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A. M. ROSSI
 SPRAY APPARATUS HAVING PRESSURE
 RESPONSIVE SELECTOR VALVE MEANS
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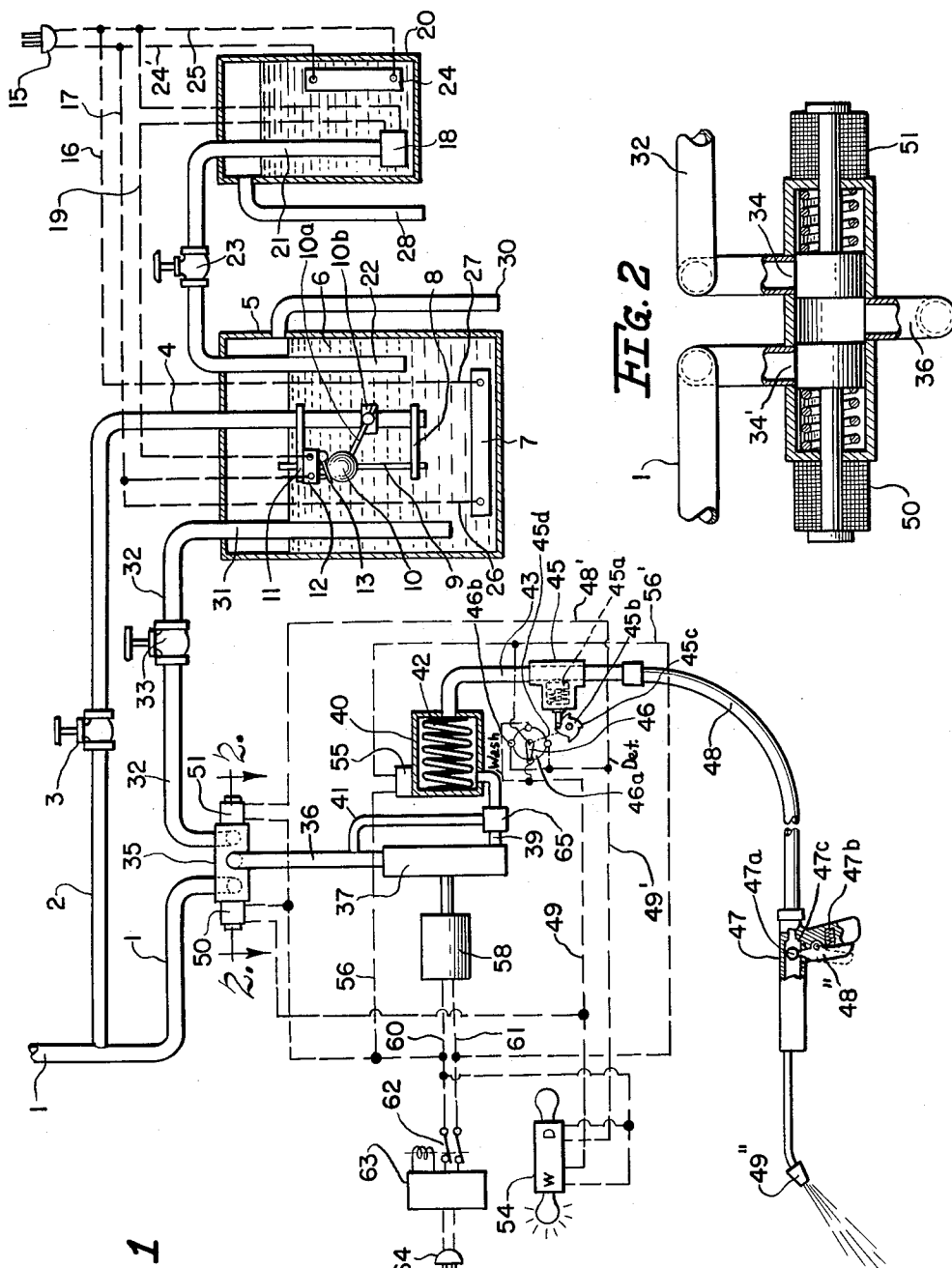


FIG. 1

FIG. 2

INVENTOR.
 Anthony M. Rossi
 BY Richard J. Myera
 and John J. Kowalik
 Atty.

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SPRAY APPARATUS HAVING PRESSURE RESPONSIVE SELECTOR VALVE MEANS

Anthony M. Rossi, 5043 W. Oakdale, Chicago, Ill.

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17 Claims. (Cl. 239—135)

This invention relates to a vehicle washing mechanism and more specifically is directed to an apparatus particularly adapted to a self-service or customer operated system.

To my knowledge there is presently no coin-operated facility available to the public wherein a user may upon depositing a prescribed sum of money condition the equipment for use to provide a certain quantity of water and washing solution for a certain length of time and at his option may alternatively spray the vehicle with water and then with a suitable washing solution such as liquidized detergent.

In an automatic apparatus, a predetermined programmed sequence is established and the high pressure of the water impinging against the dirty vehicle body is relied upon to do the cleaning. In such installations revolving brushes and the like are not normally used as in the manned operations, inasmuch, as such brushes would not do the detail cleaning and their use would complicate the installation so that it would be prohibitively costly and subject to malfunctioning but also such brushes would create an inherent hazard. Furthermore, a customer would still have to do the detail cleaning.

In view of the foregoing premises, the primary object of my invention is to provide a novel manually operated device which is inherently inexpensive to make and install and wherein the apparatus is virtually indestructible in normal usage.

A principal object of the invention is to provide a vehicle wash station incorporating a circuit for supplying water and a detergent to a wash gun which is provided with a trigger for alternatively discharging water or detergent which is directed by the user upon his vehicle.

The invention comprehends providing a novel circuit which is conditioned by the trigger of the wash gun to connect either to the water or to the detergent tank.

These and other objects of the invention will become more readily apparent from the specification and the drawings, wherein:

FIGURE 1 is a diagrammatic illustration of my novel system;

FIGURE 2 is a partly diagrammatic enlarged sectional view of the selector valve taken essentially on line 2—2 of FIGURE 1.

Describing the invention in detail and having particular reference to the drawings, the apparatus illustrated comprises a water inlet pipe 1, which has a branch line 2 with an adjustable pressure regulator or control valve 3 therein, said line 2 having a downward extension 4 into a tank 5 which is adapted to contain a dilute detergent or cleaning solution shown at 6.

The tank 5 contains a submersible thermostatically controlled heater 7 which may be set for example at (58° F.) or at any desired temperature setting to maintain the solution 6 at prescribed temperature. The pipe extension 4 carries a bracket 8 which serves as a support for the lower end of a vertical guide rod 9 which slidably supports a float 10. The pipe 4 is mounted above its lower end from the tank 5 by a bracket 11 which may support the upper end of the guide rod 9 as well as a switch 12. Switch 12 has an actuator 13 in the path of movement of the ball or float 10. The switch 12 is such that as the level of the solution 6 drops below a predetermined level, the float 10 will disengage from the

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actuator 13 and the actuator then trips the switch 12 to closed position which closes the circuit from the input or power source 15 which has one lead 17 connected to switch 12 and its other lead 16 attached to one connection of a pump 18. The pump has its other connection connected in series with switch 12 by the line 19.

The pump 18 is located within a detergent or washing solution concentrate tank 20 and is connected at its discharge side to a pipe 21 which has an outlet end 22 into the tank 5. Pipe 21 has a pressure regulating valve 23 in series. The tank 20 may be manually filled in any convenient manner and may be heated by a thermostatically controlled electrical heater 24. Heater 24 may be connected by lines 24', 25 with electrical lines 16 and 17 and heater 7 may be similarly connected by lines 26, 27 with lines 17 and 16. Tank 20 is provided at its upper end with an overflow pipe 28. An overflow pipe 30 is provided at the upper end of tank 5. Pump 18 supplies concentrated detergent to tank 5 when actuator 13 closes the circuit.

Tank 5 is connected to the inlet end portion 31 of pipe 32 which has a pressure regulator valve 33 between tank 5 and an electrically operated selector valve 35. Pipe 32 is connected to one of the two inlet ports namely port 34 of valve 35 and the other inlet port 34' of valve 35 is connected to the clear water supply line or pipe 1.

The valve 35 has its discharge port connected to a pipe 36 which is connected to the inlet side of a pump 37, the pump 37 having its discharge side connected by a pipe 39 to a heater tank 40. A bypass line 41 connects line 36 to bypass valve 65 in line 39. The heater tank coil 42 is connected to a discharge pipe 43 which is connected to the body 45 of a two position switch 46 movable between water washing (Wash) and detergent (Det.) cycles. The switch is a conventional two position actuating switch response to changes in pressure in line 42 to be moved from contact Wash to contact Det. and return. The pipe 43 is connected to the washer gun 47 by a flexible hose 48. The gun 47 has a finger operated trigger 48" actuating valve 47_a from close (dotted line) to open (solid line) position off seat 47_c and spring 47_b urging valve 47_a to close for controlling the flow of the liquid through the nozzle 49.

It will be noted that upon the user pressing the trigger either water or detergent will flow through the nozzle. To shut off the gun the operator releases the trigger. This causes a surge of back pressure to build up in the liquid in the pipe behind the gun. The rise in pressure actuates the switch 46 which is connected through lines 49 and 48' with solenoids 50 and 51 which operate the shuttle valve 35 to alternately pass water or detergent from pipes 1 and 32 to pipe 36.

Lines 49, 49' are connected with a signal light 54 which indicates which circuit is being actuated, viz. the water rinse W or detergent D.

The heater tank 40 is thermostatically controlled by switch 55 and connected with line 56' and line 56. The heating element 42 is actuated only during the detergent cycle and is off during the water or rinse cycle.

It will be seen that the electric motor 58 which drives pump 37 is connected by lines 60, 61 through a coin box operated relay switch 62 to a power source which provides 120 v. or 240 v. single phase A.C. for operating the pump motor 58 and the heater element 55. The coin box 63 may be connected to a 110 v. A.C. power source 64 which is connected to actuate relay switch 62 by deposit of a prescribed coin.

It will be noted that in order to obtain sufficient pressure in the lines, the bypass line 41 has a bypass valve 65 in the form of pressure relief valve having a setting of 325 p.s.i. (pounds per square inch), it being understood

that the pump inlet p.s.i. is in the region of 70 p.s.i. and the pump outlet pressure is about 275 p.s.i. The back or surge pressure to actuate the alternator switch 46 may be about 290 p.s.i.

The float 10 may be provided with a connection, such as lever 10a, that is fixed to valve 10b in line 4, so that as the float 10 moves down to actuate switch 12 for filling tank 5 with concentrated detergent from tank 20, the valve 10b is opened by downward movement of ball 10 and the live water in inlet 1 spills into tank 5 with the concentrated detergent, whereas when the float ball 10 returns to open circuit from source 15 both flow of inlet water and concentrated detergent from tank 20 ceases to flow into tank 5.

The two position alternator 45 that moves from water to detergent cycles may be constructed with means, such as a rotatable racket cam 45b having four points 45c, each point 45c movable to a next successive cycle position by each cycle movement of spring loaded valve member 45a of alternator 45 to provide for rotation of shaft 45d of alternator 45. The shaft 45d moving a quarter turn each water wash or detergent (Det.) cycle rotates electrical contact pointer of switch 46 over contact point plate 46a of switch 46 to alternately open and close water or detergent cycles by moving electrical contact pointer of switch 46 over contact point plate 46a of switch 46 to alternately open and close water or detergent cycles by moving electrical contact pointer of switch 46 in or out of electrical connection with a respect electrical contact lead 46b for either energizing the "WASH" solenoid 50 or the "DET" solenoid 51.

Thus it will be appreciated that a novel system has been disclosed wherein the operator may readily, merely by actuating the trigger on the gun, change the flow from detergent to rinse water and vice versa and determine the length of time of each cycle. If the operator should want, for example, more water after he turned the gun off during the water cycle, the operator merely presses the trigger twice in quick succession. The same is true of the detergent cycle.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A vehicle washing apparatus comprising a source of cleaning solution and a source of rinse water, a selector valve means communicating with each source and having first position supplying rinse water and a second position supplying cleaning solution to a vehicle, a manually operated wash discharge means having open and close flow positions and being provided for selectively receiving the rinse water and the cleaning solution, and means for selectively placing said selector valve means in said first and second positions and comprising switch means being responsive to changes in pressure in operating the discharge means from open to close positions, said switch means having a connection with said selector valve for operation thereof and a fluid pressure connection with said discharge means and operative thereby.

2. A coin operated vehicle washing apparatus comprising a source of cleaning solution and a source of rinse water, an electrically solenoid operated selector valve communicating with each source and having first position supplying rinse water and a second position supplying cleaning solution to a vehicle, a manually operated wash discharge means having open and close flow positions and being provided for selectively receiving the rinse water and the cleaning solution, and means for selectively placing said selector valve means in said first and second positions and comprising an electrical mechanical switch means being responsive to changes in pressure in operating the discharge means from open to close positions, said switch means having an electrical

connection with said selector valve for operation thereof and a fluid pressure connection with said discharge means and operative thereby.

3. A vehicle washing apparatus for washing and rinsing of a vehicle comprising a rinse supply and a cleaning solution supply under pressure, a manually operated wash nozzle means having open and close positions and alternately supplying a cleaning solution and a rinse under pressure to the surface of the vehicle in the open position of the nozzle means, selector means in selective operative communication with each supply and the nozzle means for respective wash and rinse cycles, and means defining a pressure responsive alternator in operative connection between the selector means and the nozzle means and operative in the closed position of the nozzle means to energize the selector means in changing from one cycle to the other in alternately supplying one of the solutions to the nozzle means in the open position thereof.

4. The invention according to claim 3 and said selector means comprising a two position solenoid valve means responsive to said alternator in said wash and rinse cycles in alternately blocking fluid communication of the rinse supply with the nozzle means and allowing fluid communication of the cleaning solution supply with the nozzle means.

5. The invention according to claim 4 and said solenoid valve means including a pair of solenoid valves and an electrical circuit connecting with each valve and the alternator, each valve being electrically energized independent of the other by said alternator for fluid communication from a respective supply with the nozzle means.

6. The invention according to claim 3 and said alternator including a two position electrical switch and an electrical circuit connecting with the switch and the selector means and being pressure responsive to the opening and closing of the nozzle means in electrically operating said selector means.

7. The invention according to claim 3 and said nozzle means being in the form of gun means having a two position trigger and valve means in the gun means connecting with the trigger and communicating with the alternator and operable thereby to move from open to close positions of the nozzle means in developing a back pressure on the alternator in energizing the selector means.

8. The invention according to claim 3 and cleaning solution heating means being connected between the selector means and the nozzle means, said heating means comprising a tank and an electrical heating element for heating said tank having an electrical connection with the alternator, said selector means comprising a cleaning solution electrically operated solenoid valve having an open position for the cleaning solution flow only to the nozzle means, said alternator having an electrical switch contact for energizing the cleaning solution solenoid valve, and electrical lead means being connected between said contact and said cleaning solution solenoid valve and completing an electrical circuit with the heating element during the wash cycle.

9. The invention according to claim 3 and means for heating the cleaning solution supply during the wash cycle comprising a heating element between the selector means and the alternator and means for actuating the heating element including an electric circuit having a contact means in electrical connection with the alternator and the selector means during the wash cycle.

10. The invention according to claim 3 and said cleaning solution supply comprising a first tank of dilute cleaning solution and a second tank of concentrated cleaning solution and means for supplying solution from the first tank to the second tank including a float means in the first tank and a pump in the second tank, and an electrical circuit connecting with the pump and having a switch actuated by the float upon a decrease of solution in the first tank below a predetermined level to close the circuit and pump the solution from the second tank.

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11. The invention according to claim 10 and each tank having a heating element therein connected with the electrical circuit for the heating of the tank.

12. A vehicle washing apparatus comprising a cleaning solution source and a rinse solution source, a selector valve means having a first electrically actuated solenoid valve in communication with the cleaning solution source, said first solenoid valve having an open position allowing the solution to flow therethrough for a wash cycle and a closed position preventing flow of the solution therethrough, said selector valve means having a second electrically actuated solenoid valve in communication with the rinse solution source, said second solenoid valve having an open position allowing the solution to flow therethrough for a rinse cycle and a closed position, a manually operated wash and rinse nozzle means having open and closed flow positions, a motor driven pump communicating the selector valve means with the nozzle means during the rinse and wash cycles, a pressure responsive alternator responsive to increase in fluid pressure in the closed position of the nozzle means to change from one cycle to the other and in the open position of the nozzle allow solution flow therethrough for the selected cycle, a heating element between the pump and the nozzle means to warm the cleaning solution during the wash cycle, a by pass means on the outlet side of the pump for circulating solution back to the inlet side of the pump in the closed position of the nozzle means, and an electrical circuit providing an electrical connection for the motor driven pump, the alternator, the heating element, and the solenoid valves for completing the connection with the alternator for alternating the wash and rinse cycles and for completing the connection with the heating element during the wash cycle and for completing the connection alternately with the first and second solenoid valves for the wash and rinse cycles respectively.

13. A vehicle washing apparatus comprising a cleaning solution source and a rinse solution source, a selector valve means having a first electrically actuated solenoid valve in communication with the cleaning solution source, said first solenoid valve having an open position allowing the solution to flow therethrough for a wash cycle and a closed position preventing flow of the solution therethrough, said selector valve means having a second electrically actuated solenoid valve in communication with the rinse solution, said second solenoid valve having an open position allowing the solution to flow therethrough for a rinse cycle and a closed position, a manually operated wash and rinse nozzle means having open and closed flow positions, a motor driven pump communicating the selector valve means with the nozzle means during the rinse and wash cycles, a pressure responsive alternator responsive to increase in fluid pressure in the closed position of the nozzle means to change from one cycle to the other and in the open position of the nozzle allow solution flow therethrough for the selected cycle, and an electrical circuit providing an elec-

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trical connection for the motor driven pump, the alternator, and the solenoid valve means for completing the connection with the alternator for alternating wash and rinse cycles and for completing the connection alternately with the first and second solenoid valves for the wash and rinse cycles respectively.

14. The invention according to claim 13 and heating element connected between the pump and the nozzle means to warm the cleaning solution during the wash cycle, and said electrical circuit providing an electrical connection for the heating element for completing the connection with the heating element during the wash cycle.

15. The invention according to claim 13 and a by-pass means on the outlet side of the pump for circulating solution back to the inlet side of the pump in the closed position of the nozzle means.

16. A vehicle washing apparatus comprising a cleaning solution source and a rinse solution source, a selector valve means having a first valve in communication with the cleaning solution source, said first valve having an open position allowing the solution to flow therethrough for a wash cycle and a closed position preventing flow of the solution therethrough, said selector valve means having a second valve in communication with the rinse solution source, said second valve having an open position allowing the solution to flow therethrough for a rinse cycle and a closed position, a manually operated wash and rinse nozzle means having open and closed flow positions, a pump communicating the selector valve means with the nozzle means during the rinse and wash cycles, a pressure responsive alternator responsive to increase in fluid pressure in the closed position of the nozzle means to change from one cycle to the other and in the open position of the nozzle allow solution flow therethrough for the selected cycle, and energizing means providing a connection with the alternator for alternating the wash and rinse cycles and for completing a connection alternately with the first and second valves for the wash and rinse cycles respectively.

17. The invention according to claim 16 and said energizing means comprising an electrical circuit having a source of power and a coin operated electrical connection operated for a predetermined time whence the circuit opens and the operation of the washing apparatus terminates.

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M. HENSON WOOD, Jr., *Primary Examiner.*