ABSTRACT OF THE DISCLOSURE

This invention is a compact fluid dispensing apparatus including a support means having heated, cleansing fluid therein; a pressure spray apparatus mounted upon the support means operable to impart pressure to a fluid received; a second fluid source connectable to the support means to add the second fluid to the cleansing fluid solution and, additionally, to supply the fluid directly to the spray apparatus for dispensing thereof during the rinsing cycle; a heater element secured to the support means to heat the cleansing fluid; and a chemical supply means to add the required chemical to the cleansing fluid with the second fluid to maintain a consistent cleansing fluid mixture.

There are numerous types of power washing assemblies in the prior art operable to dispense cleansing and rinsing fluids under pressure from a hose and wand assembly for cleansing automobiles, motors, and the like. However, the prior art power washing assemblies require expensive softeners to provide soft water and heaters in order to heat the water which is necessary to do an efficient and effective cleansing job. Additionally, the prior art spraying assemblies are generally complicated in structure requiring numerous expensive components and a large area in which to store the same in order to dispense heated, soft cleansing fluid under pressure and, subsequently, a rinsing fluid from the same assembly. Therefore, the prior art pressure spray assemblies are not economically feasible for limited usage such as cleansing trucks, tools, and the like.

In one preferred embodiment of this invention, a fluid dispensing apparatus is provided including a pressure spray means mounted upon a support means requiring a fluid supply source plus electrical power source thereto. The support means includes a cylindrical support and solution drum member with a lid member mounted upon a support and wheel assembly and having a fluid supply assembly connected thereto. The fluid supply assembly includes a connector member extended transversely of the drum member secured to an actuator valve movable from open to closed conditions through the use of a conventional float assembly. The float assembly is operable to maintain a constant level within the support and solution drum member. Additionally, a heating element extends transversely of the drum member in order to heat the fluid therewithin. The pressure spray apparatus includes a power means connected to a mounting plate extended transversely of the upper surface of the drum member and chemical supply means mounted on the upper surface of the lid member adapted to supply a chemical to the drum member. The power means includes a motor member operably connected through a drive shaft to a pump member and having an inlet assembly and a discharge assembly secured to the pump member. The inlet assembly includes a T member having one portion connected to the pump member; a second portion connected through a manual control valve to a fluid supply line; and an intermediate portion connected through a check valve to the drum member. The check valve is operable to permit fluid flow from the drum member to the pump member but prevents fluid flow from the fluid supply line of the inlet assembly into the drum member. The discharge assembly includes a wand assembly connected through a T member and a pulsator assembly to the output side of the pump member. The pulsator assembly includes a cylindrical housing having a pair of resilient ball members therein to serve as a shock absorbing function. The wand assembly includes an elongated fluid hose having one end connected to the T member and the opposite end connected to a wand member. The wand member includes a handle member connected to the fluid hose at one end and the opposite end secured to an elongated rod member having a discharge tip on the outer end thereof. It is noted that the wand member is readily usable for cleaning or rinsing purposes. The detergent supply means includes an upright hopper member connected to a discharge funnel which is extended through the lid member for dispensing a powder chemical therethrough. The hopper form of the hopper member can be dispensed either by hand, a manually operated auger member, or an automatically rotatable auger member operable during a chemical solution dispensing cycle to maintain a constant concentration within the drum member. In another embodiment of this invention, a fluid dispensing apparatus is operable through the use of a coin operated timer mechanism to supply the desired fluid therefrom and, additionally, to automatically maintain a constant chemical solution in the drum member.

One object of this invention is to provide a fluid dispensing apparatus overcoming the aforementioned disadvantages of the prior art devices.

Another object of this invention is to provide a fluid dispensing apparatus which is compact and portable operable to supply a heated, softened, cleansing fluid therefrom under pressure and, selectively, a rinsing solution under pressure.

One further object of this invention is to provide a fluid dispensing apparatus operable to maintain a constant supply of heated detergent solution for dispensing under pressure and dispense a non-heated rinse solution requiring only a single source of fluid to the apparatus.

Still, one other object of this invention is to provide a fluid dispensing apparatus including a pressure spraying means mounted upon a support means whereby the pressure spraying means includes a pump member to receive either a rinse or washing solution through an inlet assembly and dispense the same through a discharge assembly having a wand member to direct the discharge stream as desired.

One other object of this invention is to provide a fluid dispensing apparatus having the rinse and detergent solutions readily controlled through the cooperation of a control valve and a check valve whereupon the supply of the detergent solution is immediately ceased on actuation of the control valve to supply a rinse solution and, additionally, automatically supplies rinse solution when the control valve is in the open condition.

One other object of this invention is to provide a fluid dispensing apparatus which is compact in nature; self-contained in supplying a heated, softened washing solution; economical to manufacture; easy to move about to various locations; and substantially maintenance free.

Various other objects, advantages, and features of the invention will become apparent to those skilled in the art from the following discussion, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of the fluid dispensing apparatus of this invention having portions broken away for clarity;

FIG. 2 is a fragmentary elevational view of the fluid
dispensing apparatus of this invention having portions broken away for clarity;

FIG. 3 is an enlarged fragmentary sectional view of a check valve assembly of this invention;

FIG. 4 is a sectional view of the pulsator assembly of this invention;

FIGS. 5 and 6 are schematic diagrams illustrating the wash and rinse conditions, respectively, of the fluid dispensing apparatus of this invention; and

FIG. 7 is a schematic diagram illustrating an automatic coin operated fluid dispensing apparatus embodiment of this invention.

The following is a discussion and description of preferred specific embodiments of the new fluid dispensing apparatus of this invention, such being made with reference to the drawings, whereupon the same reference numerals are used to indicate the same or similar part and/or structure. It is to be understood that such discussion and description is not to unduly limit the scope of the invention.

Referring to the drawings in detail and in particular to FIG. 1, a fluid dispensing apparatus, indicated generally at 12, includes a pressure spraying means 14 mounted upon a support means 16 operable to dispense a fluid solution under pressure usable, for example, to apply a cleansing solution to a given surface.

The support means 16 includes a main support drum member 18 mounted upon a transport assembly 20; a heating element assembly 22 connected to and extended transversely of the drum member 18 to heat the fluid contained therein; a lid member 24 mounted on the drum member 18 to cover the upper open end thereof; and a fluid supply assembly 26 connected to and extended within the drum member 18. The drum member 18 is of a generally conventional cylindrical shape having an open side wall 27 integral with a common bottom wall 29 and provided with spaced annular rings 30 for rigidity. The drum member 18 may be constructed of a non-corrosive material such as plastic or stainless steel and preferably of the 55 gallon drum size. The bottom wall 29 is supported about its outer periphery upon a support ring 32 of the transport assembly 20. The support ring 32 is of generally L-shape in transverse cross-section to provide the required vertical and lateral support and provided at spaced intervals with wheel assemblies 33 adapted to contact a supporting surface 35. Each wheel assembly 33 is generally of a conventional type having parallel support arms 37 connected through a shaft member 38 to a rotating wheel member 39. It is seen that the transport assembly 20 is operable so as to easily move the drum member 18 as the same will be quite heavy when filled with the chemical fluid solution.

The lid member 24 is of a circular structure having an outer peripheral rim 41 adapted to be mounted on the upper surface of the drum member 18 for support. Additionally, the lid member 24 is provided with an opening 43 for reasons to become obvious.

The fluid supply assembly 26 includes a control valve 45 secured to the side wall 27 of the drum member 18 having a line 47 connecting to a heater guage 56 and then through a conductor member 57 to an available electrical 110 volt outlet to provide power thereeto. The heater guage 56 is provided with a control knob 59 operable to set the output heat to achieve a desired temperature as shown by the indicating needle 61 thereon.

The pressure spraying means 14 includes a power means 63 connected to a mounting plate 64 secured to the drum member 18 and a chemical supply means 66 connected to the mounting plate 64 and extended transversely of the lid member 24. The power means 63 includes a motor member 67 operably connected to a pump member 68 which, in turn, has an inlet assembly 70 and a discharge assembly 72 connected thereto. The motor member 67 is shown as an electrical type having a control on/off switch 73 and supplied with electrical current through a conductor member 74 having a plug member 76 mountable within a conventional 110 volt outlet. The motor member 67 is operable to rotate a drive shaft 78 which is connected to the pump member 68.

The pump member 68 is preferably of a piston type and operable to receive fluid through an inlet section 81 and discharge same through an outlet section 83. The pump member 79 is connected through a mounting bracket 85 to the upper surface of the mounting plate 64.

The inlet assembly 70 includes a rinse supply line 86 connected at one end to a common fluid line 87 and the fluid inlet line 47 through a connector member 89. The other end of the rinse supply line 86 is connected through a first control valve 91 and a T member 93 to the inlet section 81 of the pump member 79. The T member 93 is additionally connected to a solution supply line 94 having a second control valve 96 therein. The inlet end of the solution supply line 94 extends through the opening 43 in the lid member 24 to a position below the fluid level in the drum member 18 for reasons to become obvious. The first control valve 91 is of a manual type having an actuator handle 98 pivotal 90 degrees to permit or prevent fluid flow from the rinse supply line 86 therethrough.

As shown in FIG. 3, the second control valve 96 includes a check valve assembly 99 having a housing portion 101 with a spring member 103 therein operable to bias a ball member 105 in one direction against a seat portion 107. It is seen that this check valve assembly 99 allows fluid flow in the direction of an arrow 108 which operates to open the same and permit the fluid solution to flow therethrough. On a greater fluid pressure in the direction of the arrow 109, it is obvious that the spring member 103 forces the ball member 105 against the seat portion 107 so as to not permit fluid flow in this direction.

The discharge assembly 72 includes a wound assembly 111 connected to a fluid hose member 112 through a pulsator assembly 114 to the outlet section 83 on the pump member 79. The pulsator assembly 114 is connected to a T member 116 so as to always receive the output pressure of the pump member 68. As shown in FIG. 4, the pulsator assembly 114 includes a main support member 118 having external threads connectable to the T member 116 and having the upper open end closed by a housing member 119. A pair of ball members 121 and 123 are mounted within the housing member 119 operable on receiving fluid pressure therein to compress the ball members 121, 123 so as to achieve a shock absorbing function. The operation of the pulsator assembly 114 is described in detail in the above application, Ser. No. 553,767, filed May 31, 1966, and entitled "Power Washing Apparatus," now Pat. No. 3,473,450.

The fluid hose member 112 has its outer end connected through a rotatable coupling member 126 to the wound assembly 111. The wound assembly 111 includes a handle member 127 connected to the fluid hose member 112 at one end and the opposite end connected to a dispensing...
rod 128 with its outer end connected through an elbow member 129 to a dispensing nozzle 131. As well known in this art, the dispensing nozzle 131 has a discharge orifice (not shown) which controls the output pressure received from the overall fluid dispensing apparatus 12.

The chemical supply means 66 includes a main storage hopper 135 with a discharge funnel 137 extended transversely of the lid member 24 so as to dispense cleansing chemicals or the like therein. An auger member 138 is positioned within the discharge funnel 137 to convey the chemical therefrom on rotation of a handle member 141.

In the use and operation of the fluid dispensing apparatus 12 of this invention, as best shown in FIG. 5 during the chemical solution cycle, it is seen that the supply line 87 is connected to a conventional supply such as a cold water source available under local supply pressure. This fluid is thereupon conveyed through the rinse supply line 86 to the first control valve 91 and the actuator valve 45 to supply fluid to the drum member 18 to maintain a constant level therein. Additionally, the conductor 74 connected to the motor member 67 is plugged into a conventional electrical power supply. As shown in FIG. 5 with the first control valve 91 in the closed position, it is seen that only the on/off switch 73 to the on position in order to power the pump member 67 through the drive shaft 78. This operates to create a suction within the chemical supply line 94 to pull fluid from within the drum member 18 against the ball member 105 upwardly through the nozzle 93 and into the pump member 67. It is seen that the control valve 91 is in the off condition not permitting fluid flow into line 86. The pressure fluid moves outwardly through the outlet section 93 of the pump member 67 whereupon the fluid vibrations are smoothed out by the pulsator assembly 114 for discharge through the wand assembly 116.

As the fluid is being withdrawn from the drum member 18 and supplied at this time through the fluid supply assembly 26, it is obvious that the strength of the chemical solution therein is continuously changing. In order to compensate for this change, a chemical must be added through the chemical supply means 66. This may be done manually by adding an amount of chemical liquid or powder to the drum member 18 or through rotation of the handle member 141 to raise the auger member 138 to supply a desired amount of powdered chemical therefrom. Also, it is seen that the heater element assembly 22 is connected through the conductor 57 to a conventional 110 volt power supply and the control knob 59 is set to maintain the desired temperature therein. Thereupon, the normally cold water added through the float assembly 26 is heated to maintain a heated chemical solution therein. This heated solution is desirable for the chemical cycle to achieve the most efficient and effective use for, as an example, cleansing purposes.

As shown in FIG. 6, the first control valve 91 is movable to the open condition which is called the rinse cycle condition. This allows the supply fluid to move through the control valve 91 and the T member 93 to supply fluid to the pump member 68. Additionally, fluid is supplied from the T member 93 to the chemical supply line 94 against the second control valve 96. Thereupon, the fluid pressure acts against the upper surface of the ball member 105 to press the same against the seat portion 107 to prevent fluid movement in this direction. Therefore, the suction cycle of the pump member 68 gets all of the required fluid from the fluid supply line 86 and maintains the check valve assembly 99 in the closed condition. Additionally, it is noted that in this rinse cycle you need not add chemical and the actuator valve 45 is in the closed condition as no fluid is being withdrawn from the drum member 18.

As shown in FIG. 7, another embodiment of this invention is a coin operated fluid apparatus 145 operable through a coin box mechanism 147 as normally found in self-service type car wash installations of today to automatically control and dispense a cleansing and rinsing fluid under pressure. More particularly, the coin box mechanism 147 is provided with a timing motor 151 operable on movement of a coin slot tongue member 153 to close a lever member 154 and actuate the timing motor 151 for a given predetermined period. The actuation of the coin box mechanism 147 operates through a relay member 155 to control powering of the motor member 67 connected to the pump member 68 with the pressure spraying means 14 substantially identical as previously described in the embodiment of the fluid dispensing apparatus 12. The relay member 155 is operably connected to a rinse and soap cycle push button device 158 which, in turn, operates a normally opened electrical solenoid member 161 that takes the place of the manual control valve 91 in the previously described fluid dispensing apparatus 12. The push button device 158 is operably connected to the chemical supply means 66 having a motor member 163 connected to the rotatable auger member 138 to dispense a powdered cleansing chemical into the drum member 18 to maintain a constant solution therein.

More particularly, one member 155 is connected through lines 166 and 168 to contact points 169. Additionally, on the relay member 155 and through a line 171 to a coil 173 actuating the relay member 155. The other side of the relay member 155 is connected through lines 175 and 176 to drive the motor member 67 when the relay is actuated. A line 178 from the relay member 155 is connected to the push button device 158 and through a lever member 181 for the soap cycle as will be explained. On actuation of the push button device 158 to the soap cycle, the same is connected through a line 185 to the solenoid member 161 which additionally is connected by a line 187 to the motor member 163 of the chemical supply means 66. Additionally, power is supplied through line 188 connected to line 168 and line 189 connected to the line 175 plus the coil 173 and, additionally, through lines 191 and 193 to the solenoid member 161 and the drive motor member 67 respectively.

In the use and operation of the fluid dispensing apparatus 145 of this invention, it is obvious that a coin may be placed in the tongue member 153 of the coin box mechanism 147 and on depressing the same, operation is to manually close the lever 154 to supply power through lines 189 and 171 to the coil 173 to move the contacts of the relay member 155 to the closed condition. This operates to supply power to the motor member 67 through lines 166, 168, 175, 176, 188, and 189 to drive the same. Additionally, power is supplied through the relay member 155 and line 175 to the push button device. Also power is supplied to one side of the solenoid member 161 and the motor member 163 of the chemical supply means 66. However, with the push button device 158 in the condition shown in FIG. 7, it is seen that the same is open wherein the solenoid member 161 and the motor member 163 are not powered.

On depression of the push button device 158 to connect the lever member 181 to the line 185, it is seen that the solenoid member 161 is moved to the closed condition and the drive motor member 163 is energized. This operates during the soap cycle to supply at a slow, predetermined rate the powdered chemical from the hopper member 135 of the chemical supply means 66 into the drum member 18. Additionally the normally opened solenoid member 163 is energized to the closed condition to pull the soap solution out of the drum member 18. It is obvious that on having the contact lever 181 of the push button device 158 in the rinse condition, the normally opened solenoid member 161 permits fluid flow therethrough for the rinse cycle and operable as previously described for the fluid dispensing apparatus 12.

After a certain time period such as five minutes, the timing motor 151 opens to de-energize the coil 173 on
the relay member 155 to the condition of FIG. 7 which operates to de-energize the motor member 67, the push button device 158, the solenoid member 161, and the drive motor member 163.

It is seen that the fluid dispensing apparatus of this invention provides a compact, neat appearing structure which is readily portable and need only be supplied with a fluid and electrical energy to be fully operable. It is seen that the chemical could be readily supplied with a softening agent therein so that on adding the same to the 10 drum member, this operates to soften this water for the chemical cycle which is extremely desirable and eliminates the necessity for expensive softening apparatus. Also, the heating assembly operates to maintain a heated chemical solution which is desirable in providing a most efficient power spray wash. The fluid dispensing apparatus provides a compact, portable washing structure which is economical to manufacture having a minimum amount of moving parts and resultant decreased maintenance. The fluid dispensing apparatus utilizes a pressure relationship which permits a suction of the chemical solution into the pump member which is desirable over restricted venturi thrust structures of the prior art that continually mix a chemical and the working fluid.

As will be apparent from the foregoing description of the applicant's fluid dispensing apparatus, relatively inexpensive means have been provided taking a minimum amount of space, requiring substantially no maintenance, being manually or automatically supplied with the required chemical and not requiring external softening and heating sources.

While the invention has been described in conjunction with preferred specific embodiments thereof, it will be understood that this description is intended to illustrate and not to limit the scope of the invention, which is defined by the following claims.

What is claimed is:

1. A fluid dispensing apparatus, comprising:
   (a) support means having a fluid reservoir with a first fluid therein,
   (b) power means to receive fluid at an inlet section and discharge same through an outlet section under pressure,
   (c) an inlet assembly connected to said inlet section and said fluid reservoir to receive said first fluid therefrom through a first valve member and prevent fluid flow in the opposite direction,
   (d) fluid supply means connected to said fluid reservoir to supply a second fluid thereto and to maintain a predetermined level therein and connected through a supply line and a second valve member to said inlet assembly, and
   (e) said first and second valve members operable under one set of conditions to provide only said first fluid to said inlet section from said fluid reservoir and operable under a second set of conditions to supply only said second fluid to said inlet section through said second valve member.

2. A fluid dispensing apparatus as described in claim 1, wherein:
   (a) said inlet assembly means including a T member having one portion connected to said inlet section, a second portion connected to said fluid reservoir, and a third portion connected to said second valve member,
   (b) said first valve member being a check valve to permit fluid flow of said first fluid under suction to said inlet section, and
   (c) said second valve member moveable to an open condition and the pressure of said second fluid is greater than the pressure of said first fluid to hold said first valve member in a closed condition to supply only said second fluid to said power means.

3. A fluid dispensing apparatus as described in claim 1, wherein:
   (a) said support means including an upright drum member mounted upon a support ring having wheel assemblies connected thereto so that said support means is readily movable in any direction and a lid member enclosing the upper open end of said drum member,
   (b) said power means having a motor member connected through a drive shaft to a pump member, all of which is connected to a mounting plate secured to the upper surface of said drum member,
   (c) said first valve member being a check valve assembly operable to permit fluid flow only from said fluid reservoir towards said pump member and prevent fluid flow in an opposite direction,
   (d) said second valve member being a solenoid member moveable from open to closed conditions to permit fluid flow towards said pump member and having the pressure of said second fluid greater than said first fluid so as to hold said check valve assembly in a closed condition when said solenoid member is in the open condition,
   (e) chemical supply means connected to said fluid reservoir having a hopper member and an auger mounted within said hopper member to convey chemical therefrom, and a motor connected to said auger member operable on energization to rotate said auger member to dispense chemical into said fluid reservoir,
   (f) control and circuit means connected to said solenoid member and said motor to drive said auger member including a timing mechanism connected through a relay member to said motor, a button device connected to said relay member and said solenoid member and said motor on said chemical supply means, and
   (g) said timing mechanism operable on actuation to operate said relay member to energize said motor member to drive said pump member, and said button device operable in one position to actuate said solenoid member to a closed condition and operate said motor on said chemical supply means to automatically supply a predetermined amount of chemical from said hopper member when receiving said first fluid from said fluid reservoir, and said button device operable in a second position to de-energize said solenoid member to the open condition to supply said second fluid to said pump member and close check valve assembly.

4. A fluid dispensing apparatus, described in claim 1, wherein:
   (a) said first valve member being a check valve to permit fluid flow of said first fluid under suction to said inlet section, and
   (b) said second valve member being a manual valve moveable to an open condition and the pressure of said second fluid is greater than the pressure of said first fluid to hold said first valve member in a closed condition to supply only said second fluid to said power means.

References Cited

UNITED STATES PATENTS

2,632,999 3/1953 Balton 103—224X
2,802,599 8/1957 Callahan et al. 222—129,4X
3,037,707 5/1962 Ligon 222—144,5X
3,084,047 4/1963 Holstein et al. 222—67X
3,118,610 1/1964 Tschirler 222—144,5X
3,259,649 3/1966 Reeve 222—146X

STANLEY H. TOLLBERG, Primary Examiner
H. S. LANE, Assistant Examiner