

Sept. 21, 1965

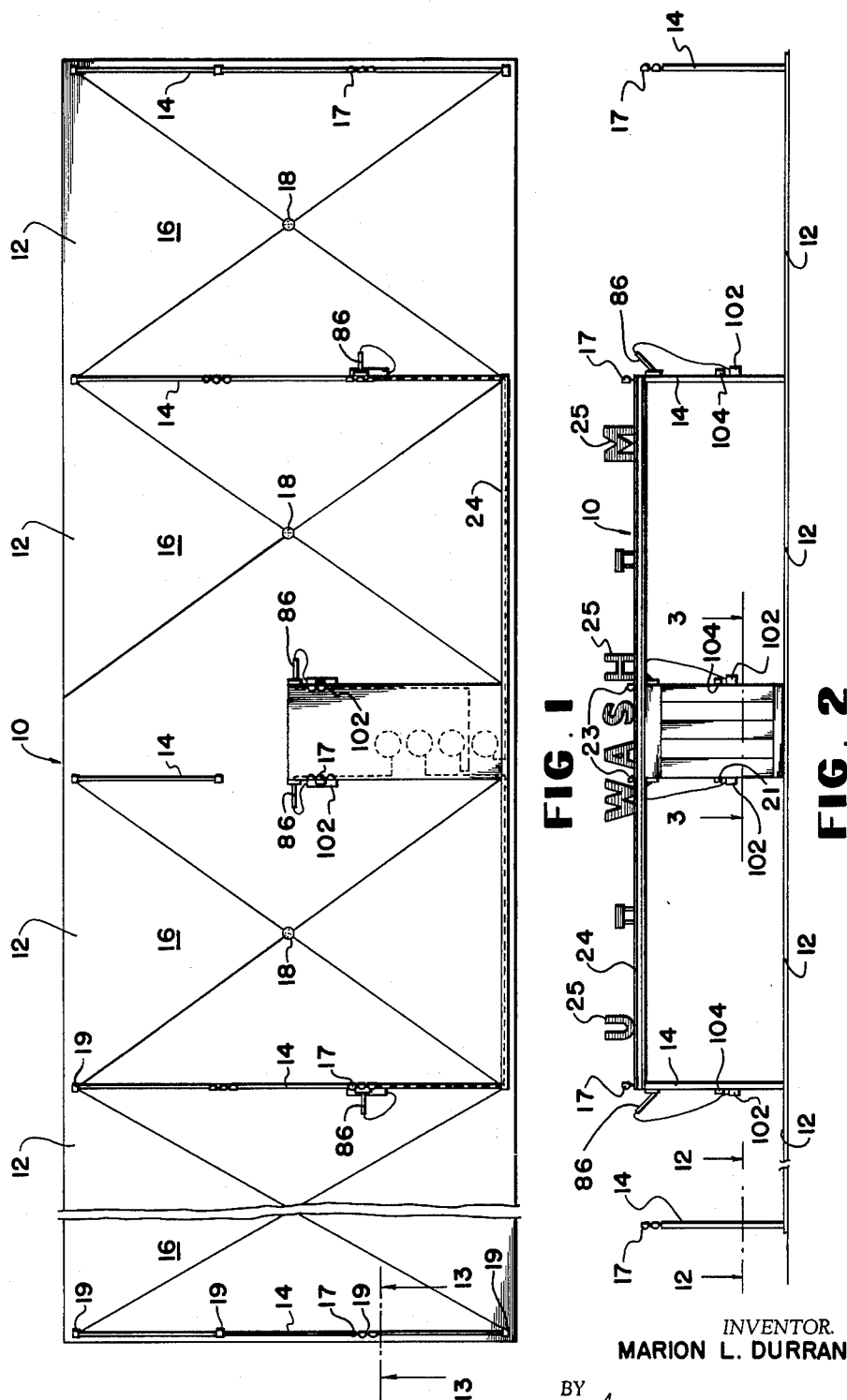
M. L. DURRANT

3,207,165

WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

Filed Dec. 23, 1963

6 Sheets-Sheet 1



INVENTOR.
MARION L. DURRANT

BY *John H. Widdowson*
ATTORNEY

Sept. 21, 1965

M. L. DURRANT
WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

3,207,165

Filed Dec. 23, 1963

6 Sheets-Sheet 2

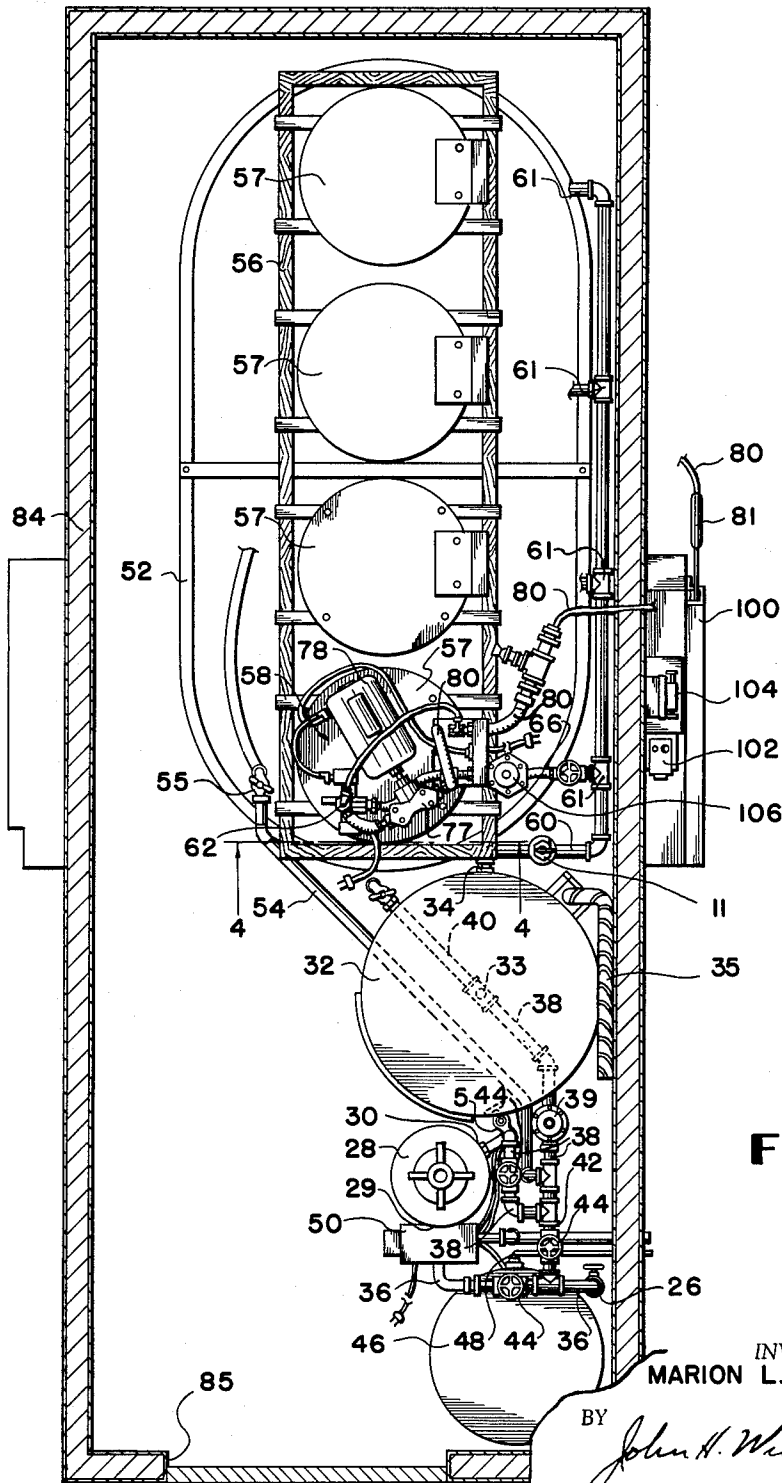


FIG. 3

INVENTOR.
MARION L. DURRANT

BY *John H. Widdowson*
ATTORNEY

Sept. 21, 1965

M. L. DURRANT

3,207,165

WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

Filed Dec. 23, 1963

6 Sheets-Sheet 3

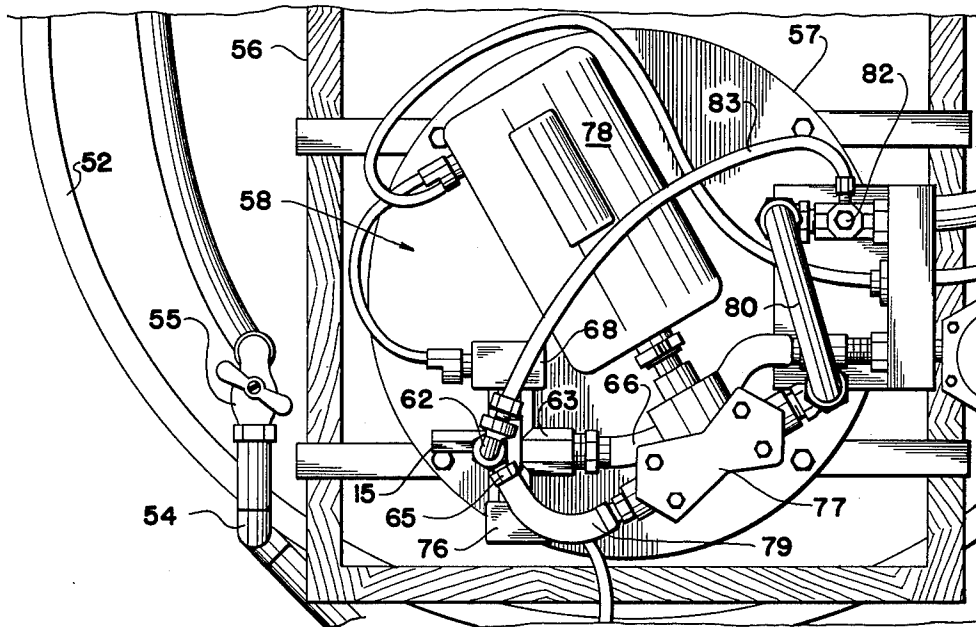


FIG. 5

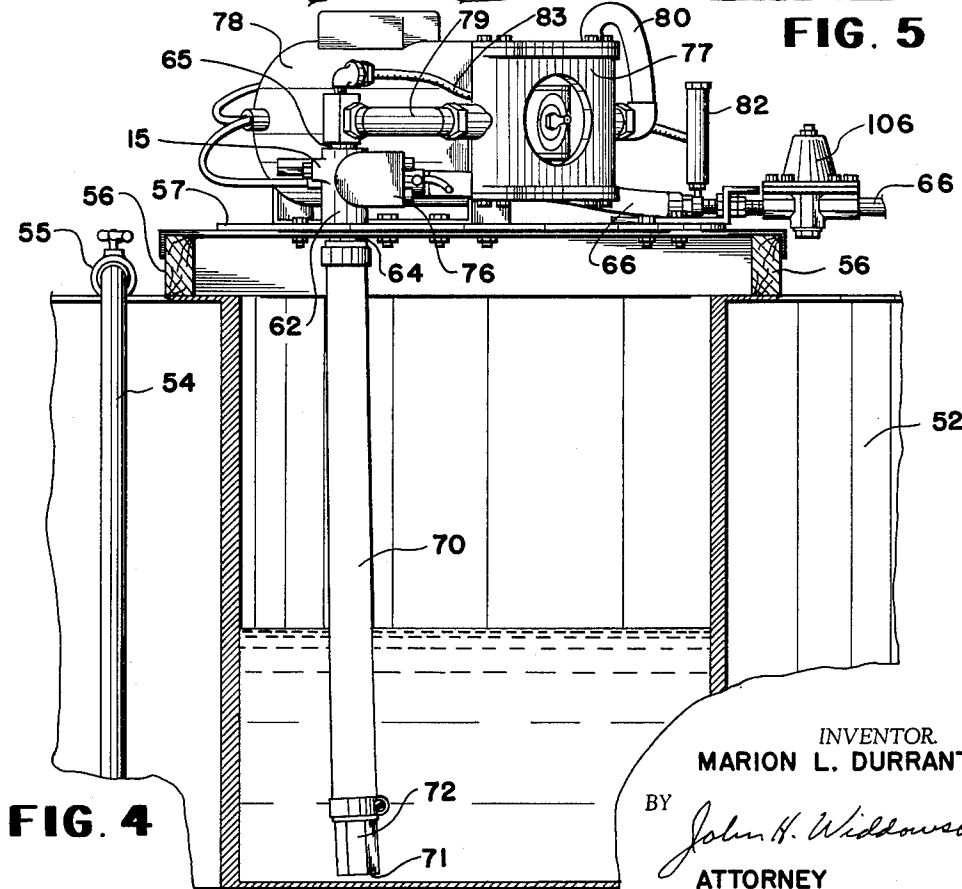


FIG. 4

INVENTOR.
MARION L. DURRANT

BY

John H. Widdowson
ATTORNEY

Sept. 21, 1965

M. L. DURRANT

3,207,165

WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

Filed Dec. 23, 1963

6 Sheets-Sheet 4

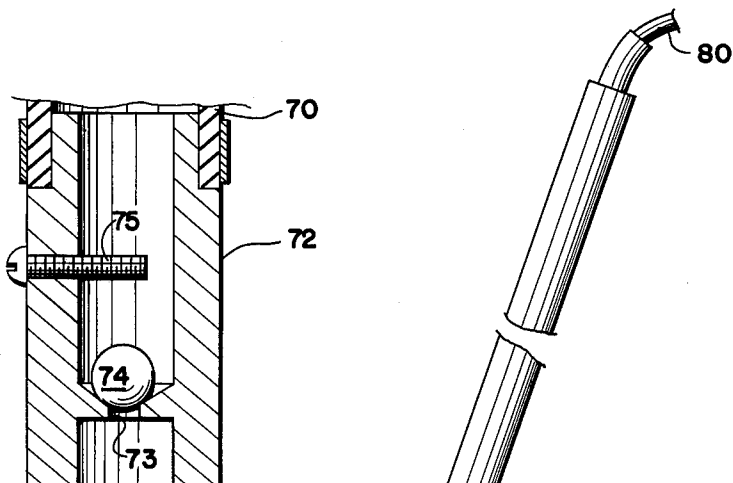


FIG. 6

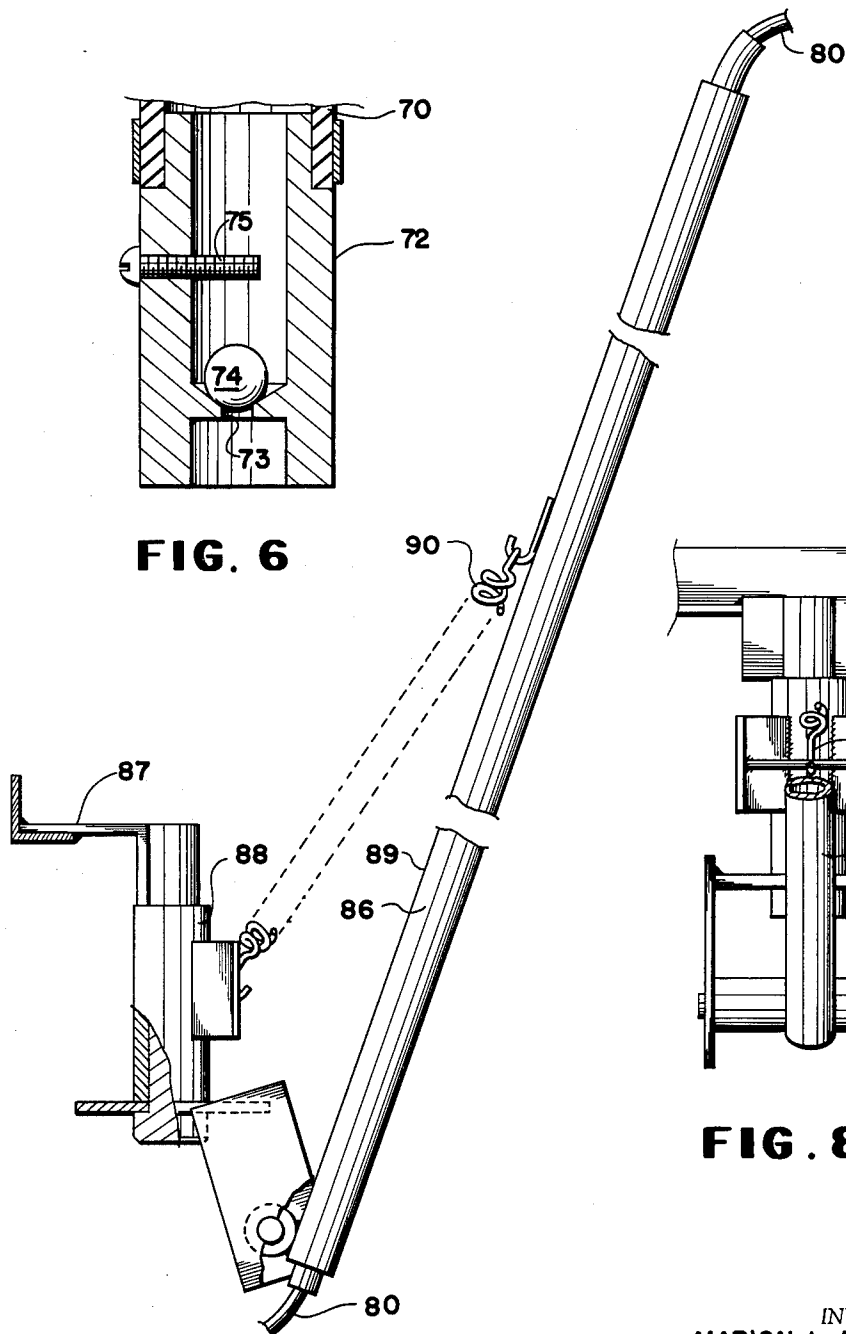


FIG. 7

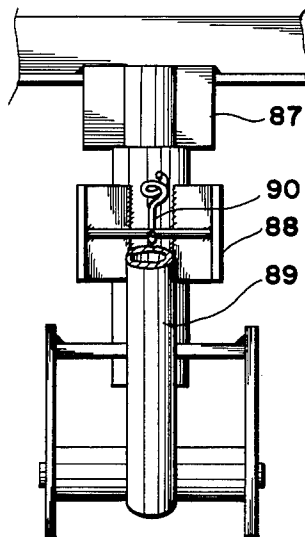


FIG. 8

INVENTOR
MARION L. DURRANT

BY *John H. Widdowson*
ATTORNEY

Sept. 21, 1965

M. L. DURRANT

3,207,165

WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

Filed Dec. 23, 1963

6 Sheets-Sheet 5

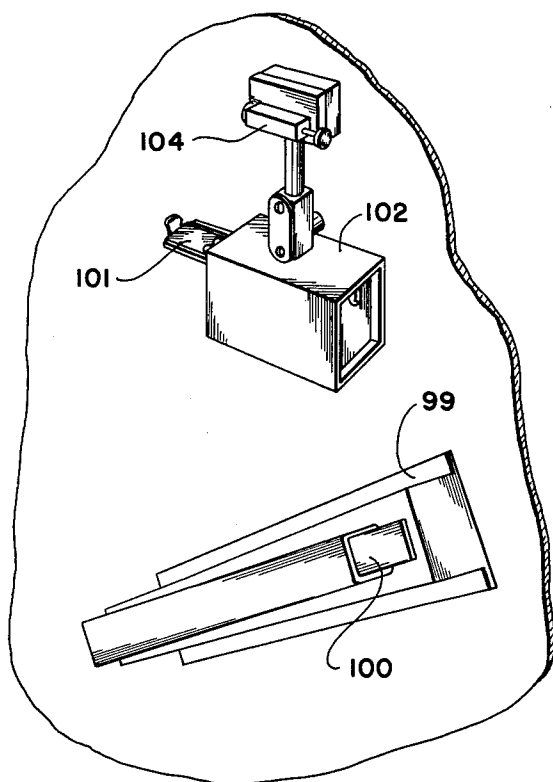


FIG. 9

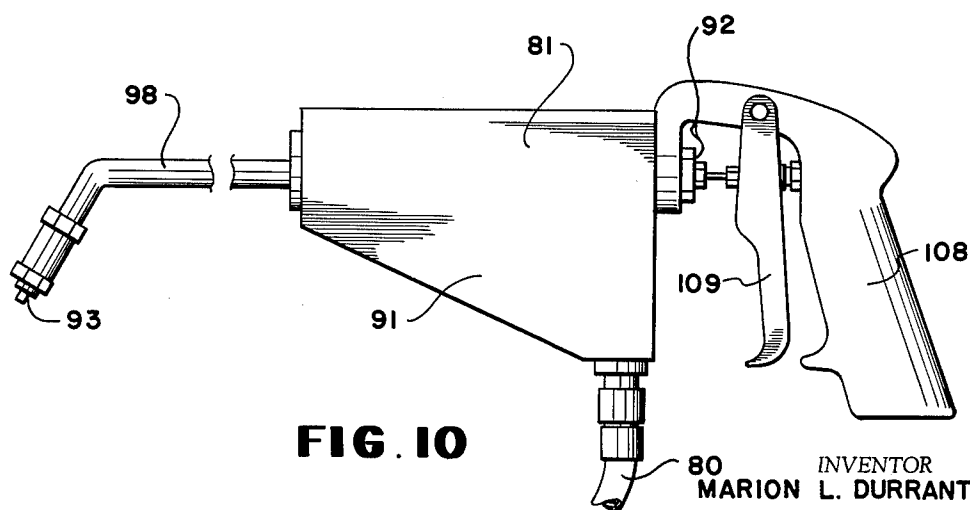


FIG. 10

INVENTOR
MARION L. DURRANT

BY

John H. Widdowson
ATTORNEY

Sept. 21, 1965

M. L. DURRANT

3,207,165

WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING
SOLUTION AND RINSE FLUID

Filed Dec. 23, 1963

6 Sheets-Sheet 6

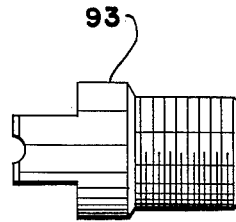
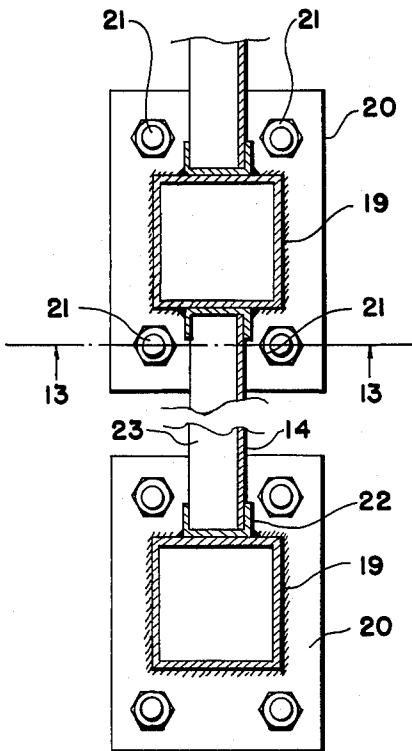


FIG. II-A

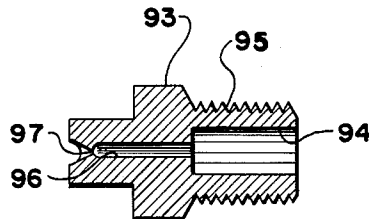


FIG. II-B

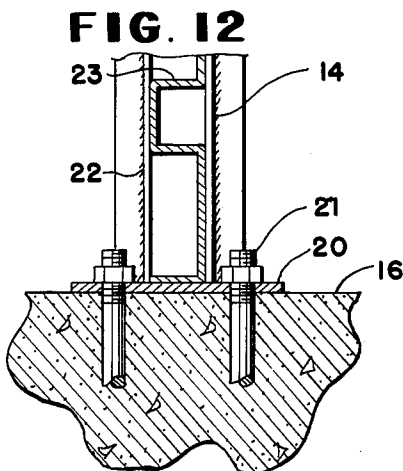


FIG. 13



FIG. II-C

INVENTOR
MARION L. DURRANT

BY
John H. Willderson
ATTORNEY

1

3,207,165 WASHING APPARATUS FOR ALTERNATIVELY SUPPLYING CLEANING SOLUTION AND RINSE FLUID

Marion L. Durrant, Wichita, Kans., assignor to
Dyna-Co., Inc., Wichita, Kans.
Filed Dec. 23, 1963, Ser. No. 332,600
8 Claims. (Cl. 134—58)

This invention relates to a washing apparatus, more specifically to self-service vehicle washing apparatus, still more specifically to self-service vehicle washing apparatus adapted to provide cleaning solution through a manually operated spray gun for a limited length of time for washing a vehicle or the like.

Vehicle washers are in general old in the art. A common type of vehicle washing apparatus known to the prior art is an apparatus having a plurality of stationarily mounted nozzles that are directed inwardly and adapted to play against a vehicle as it is moved along a predetermined path in the stream of the nozzles. This type of vehicle washing apparatus requires a very large capital investment since it is very complicated, often involving a track and a moving means to move the vehicle past the nozzles. Further, this type of apparatus is quite expensive to operate since it has complex mechanism and a great deal of plumbing which must be maintained. Further, this apparatus in operation requires a large amount of water and cleaning solution because it is not efficient since the nozzles are not all directed at the vehicle being washed at all times. Most important, this apparatus requires one or more operators in order to operate and direct the traffic through same. With the wages of employees constantly rising, with the attendant possibility of strikes, etc. this item of expense is quite significant. In conventional commercial car washing apparatus the employees must also collect for the washing service with the attendant possibility that the employees may be tempted to dishonestly pocket the money received. In general, the washing apparatus of the prior art fails to teach a coin-operated vehicle washing apparatus that is manually operated which is inexpensive to construct and subsequently maintain, and does not require the services of one or more full time employees to operate it.

The new washing means of this invention is a washing apparatus having means to provide under pressure cleaning medium and alternately to provide rinsing medium. A means is provided to initiate operation of the means to provide washing and rinsing medium. And, means is also provided to selectively control which of the cleaning and rinsing medium is provided.

In a preferred specific embodiment of the invention, there is spray means which is manually operated to direct the cleaning and rinsing medium and such is preferably a spray gun having a spray nozzle and a hand operated valve to control flow therethrough. The washing apparatus has a source of water, a water heater operably connected to the source of water, and a pumping and mixing means. The pumping and mixing means has a mixing valve with first and second inlets, and an outlet. A detergent solution tank is also provided. A fluid pump is operably connected by conduits to the source of water, the water heater, a mixing valve, the detergent solution tank and the spray means. The pump is adapted to provide at the spray means a cleaning solution, or rinse water. Suitable

2

shutoff-valve means are connected to the mixing valve to either combine the detergent solution contained in the solution tank or exclude it during operation. This operation is accomplished with a solenoid valve which controls the flow of detergent solution to an inlet of the mixing valve. A coin-operated switch and an associated timer means initiates operation of the washing apparatus for a limited length of time.

The vehicle washing apparatus of the invention solves all the problems associated with vehicle washing apparatus known to the prior art. In the washing apparatus of this invention, only a small capital investment is required to place it in operation since its mechanism is relatively simple and is very dependable and trouble-free in operation. After the vehicle washing apparatus is in operation it is relatively inexpensive to maintain requiring only a periodic inspection and servicing. The maintenance and servicing can be accomplished by a relatively unskilled person. Persons using the washing apparatus initiate operation of it by placing appropriate coins in the apparatus. An employee is not required to operate the apparatus or to collect and handle service fees. This eliminates the expense of an employee operator, and the attendant risk of a dishonest employee pocketing service charges as often occurs in conventional prior art vehicle washing apparatus. The washing apparatus of my invention enables the person utilizing it to obtain efficient, effective but inexpensive vehicle washing service of a vehicle or the like. Further, the apparatus is particularly adapted to clean the motor and other ordinarily inaccessible areas of a vehicle or the like which prior art apparatus are not adapted to wash.

It is an object of this invention to provide a new washing apparatus.

Another object of this invention is to provide a new self-service vehicle washing apparatus adapted to provide under high pressure a cleaning solution, and a rinse.

Yet another object of this invention is to provide a coin-operated vehicle washing apparatus that does not require an employee to operate same.

Another object of this invention is to provide a vehicle washing apparatus that is manually operated and adapted to clean and rinse the vehicle motor and other ordinarily inaccessible vehicle elements.

Yet another object of this invention is to provide a new vehicle washing apparatus which can be put into operation with a relatively small capital investment.

Still another object of this invention is to provide a vehicle washing apparatus that is inexpensive to operate and maintain.

Another object of this invention is to provide a self-service car washing apparatus that is simple and yet dependable in operation.

Still another object of this invention is to provide a car washing apparatus adapted to provide at a manually directable spraying means a heated detergent and water solution and a heated rinse water under high pressure in a broad spray pattern adapted to efficiently clean and rinse the surface of a vehicle or other apparatus being washed.

Still another object of this invention is to provide a self-service car washing apparatus adapted to supply an inexpensive vehicle washing service to the public.

Other objects and advantages of the invention will be apparent to those skilled in the art from the disclosure set forth herein.

Drawings of preferred specific embodiments of the invention accompany and are a part hereof and such are to be understood to not unduly limit the scope of the invention. In the drawings,

FIG. 1 is a top view of a preferred specific embodiment of the invention illustrating a typical multiple stall arrangement.

FIG. 2 is a front elevational view of the preferred specific embodiment of the invention illustrated in FIG. 1.

FIG. 3 is a view in cross section taken on line 3—3 of FIG. 2 illustrating the arrangement and structure of the washing and mixing mechanism.

FIG. 4 is a detail cross sectional view taken on line 4—4 of FIG. 3.

FIG. 5 is a top elevational view of the structure shown in FIG. 4.

FIG. 6 is a cross sectional view of a check valve in the conduit supplying detergent and water solution to the mixing valve.

FIG. 7 is a detail view of the hanger means used to support the spraying means conduit.

FIG. 8 is a side view in broken cross section of the structure shown in FIG. 7.

FIG. 9 is a perspective view showing the coin-operated switch means, the timer means, and the switch means to select the type of solution being sprayed, and also a bracket to mount the spraying gun.

FIG. 10 is a front elevational view of the spray gun.

FIG. 11-A is a front view of the nozzle apparatus used in the spray gun depicted in FIG. 10.

FIG. 11-B is a cross sectional view of the nozzle depicted in FIG. 11-A.

FIG. 11-C is a side elevational view of the spray nozzle.

FIG. 12 is a cross sectional view in broken cross section taken on line 12 of FIG. 2.

FIG. 13 is a detail cross sectional view taken on line 13 of FIG. 1.

The following is a discussion and description of the new vehicle washing apparatus of the invention made with reference to the drawings, wherein the same reference numerals are used to indicate the same or similar parts and/or structure. The discussion and description are of preferred specific embodiments of the vehicle washing apparatus of the invention, and it is to be understood that such are to unduly limit the scope of the invention.

Referring now to FIGS. 1 through 13, there is shown a specific embodiment of the self-service vehicle washing apparatus 10. The vehicle washing apparatus 10 has a plurality of car stalls 12. Each car stall 12 has parallel upright walls 14, open ends, and a floor 16 preferably of concrete sloped toward the center thereof, having a drain 18 to accept the resultant fluid flow. The specific construction of the upright walls 14 is shown in FIGS. 12 and 13. The wall 14 has aligned and spaced upright posts 19, each having a flat transverse base plate 20 welded to the bottom. The base 20 is affixed to the floor 16 by bolts 21 embedded in the concrete of floor 16. U-shaped channel irons 22 are secured to one or both sides of post 19 to accept a corrugated metal panel 23. As shown in FIG. 2, a horizontal beam member 24 supported on wall 14 has identifying indicia 25 mounted thereon. Lights 17 are mounted on the top of walls 14 to properly illuminate the car stalls 12. A manually operated washing means is associated with the washing apparatus 10 and has a separate outlet and control for same in each of car stalls 12. The washing apparatus is depicted in FIG. 3 and has a source of water 26, which in practice can be a conduit from a city water main, a privately owned well having its own pressure pumping system, or any other suitable source of water. A water softener tank 28 having an inlet 29, an outlet 30 and a water softener type ion exchange resin disposed therein is provided. A water heater 32 having an inlet 33 and an outlet 34 is positioned in closed proximity to water softener tank 28. A suitable gas conduit 35 connected to a gas

main or tank is provided to heat the water heater 32. However, if necessary or desirable other forms of energy such as oil, electricity, etc., can be used to heat water heater 32. A conduit means 36 is provided and connects with the source of water 26 and the inlet 29 of the water softener tank 28. Another conduit 38 is connected to the outlet 30 of the water softener tank 28 and the inlet 33 of water heater 32. A pressure regulator 39 is connected in conduit 38 and is preferably set for 40 pounds per square inch. Also connected to inlet 33 of water heater tank 32 is a short conduit 40 having a valve on the end thereof adapted to draw water from the water tank 32 for testing, etc. A generally similar valve outlet 15 is connected adjacent outlet 30. A conduit means 42 is connected to the conduit means 36 and conduit means 38 providing a means to bypass water softener tank 28. A plurality of valves 44 is disposed in conduits 36 and 38 and 42, and in use are adapted to alternately enable water to be transferred to the water heater 32 from the source of water 26 through the water softener 28 or bypassing it. A tank 46 having a salt therein is positioned adjacent the water softener tank 28. The salt in tank 46 is adapted to provide a salt solution to recondition the ion exchange resin in the water softener 28. A conduit means 48 is provided between the water softener tank 28 and the tank for salt 46 for back flushing a salt and water solution through the ion exchange resin to regenerate it. A valve and timer means 50 interposed between tank 46 and water conditioner 28 is provided for periodically causing back flushing of the ion exchange resin. Preferably a timer is set to cause the back flushing operation to occur during a slack period of use of the vehicle washing apparatus, normally in the very early hours of the morning.

A relatively large detergent solution tank 52 is positioned adjacent the water heater 32. A conduit means 54 connected to conduit 38 and having a valve 55 therein is adapted to supply water to detergent solution tank 52. A horizontal mounting platform 56 is disposed on the top of the detergent solution tank 52. Preferably the detergent tank 52 has an open top. A plurality of pumping and mixing means 58 are mounted on mounting platform 56. A separate pumping and mixing means 58 is provided for each of the car stalls 12 to supply cleaning solution and rinsing solution thereto using the tank 52 as a common tank. In FIG. 3 of the drawings there is illustrated only a single washing and mixing apparatus 58 mounted on mixing platform 56. Actually a similar pumping and mixing apparatus is mounted on each of the circular mounting platforms 57. A conduit means 60 is connected to the outlet 34 of water heater 32 and provides a plurality of water outlets 61 at spaced positions along the mounting platform 56 adjacent each of the pumping and mixing means 58 mounted thereon. Preferably a shut-off valve 11 is disposed in conduit 60 adjacent the outlet 34 of the water heater 32. Each of the pumping and mixing means 58 has an aspirator type mixing valve 62 having inlets 63 and 64, an outlet 65 and an adjustment means 15 therein for varying the ratio of fluids entering the inlets 63 and 64. The adjustment means 15 for varying the ratio of fluids is a conventional needle valve adapted to provide a 10 to 1 ratio between the fluids entering inlets 63 and 64. A conduit means 66 is connected to outlet 61 of conduit 60 and to the inlet 63 of the mixing valve 62. A pressure regulator 106 is connected in conduit 66 to regulate the pressure of the inbound water to the pumping and mixing means 58 to about 30 pounds per square inch. A cut-off solenoid valve 68 to control the flow of water in the conduit means 66 to the inlet 63 of mixing valve 62 is provided. A conduit means 70 is connected to the inlet 64 of mixing valve 62 and has an open end 71 disposed in the detergent solution tank adapted to draw detergent solution therefrom. On the bottom of conduit 70 is disposed a check valve 72 illustrated in detail in FIG. 6. The check valve 72 has

5

an aperture 73 having a ball 74 with a diameter greater than the aperture 73 seated in it. A stop means 75 in the form of a screw prevents the ball 74 from being drawn upwardly into the mixing valve 62 in the event that the flow in conduit 70 is extremely high. A solenoid cut-off valve 76 is provided to control the flow of detergent solution to mixing valve 62 through conduit 70. A piston type fluid pump 77 having an inlet and an outlet is provided. If necessary or desirable any suitable type pump, as for example a rotary pump, can be used. A motor 78 drives pump 77. A conduit means 79 is connected to the outlet 65 of the mixing valve 62 and the inlet of pump 77. A conduit means 80 is connected to the outlet of pump 77 and to a spraying means 81 associated with the pumping and mixing valve and disposed in each respective car stall 12. A bypass means is provided for the pump 77 which includes a relief valve 82 having an outlet, and an inlet communicating with the conduit means 80, and a separate conduit means 83 having one end connected to the outlet of relief valve 82 and the other end communicating with the conduit means 79. The bypass means provides an important safeguard to the pump and motor which prevents overloading of the motor 78 and possible damage to pump 77 when the spraying means 81 is closed.

A suitable housing means 84 having a door 85 therein encloses the washing means, including the detergent tank 52, hot water heater 32, softener tank 28, etc. Housing means 84 serves to protect the pumping and mixing means, tanks, heaters, etc. from the cold and possible danger due to freezing during the colder seasons of the year. An arm 86 is provided in each of stalls 12 for supporting the free end of conduit 80. The resiliently mounted arm 86 maintains the end of conduit 80 out of the way while the person washing the vehicle is manipulating the spraying means 81. The arm 86 has a mounting bracket 87, including a vertically positioned bolt, disposed in each car stall 12 on a respective wall. A pivoted tubular element 89 enclosing a portion of conduit 80 is pivotally supported on the pivoted portion 88 as shown in FIG. 7. Spring means 90 is connected to the tubular element 89 and the pivoted portion 88 and maintains the tubular element 89 in a raised position.

The spraying means 81 includes a spray gun 91 on the end of conduit 80 having a manually operated valve means 92 operated by trigger 109 for controlling the fluid flow therethrough and a nozzle orifice fitting 93. A handle 108 is provided on spray gun 91 to facilitate handling. The fitting 93 is depicted in detail in FIGS. 11-A, 11-B, and 11-C. The fitting 93 has a large longitudinally extending bore 94, an exteriorly threaded portion 95 adapting it to be secured to the spray gun 91 of spray means 81, a relatively smaller longitudinally extending bore 96 communicating with bore 94, and a thin elongated transverse slot 97 in the opposite end of fitting 93 communicating with the relatively smaller bore 96. The orifice fitting 93 will produce a fine spray when fluid is pumped through it under pressure. The particular shape of the nozzle orifice, namely the elongated slit produces a desirable broad elongated oval spray pattern. The orifice fitting 93 is preferably mounted on the end of a long tube 98 affixed to the main body of spray gun 91. A bracket 99 having an opening 100 to receive conduit 98 of spray gun 91 provides a suitable mounting for holding same when the spray gun is not in operation. The bracket is preferably mounted in an inclined position on an upright wall 14.

A coin-operated switch 101 and a timing means 102 is mounted on the upright wall 14 of each car stall 12. The switch means 101 in use initiates operation of the washing means after coins of the suitable denomination are placed therein and the switch means forced inwardly. A source of electricity is provided and suitable electrical wiring means operatively associated with the switch 101, the timer 102, motor 78, and cut-off solenoid valves 68

6

and 76 to achieve the hereinafter described mode of operation, the electrical wiring means is believed within the scope of one skilled in the art and will therefore not be described in detail. In general, the wiring means is operative after the coin-operated switch means is actuated to supply current to the timer means 102 to initiate its cycle. The timer has suitable electrical contacts that open and close during the cycle in combination with the electrical wiring means to open solenoid valve 68, activate the motor 78, and provide electrical current to solenoid shut-off valve 76 to enable it to be controlled by manually operated selector switch 104. At the end of a predetermined cycle extended over a time interval the timer means 102 disconnects the source of electricity and the solenoid valves 68 and 76 and motor 78 to deactivate the washing means. The manually operated switch 104 and the associated electrical wiring means makes possible a selection of either a cleaning solution or a rinse water to be supplied at the spray means 81. The switch 104 in one position will cause solenoid valve means 76 to open to allow passage of a detergent solution to the mixing valve 62 where it is combined with heated water from the water heater 32, and subsequently be expelled or sprayed from the spray means 81, or in the alternative position, cause solenoid valve to be closed to thereby block passage of the detergent solution to mixing valve 62. In such an instance only heated water, preferably softened, will be supplied to the spray means 81. Preferably the switch 104 is inactivated when the timer 102 is not in operation.

In operation one using the vehicle washing apparatus of the invention drives the vehicle to be washed into car stall 12. Coins of the suitable denomination are deposited into coin-operated switch 101. Prior to depositing the coins the switch 104 is set to the position for supplying a cleaning solution of detergent and water. Upon depositing the coins in switch 101 and activating same the electrical circuit associated therewith activates the timer means. The timer upon being activated supplies current to motor 78 driving pump 77. The pump 77 is adapted to develop a high pressure in conduit 80. This pressure is desirably on the order of 500 to 600 pounds per square inch. The electrical circuit associated with the timing means opens the solenoids 68 and 76 allowing the pump 77 to pump heated and softened water from tank 32, which water has been preferably treated by passing same through water softening tank 28, and detergent solution from tank 52, and supply the mixture to the spray means under high pressure. The person washing the vehicle first sprays the vehicle with the cleaning solution, preferably holding the nozzle at a distance of 10 to 12 inches from the surface thereof. After the vehicle has been completely sprayed with the cleaning solution, the operator changes the position of switch 104. Switch 104 and the electrical circuit means associated therewith operates to close the solenoid valve 76 on mixing valve 62. Upon closing the solenoid valve 76 the detergent solution from tank 52 is no longer admitted to a mixing valve 62. The pump 77 thereby supplies only a rinsing water to the spray means 81 through conduit 80. The operator then thoroughly rinses off the vehicle being washed with a rinsing water. After a predetermined time, preferably on the order of about five minutes, the timer associated with switch 101 completes its cycle and thereby breaks the electrical circuit supplying electrical current to motor 78 and solenoids 68 and 76 thereby causing the motor and pump 77 to stop, and the solenoid valves to close to effectively deactivate the washing means.

The maintenance of the vehicle washing apparatus of the invention is very simple. Since the timing means 50 periodically backs flushes the ion exchange resin contained in water softening 28 from a salt solution in tank 46 this salt solution is replenished from time to time. The maintenance personnel must also add detergent to

the tank 52 and also allow water to enter from conduit 54. If desired, an automatic dispensing means can be provided to largely eliminate this operation. It is understood that the electrical circuitry and conduit system can be modified to provide for a modified type of operation if desired. Also the elements of the washing apparatus can be repositioned, and the solenoid valves substituted with manually operated valves if desired.

While there have been described and illustrated preferred specific embodiments of the invention, it is understood that the washing apparatus and elements thereof of the invention disclosed can be made in other forms than herein described or suggested without departing from the spirit of the invention or scope of the claims.

I claim:

1. A self-service car washing apparatus comprising, a plurality of car stalls, each having parallel upright walls and open ends, illuminating light means on said walls, a floor sloped toward the center thereof, and a drain, and a manually operated washing means associated with said car stalls comprising, a source of water, a water softener tank having an inlet, an outlet, and water softener type ion exchange resin disposed therein, a water heater having an inlet and an outlet, first conduit means connecting said source of water and the inlet of said water softener tank, a second conduit means connected to the outlet of said water softener tank and the inlet of said water heater, a pressure regulator in said second conduit means, a third conduit means connected to said first and second conduit means, valve means in said first, second and third conduit means to alternately enable water to be transferred to said water heater from said source of water through said water softener or bypassing it, a tank having salt therein for reconditioning said ion exchange resin in said water softener, fourth conduit means between said water softener and the tank for salt for back flushing a salt and water solution through said ion exchange resin to regenerate same, means to automatically periodically cause said ion exchange resin in said water softener to be regenerated, a relatively large detergent solution tank, a mounting platform disposed on the top of said detergent solution tank, a plurality of pumping and mixing means on said mounting platform, a fifth conduit means connected to the outlet of said water heater and providing a plurality of outlets at spaced positions along said mounting platform adjacent each of said pumping and mixing means, a safety valve in said fifth conduit adjacent the outlet of said water heater, each of said pumping and mixing means comprised of, an aspirator type mixing valve having first and second inlets, an outlet, an adjustment means for varying the ratio of fluids entering said first and second inlets, a sixth conduit means connected to said fifth conduit means and said first inlet of said mixing valve, a first cut-off solenoid valve to control the flow of water in said sixth conduit to said mixing valve, a seventh conduit means connected to said second inlet of said mixing valve having an open end disposed in said detergent solution tank adapted in use to draw detergent solution therefrom, a second cut-off solenoid valve to control flow of detergent solution to said mixing valve, a piston fluid pump having an inlet and an outlet, a motor driving said pump, an eighth conduit means connected to the outlet of said mixing valve and the inlet of said pump, a ninth conduit means connected to the outlet of said pump and to a spraying means disposed in an associated car stall, a bypass means for said pump comprising, a relief valve having an outlet and an inlet communicating with said ninth conduit means, a tenth conduit means having one end connected to said outlet of said relief valve and the other end communicating with said eighth conduit means, and housing means enclosing said washing means, an arm for supporting the free end of said tenth conduit having a mounting bracket including a vertically positioned bolt disposed in said car stall on a respective upright wall, a pivoted portion mounted on said bolt of said

bracket to pivot about a vertical axis, an elongated tubular element having disposed therein an intermediate portion of said tenth conduit, means pivotally supporting said tubular element on said pivoted portion, said last-mentioned means adapted to pivot about a horizontal axis, a spring means connected to said tubular element and said pivoted portion for maintaining said tubular element in raised position, a spray gun on the end of said tenth conduit means having a handle and a manually operated valve means for controlling the fluid flow therethrough, and a nozzle orifice element in said spray gun, said orifice element having a large bore and an exteriorly threaded portion on one end, a relatively smaller bore in the intermediate portion, and a thin elongated transverse slit in the opposite end communicating with said smaller bore, a timer means, a coin-operated switch means for initiating operation of said timer means mounted on an upright wall of each respective car stall, electrical circuit means associated with said timer means for selectively supplying electrical current for a predetermined interval to maintain operation of said timer means, and said motor, open said first solenoid valve, to thereby supply at the spray gun a heated solution of detergent and water, a manually operated switch on said upright wall adjacent said coin-operated switch, and electrical circuit means connected to said manual switch and said second solenoid valve to close same during the timing cycle of said timer to provide rinse washing water at the spray gun.

2. A self-service car washing apparatus comprising, a car stall having parallel upright walls and open ends, a floor having a slope thereof, and a drain, and a manually operated washing means associated with said car stall comprising, a source of water, a water softener tank having an inlet, an outlet, and a water softener type ion exchange resin disposed therein, a water heater having an inlet and an outlet, first conduit means connecting said source of water and the inlet of said water softener tank, a second conduit means connected to the outlet of said water softener tank and the inlet of said water heater, a third conduit means connected to said first and second conduit means, valve means in said first, second and third conduit means to alternately enable water to be transferred to said water heater from said source of water through said water softener tank or bypassing it, a tank having a salt therein for reconditioning the ion exchange resin in said water softener, fourth conduit means between said water softener and said tank for salt for back flushing a salt and water solution through said ion exchange resin to regenerate same, a detergent solution tank, a mounting platform, a pumping and mixing means on said mounting platform, a fifth conduit means connected to the outlet of said water heater and providing an outlet adjacent said mounting platform, said pumping and mixing means comprising, an aspirator type mixing valve having first and second inlets, an outlet, an adjustment means for varying the ratio of fluids entering said first and second inlets, a sixth conduit means connected to said fifth conduit means and said first inlet of said mixing valve, a first cut-off solenoid valve to control the flow of water there-through, a seventh conduit means connected to said second inlet of said mixing valve having an open end disposed in said detergent solution tank adapted to draw detergent solution therefrom, a second cut-off solenoid valve to control flow of detergent solution to said mixing valve, a piston fluid pump having an inlet and an outlet, a motor driving said pump, a timing means for actuating said first solenoid valve and said motor, an eighth conduit means connected to the outlet of said mixing valve and the inlet of said pump, a ninth conduit means connected to the outlet of said pump and to a spraying means disposed in said car stall, a bypass means for said pump comprising, a relief valve having an outlet and an inlet communicating with said ninth conduit means, a tenth conduit means having one end connected to said outlet of said relief valve and the other end communicating with

said eighth conduit means, said spray means positioned on the end of said tenth conduit means having a manually operated valve means for controlling the fluid therefrom, and a nozzle orifice in said spray means, said orifice having a relatively large bore at one end thereof, a relatively smaller bore in the intermediate portion thereof, and a thin elongated transverse slit in the opposite end communicating with said relatively smaller bore, a coin-operated switch means for initiating operation of said timer means mounted on an upright wall of said car stall, electrical means associated with said timer means for supplying electrical current to said timer means to thereby start said timer means, actuate said motor, and open said solenoid valve to thereby supply to the spray means a heated solution of detergent and water, a manually operated switch on said upright wall adjacent said coin-operated switch, an electrical circuit means connected to said manual switch and said second solenoid valve to close same to thereby provide rinse washing water at the spray means.

3. A self-service car washing apparatus comprising, a car stall having upright walls and open ends, a floor sloped toward a drain, a manually operated washing means comprising, a source of water, a water softener tank having an inlet, an outlet, and a water softener type ion exchange resin disposed therein, a water heater having an inlet and an outlet, first conduit means connecting said source of water and the inlet of said water softener tank, a second conduit means connected to the outlet of said water softener tank and the inlet of said water heater, a third conduit means connected to said first and second conduit means, valve means in said first, second and third conduits to alternately enable water to be transferred to said water heater from said source of water through said water softener or bypassing it, a detergent solution tank, a mounting platform, a pumping and mixing means on said mounting platform, said pumping and mixing means comprising, a mixing valve having first and second inlets, an outlet, an adjustment means for varying the ratio of fluids entering said first and second inlets, a fourth conduit means connected to the outlet of said water heater and said first inlet of said mixing valve, a first cut-off solenoid valve to control the flow of water therethrough, a fifth conduit means connected to said second inlet of said mixing valve and in communication with said detergent solution tank adapted in use to draw detergent solution therefrom, a second cut-off solenoid valve to control flow of detergent solution to said mixing valve, a fluid pump having an inlet and an outlet, a motor driving said pump, a sixth conduit means connected to the outlet of said mixing valve and the inlet of said pump, a seventh conduit means connected to the outlet of said pump, spraying means disposed in said car stall communicating with said seventh conduit means, a fluid bypass means for said pump, a support means in said car stall mounted on said upright wall for movably supporting the end extending portion of said seventh conduit means, said spray means having a manually operated valve means for controlling of a fluid flow therethrough, and a nozzle orifice, said orifice having a circular bore communicating with a thin elongated transverse exterior slit, a timer means, a switch means for initiating operation of said timer means, electrical circuit means associated with said timer means for supplying electrical current to said motor and said first solenoid valve to open same to thereby supply at the spray means a heated solution of detergent and water, a second manually operated switch, circuit means connected to said second switch and said second solenoid valve to enable control of same to provide rinse washing water at the spray means when said second solenoid valve is in closed position.

4. A washing apparatus comprising, a manually operated washing means including a source of water, a water softener tank having an inlet and an outlet, a water heater having an inlet and an outlet, first conduit means con-

necting said source of water and the inlet of said water softener tank, a second conduit means connected to the outlet of said water softener tank and the inlet of said water heater, a third conduit means connected to said first and second conduit means, valve means in said aforementioned conduits to enable water to be transferred to said water heater from said source of water either through said water softener or bypassing it, a detergent solution tank, pumping and mixing means, comprised of a mixing valve having first and second inlets, and an outlet, a fourth conduit means connected to the outlet of said water heater and to the first inlet of said mixing valve, a first cut-off solenoid valve to control the flow of water through said mixing valve, a fifth conduit means connected to said second inlet of said mixing valve having an end in communication with said detergent solution tank adapted to draw detergent solution therefrom, a second cut-off solenoid valve to control flow of detergent solution to said mixing valve, a fluid pump having an inlet and an outlet, a means for driving said pump, a sixth conduit means connected to the outlet of said mixing valve and the inlet of said pump, a seventh conduit means connected to the outlet of said pump, a spraying means connected to said ninth conduit means, a fluid bypass means for said pump, said spray means having a spray gun, a manually operated valve means on said spray gun for controlling the fluid flow therethrough, and a nozzle orifice, a first switch means, a first electrical circuit to drive said pump and control said first solenoid valve to thereby supply at the spray gun the solution of detergent and water, a second switch, electrical circuit means associated with said second switch and said second solenoid valve to control same to provide a rinse washing water at the spray gun.

5. A washing apparatus comprising, a source of water, a water heater having an inlet and an outlet, first conduit means connecting said source of water to the inlet of said water heater, a detergent solution tank, a pumping and mixing means comprising, a mixing valve having first and second inlets, and an outlet, a second conduit means connecting the outlet of said water heater to the first inlet of said mixing valve, a first solenoid cut-off valve to control the flow of water to said mixing valve, a third conduit connected to said second inlet of said mixing valve and said detergent tank adapted in use to draw detergent solution therefrom, a second solenoid cut-off valve to control flow of detergent solution to said mixing valve, a fluid pump having an inlet and an outlet, a means driving said fluid pump, a fourth conduit means connected to the outlet of said mixing valve and the inlet of said pump, a fifth conduit means connected to the outlet of said pump, spraying means connected to the fifth conduit means, bypass means for said fluid pump, said spraying means including a manually operated valve means for controlling the fluid flow therethrough, and a nozzle orifice, first switch means, first electrical circuit means associated with said first switch means, said first solenoid cut-off valve, and said means driving said pump to operate said first solenoid cut-off valve and activate said means driving said pump in response to activation of said first switch means, second switch means, second electrical circuit means associated with said second switch means and said second solenoid cut-off valve to operate said second cut-off valve in response to activation of said second switch, said washing apparatus in use adapted to supply at the spray means through the nozzle thereof a heated solution of detergent and water with said second cut-off valve in open position, and a rinsing washing water with said second cut-off valve in closed position.

6. A washing apparatus comprising, a source of water, a water softener tank having an inlet and an outlet, and a water softener type ion exchange disposed therein, a water heater having an inlet and an outlet, first conduit means connecting said source of water and the inlet of said water softener tank, a second conduit means con-

ected to the outlet of said water softener tank and the inlet of said water heater, a third conduit means connected to said first and second conduit means, valve means in said first, second and third conduit means to alternately enable water to be transferred to said water heater from said source of water through said water softener tank or bypassing it, a means to regenerate said ion exchange resin in said water softener tank, a detergent solution tank, a mounting platform, a pumping and mixing means on said mounting platform, a fourth conduit means connected to the outlet of said water heater and providing an outlet adjacent said mounting platform, said pumping and mixing means comprising, an aspirator type mixing valve having first and second inlets, an outlet, and an adjustment means for varying the ratio of fluid entering said first and second inlets, a fifth conduit means connected to said fourth conduit means and said first inlet of said mixing valve, a first solenoid cut-off valve to control the flow of water therethrough, a sixth conduit means connected to said second inlet of said mixing valve having an open end disposed in said detergent solution tank adapted to draw detergent solution therefrom, a second solenoid cut-off valve to control flow of detergent solution to said mixing valve, a piston fluid pump having an inlet and an outlet, a motor in said pump, a seventh conduit means connected to said outlet of said mixing valve and the inlet of said pump, an eighth conduit means connected to the outlet of said pump, and a means connected to said first and said second solenoid cut-off valves to control operation thereof to enable said washing means to alternately provide a cleaning solution and a rinse water.

7. A washing apparatus comprising, a manually operated washing means including a source of water, a water softening tank having an inlet and an outlet, a water heater having an inlet and an outlet, first conduit means connecting said source of water and the inlet of said water softener tank, a second conduit means connected to the outlet of said water softener tank and the inlet of said water heater, a third conduit means connected to said first and second conduit means, valve means in said aforementioned valve conduits to enable water to be transferred to said water heater from said source of water either through said water softener or bypassing same, a detergent solution tank, pumping and mixing means comprised of a mixing valve having first and second inlets and an outlet, a fourth conduit means connected to the outlet of said water heater and to the first inlet of said mixing valve, a first cut-off valve to control the flow of water to said mixing valve, an actuating means for said first cut-off valve, a fifth conduit means connected to said second inlet of said mixing valve having an end in communication with said detergent solution tank adapted to draw detergent solution therefrom, a second cut-off valve to control flow of detergent solution to said mixing valve, a means for actuating said second cut-off valve, a fluid

pump having an inlet and an outlet, a means for driving said fluid pump, and a sixth conduit means connected to the outlet of said mixing valve and the inlet of said fluid pump, a seventh conduit means connected to the outlet of said fluid pump, a spray means connected to said seventh conduit means, said spraying means having a spray gun, a manually operated valve means on said spray gun for controlling the fluid flow therethrough, and a nozzle orifice, a first switch means, a first electrical circuit to drive said pump and control said means to actuate said first cut-off valve to thereby supply fluid to the spray gun, a second switch, a second electrical circuit means associated with said second switch and said means to actuate said second cut-off valve to control same to provide a rinse washing water at the spray gun.

8. A washing apparatus comprising, a source of water, a water heater having an inlet connected to said source of water and an outlet, a cleaning solution container, a pumping and mixing means comprising, a mixing valve having first and second inlets, and an outlet, a first conduit means connecting the outlet of said water heater to the first inlet of said mixing valve, means to control the flow of water to said mixing valve through said first conduit means, a second conduit connected to said second inlet of said mixing valve and said solution container adapted in use to draw solution therefrom, a control valve in said second conduit to control flow of cleaning solution to said mixing valve, a fluid pump having an inlet and an outlet, pump drive means connected to said fluid pump, a third conduit means connected to the outlet of said mixing valve and the inlet of said pump, a fourth conduit means connected to the outlet of said pump, spray means connected to the fourth conduit means, first switch means, first electrical circuit means associated with said first switch means and said pump drive means to operate said pump in response to activation of said first switch means, second switch means, second electrical circuit means associated with said second switch means and said control valve to operate said control valve in response to activation of said second switch means, said washing apparatus in use adapted to alternatively supply at the spray means a cleaning solution or a rinsing fluid.

References Cited by the Examiner

UNITED STATES PATENTS

1,162,966	12/15	Zaninovich	134—100
1,759,601	5/30	Apeldorn	210—191
2,036,634	4/36	Inch	210—191
2,222,516	11/40	Powell	134—101 X
2,558,472	6/51	Wilcox	134—100
2,751,915	6/56	Roberts	134—123
3,139,238	6/64	Norstrud et al.	134—36 X

CHARLES A. WILLMUTH, *Primary Examiner.*

GEORGE J. NORTH, *Examiner.*