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AUTOMATIC DIAPER WASHER

3 Sheets-Sheet 1



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July 24, 1962

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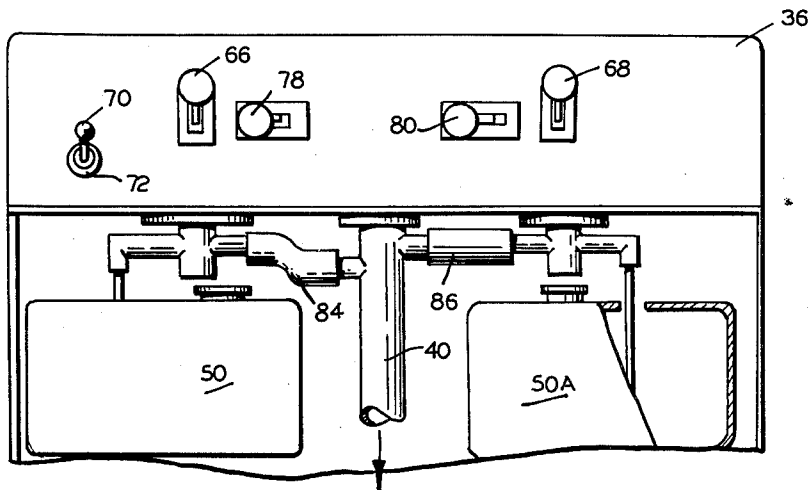


FIG. 2

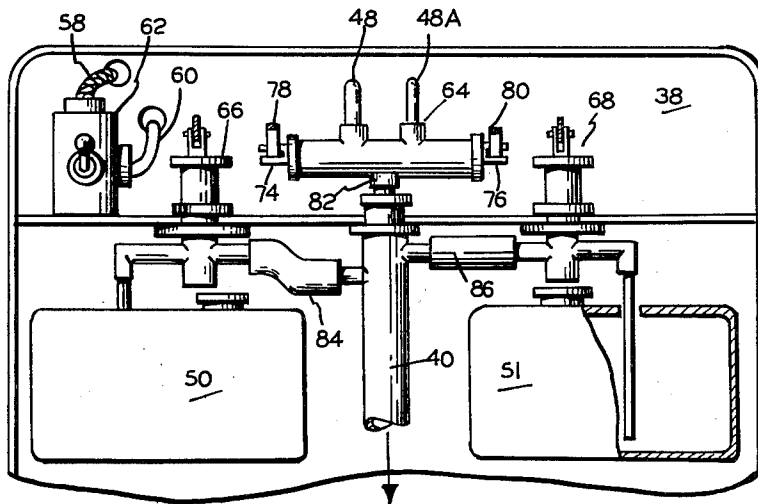


FIG. 2A

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FIG. 3

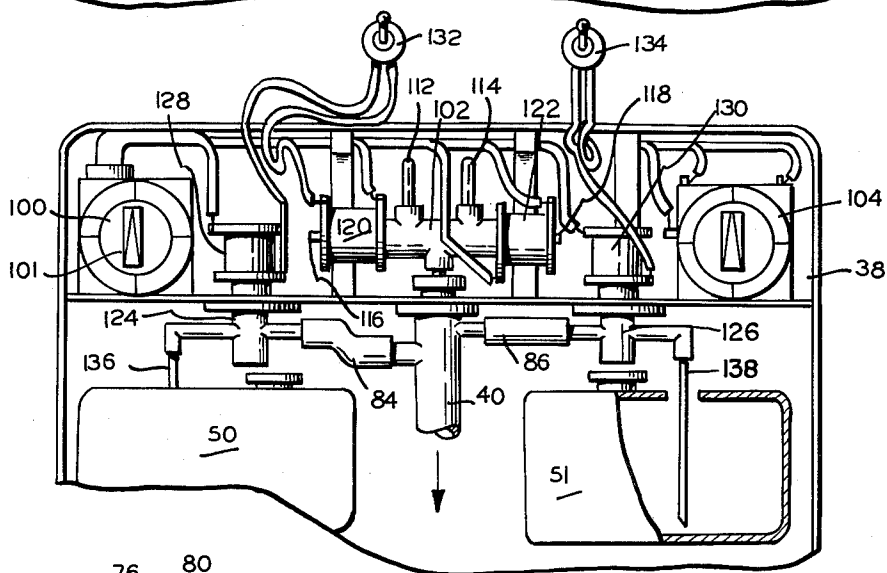
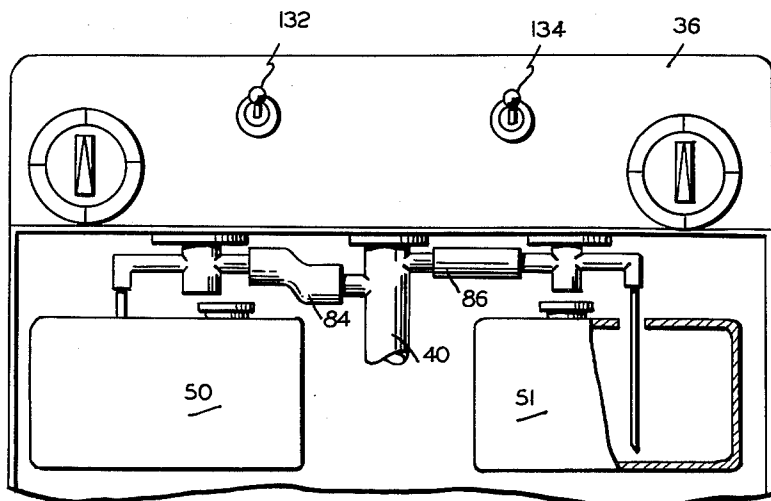


FIG. 3A

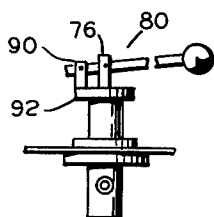


FIG. 4

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My invention relates generally to an improvement in apparatus for rinsing, washing and drying fabric material and, more specifically to such an apparatus for spraying a plurality of cleaning liquids onto an article supported within a spray chamber.

The apparatus of my invention may be designated for operating upon diverse materials such as garments, sheet fabrics, rugs, blankets and similar articles. However, in the present embodiments the features of my invention are arranged for performing rinsing, washing and drying operations upon sheet type materials such as baby diapers, clothing and bed linen.

It is well known that the rinsing and washing of liquid and semi-solid waste matter from baby diapers by hand has been an unpleasant task since the beginning of civilization. Prior art devices relating to the solution of this problem have not proven effective and for the most part, these earlier devices have constituted portable units used in association with toilet fixtures and were unsightly, unsanitary and time consuming in operation.

With the above and other disadvantages of prior art devices in mind an object of my invention is to provide a spray chamber with an improved fabric supporting means, a spray head and automatic and/or manual control means for selectively and/or sequentially spraying any of a plurality of liquid cleaning agents onto a fabric positioned upon the support, and means for effecting the removal of waste matter and cleaning liquids from said spray chamber.

Another object of my invention is to provide an apparatus of the type set forth which may be selectively employed for the preliminary rinsing or for the complete washing and drying of heavily soiled materials.

Another object of my invention is to provide an apparatus of the type set forth which may be either permanently installed and connected to conventional water, electric and sewer utilities or equipped with adapter couplings for effecting temporary connection with the conventional fittings of such utilities.

A further object of my invention is to provide an apparatus for rinsing, washing and drying fabrics, having a spray chamber, a closure for an access opening in said chamber, a fabric suitably supported within the chamber and improved means associated with the closure of said chamber for securely holding the fabric against accidental displacement from a supporting position during various treatment operations.

A still further object of my invention is to provide an improved apparatus for facilitating rinsing, washing and drying of fabric material which will be durable and efficient in use, simple and easy to manufacture and readily adaptable to variable installation requirements.

These and other objects of my invention together with the novel construction, arrangement and formation of parts will be apparent from the following specification when taken with the accompanying drawing in which:

FIGURE 1 is a sectional view showing a preferred arrangement of the novel features of my invention;

FIGURE 2 is a fragmentary view partly in section illustrating various features of the manually controlled embodiment of my invention;

FIGURE 2A is a view similar to FIGURE 2 with the cover of the control compartment removed;

FIGURE 3 is a view similar to FIGURE 2 illustrating

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features of the automatically controlled embodiment of my invention;

FIGURE 3A is a view similar to FIGURE 3 with the cover of the control compartment removed; and

FIGURE 4 is a detail view of a manual control valve of the present invention.

With reference to the accompanying drawings the preferred arrangement of the novel features of my invention are generally shown in FIGURE 1. Manual as well as automatic embodiments of my improved rinsing, washing and drying apparatus are set forth, wherein FIGURES 2 and 2A illustrate the manual control embodiment while FIGURES 3 and 3A show the control features of the automatic or timer-sequence control arrangement.

First the apparatus as set forth in FIGURE 1 is described in detail followed by descriptions of the manual and automatic embodiments.

Referring now to FIGURE 1, each form of my invention includes a housing 10 having a top 12 and side wall portions 14 and a rearwardly and upwardly inclined front wall section 16 including an access opening 18. The interior of the housing 10 is divided into an upper chamber 20 and a lower chamber 22 by a forwardly and upwardly inclined partition wall 24. The upper chamber 20 constitutes the spray chamber of the apparatus while chamber 22 encloses a motor driven pump 25 hereinafter described in detail.

The spray chamber 20 is provided with a closure 26 hinged at 28 and movable between a closed position, as shown in full lines in FIGURE 1, to an open latched position as shown in dotted lines in this figure. Any suitable means for holding the closure 26 in open position may be employed and, in the instant case, a strap 30 is hinged to the closure at 32 and is provided with a notch 34 adapted to engage the edge of an elongated slot (not shown) in the housing.

Surmounting the housing 10 is a removable cover 36 forming a control compartment 38 containing instrumentalities to effect operation of the apparatus. These control instrumentalities are identified and discussed in connection with the manual and the automatic embodiments hereinafter described.

With further reference to FIGURE 1, the upper chamber 20 contains a spray-head 40 arranged to direct liquids under pressure onto a fabric 42 positioned upon a foraminous support 44 secured by fastening elements 27 in spaced and substantially parallel relation with the inclined partition 24. The lower portion of the support 44 extends above and beyond a drain opening 46 in the bottom of the spray chamber while the upper portion of the fabric support 44 is bent downwardly and rearwardly to present a rounded fabric engaging surface.

A novel feature of my invention resides in an improved fabric holding or securing means wherein the closure 26 is provided with a resilient substantially U-shaped rack 41 mounted on its inner surface and engageable with the supported fabric 42 in closed closure position. Thus, referring more particularly to FIGURE 1 it will be seen that the fabric is clamped between the rack 41 and the upper portion of the fabric support 44. In the open-closure position, as shown in dotted lines, the fabric may be draped over the rack 41 for air drying or storage until further use. The delivery of water and other cleaning agents to the spray-head 40 is controlled by valves located within the compartment 38, and water inlet couplings 38 are provided for attachment to either temporary or permanent water supply line connections. Soap, detergents or bleaching agents are stored in reservoir units 50 and 51 and are delivered to the spray-head 40 in a manner presently described.

In the lower chamber 22 of the housing 10 a pump 25

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is shown with its inlet connected to the drain opening 46 and arranged for withdrawing waste matter and spent cleaning liquids from the spray chamber 20. This pump 25 is driven by an electric motor 52 through a drive coupling 54, and waste matter from chamber 20 is discharged through conduit 55 either temporarily connected with a toilet fixture or permanently attached directly to a sewer service line. The electric power is delivered to the motor 52 from line 58 and the cable 60 in a manner presently described.

In FIGURES 2 and 2A, each taken along the line x—x of FIGURE 1, features of the manually operated embodiment of my invention are shown. In FIGURE 2 the cover 36 is in position with various control levers of compartment 38 extending through apertures or elongated openings formed therein. FIGURE 2A, with the cover 36 removed, illustrates control devices including a motor switch 62, an inlet water mixing valve 64, and additional cleaning agent supply valves 66 and 68. The switch 62 is a simple on and off device whereby electric power from line 58 may energize pump motor 52 through cable 60. Control of the switch is effected by manual operation of lever 70 extending forwardly from the switch housing through opening 72 of the compartment cover 36. The inlet water mixing valve 64 may comprise any well known type and as shown includes hot and cold water inlet connections 48 and 48A. Each water connection or coupling is associated with a control valve element 74 and 76 having respective operating levers 78 and 80. Each of the control valves 74 and 76 may be progressively opened to permit hot and cold water to enter an internal misting chamber connected with the outlet 82 of the mixing valve 64. It will be obvious that the temperature of water entering the spray-head 40 through the valve outlet 82 may be regulated, as desired, by opening or restricting the flow by movement of the valve control levers 78 and 80.

Reservoir units 50 and 51 are provided for additional cleaning agents such as soap, detergents and bleaching solutions. These units are supported within the chamber 20 and adjacent the spray-head 40 by brackets generally shown in FIGURE 1. Solutions contained within the reservoirs 50 and 51 are fed into the spray stream by the action of injector pump assemblies located within the spray-head 40 and connected to the reservoirs by valve controlled conduits 84 and 86 as shown. Reference to FIGURE 2A will indicate the manner in which valve 68 and conduit 86 connect reservoir 51 with the spray-head 40. The flow of water through spray-head 40 passing the associated injector pump unit will, reopen valve 68, draw or syphon a cleaning agent from the reservoir 51 in a manner obvious to those skilled in the art. The quantity of cleaning agents, such as, soap and bleach solutions, entering the spray stream will depend upon the size of the opening of the valves 66 and 68. The valve elements shown are retained in various adjusted positions by friction, although more positive devices such as rack and pawl arrangements may be employed as desired within the scope of the present invention.

FIGURE 5 shows the operating lever assembly of one of the valve units of this embodiment of my invention. The lever 80 is connected to valve element 76 by pin 88 and fulcrumed by pin 90 on bracket 92.

Referring to FIGURES 1, 2 and 2A, the operation of the manual embodiment of my invention will require positioning the soiled article upon the support 44 in the following manner. After the closure 26 has been secured in open position by latch strap 30, as shown in dotted lines, a baby's diaper or similar article 42 is placed upon the support 44 with an upper edge of the same partly covering the upper roller section of the support. In this position of the diaper, the rack 41 frictionally engages and clamps the fabric as the closure 26 is moved into its closed position.

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Operation of arm 70 will close switch 62 energizing pump motor 52. Movement of levers 66 and 68 upwardly will open the associated valves permitting the flow of desired solutions such as soap and bleach. The flow of hot and cold water may be regulated by movement of the control levers 78 and 80 outwardly toward the respective sides of the housing 10. The application of water, soap or detergent and bleach may be interrupted, as desired, by the closing of appropriate valves. However, the injector pumps for the bleach and soap supply, of course, will be inoperative should the water supply and mixing valve be closed. This injector pump principle of supplying strong bleach or detergent solutions, which depends upon the flow of water and the intermingling of strong cleaning agents with the spray stream will preclude their inadvertent use and possible damage to expensive fabrics.

Waste matter and spent cleaning agents will flow to the pump 25 through drain opening 46 and be discharged to sewer utilities through conduit 55.

An operator of the manual form of my invention may, of course, utilize a wide range of cleaning procedures. The cleaned article may be conveniently draped over the rack 41 for air drying after the closure 26 is latched in open position.

The automatic embodiment is a modification of my improved apparatus and is shown in FIGURES 3 and 3A, which are also taken along the line x—x of FIGURE 1. These views illustrate features forming the automatically controlled embodiment of my invention. FIGURE 3 shows the cover 36 in position with various control elements extending through openings formed therein. FIGURE 3A, with the cover removed illustrates control devices including a motor operated timer switch 100, an inlet water mixing valve 102, a water temperature control 104 and additional cleaning agent supply valves 124 and 126. This automatic embodiment of my apparatus is basically similar in construction to the manually controlled form. However, in the present form the various valves and the pump motor actuation are electrically controlled and are preferably programmed by the operation of the motor operated timer switch 100.

The motor timer switch is of well known construction and essentially consists of a plurality of switch units each respectively opened and closed by one of a series of cam discs mounted upon a common shaft which is in turn driven by a small electric motor. The various timer switch units may be arranged and adjusted for simultaneous or successive operation to meet the requirements of various installations. In the form shown the control knob 101 is at rest at the switch off position. Manual clockwise rotation of this knob 101, through approximately ten degrees closes a timer motor energizing switch, whereupon the cam disc assembly is driven through one complete revolution and cycle of operation.

With further reference to FIGURE 3A the inlet water mixing valve 102 is shown attached to hot and cold water service couplings 112 and 114 respectively. The hot and cold water delivered through the valve 102 to the spray-head 40 is controlled by the opening of valve elements 116 and 118 each moved to open or close positions by solenoid units 120 and 122. Such solenoids being electrically connected to appropriate cam operated switch units of the timer 100. The temperature of the water delivered to the spray-head may be selected by the proper setting of a temperature control switch 104. This switch may comprise a four position rotary unit connected to the timer operated switch units to effect selective or simultaneous energization of solenoids 120 and 122. As shown, these switch positions include Off, Cold, Warm and Hot water settings. Such details of these circuit and switch elements and their operative arrangements and connections are well known to those skilled in the art and, therefore, are not shown or described.

The flow of soap and bleach solutions from reservoirs 50 or 51 is effected by injector pumps within the spray-

head 40 in the manner set forth above. In the present form valves 124 and 126 respectively control the flow of such additional cleaning agents and such valves are each provided with an operating solenoid as 128 and 130. These solenoid valve actuators 128 and 130 are connected to the timer switch 100 by circuits each of which respectively include nullifying switch elements 132 and 134.

The operation of this automatic embodiment of my invention under the programming of the motor driven timer switch 100 may be arranged to include various rinsing, soaking, soaping and bleaching intervals of desired predetermined durations.

A preferred mode of operation and a typical cycle for rinsing, washing and bleaching a fabric article, such as, a baby's diaper are as follows: With the closure 26 latched in open position the soiled article will be placed upon the support 44 after the manner set forth hereinbefore. The optional use of bleach and soap or detergent will be determined by manually setting switch units 132 and 134 in "on" or "off" positions. These switch units 132 and 134 each respectively complete or nullify the energizing circuits for solenoids 128 and 130 of valves 124 and 126 controlling the delivery of additional cleaning agents to the spray-head 40. As also described hereinbefore such additional cleaning agents are stored for use within reservoir units 50 and 51, and valved conduits 136 and 138 deliver such agent under the action of injector pumps (not shown), to the spray-head 40.

The water temperature may be established by adjusting the temperature control knob 105 from the "off" position to the desired "cold," "warm" or "hot" settings. It will be understood, the setting "off" of this control 104 prevents the flow of water through the spray-head 40 and, thus, will permit complete evacuation of waste matter and cleaning agents from the chamber 20. The setting "Cold" of the control 104 completes the circuit for operating only the cold water supply valve 118, the "Warm" setting completes the circuits for operating both the cold water supply valve 118 and the hot water supply valve 116 and the "Hot" setting completes the circuit for operating only the hot water supply valve 116.

In a typical cycle for cleaning an article a "rinsing" interval may be followed by the combined use of the water spray and a detergent solution. Next an interval of "soaking" may ensue wherein the spray stream is interrupted and the detergent is permitted to dissolve waste matter and otherwise act upon the soiled portion of the article. Following this a second "rinsing" interval is desired after which the bleaching solution may be applied and a second "soaking" interval may then be appropriate. After the foregoing, a final or third "rinsing" interval will be employed of such duration as to completely free the article of all traces of the waste matter and the cleaning agent. Throughout the foregoing cycle, the motor driven pump 25 should be operated especially during the intervals the spray stream is delivered into chamber 20. Optionally, the intervals of "soaking" will not require continued evacuation of liquids and matter, and therefore the pump operation may be interrupted. After the liquid spray treatment is completed the pump 25 must be operated for a short interval to ensure complete evacuation of chamber 20.

Obviously, modifications of the above cycle of operation may be made to meet various cleaning requirements. My improved apparatus may be employed for the pre-rinsing of heavily soiled articles which, are subsequently completely washed by other laundry facilities, or my apparatus may be utilized to completely wash such articles.

Drying of wet articles will be facilitated by draping the same over the U-shaped rack 41 with the closure 26 in the open, latched position. While this mode of air drying of articles will suffice in most household installations, it is within the scope and concept of my invention to effect more rapid drying of fabrics by circulating warmed, dry air through the spray chamber 20.

My improved apparatus may be installed and used in various environments such as the household bathroom and laundry. Additionally, it may be employed adjunct of other laundry facilities. Workmen, such as, laborers, mechanics and the like may well adopt my improved apparatus for pre-rinsing or the complete laundering of clothing, floor cloths and related fabric materials.

The foregoing is considered as illustrative only of the principles of the invention. Numerous modifications and changes will readily occur to those skilled in the art, and therefore, it is not desired to limit the invention to the exact construction and operation shown and described. Accordingly, all suitable modifications and equivalents are included within the scope of the invention, as claimed.

What I claim is:

1. In an apparatus for treating fabric material including a spray chamber having an access opening and fabric supporting means within the chamber the combination of a closure for said access opening and means carried by said closure engageable with said supported fabric in closed closure position to prevent displacement thereof during treatment and providing in opened closure position a rack support upon which the fabric may be draped for drying.
2. The apparatus as set forth in claim 1 wherein a spray-head within said chamber is positioned to direct liquids onto said fabric, means is provided for supplying at least one liquid to said spray-head, and means is provided for removing waste matter and cleaning liquids from said chamber.
3. The apparatus as set forth in claim 2 wherein said means carried by said closure includes a resilient substantially U-shaped rack mounted on the inner surface of said closure and adapted in closed closure position to engage and hold the fabric against displacement.
4. The apparatus as set forth in claim 3 wherein a conduit and control valve connects said spray-head with a supply of water under pressure.
5. The apparatus as set forth in claim 2 wherein said spray-head is connected to a pair of control valves and respective sources of hot and cold water under pressure.
6. The apparatus as set forth in claim 1 wherein a spray-head within said chamber is positioned to direct liquids onto said fabric, means is provided for removing waste matter and cleaning liquids from said chamber, and a pair of valved conduit means is provided for connecting said spray-head to sources of hot and cold water under pressure.
7. The apparatus as set forth in claim 6 including a supply reservoir for an additional cleaning agent, a liquid injector pump within said spray-head and valved conduit means for selectively connecting the injector pump and supply reservoir.
8. The apparatus as set forth in claim 1 wherein a spray-head within said chamber is positioned to direct liquids onto said fabric, an electric motor operated pump is connected to said chamber for removing waste matter and cleaning liquids from said chamber, a pair of valved conduit means connects said spray-head to sources of hot and cold water under pressure, reservoir means associated with said chamber forms at least one additional liquid cleaning agent supply source, and valved conduit means connects said spray-head to such source of additional cleaning agent.
9. The apparatus as set forth in claim 8 wherein an electric switch operatively connects said pump motor to a source of electrical power and wherein each of the valves connecting the spray-head to sources of liquid supply are manually controlled.
10. The apparatus as set forth in claim 8 wherein a motor driven timer switch operatively connects said pump motor to a source of electrical power and each of the valves connecting the spray-head to sources of liquid supply are solenoid actuated by separate circuits ener-

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gized by the power source as controlled by said motor driven timer switch.

11. The apparatus as set forth in claim 8 wherein a motor driven timer switch operatively connects said pump motor to an electric power source, each of the valves connecting the spray-head to sources of liquid supply are solenoid actuated by separate circuits energized by the power source and said motor driven timer switch, and manually controlled switch means are provided for selectively nullifying the operation of certain solenoid valves.

12. In an apparatus for washing fabric material the combination of a housing having top, and side wall portions and rearwardly and upwardly inclined front wall section defining an access opening, a closure for said opening movable between a closed position and an open, latched position, a forwardly and upwardly inclined partition wall dividing said housing into an upper chamber and a lower chamber, a spray-head within said upper chamber positioned to direct liquids onto said fabric, means to supply at least one liquid to said spray-head, means to remove waste matter and cleaning liquids from said upper chamber, and a resilient substantially U-shaped rack mounted on the inner surface of said closure and

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adapted in closed closure position to engage and hold the fabric against displacement and in open closure position to provide a drying rack to support said fabric.

13. Apparatus as set forth in claim 12 including a plurality of cleaning liquid supply sources, a valved conduit individually connecting each of said supply sources to said spray-head and manual means for controlling said valves.

14. Apparatus as set forth in claim 12 including a plurality of cleaning liquid supply sources, solenoid operated valves and conduits separately connecting each of said supply sources to said spray-head and motor driven timer switch means for energizing said solenoid valves.

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