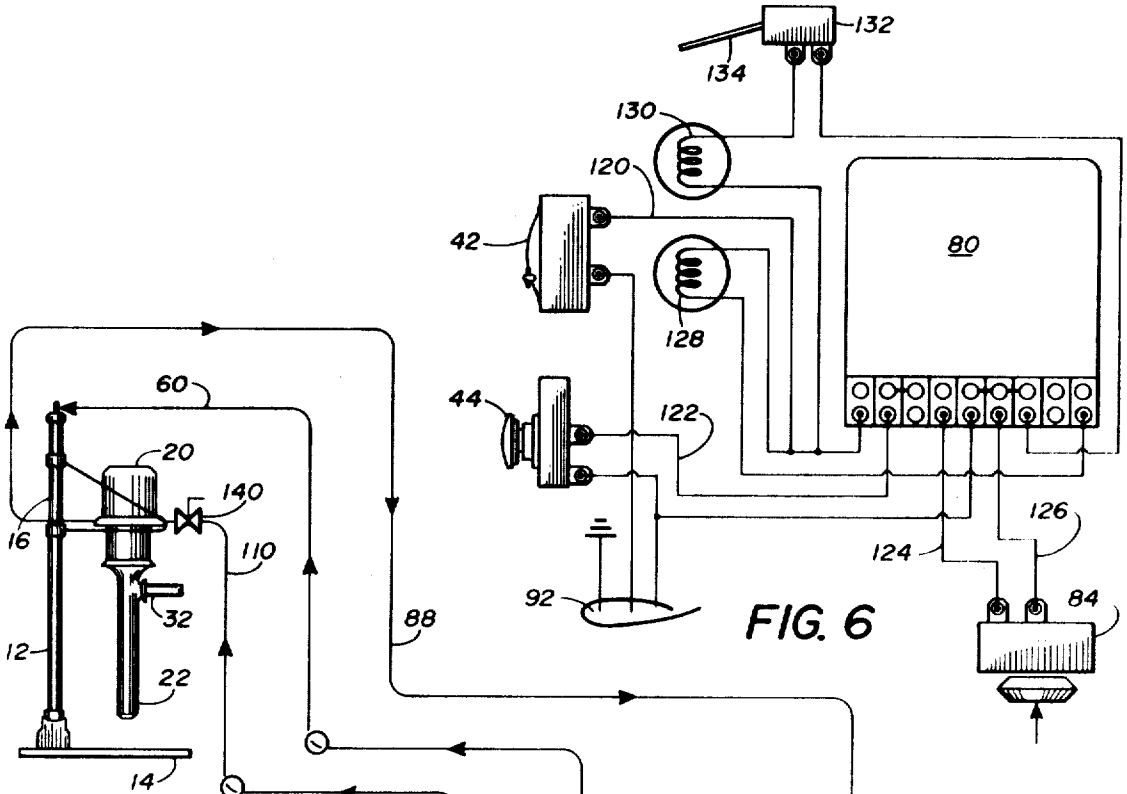


FIG. 6

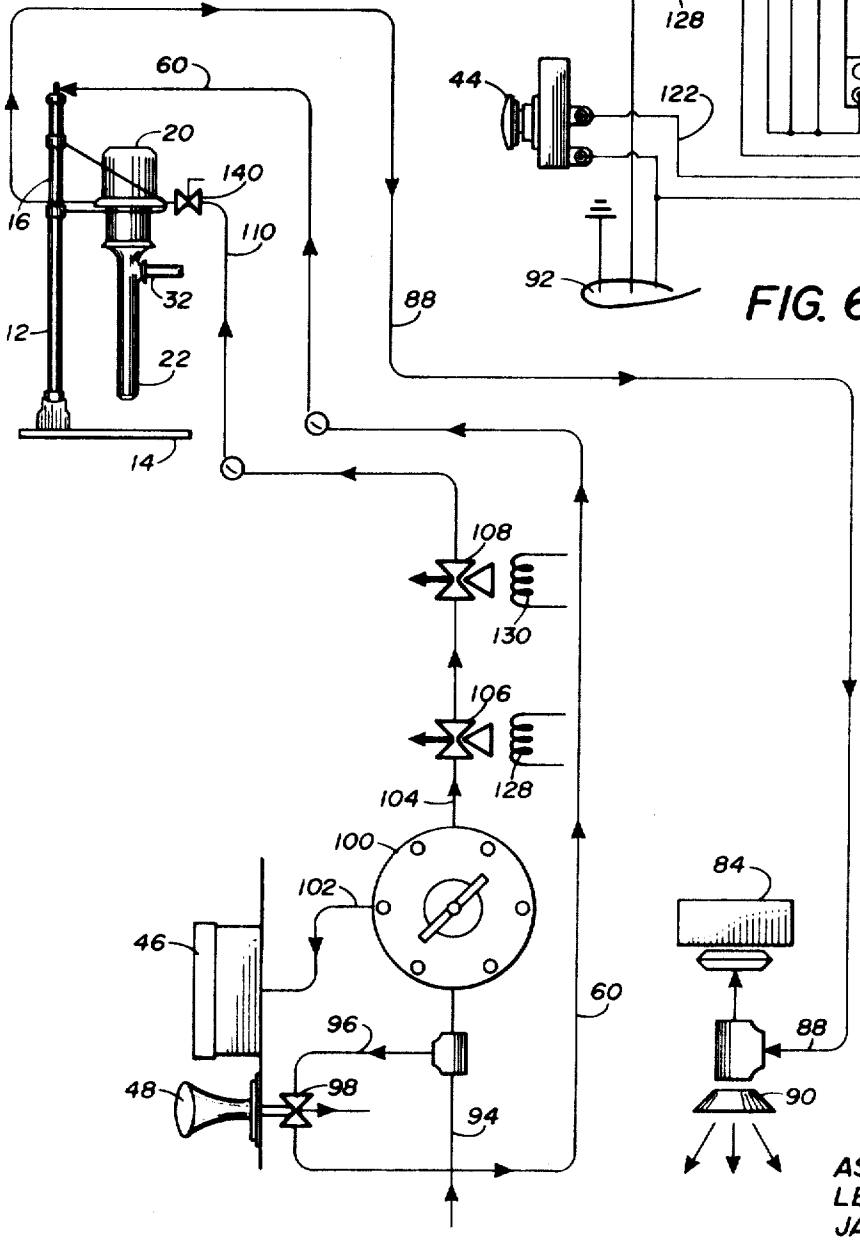


FIG. 7

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METHOD AND SYSTEM FOR DISPENSING METERED AMOUNTS OF FLUID SUBSTANCES FROM BULK CONTAINERS

FIELD OF THE INVENTION

This invention relates to fluid and semifluid dispensing, and more particularly to a sanitary method and apparatus for selectively dispensing metered amounts of food products from bulk containers.

THE PRIOR ART

It is often necessary to dispense metered amounts of liquid hygienic products from large bulk containers into smaller batches, hoppers or the like. For instance, in restaurant chains, salad product manufacturers, food processors, and other food-handling establishments, it is necessary to dispense accurately metered amounts of liquids and semiliquid food substances such as mayonnaise, salad dressings, mustard, catsup, sausage, liquid cheese, liquid margarine, jellies, fruit fillings, and the like from large cylindrical bulk-shipping containers into mixing hoppers. During such food product dispensing, it is important that the food product not be subjected to severe pumping action in order to prevent product breakdown, such as separation of oil and egg suspension in the case of the dispensing of mayonnaise. In addition to food substances, it is often desirable to pump metered amounts of other liquid or semiliquid substances such as pharmaceuticals and cosmetics from bulk containers into a plurality of smaller retail size containers.

Sanitary vane meter-type pumps have previously been developed for fluid pumping, but have been too expensive for many commercial uses. Pumps have also heretofore been developed which may be attached to the upper rim of an open bulk-shipping drum and operated by pressurized air in order to pump a liquid from the drum through an elongated flexible dispensing hose. However, such previously developed pumps have not been completely satisfactory with respect to cleanliness and have generally required that the operator physically lift the pump into and out of the bulk-shipping containers, thereby imposing physical strain upon the operator as well as subjecting the pump to the danger of physical damage. Moreover, once installed, many previously developed hygienic fluid pumps have required that the operator guess or estimate the amount of fluid pumped from the container. In the case of recipes requiring accurate measurement of ingredients, such guesswork often results in improper mixtures, as well as creating product waste. Also, with the use of previous pump systems, it has been difficult to completely empty bulk-shipping containers, and substantial amounts of the product have been left on the interior sides and bottoms of the containers because some fluids cavitate, or channel, and do not flow and seek their own level.

SUMMARY OF THE INVENTION

In accordance with the present method and apparatus invention, a fluid-dispensing system is provided wherein a pump is operable to pump and dispense fluid from a bulk container. The operation of the pump is automatically terminated when a preselected amount of fluid has been dispensed, or when the container is emptied.

In another aspect of the invention, a metered fluid-dispensing system is provided wherein a support structure may be selectively elevated or lowered into position adjacent a fluid container. A pump is connected to the support structure in order to be disposed within the fluid container and includes dispensing structure for selectively dispensing of the fluid pumped from the container. Structure connected to the pump is selectively operable in order to control the amount of fluid pumped according to preset batch commands. Structure is also provided for continuously sensing the level of the fluid within the container in order to terminate the operation of the pump when the fluid container is substantially emptied, without losing the present batch commands.

In accordance with another aspect of the invention, a fluid-dispensing system includes a pedestal which supports an elongated upright member having an extension member selectively vertically movable relative to the upright member under the control of pressurized fluid. A pump is connected to the extension member in order to be selectively raised above and lowered within a bulk fluid container. Circuitry is provided for comparing the amount of fluid pumped against a preselected fluid amount, and for shutting off operation of the pump when the preselected amount has been dispensed. Additionally, structure is provided for detecting the level of the fluid within the container and for shutting off the pump when the fluid is substantially depleted within the container. A diffusing structure is provided on the pump in order to facilitate removal of the fluid from within the container, and structure is provided for removing the fluid from the interior walls of the container during operation of the system.

THE DRAWINGS

For a more complete understanding of the invention and for further objects and advantages thereof, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective view of the present fluid-dispensing system in operation;

FIG. **2** is a somewhat diagrammatic sectional view of a portion of the system shown in FIG. **1**;

FIG. **3** is a front view of the system shown in FIG. **1** in an elevated position;

FIG. **4** is a perspective view of a typical air-operated pump for use with the present system;

FIG. **5** is a somewhat diagrammatic section taken through the instrument casing of the system shown in FIG. **1**;

FIG. **6** is a schematic view of the electrical circuit of the system shown in FIG. **5**;

FIG. **7** is a diagrammatic view of the pressurized airflow of the present invention; and

FIG. **8** is a sectional view of another embodiment of the level sensing structure of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, the present fluid-dispensing system is designated generally by the numeral **10**. An upright support member **12** is supported by a pedestal **14** and slidably supports a vertical extension member **16**. A pair of support arms **18***a* —*b* are rigidly connected to the extension member **16**. A pair of brackets **19** are attached across arms **18***a* —*b* to firmly support an air-operated pump **20**. A stroke adjuster unit **21** enables selective control of the pumping stroke exerted by the pump **20** so that the system may be adjusted for use with various types of liquids. A pump intake extension **22** extends within a bulk-shipping container **24**. In the illustrated embodiment, the container **24** comprises a cylindrical, open mouth barrel-type bulk container which contains a flexible plastic, typically polyethylene, bag **26** filled with a liquid product. An upper portion of the plastic bag is pulled over the upper rim of the container **24** in the manner illustrated to expose the fluid product.

A cover **28** is attached to the pump **20** and fits over the upper edge of the container **24** to maintain sanitary conditions during dispensing of the fluid, and also to properly position the intake extension **22** of the pump within the container **24**.

A flexible dispensing hose **32** is connected to the output port **34** of the pump **20** and includes a dispensing nozzle **36**. Hose **32** may be selectively held by an operator, in the manner shown, in order to dispense metered amounts of the fluid from the bulk container **24** into a remote mixing hopper **38**, or to any other suitable container. A watertight cabinet **40** is attached to the extension member **16** and includes an off-on switch **42**, a batch button switch **44**, a regulated air gauge **46**

and an elevator push-pull valve **48**. Cabinet **40** is watertight so that the entire system may be washed down with water and the like in order to maintain sanitary conditions. A suitable watertight cabinet for use with the invention is the NEMA 12 . Cabinet manufactured and sold by E.M. Wiegmann & Co., Inc. of Freeburg, Illinois. The switch controls on the cabinet **40** may be selectively operated by the operator, in the manner to be subsequently described in detail, to provide preset amounts of fluid via the dispensing hose **32**.

The present pump system is constructed according to a sanitary design concept for use with food products under USDA specifications. No threaded structure is in contact with the food product being pumped. The majority of the parts of the system are made from stainless steel and the dispensing hose is made from approved plastic material. All parts of the invention are easily removable for cleaning and maintenance. The watertight nature of the system allows it to be fully washed down with hot water or the like after use.

A level-sensing plate **50** is concentrically disposed about the pump intake extension **22** and is vertically slidable along the length thereof. Plate **50** is rigidly connected to rods **52***a*—*b* which slidably extend through apertures in the cover **28** and are slidably received within holes in the brackets **19**. Plate **50** rides on the upper surface of the fluid within the container **24** to continuously monitor the level of the fluid. As will be later described, the rods **52***a* —*b* control the actuation of a microswitch which shuts off the pump **20** when the plate **50** reaches the bottom of the container **24**. Additionally, the plate **50**, in combination with the slight vibration imparted by the pump **20**, tends to clean the interior walls of the container **24** during its downward travel.

FIG. **2** somewhat diagrammatically illustrates the pumping action of the fluid pump **20**. When the cover **28** is properly positioned on the open upper end of the bulk container **24**, the pump intake extension **22** is properly positioned near the bottom of the container **24**. A diffuser plate **56** is attached to the intake extension **22** in order to facilitate removal of the fluid from within the container **24**. When the pump in energized, fluid from within the container **24** is sucked around the outer edges of the diffuser plate **56** and upwardly through the interior of the intake extension **22**, and out the outlet port **34** to the dispenser hose **32**. The diffuser plate **56** eliminates "channeling," or the formation of an inverted cone by the fluid within the container, which tends to occur when relatively thick fluids are pumped without the use of the diffuser plate **56**.

As previously noted, the particular bulk-shipping container **24** illustrated includes a plastic bag **26** having the ends rolled over the top of the container **24**. It will, however, be understood that not all bulk-shipping containers with which the present system is utilized will include such plastic bags.

Level-sensing plate **50** is shown riding on the top of the liquid **58** within the container **24**. The weight of the plate **50** is chosen for use with specific liquids so as not to sink below the surface of the liquid. As the plate **50** sinks within the container **24** due to depletion of the liquid **58**, rods **52***a* —*b* slide lower until a microswitch is actuated in order to terminate operation of the pump **20** when the supply of liquid is exhausted within the container **24**. It will be noticed that the diameter of the plate **50** is somewhat less than the inner diameter of the container **24**. However, the outer edges of the plate **50** are disposed sufficiently close to the interior walls of the container **24** so as to cause a nonimpinging wiping or cleaning action as the plate **50** slides downwardly within the container **24**. This wiping action occurs due to surface tension between the liquid **58**, the plate **50** and the sidewalls of the container **24**. The nonimpinging wiping action provided by the plate **50** is facilitated by the gentle vibration induced by the operation of the pump **20**.

FIG. **3** illustrates the present dispensing system in its elevated position to allow removal of an empty bulk container and insertion of a full bulk container. Elevation of the system occurs upon operation of the push-pull valve **48**, in a manner to be later described, and supplies air under pressure via a hose **60**. Hose **60** is connected to a conduit extending through the extension member **16** to the support **12**. The extension member **16** is telescoped over the support member **12** such that the application of air under pressure causes extension member **16** to be elevated in the manner illustrated. A stop, not shown, is provided on the extension member **16** to maintain the pump **20** in the elevated position to enable changing of the bulk container drums.

When a fresh drum has been properly placed on the pedestal **14**, elevator valve **48** is again actuated and the extension member **16** slides downwardly over the support member **12**. At the same time, the diffuser plate **56**, the pump intake extension **22** and the level-sensing plate **50** are inserted within the bulk container **24**. The cover **28** is lowered until it abuts the top of the container **24** to properly position the pump within the container, and then the pumping and dispensing operation is begun. It will be understood that as the plate **50** abuts the upper level of the fluid within the container **24**, the plate **50** rides on the top of the fluid and will thus be moved upwardly adjacent the cover **28** for start of a new dispensing cycle.

For a more detailed view of a suitable air pump **20** for use with the invention, reference is made to FIG. **4**. A suitable pump **20** is the air-powered fluid pump sold under the tradename Model 206–030 Series "A" by the Gray company, Inc., of Minneapolis Minn. However, it will be understood that various types of sanitary fluid pumps could be alternatively utilized with the invention. The preferred pump shown in FIG. **4** comprises an air motor **62** which causes reciprocation of a displacement rod **64** within a riser tube **66**. An exhaust muffler **68** is provided to muffle the exhausted air. A supply of pressurized air is supplied via an air intake port **70**. A fluid intake valve assembly **72** is provided in the lower end of the riser tube **66** and includes a ball valve **74** to prevent back flow of the fluid. In operation of the pump, fluid is sucked upwardly through the inlet intake valve **72** and along the riser tube **66** where it is output at the outlet port **34**. Further explanation of the construction and operation of the fluid pump **20** is not deemed necessary, as the pump is conventional.

FIG. **5** illustrates a somewhat diagrammatic illustration of the interior of the cabinet **40**, with the electrical connections omitted for simplicity of illustration. An impulse counter **80** is connected within the cabinet **40** and includes a selector knob **82** which is accessible to the operator through a door in the casing in order to preselect a desired amount of fluid to be pumped during a run. In the preferred embodiment, the dial of the counter **80** is calibrated in impulse strokes of the pump **20** and the knob **82** is merely rotated to preselect a specified number of strokes to be pumped and dispensed. By knowing the displacement fluid volume of each stroke of the pump, the setting is easily calibrated in gallons. A suitable memory counter **80** for use with the invention is the Model HZ40 A 6 Microflex Reset Counter manufactured and sold by the Eagle Signal Division of E. W. Bliss of Davenport, Iowa. The memory counter **80** is of the automatic reset type and requires no resetting to run the same size batches over and over. Only the push of button switch **44** is required to meter out the same size batch time after time. If a different size batch is desired, the memory counter **80** is manually reset to the new value.

A pulsation count switch **84** is connected to a conduit **86** to which is connected a line **88** which feeds the pulsating exhaust air from the pump **20** to a muffler device. Switch **84** includes a diaphragm which senses each pump pulsation and generates an electrical pulse which is fed to the counter **80**. As will be later described, when the number of pulses sensed by the switch **84** equals the preset amount set by the knob **82**, counter **80** actuates a valve in order to terminate operation of the pump. A suitable switch **84** is the Pressure Switch Type 4410 manufactured and sold by Penn Controls, Inc. of Goshen, Ind.

The present system is set so that a predetermined number of strokes of the pump for a specified liquid is equal to a known liquid volume. Thus, by monitoring the operation of the pump

20 with the switch 84, the amount of liquid pumped by the pump 20 may be accurately determined and utilized to control the operation of the pump. Electrical power is supplied to the cabinet 40 via a cord 92 which is adapted to be plugged into a conventional electrical outlet.

A supply of compressed air is fed via line 94 to the cabinet 40 and via a conduit 96 to a mechanically operated air valve 98. Valve 98 is normally closed, when pushed in, but upon pulling out the handle of elevator valve 48, pressurized air is fed through the valve to the line 60 to elevate the present system in a manner shown in FIG. 3.

Pressurized air is also fed through a regulator 100 which supplies an indication of the air pressure via a conduit 102 to the pressure gauge 46. A selected portion of the pressurized air is fed through a conduit 104 to a normally closed solenoid air valve 106. A normally open solenoid operated air valve 108 is connected in series with valve 106 and is connected to a conduit 110 which supplies air to the intake 70 of the pump 20, as shown in FIG. 3.

FIG. 6 illustrates the electrical circuitry contained within the cabinet 40. AC electrical power is provided via the cord 92 and is supplied to one terminal of the emergency switch 42. The remaining terminal of the switch 42 is fed via lead 120 to a terminal of the counter 80. Electrical power is also supplied to the terminal of the switch 44, the other terminal of the switch 44 being connected via a lead 122 to a terminal of the counter 80. The pulsation count switch 84 is connected to leads 124 and 126 which are connected across terminals of the counter 80. A solenoid coil 128 which actuates the solenoid valve 106 is connected across the counter 80, as is a solenoid coil 130 which controls the operation of the solenoid-operated valve 108. A microswitch 132 having a switch arm 134 is connected between one terminal of the solenoid winding 130 and a counter 80. As best shown in FIG. 3, switch arm 134 bears against the rod 52*b* and normally maintains the microswitch 132 in an "off" position. When the rod 52*b* drops below the level of the switch arm 134, as occurs when the plate 50 reaches the bottom of the container 24, the switch arm 134 closes the microswitch 132 to indicate that the fluid within the container 24 is exhausted.

FIG. 7 illustrates schematically the pneumatic connections of the invention. The air supply is supplied via the conduit 94 and is fed through a conduit 96 to valve 98 operable by the push-pull elevator valve 48. Air under pressure is also fed through the regulator 100 and through the conduit 102 to the gauge 46. The pressurized air is also fed through conduit 104 through valves 106 and 108 to the inlet port of the pump 20. When valve 98 is open, air is fed via hose 60 to selectively raise the pump structure in the manner previously described. The exhaust from motor 20 is fed via the line 88 to the pulsation count switch 84 and through the muffler 90 to the atmosphere.

Operation of the system will now become apparent from the previous description. Normally, the line 94 is connected to the pressurized source of air and air pressure is adjusted until the gauge 46 reads approximately 40 p.s.i. The electrical cord 92 is connected to a suitable 110 AC voltage grounded power supply. The valve handle 48 is pulled out to open valve 98 and to supply pressurized air via the hose 60 in order to elevate the system to the position shown in FIG. 3. A bulk container 24 full of liquid is set upon the pedestal 14 and positioned to rest against the base of the support member 12. If the bulk container 24 contains a plastic bag, the bag is loosened and the edge of the bag is pulled over the rim of the bulk container 24 in the manner shown in FIGS. 1 and 3. The valve handle 48 is then depressed and the pump 20 is lowered into the container 24 in the manner shown in FIG. 1.

The operator then manually sets the knob 82 on the memory counter 80 to a selected charging count. The valve at the dispensing nozzle 36 on the dispensing hose 32 is opened and the emergency on-off switch 42 is turned to its on position The batch button switch 44 is depressed to energize the solenoid coil 128 in order to open the normally closed valve 106. Compressed air is then fed via the conduit 100 to energize the pump 20 to charge the system. In operation, it has been found that setting the memory counter 80 to generate 30 pump strokes, or one gallon of liquid, will properly charge the system.

After the system is properly charged with liquid, the amount of fluid desired to be dispensed in the next batch is set by rotation of knob 82. Emergency on-off switch 42 should be checked to insure that it is turned to its "on" position. The batch button switch 44 is then depressed to energize solenoid coil 128 to cause operation of the pump 20. The switch 44 does not have to be maintained in a depressed condition to maintain the coil 128 in an energized state. The pump 20 will continue pumping liquid from the bulk container 24 until the count stored by the setting of the knob 82 on the memory counter 80 equals the number of impulses supplied by the pulsation count switch 84. When these two counts are equal, memory counter 80 shuts off the voltage supplied to the solenoid coil 128 and thus closes the valve 106 to automatically terminate operation of the pump 20. Upon setting of the counter 82 to a new batch setting, additional different metered amounts of fluid may be pumped by the system.

As long as sufficient fluid remains within the bulk container 24, the rod 52*b* maintains the switch arm 134 in a position to maintain microswitch 132 in its deenergized position. When the plate 50 reaches the lowermost part of the bulk container 24, the rod 52*b* releases switch arm 134 and winding 130 is energized in order to close the normally open valve 108. This automatically terminates operation of the pump 20. The petcock 140 is then turned to an off position. The system is then elevated by the manual operation of the valve 48 and a new bulk container is positioned in the unit. During this time, the remaining count required for the desired batch is stored by the memory counter 80. The valve 48 is then manually closed to allow the pump unit to lower itself into a new bulk container 24. Petcock 140 is then turned to an on position which starts pump 20 to dispense fluid for the remainder of the desired batch. Charging of the system is not required for subsequent bulk containers after the initial charging procedure.

When the system is automatically terminated by the level-sensing plate 50 in the manner described, the air petcock 140 on the pump 20 should be promptly closed until a new bulk container 24 has been positioned on the system.

FIG. 8 illustrates another embodiment of a level-sensing plate according to the invention. Plate 142 includes an annular curved portion 144 which defines an annular air space between the plate 142 and the upper level of the fluid. This air space insures that the plate 142 rides lightly on the top of the fluid during operation of the system. The weight of the plate 142 and the relative size of the curved portion 144 may be varied to tailor the system for use with specific fluids.

An important aspect of the invention is the feature that after use in dispensing food products or the like, the system is first cleaned by discharging leftover food from the hose 32. Hose 32 is then removed and is replaced by a small cleaning hose with a washing gun nozzle. The pressure of the pump system is turned up and a container of water, soap or other cleansing agent is positioned on the system and utilized to cleanse the system by dispensing the cleansing agent through the cleansing hose.

Although the present invention has been described with respect to specific embodiments, it will be understood that various changes and modifications will be suggested to one skilled in the art, and it is intended to encompass these changes and modifications as fall within the scope of the appended claims.

What is claimed is:

1. A metered dispensing system for fluids comprising:
   a. a support structure,
   b. means for moving said support structure into position adjacent a fluid container,
   c. an air motor operated fluid pump means connected to said support structure for being disposed within the fluid

container when said support structure is adjacent the container,

d. dispensing means connected to said fluid pump means for dispensing the fluid pumped from the container,

e. means connected to said pump means and selectively operable to control the amount of fluid pumped by said pump means according to the preset commands,

f. means for sensing the level of the fluid within the container for terminating the operation of said pump means when the fluid container is emptied,

g. counter means having a register for storing a preset quantity representing a selected amount of fluid,

h. means for sensing the air exhaust from said motor for generating an indication of the amount of fluid pumped by said pump means, and

i. means for terminating operation of said pump means when the amount of fluid pumped equals the preset quantity.

2. A system for pumping fluid from bulk fluid containers comprising:

a. a pedestal supporting an elongated upright member,

b. an extension member mounted on said upright member and movable relative thereto along the longitudinal axis of said upright member,

c. air pressure means selectively connectable to said upright member for elevating and lowering said extension member,

d. an air-motor-operated fluid pump connected to the upper portion of said extension member for being selectively raised above and lowered within bulk fluid containers,

e. a watertight cabinet rigidly attached to said extension member and containing counter means for monitoring the operation of said fluid pump,

f. means for presetting a selected amount of fluid to be pumped and for terminating the operation of said pump means in response to said counter means, said means automatically resetting said system for repeat pumping of said selected amount of fluid after termination of said pump operation,

g. means for detecting the level of fluid within the container and for terminating the operation of said pump means when the fluid is substantially depleted within the container, and

h. means responsive to the exhaust of said motor for detecting the amount of fluid pumped by said pump.

3. A metered dispensing system for fluids comprising:

a support structure operable to be positioned over an open-topped fluid container,

a fluid pump connected to said support structure for being disposed within the fluid container and including an intake end for being positioned near the bottom of the fluid container,

dispensing means connected to said fluid pump for dispensing the fluid pumped from the container,

a circular plate having an outer diameter less than the inner diameter of the fluid container for riding upon the upper surface of the fluid within the container and for providing a nonimpinging wiping action to the interior of the container as the fluid therein is depleted,

rod means connected to said circular plate and slidable within said support structure,

switch means responsive to said rod means for being actuated when the container is substantially empty,

means for sensing the amount of fluid pumped from the container,

electrical circuitry for storing a memory of reference amount of fluid to be pumped and for comparing said reference amount with the amount pumped to thereby maintain a memory of the amount of fluid yet to be pumped even after the fluid is exhausted from the container, and

means for terminating pumping of fluid when said reference amount has been pumped.

4. The system of claim 3 and further comprising:

a diffuser plate rigidly connected on the lower end of said pump and adapted to be closely disposed to the bottom of the fluid container when said pump is lowered into the container, whereby the removal of fluid from the container is facilitated.

5. The system of claim 3 and further comprising:

a cover attached to said pump whereby when said pump is properly positioned within a fluid container said cover fits over the open end of the container.

6. A system for pumping fluid from bulk fluid containers comprising:

a pedestal supporting an elongated upright member,

an extension member mounted on said upright member and movable relative thereto along the longitudinal axis of said upright member,

air pressure means selectively connectable to said upright member for elevating and lowering said extension member,

a fluid pump connected to the upper portion of said extension member for being selectively raised above and lowered within a bulk fluid container such that the lower fluid intake end is positioned near the bottom of the container,

a watertight cabinet rigidly attached to said extension member and containing counter means for monitoring the operation of said fluid pump,

a circular plate having an outer diameter less than the inner diameter of the fluid container for riding upon the upper surface of the fluid within the container and for providing a nonimpinging wiping action to the interior of the container as the fluid therein is depleted,

means responsive to the position of said circular plate for terminating operation of said pump,

means for sensing the amount of fluid pumped from the container, and

electrical circuitry for maintaining a memory of the amount of fluid desired to be pumped after the fluid is depleted from a container.

7. The system of claim 6 wherein said pump is air motor operated,

means for sensing the exhaust from said motor to indicate the amount of fluid pumped.

8. The system of claim 6 and further comprising:

at least one rod connected to said plate, and

switch means operable by said rod.