Dec. 10, 1963 W. C. CHAFFEE ETAL 3,113,700

VARIABLE CAPACITY METERING DISPENSER

Filed Dec. 23, 1960 3 Sheets-Sheet 1

FIG. 1

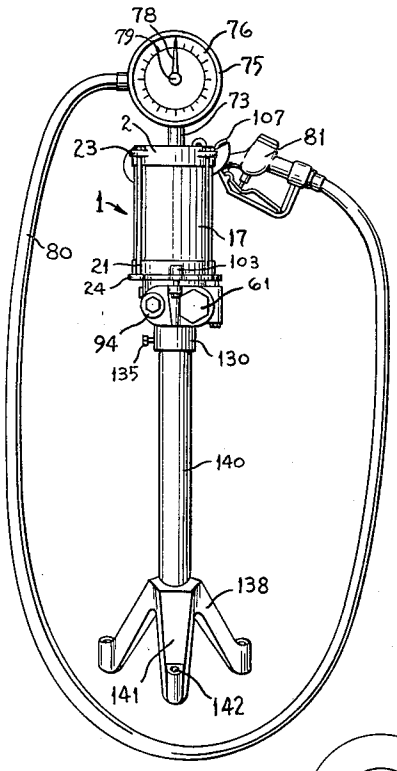
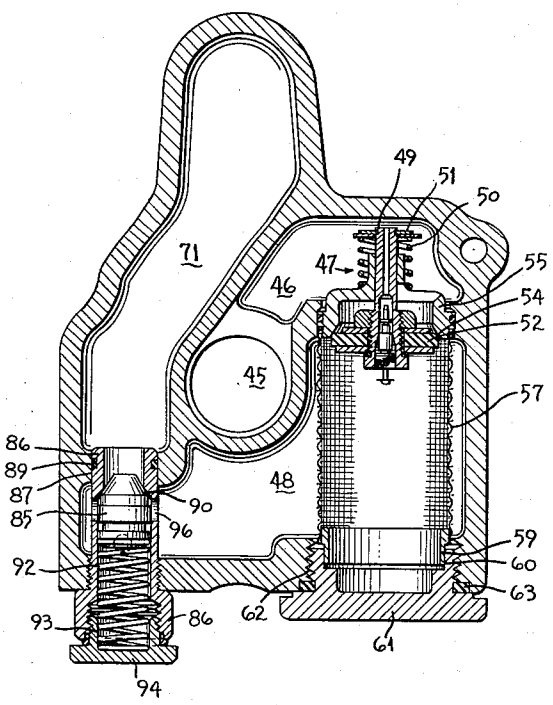



FIG. 3



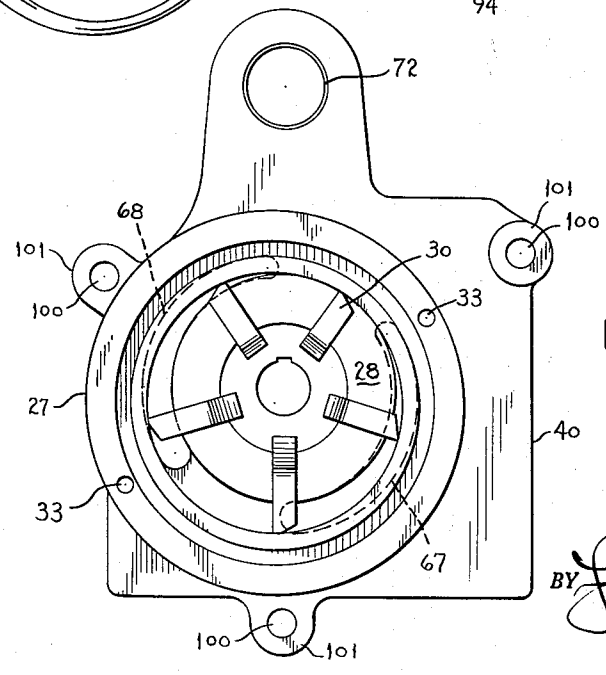




FIG. 4

INVENTORS
WALTER C. CHAFFEE
LESTER B. HARRINGTON

BY

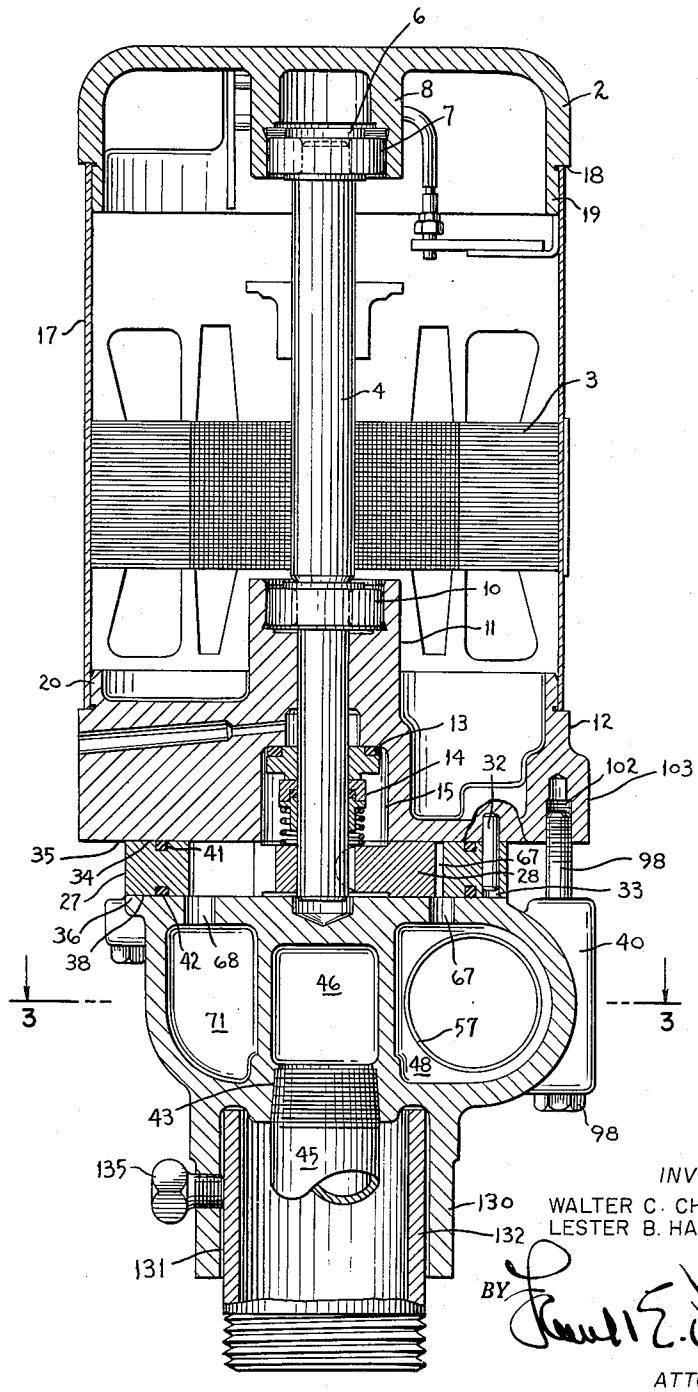
ATTORNEY

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VARIABLE CAPACITY METERING DISPENSER

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FIG. 2




INVENTORS
WALTER C. CHAFFEE
LESTER B. HARRINGTON
BY
ATTORNEY

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FIG. 5

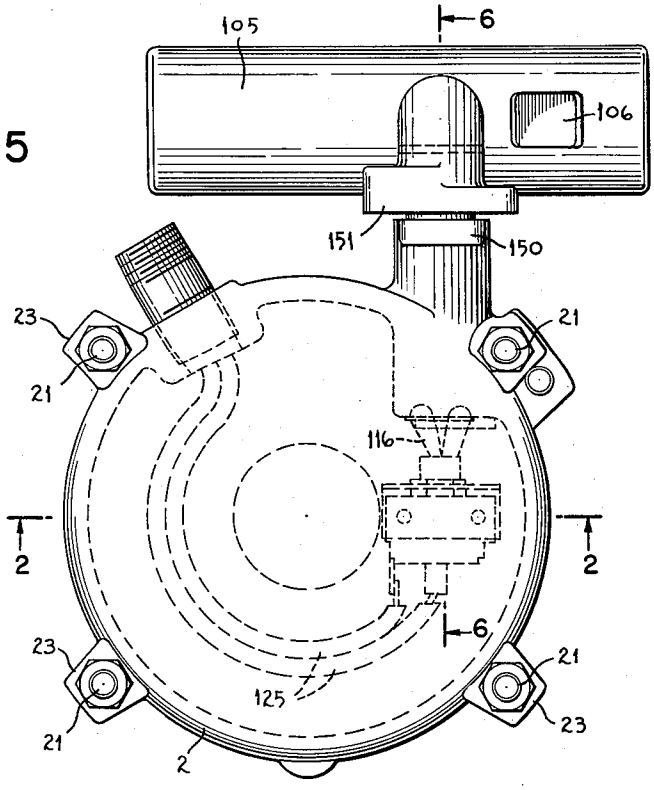



FIG. 6

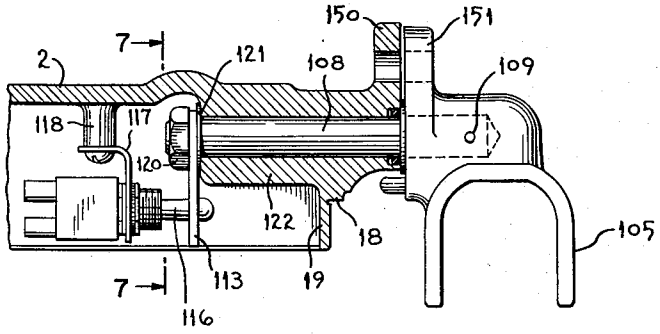
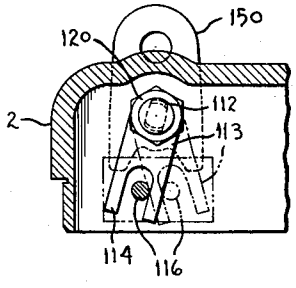



FIG. 7





INVENTORS
WALTER C. CHAFFEE
LESTER B. HARRINGTON

BY Ernest E. Baird

ATTORNEY

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3,113,700

# VARIABLE CAPACITY METERING DISPENSER

Walter C. Chaffee, Spring Lake, and Lester B. Harrington, North Muskegon, Mich., assignors to John Wood Company, New York, N.Y., a corporation of Delaware

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4 Claims. (Cl. 222—74)

Our invention relates to improvement in pump which is particularly adaptable for handling petroleum products used on farms, estates, construction sites, small fleet operations, industrial uses, and other uses where there is no resale involved of the fuel dispensed.

Our improved utility pump may be mounted on a pedestal unit, or may be mounted directly on a skid tank, or may be directly connected to an underground tank installation where it may not be feasible to mount the pedestal element on concrete at the ground level.

One object of our invention is to provide a general utility pump which is relatively light in weight, compact, and of a low cost.

Another object of our invention is to provide a pump wherein the volumetric dispensing capacity of the pump may be increased or decreased by merely increasing or decreasing only the height of the pump unit assembly, and using the same upper closure, the same motor unit, and the some bottom closure of the pump.

Another object of our invention is to provide a pump in which the lower end surface of the motor unit and the upper end surface of the bottom closure form the top and bottom closures of the pumping unit assembly.

Another object of our invention is to provide a pump of a construction which enables a purchaser at any time to substitute in the pump an electric motor of increased or decreased horsepower, which would be of a same diameter but of greater or lesser height, and use the same upper closure, the same pump unit assembly, and the same bottom closure of the pump, with the addition of an inexpensive substitution of a piece of tubing of proper height used as the motor housing.

Our invention may be more fully understood and further objects and advantages may become apparent when reference is made to the more detailed description of the invention with respect to the accompanying drawings.

In said drawings:

FIG. 1 is a front elevation on a small scale of our improved utility pump mounted on a supporting pedestal.

FIG. 2 is a vertical sectional view of the pump shown generally in FIG. 1, and taken on the line 2—2 in FIG. 5, but with the pedestal and its supporting connection to the pumping unit being omitted.

FIG. 3 is a horizontal sectional view, taken on the line 3—3 in FIG. 2.

FIG. 4 is a top plan view of the pumping unit assembly and end closure, indicated in FIG. 2.

FIG. 5 is a top plan view of the pump shown in FIG. 2.

FIG. 6 is a fragmentary vertical sectional view, partly in elevation, taken on the line 6—6 in FIG. 5.

FIG. 7 is a fragmentary vertical sectional view, partly in elevation, taken on the line 7—7 in FIG. 6, and showing the inner end of the switch operating means.

Referring to said drawing; our improved utility pump is indicated generally at 1 in FIG. 1. Said pump includes an upper closure 2, a motor of any of the well-known construction is indicated at 3, and includes a motor shaft 4. The upper end of said motor shaft 4 is provided with suitable bearing means 6 of any of the well-known constructions which are positioned in an opening 7 formed in the boss 8 of the upper closure 2.

The lower end of the motor 3 is mounted in suitable bearing means 10 positioned in an opening formed in the boss 11 of the motor support base 12. We find it convenient to provide the lower end of the motor shaft 4 with an O ring 13 and a rotary seal assembly 14 mounted in an axial opening 15 formed in said motor base support 12.



The motor 3 is surrounded by an outer cylindrical housing 17, the upper end of which is engaged by the undercut 18 and reduced diameter portion 19 of the upper closure 2. The lower end of said outer cylindrical housing 17 engages a similar reduced diameter portion 20 of the motor base support 12. The upper closure 2, cylindrical outer housing 17, and motor base member 12 are rigidly connected together by means of a series of bolts 21, extending through bosses 23 formed on the upper closure 2, and engaged at their lower ends in threaded openings formed in corresponding bosses 24 on the base member 12.

The pumping unit, conveniently, is of the rotary-vane type and is comprised of an outer ring member 27 and an eccentric rotor 28 which is fixedly mounted on the lower end of the motor shaft 4 by any convenient means, such as a Woodruff key as indicated in dotted lines in FIG. 2. The rotor 28 is provided with a series of radial slots in which a series of blades 30 are mounted with freedom of reciprocal movement. The ring member 27 is prevented from movement by means of pins 32, one of which is shown in FIG. 2, which are push fitted tightly into openings formed in the bottom surface 35 of the motor support base 12 and into matching openings 33 formed near the outer periphery of ring member 27.

The upper surface 34 of the ring member 27 is sealingly engaged with the bottom surface 35 of the motor support base 12. The bottom surface 36 of the ring member 27 is sealingly engaged with the upper surface 38 of the bottom closure member 40. We find it convenient to interpose O rings 41 and 42 in annular grooves formed in the respective top and bottom surfaces of the ring member 27 so as to enable the ring member 27 to be maintained in sealed relationship with the bottom surface of the motor support base 12 and the upper surface of the bottom closure 40 when clamped together, as hereinafter described.

The bottom closure member 40 is provided with a screw threaded opening 43 which is engaged by the screw threaded open end of the fluid inlet pipe 45. The lower end of the pipe 45 depends into the source of fluid supply, such as a skid tank, or an underground tank, etc.

As best shown in FIG. 3, the inlet pipe 45 is in open communication with the inlet passageway 46. A check valve, indicated generally at 47, is positioned between the inlet chamber 46 and the strainer chamber 48. The check valve 47 includes the valve stem 49 which is surrounded by the spring 50 which is maintained under compression by means of the retaining ring 51. A check valve disc 52 is rigidly mounted on the end of the valve stem 49, and said check valve disc is adapted to sealingly engage the valve seat 54 formed in the valve seat member 55. The valve seat member 55 is provided with a reduced diameter portion on which the inner end of the strainer screen member 57 is soldered. The opposite end of the strainer screen member 57 is mounted on a supporting ring 59 which is provided with a flange portion adapted to be engaged in an annular recess 60 formed in strainer cap 61, which is screw threaded into a screw threaded opening 62 formed in the bottom closure 40. We find it convenient to interpose a sealing gasket 63 between the strainer cap 61 and its seat formed in the bottom closure screw threaded opening 62.

The top wall of the bottom closure 40 is provided with an inlet valve port 67 formed in said wall.

The outlet valve port 68, formed in the top wall of the bottom closure 40, is in open communication with the outlet chamber 71, which is provided at its rearward

end with a screw threaded opening 72 into which the screw threaded end of the outlet pipe 73 is screw threadedly mounted.

As shown in FIG. 1, the upper end of the outlet pipe 73 extends above the top of the upper closure 2, and said pipe 73 is connected to the gallon meter, or counter, 75 which is of a conventional type and includes a dial face 76 and a rotatable indicator 78 which may be reset to zero by means of the reset knob 79 in the manner well-known in the art. Of course, the meter or counter, if desired, may be of the well-known tens-transfer type, including number wheels. The outlet of the meter 75 is connected by suitable means to the flexible dispensing hose 80 which is provided at its distal end with a valve dispensing nozzle 81 of the well-known type.

A by-pass valve is included in the outlet chamber 71, so that if the pump motor is operating the pumping unit and the valve in the dispensing nozzle 81 is closed, the fluid will be circulated from the outlet chamber back to the inlet side of the pumping unit. The by-pass valve shown is a poppet valve of the conventional type, and includes a by-pass valve body 86 which is push fitted in an opening 87, the by-pass valve body being provided at its rearward end with an O ring 89. The valve poppet 85 is stressed toward its valve seat 90 by means of the spring 92, one end of which engages the bottom of the poppet valve 85, and the other end of which is engaged in a socket 93 formed in the by-pass valve cap 94 which is screw threaded into the outer end of the by-pass valve body 86.

The by-pass valve body 86 is provided with a series of openings 96 therethrough to afford communication between the outlet chamber 71 and the chamber 48 when the fluid pressure in the chamber 71 is sufficient to move the poppet valve 85 from its seat against the effective force of the spring 92 to afford open communication through said openings 96 between the outlet chamber 71 and the chamber 48.

A series of bolts 98 tightly clamp the bottom closure member 40 to the motor support base 12 with the pumping unit ring member 27 clamped in fluid tight relationship between the bottom of the motor base support 12 and the top surface of the bottom closure 40. The series of bolts 98 pass through respective openings 100 formed in the series of bosses 101 formed on the bottom closure member 40. The bolts 98 are screw threaded into the screw threaded openings 102 formed in a series of bosses 103 formed on the bottom portion of the motor base support 12. The bosses 103 are spaced between the bosses 24 for the series of bolts 21, heretofore described.

Referring more particularly to FIGS. 5, 6 and 7; the switch means controlling the circuit to the motor 3 is located in the upper closure 2. The switch means is adapted to be moved to open position by the weight of the nozzle 81 and its hose 80 when the nozzle 81 is pushed in the nozzle holder 105, which has an opening 106 through which the hook element 107 of the nozzle 81 is inserted to maintain the nozzle in the nozzle holder 105.

As shown in FIG. 6, the nozzle holder 105 is rigidly connected to the shaft 108, conveniently by means of a tapered pin 109. The inner end of the shaft 108 is provided with a flattened portion 112 on which is fitted a switch lever 113 provided with a bifurcated outer end 114 adapted to engage the operating member of the switch 116, conveniently a double pole toggle switch, rigidly mounted on the supporting bracket 117 attached by screw means to a boss 118 formed on the underside of the top of the upper closure member 2. The switch lever 113 is rigidly maintained in proper position on the end of the shaft 108 by locking means 120. We find it convenient to interpose a spring tension washer 121 between the inner end of the boss 122, in which the shaft 108 is mounted, and the switch lever 113.



The switch 116 is operatively connected by suitable wiring 125 to the motor indicated at 3 in FIG. 2.

The lower end of the bottom closure 40 includes a depending boss member 130 which is provided with a central bore 131 into which the upper end of a pump support pipe member 132 may be rigidly clamped by means of the screw 135 engaged in a screw threaded opening formed in the boss 130, the inner end of the screw 135 being adapted to engage the periphery of the pipe 132 to maintain it rigidly in said opening.

As shown in FIG. 2, the support pipe 132, surrounding the inlet pipe 41, may be relatively short and provided at its lower end with a screw thread 136 adapted to engage the screw threaded spud in top of a skid tank (not shown) so that the pump may be rigidly mounted directly on the top of a skid tank, with the inlet pipe 45 being of sufficient length to depend the proper distance to the bottom of the skid tank in which the supply of fluid is contained.

If desired, the pumping unit may be mounted on a pedestal such as indicated at 138 in FIG. 1. When mounted on a pedestal, the short pipe 132, as shown in FIG. 2, is removed from the socket 130, and a longer section of pipe 140 of suitable length is clamped in the socket 130, in the same manner as heretofore described with reference to the pipe 132. The lower end of the pipe 140 is screwed into a screw fitted opening formed in the pedestal 138. The pedestal 138, conveniently, is provided with series of supporting legs 141 which are provided at their outer ends with openings 142 adapted to receive bolt or lag screw means to rigidly screw the pedestal and pump at any desired location, for example, in position over an underground tank. The inlet pipe 45, of course, will extend through the pipe 140 to a sufficient depth to enable it to be positioned near the bottom of the underground tank, where the supply source of fluid is contained.

If it is not feasible to use a pedestal installation, the support pipe 140 may be of sufficient length to be screwed directly into a screw threaded spud opening formed in the top of an underground tank. Of course, the inlet pipe 45, surrounded by the support pipe 140, would have to be of sufficient length to enable the inlet pipe to be positioned near the bottom of the underground tank.

We find it desirable to include an upstanding boss 150 on the upper housing 2 and a boss 151 on the nozzle holder 105, the bosses 150 and 151 being provided with matching openings so that the hasp of a padlock may be inserted therethrough to lock the pump with the dispensing nozzle 81 in the nozzle holder 105, to prevent unauthorized use of the pump.

*Operation*

Assuming that the nozzle 81 is positioned in the nozzle holder 105, with the hook element 107 of the nozzle 81 in the opening 106, as shown in FIG. 1, and a dispensation is to be made; the operator removes the nozzle 81 from the holder 105 which will move the nozzle holder 105 counterclockwise, as in FIG. 1. Such counterclockwise movement of the nozzle holder 105 causes counterclockwise movement of the switch lever 113 which moves the switch 116 from open to closed position to close the circuit to the motor 3 connected to the pumping unit.

The rotation of the rotor 28 of the pumping unit draws fluid from the tank source of supply through the inlet pipe 45 to the inlet passageway 46; then through the opened check valve 47 through the strainer screen member 57 to the chamber 48; and then through the inlet valve port 67 to the inlet side of the pumping unit. Fluid under pressure is discharged by the rotary-vane type pump through the outlet valve port 68 which is in open communication with the outlet chamber 71. The fluid passes from the outlet chamber 71 to the outlet pipe 73 connected to the gallon meter, or counter, 75 where the volume of fluid passing through the meter is indicated vis-

ibly. The fluid passes from the outlet side of the meter to the dispensing hose 80 to the nozzle 81, which the operator would have inserted in the tank in which the fluid is to be dispensed and would have manually opened the valve of the dispensing nozzle.

When the desired amount of fluid has been dispensed, the valve of the dispensing nozzle 81 is permitted to close, and the nozzle withdrawn from the tank in which the fluid had been dispensed. The operator then inserts the nozzle in the nozzle holder 105, with the hook element 107 of the nozzle inserted through the opening 106 in the nozzle holder. The weight of the nozzle 81, and its depending hose 80, will automatically move the switch lever 113 clockwise, as in FIG. 1, to effect opening of the motor switch 116.

If the motor switch 116 is closed and the motor 3 operating the pumping unit, but with the valve of the dispensing nozzle 81 in closed position, the fluid under pressure will open the valve poppet 85 and permit the fluid to be returned to the chamber 48 at the inlet side of the pumping unit.

If it is desired to change, say, increase the displacement of the pumping unit, such an increase in displacement may be effected by merely substituting a pumping unit assembly of the outer ring member 27, the eccentric rotor 28 with its series of blades 30, which is of a greater thickness to effect the desired change in displacement. Such a change in pumping unit may be done very facilely by merely removing the series of bolts 98; removing the pumping unit from engagement with the pins 32; inserting a pumping unit assembly of greater height, with the pins 32 push fitted tightly into corresponding matching openings 33 in the periphery of the replaced ring member 27; and again tightly clamping the bottom closure member 40 to the motor support base 12 by the series of bolts 98.

If it is desired to substitute a motor of increased horsepower, which probably would be of greater length but of the same diameter, such a change can be made very facilely by merely removing the series of bolts 21 from engagement with the motor base member 12, which permits the motor to be removed. The substituted motor is positioned in the same manner, with its outer housing, and the series of bolts 21 again inserted and tightened.

We do not desire to limit ourselves to the specific details of the construction as herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of our invention as defined in the appended claims.

We claim:

1. A fluid dispenser comprising a top closure member; a motor support base member; a motor including a drive shaft, one end of said drive shaft being journaled in bearing means in said top closure member, and the other end of said drive shaft being journaled in bearing means in said motor support base member, said drive shaft extending through said motor support base member for a distance sufficient to be engaged with the rotor means of a pumping unit; a housing surrounding said motor, one end of said housing being in engagement with the lower part of said top closure member and the other end of said housing being in engagement with the upper part of said motor support base member; means rigidly connecting said top closure member and said motor support base member together, with said motor housing and motor clamped therebetween; a bottom closure member; a pumping unit assembly, wherein the bottom surface of said motor support base member and the upper surface of said bottom closure member form top and bottom closures respectively for said pumping unit assembly, said



pumping unit assembly including a rotor rigidly connected to the lower end of said motor drive shaft, and a stationary ring member; means preventing rotation of said ring member with respect to said motor support base member; means rigidly connecting said bottom closure member with said motor support base member, with said pumping unit assembly tightly clamped therebetween in fluid tight relationship; fluid inlet means connected to said bottom closure member, said fluid inlet means being adapted for open communication at its distal end with a source of fluid supply; a fluid inlet chamber formed in said bottom closure member; a fluid outlet chamber formed in said bottom closure member; an inlet valve port formed in the top wall of said bottom closure member, said inlet valve port affording fluid communication between said inlet chamber and the inlet side of said pumping unit assembly; a fluid outlet valve port formed in the top wall of said bottom closure member, said fluid outlet valve port affording fluid communication between the outlet side of said pumping unit assembly and said outlet chamber; an axially disposed opening in said support base member at the bottom surface thereof, an axially disposed opening in said stationary ring member, a pin, said openings being in register and said pin being positioned partially in the opening of said support base member and partially in said stationary ring member whereby said inlet valve port and said inlet side of said pumping assembly unit are in alignment and said fluid outlet valve port and said outlet side of said pumping assembly unit are in alignment, and conduit means connected in open communication with said fluid outlet chamber, said conduit means having at its distal end dispensing nozzle means for said fluid, motor switch means, including a rotatable operating shaft, positioned within the confines of said top closure member; and a nozzle holder rigidly connected to the outer end of said rotatable operating shaft which extends through said top closure member; whereby, when said dispensing nozzle is positioned in said nozzle holder, the weight of said dispensing nozzle causes rotation of said nozzle holder and operating shaft in one direction to automatically open said motor switch, and removal of said dispensing nozzle from said nozzle holder causes rotations of said nozzle holder and operating shaft in the opposite direction to automatically close said motor switch.

2. A fluid dispenser of claim 1; wherein said dispensing nozzle is provided with a hook-like member rigidly connected to the body portion of said dispensing nozzle; and said nozzle holder is provided with an opening in which said hook-like member is engaged when said dispensing nozzle is positioned in said nozzle holder.

3. The fluid dispenser of claim 1; wherein said inlet chamber is divided into a first portion and a second portion by a valve normally biased into a closed position; said valve being opened by fluid flow when said pump is operating.

4. The fluid dispenser of claim 1; wherein said inlet chamber is divided into a first portion and a second portion by a valve normally biased into a closed position; said valve being opened by fluid flow when said pump is operating; and said second portion is divided by a strainer.

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