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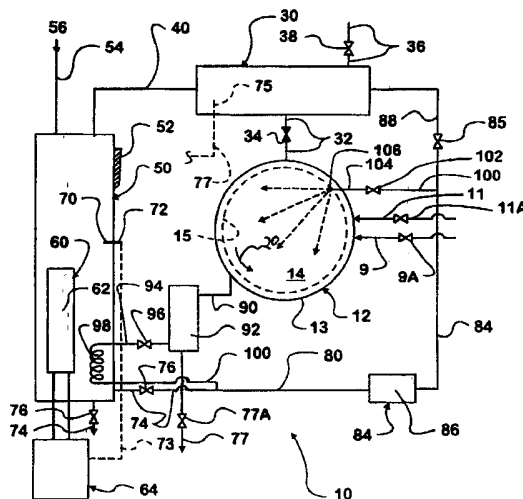
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(54) Title: IMPROVED WASHER METHOD AND APPARATUS



(57) Abstract: An improved washer (10, 210, 710) having a quick fill (32, 34) and a quick drain (36, 38) with reduced overall wash time is provided. Means are provided for doing a very cold wash to permit machine washing of fine clothing that heretofore was hand washed or dry cleaned. The washer (10, 210, 710) can be provided with one (30), two (224, 230) or three tanks (750A, B & C, 950A, B & C) for water at three temperatures, very cold (refrigerated), tap or city water supply temperature, or hot water. The very cold can be made by a refrigeration or chilling means (62, 64, 98), located in or adjacent the very cold water tank. The hot water can be provided from or have a heater (230, 320, 750C, 950C) therein one of the tanks. The washer also includes an improved embossed basket (600) with increased surface area. The features can be built into a new washer or retrofitted into an existing washer. Very cold water wash and rinse can be provided so that cloths, and particularly clothes such as made of wool, rayon, acetate or other clothes, such as leathers or furs, usually dry cleaned or hand washed, can be machine washed with the present invention without use of hazardous chemicals or shrinkage.

## IMPROVED WASHER METHOD AND APPARATUS

This United States PCT application is a continuation-in-part of United States provisional patent application Serial No. 60/446,928 filed February 12, 2003, by the same inventor on which claim of priority is made. This invention relates to a method and apparatus for a clothes washer and particularly relates to a “quick” type washer for commercial or domestic use additionally capable of cold water alternative washing to conventional (“perc”) dry cleaning of fine clothes.

### Background of the Invention

10 It is known to wash clothes with a washing machine, and these machines generally operate with several cycles such as “Regular Wash” and “Gentle Wash”. In either cycle the washing machine’s wash drum, tub or compartment has to be filled and emptied many times with say wash water, and one or usually more rinses. Generally the wash cycle is made up of fill, wash, drain, fill, rinse, drain, fill, rinse and drain times. The fill and drain  
15 times with present washing machines can comprise 50% or more of the entire wash cycle. For example, if a full wash cycle takes 30 minutes, the fill and drain times can amount to more than 15 minutes. Thus, if a laundry is to do an ascertained amount of laundry per hour beyond what one machine can do to keep up with customer demand, additional washers are necessary.

20 Further, there are certain types of clothing which presently have to be dry cleaned or hand washed as present washing machines do not permit them to be washed therein. An example of such wash, are fine silks, woolens and even leathers or furs. If washed in a prior art washing machine these fine silks, woolens or other fine clothing or leather or furs would not come out satisfactory, would distort, shrink or become smaller in size  
25 and/or would likely result in a customer complaint.

### Summary of the Present Invention

The present invention provides a method and apparatus for a washer that has a considerably shortened cycle time and can generally do about two loads of wash in the  
30 time one load of wash would be done in a prior art washer. The present invention achieves the increased washing capacity without reducing the actual washing action or

wash time. Instead, the washer apparatus and method of the present invention provides extremely quick filling and quick draining of the wash chamber to essentially shorten the overall wash cycle. To achieve these results, a quick fill means for filling and a quick drain for draining the wash chamber means of the washer is provided. For example, 5 filling can be reduced from three (3) minutes to fifteen (15) seconds or shorter, say 10 seconds, while draining can be reduced from sixty (60) seconds to fifteen (15) seconds or shorter, say 10 seconds. In prior art washers, draining was controlled by the public water supply pressure (say normally 80 psi) and the smallest size pipe from there to the washer. This pipe was usually about one inch or less in diameter and limited the supply or fill rate 10 resulting in slow filling. However, this normal pressure is not always available and can be considerably lower when several washing machines or other devices are using water at about the same time. If the normal city water pressure were 80 psi, the pressure in the laundry at the washer could be 30 psi or lower, greatly slowing filling times. Likewise, the drain was limited by the size pipe used to drain the washer. This was usually about a two 15 inch diameter pipe or less.

The washer method and apparatus of the present invention achieves a quick fill by providing a quick fill tank above the washer which can be constantly filled by the public water supply if needed, but via a large diameter pipe or pipes say two pipes of two inches in diameter or more used to quickly fill (15 seconds or less) the wash chamber. Another 20 alternative is to provide a single large diameter pipe say of 3 or 4 inches or more in diameter between the quick fill tank and wash chamber with a drain flow area of greater than 3 and preferably 4 square inches in area. Of course the inlet pipe or pipes would be fitted with a suitably sized fill control valve(s), preferably controlled for operation either by pneumatic, hydraulics or electrical means. For example, if the wash chamber requires 25 10 gallons, the quick fill tank might be sized for 30 gallons or more to hold all the water for the entire wash cycle, including the wash and all rinses. The quick fill tank of course would be refilled during the entire wash cycle. The quick fill tank could fill the washer chamber by gravity, but as a preferred alternative, or in addition, a quick fill pump could be supplied to do so. If a quick fill pump is used, it may be desirable to close the fill tank 30 so it can be pressurized by the pump to achieve a short fill-time. In addition, if the pump is used, the tank bottom can be funnel shaped and of a smaller size, say 5 gallons as the

pump and its pressure will still achieve a quick fill. In addition an appropriate storage tank or reservoir tank means is provided so that the quick fill pump can draw from such storage tank or reservoir tank means and is not dependent on the slow fill rate of the city water supply.

5           A quick drain is also provided from the wash chamber to the public sewer system. Usually laundries are required to have a drain tank into which the washers are drained. In the present invention the drain flow path from the wash chamber to the laundry drain tank is sized larger than heretofore to permit a very quick drain (15 seconds or less). For example, the drain might consist of several two inch diameter or larger drain pipes or a  
10   single yet larger drain pipe. Again, suitable drain control valve or valves are provided in the washer to control the drain as required by the various washer cycle. While "diameters" are mentioned, the inlet and drain pipes could be of other shapes than round cross-section.

          The washer of the method and apparatus of present invention can not only do a  
15   "regular" and/or "gentle" wash cycle, it is also capable of washing some forms of fine clothing, such as woolens, rayons, silks and acetates and even leathers or furs, that heretofore, were hand washed or only dry cleaned. In order to accomplish this additional task, the washer method and apparatus of the present invention is provided with a very cold water source, say under 50°F, and preferably around 40°F, say plus or minus 5°F. The  
20   advantage of the very cold water wash is that it minimizes distortion or shrinking of the clothing being washed. The very cold water wash with a suitable soap or cleaning chemical can in many cases replace dry cleaning done with environmentally hazardous "perc".

          To supply the very cold water, the city or public water supply flows into a large  
25   insulated tank which is several times larger than the quick fill tank and even the washers washing chamber. A means is provided for cooling the water flowing into or in the tank and/or to be supplied to the washer to the desired very cold temperature. This could take the form of chiller means or refrigerator means for cooling water. Various means could be used such as a heat exchanger, a refrigeration unit, icemaker, ice or the like to keep the  
30   water in the washer cold. The cooling could take place before the tank or before the washer chamber, but preferably takes place in the tank. This very cold water can be

recirculated from the wash chamber to the cold tank or cooling means to keep the water cold. Again, such may be in the form of a pipe or line taking wash or rinse water from the washer chamber and cooling it and returning it to the wash chamber. Such means can be a pump for recirculating flow and heat exchanger in the cooling tank, or even a separate cooling or refrigerating unit. Again, as discussed above, the filling and draining of the wash chamber can, if desired, be done very quickly (15 seconds or less).

The very cold wash concept integrates into the quick wash concept so that the desired features of both can be realized. To this end, like the cold water tank, the quick fill tank, and connecting lines or pipe are also insulated to prevent heating of the water and to decrease the energy required by the refrigeration or other means providing the very cold water.

The method and washer of the present invention can also be provided with a similar hot water quick fill tank which can be filled from a conventional hot water heater or the heater integrated into the hot water tank. Also, if desired, a third tank at city water temperature could be provided for conventional washing and rinses.

Thus, the washer and method of the present invention can do a regular hot, warm or cold wash, a gentle hot, warm or cold wash, along with an alternative to dry cleaning, a very cold water wash, and the latter could also optionally include a very cold water or city water rinse.

Further to enhance the washing action the inner basket of the wash chamber may have increased surface area such as by providing fins and/or raised inwardly or outwardly embossments on the cylindrical surface and end wall of the basket. The function of the increased surface area is to enhance the washing action on the clothes therein in a gentle but positive manner, without causing undo turbulence which might damage fine clothing and their buttons, while enhancing water flow area such as on a rinse or extraction cycle. This type embossed basket could also be used in a dryer.

#### **Brief Description of the Drawings**

Figure 1 is a schematic view of the water supply and flow used in the method and apparatus of the present invention.

Figure 2 is a schematic perspective view of the washer for the method and

apparatus of the present invention.

Figure 3 is a schematic view of an alternative washer flow portion for the method and apparatus of the present invention.

Figure 4 is a schematic perspective view of the embossed washer basket for the method and apparatus of the present invention.

Figure 4A is an enlarged cross-sectional view of a portion of the basket 600's cylindrical wall or shell 602 and end wall 604 with openings 606 therethrough and inward and outward embossments 612 thereon.

Figure 5 is a schematic time diagram of the fill, wash rinse drain cycles of a conventional washer (TOP) and of the quick fill, wash, rinse, quick drain cycles of the washer method and apparatus of the present invention (BOTTOM).

Figure 6 is a perspective view from the top of another embodiment of the washer apparatus and method of the present invention.

Figure 7 is a further perspective view of the washer shown in Figure 6.

Figure 8 is a front view of the washer shown in Figures 6 and 7.

Figure 9 is a schematic of water flow for additional embodiment having 3 tanks, no quick fill tank, a single pump and a plurality of control valves.

Figure 10 is an operating chart for some of the conditions of the embodiment shown in Figure 9.

### **Description of the Preferred Embodiments**

Referring to Figure 1, a schematic of the water flow system of the method and apparatus of the present invention is shown. Shown in Figure 1 is the washer 10 with washer chamber means or drum 12. It is understood the cylindrical drum 12 has a cylindrical side wall 13 and end wall 14, which has an opening for a door (similar to opening 220 and door 219 of Figure 2) to permit loading and unloading of clothes into and from the washer. Like a conventional washer, a conventional water supply, including water from the public supply and a hot water heater are included and represented by the lines 9 and 11 with control valves 9A and 11A therein. The supplies 9 and 11 are used for the conventional regular and conventional gentle cycle washes. The drum 12 is understood to be able to contain wash water or rinse water. It should be understood that

pipes or lines 9 and 11 and their valves could also be of an existing conventional washer.

Inside the washer 12 drum is a washer basket 15 (also see Figure 2, part 218 and Figure 4, part 600). The washer basket 15, 218 or 600 (represented by dashed lines in Figure 1) can move relative to the drum 12 as represented by the arrow 20. As is noted  
5 below (with respect to Figures 4 and 4A) this washer basket 15 can be embossed to increase surface area and liquid flow area.

Above the drum 12 is a quick fill means for filling the water supply tank 30, which preferably is mounted at the top of the washer for a gravity fill of drum 12. The quick fill washer means includes a line 32, comprising either several conventional size pipes  
10 (several say two inches in diameter or large pipes) or a single large diameter pipe (say three inches in diameter or larger) and an associated quick fill valve 34. The function of the quick fill line(s) 32 and quick fill valve(s) 34 is to quickly fill the drum 12 by gravity flow with an appropriate quantity of wash or rinse water, much faster (say 8 or more times faster) than in prior art washers. While gravity flow is used, the quick fill means could  
15 also be a pump forced flow such as via a quick fill pump means for filling the washer means, and could also be used alone or in conjunction with the gravity flow. The supply tank 30 is provided with vent line 36 and vent valve 38, to permit quick drain of the supply tank 30 and quick fill of the drum 12. The vent would be omitted if a quick fill pump is used to prevent flow therefrom. The supply tank 30 is sized to hold and supply  
20 all the water for at least one complete wash cycle, and preferably somewhat more, say one to two complete wash cycles.

As was noted above, the quick fill tank can be funnel shaped to enhance filling for said wash chamber, and can be closed so it can be pressurized by the pump if one is used to increase flow therefrom, and if a pump is used, made smaller than or eliminated, if only  
25 gravity flow were used.

The supply water tank 30 is connected via a fill line 40 to a storage or reserve very cold water tank means 50. This fill line 40 and line 54 is of conventional size, say one half inch diameter pipe or line. The reserve tank is several times larger than the supply tank, say two to three times, and many times larger (3 to 6 or more) than the water  
30 required in the drum for a wash or rinse. For example, for a nominal 50 lbs. clothing washer, the supply tank might be 30 to 50 gallons, with about 40 gallons preferred, and

the reserve tank of 60 to 100 gallons, with about 80 gallons preferred. These sizes may vary by say  $\pm 25\%$  of the total gallons of water used in a wash cycle. Generally, the wash cycle water usage would be that required in the fine clothing, very cold water wash cycle discussed below. If that cycle is not included, then the regular wash cycle could be used in sizing components.

The reserve or storage very cold water tank 50 itself, might be shaped somewhat like a large hot water heater with insulation on the outside surface of the tank 52. The reserve water tank 50 can be filled by the line 54 connected to the outside or public water supply represented by the arrow 56. Inside the reserve water tank 50 is a cooling means 60 for cooling the water, such as the evaporator 62 of a refrigerating unit 64 or other cooling means, like ice or the discharge of an ice maker. The function of the cooling means 60, evaporator 62, and refrigerating unit 64, or the like is for providing very cold water inside the reserve water tank 50. To control the operation of the cooling means and/or refrigeration unit, a control means 70 for regulating temperature such as a water temperature sensor or thermocouple 72 is provided and connected to the refrigeration unit via a control line 73. This means would control the operation of the cooling means to assure the water therein is at a desired temperature. A similar water control means 75 could be provided in the quick supply tank 30 to be sure the water therein is appropriately "cold," and if not, replaced by cold water from the reserve tank 50. Likewise, this control 75 could be a thermocouple and would be used to determine if circulation of very cold water from tank 50 was needed. As noted in the other embodiments, the washer could have additional tanks for hot water and city water at the public or city water supply temperature.

While shown near the bottom of the tank, the cooling means 60 might be located at the top of the reserve water tank 50 to take advantage of the phenomenon of warmer water rises to the top then cools and fall to the bottom to provide some circulation in the reserve tank. Alternatively, some form of circulation such as a pump or impeller could be provided to cause circulation within the tank 50. As noted, means could be used to control such circulation, say operated in response to the thermocouples as noted. When desired, the reserve water unit 50 can be drained via a line 74 and a reserve tank drain valve 76 which, though not shown, can connect to the main drain line 77.



Additionally, a recirculation supply line 80 with its control valve 82 is connected to the reserve water tank 50. This line connects to a circulating means 84, such as a pump 86, for circulating very cold water from the reserve water tank 50 to fill the supply tank 30, via line 84, valve 85 and line 88.

5           The cold recirculation system includes a cold return line 90, connecting, in this instance, to a commercial washer, conventional, button trap 92. From there a line 94 connects to a control valve 96 therein and in turn to a cooling coil, or recirculating heat exchanger 98 within the reserve tank 50. The other end of the cooling coil connects, via a line 100, to the line 80. Thus, with valves 76, 77A, and 85 closed and valve 96 open,  
10       water can be taken from the wash chamber 12, via line 90, the button trap 92, valve 96, lines 94, cooling coil 98 line 100, and line 80 to the pump 86. From there, the recooled water can flow via line 84 to a line 100 and open valve 102 through line 104 to be sprayed through one or more nozzles 106 back into the wash chamber 12 and the clothes therein. Again if desired, a suitable temperature sensing means can also be provided for the wash  
15       chamber and controls provided to insure the wash is done at a desired, controlled temperature.

Thus, in a wash cycle, the clothes are put in the basket 15, the door (like 219) is closed, the washer's control system activated, such as a computer control, the wash chamber 12 is filled from the quick fill tank 30 going through the appropriate fill wash,  
20       drain, fill rinse, drain, fill rinse and drain cycles. If the very cold water is used, fine woolens and other fine fabrics like silk, and even leathers or furs can be cleaned without hand washing or use of "perc" or other environmentally hazardous chemical cleaners.

For regular hot water washing, hot water can be used for the wash and generally city water would be used for washing and rinsing. For nominal cold water washing, city  
25       water would be used for both washing and rinsing. For very cold water washing, a substitute for dry cleaning, very cold water may be used for both washing and rinsing.

It should be understood that this very cold water wash system could be adapted to and provided to work with an existing type conventional washer. In such a situation the necessary parts can be provided in "kit" form for installation on such existing washer.

30           Referring now to Figure 2, another embodiment of washer 200 of the method and apparatus of the present invention utilizing the features discussed above is shown. This

embodiment has the washer structure 210, including a washer chamber 214 with basket 218 therein, closed by a door 219 fitting in the aperture 220. To one side of the washer structure 210 is a reserve very cold water tank 224, somewhat like tank 50 of Figure 1. On the other side is the hot water tank 230. This tank 230 could also be in the form of a hot water heater having water heating means or just a hot water storage tank. The tanks 210 and 230 are rectangular in cross sections and can form part of the washer 200. The very cold water tank 224 can supply water to its own quick fill cold water tank 240. The hot water tank 230 has its own quick fill hot water tank 244 and can supply water to the same. Each of the quick fill tanks (240 or 244) can quickly fill the wash chamber via lines 248 and 249 in about 15 seconds or less, say 10 seconds. The structure of Figure 2 is also provided with the quick drain lines 250 and 252 which can quickly empty the wash chamber to the drain tank 260 in 15 seconds or less, say 10 seconds. The very cold or hot water can be transferred from their respective tanks to their respective quick fill tanks by pumps. The cold water side would be equipped with suitable water cooling means, such as discussed with respect to the Figure 1 embodiment. Thus, the Figure 2 embodiment could be a stand alone unit. Again, the quick fill could be by gravity but preferably is facilitated by a pump to quickly pump water from the tank to fill the chamber. The quick fill tank in that case can be either smaller and/or shaped as a funnel and have a funnel shape bottom, or even eliminated. In the latter case, the pump would pump water from the respective storage tank 224 or 230 into the wash chamber 214. To achieve the quick fill for increasing the water level, such pump would need to be driven by a one or more horsepower motor, say a 2 or 3 horsepower motor, and to achieve the desired quick flow rate, say 10 gallons or more in 10 seconds.

Referring to Figure 3, another washer 300 of the method and apparatus of the present invention is shown. This embodiment has a wash chamber 304 with a basket (like 214 or 600) therein, and is connected to a single quick supply tank 310. The quick supply tank can be supplied from either a very cold supply tank 316 or a hot water tank 320. The cold water tank 316 would have the water cooling system therein and has the recirculating cold water system including the refrigeration or cooling coil 324 connected via line 326 with valve 328 therein, button trap 330 and line 332. The other end of the cooling coil is connected via line 334 to a recirculation pump 336. The pump 336 in turn is connected

to line 338 to supply a nozzle 340 or other means to return the recooled water to the chamber 304 and clothes therein.

Cold water can be supplied to the reserve cold water tank 316 by city water line 54. Water can be supplied to the hot water tank 320 by line 54A which may be connected  
5 either to a conventional water heater, or if the tank 320 has its own water heating means, to the city water supply. The quick supply tank 310 has a vent 350 with a vent valve 352 therein. Hot water can be supplied from tank 320 to the quick fill tank 310 by flow of water through line 360, open valves 362A, valve 364 being closed, through lines 365 and 365A by a fill pump 368, which pumps the hot water up through line 370 into the tank  
10 310. Very cold water can be supplied to the quick fill tank 310 by closing valve 362 and 362A and opening valve 364 and 364A, so that very cold water can flow from tank 316, through line 365A to line 365 moved by pump 368, which can pump the very cold water into tank 310. The quick fill tank 310 is quickly emptied via one or more fast flow lines 360 and opening quick fill valve 364 therein, the cross sectional area of this line or lines  
15 360 and valve or valves 364 being such to provide the desired quick fill rate. The wash chamber 304 can be quickly drained by closing valve 328 and opening valve 77A to permit the water to quick flow through line 332, button trap 330, open valve 77A and line 77 to the drain or drain tank. Again the drain lines are sized to give the desired fast drain rate. Again, if desired, a properly sized pump 368 (say of several horsepower) could be  
20 utilized to achieve the quick fill means for increasing the water level of either the very cold water from tank 316 or hot water from tank 320, and the tank 310 could be reduced in size or eliminated, as would be the vent 350 and vent valve 352.

Referring to Figure 4, an embossed washer basket 600 is shown which can be used and is part of the method of the present invention. The washer basket 600 fits within the  
25 wash chamber (say 12 or 304), and can rotate or spin therein and has a cylindrical shell 602 with an end wall 604. The shell 602 and end wall 604 can have a multitude of small passages or openings 606 therethrough for flow of water. As noted above, the function of the raised portions or embossments 612 are to provide increased surface area and flow area by also providing fins 608 on the inside and/or raised or indented inward and/or  
30 outward on shell 602 and end wall 604 embossed portions 612 on the surfaces of the basket with additional water flow passages therethrough. These embossed portions 612

increase the action of the moving basket on the clothes therein in a gentle but positive manner without endangering fine clothes or their buttons. There is also some increase in the drainage area through the basket, particularly on a spin, rinse or extraction cycle. This embossed basket concept can also be utilized in other type laundry machines than washers, such as in a dryer basket to increase the surface area and flow of drying air in and out of the basket to improve drying.

Referring to Figure 4A an enlarged cross-sectional view of a portion of the basket's 600 cylindrical wall or shell 602 and end wall 604, showing openings 606 or the small passages for the flow of water, and the embossed portions 612 formed on the surface of the basket.

Referring to Figure 5, a time diagram shows the time for a prior art washer cycle in column 710 and the present invention washer apparatus and method time for a wash cycle in column 720. It can be seen the invention results in shorter overall wash cycle time without reduced washing action time or rinsing action time. This advantage is due to the quick fill and quick drain features described above. In Figure 5, the horizontal represents time and "F" stands for fill, "W" stands for wash, "D" stands for drain and "R" stands for rinse. While not shown, the cycles could also include extraction or spin cycles.

As is apparent, the overall cycle time for the invention is shorter and about half compared to a prior art washer. Where a prior art wash cycle might be

20	Fill	180 sec.
	Wash	360 sec.
	Drain	60 sec.
	Fill	180 sec.
	Rinse	120 sec.
25	Drain	60 sec.
	Fill	180 sec.
	Rinse	120 sec.
	Drain	60 sec.
	for total of	1320 seconds,

30 For a wash cycle with the present invention, the times are

Fill	10 sec.
------	---------

12

	Wash	360 sec.
	Drain	20 sec.
	Fill	10 sec.
	Rinse	120 sec.
5	Drain	20 sec.
	Fill	10 sec.
	Rinse	120 sec.
	Drain	20 sec.
	for total of	690 seconds.

10 Thus it is apparent that the washer method and apparatus results in greatly reduced overall wash cycle time, without diminished wash or rinse time or action. Further, the washer method and apparatus of the present invention can clean fine clothing such as those made out of woolens, rayon or acetates, leathers, furs, etc. which previously had to be hand washed and/or dry cleaned say with "perc" or other clothes previously only hand  
15 washed.

Referring to Figures 6 and 7, another embodiment of the washer method and apparatus of the present invention is shown. In this embodiment where structure is similar to that of the earlier figures, it is given a similar reference number, but use a 700 series. For example, the drum 12 of Figure 1 would be 712 in Figures 6 and 7. Shown in Figures  
20 6 and 7 is the washer 710 with washer drum 712.

It is understood that cylindrical drum washer 712 has a cylindrical side wall 713 and end walls and one of which, the front, has an opening for a door (similar to opening 220 and door 219 of Figure 2) to permit loading and unloading of clothes into and from the washer. Like a conventional washer, a conventional city water supply, including water  
25 from the public supply and a hot water heater are included. The public or city supply water and water heater are used for the conventional regular and conventional gentle cycle washes. The drum 712 is understood to be able to contain wash water or rinse water.

Inside washer 712 drum is a washer basket (like 600), not shown. The washer basket can move or turn in either direction relative to the drum 712. As noted above this  
30 washer basket can be embossed to increase surface and flow areas.

Above the drum 712 is a closed quick water supply tank or funnel 730, which

preferably is mounted at the top of the washer for, preferably, a pressurized fill of the drum 712 by a quick fill pump 787 and line 787A. A quick fill line 732, comprising either several conventional size pipes (several say two inches in diameter or large pipes in this instance) or a single large diameter pipe of four inches diameter or larger, alternatively,  
5 an associated quick fill valve (not shown) can be provided to connect the tank or funnel 730 to the drum 713.

The function of the quick pump 787 and fill lines 732 and, if present, quick fill valve, is to quickly fill the drum 712 by pressure pump or gravity flow with an appropriate quantity of wash or rinse water, much faster (say 8 or more times faster) than  
10 prior art washers. When gravity flow is used, the tank would be vented. When a forced flow such as via a pump is used, no vent is provided, and the tank is closed except for an entrance and exit therefrom.

As noted, in the gravity flow version, the supply tank 730 is provided with vent (not shown) and vent valve, to permit quick drain of the supply tank 730 and quick fill of  
15 the drum 712. The supply tank 730 can be sized to hold a supply all water for at least one complete wash cycle, and preferably somewhat more, say one to two complete wash cycles.

In the pump filled version, tank 730 would not be vented, is capable of being pressurized by the fill pump 787 no fill valve is needed, and can be of smaller size or  
20 eliminated.

The washer 710 has the three water tanks 750 A, B and C and is enclosed in a suitable housing (see Figure 8). The washer mechanism including drum 712 is mounted on a base structure 779 in a frame 781. The washer mechanism in the frame includes the washer motor 782 which carries a drive pulley 783, which via belts 784, drive the driven  
25 pulley 784A. The frame 781 mounts the washer mechanism on a plurality of springs 785 with shock absorbers 786 to limit vibrations. In addition, the embodiment 710, has a digital control 777 which controls the operation of the refrigerator unit and its compressor 765 and pump(s) and/or circulating means 787, and all other features and functions of the washer and the various wash cycles. Lines for injecting soap into the drum 712 are shown  
30 at 790 and 791. To control and show water levels in the tanks, a triple water level gauge is shown at 792, one for each tank. In addition, multiple bin means 794 are provided to

add solid type soaps, conditioners, etc. on the front of the washer.

The fill water tank 730 is connected via line 751 to a reserve very cold water tank 750A, a city water tank 750B and a hot water tank 750C. Each of the reserve or storage tanks 750A,B and C are several times larger than the supply tank and can quickly fill the top supply tank 730 and washer drum 713 with the desired quantity of coater. For example, a nominal 50 lbs. of clothing washer, the quick, supply tank might be 5 or less gallons, with each of the reserve tanks 750A,B, C of 60 to 100 gallons, with about 80 gallons preferred. The sizes may vary by say  $\pm 25\%$  of the gallons used in a wash cycle.

Generally the wash cycle water usage for sizing purposes would be that required in the fine clothing very cold water wash cycle discussed below. If that cycle is not present then the regular wash cycle could be used.

Additionally, the washer of the present invention could be built in larger or smaller sizes to handle say 75 lb. or 35 lb. (measured dry) loads of wash. Each of the reserve water tanks 750A, B and C might be shaped somewhat like a large hot water heater with insulation on the outside surface 752 of the tanks. For compactness, these tanks may be rectangular in shape. Inside the reserve water tank 750A is a cooling means 760 for cooling the water, not shown, such as the evaporator coil of a refrigerating unit 765 or other cooling means, like ice or the discharge of an ice maker. The refrigeration unit includes a compressor. The function of the cooling means 760, evaporator, and refrigerating unit, or the like is for providing very cold water inside the reserve water tank 750. To control the operation of the cooling means and/or refrigeration unit, a control means, for regulating temperature such as water temperature sensor or thermocouple, is provided and connected to the refrigeration unit via a control. This means would control the operation of the cooling means to assure the water therein is at a desired temperature.

A similar water control means would be provided in the tank 730 to be sure the water therein is appropriately "cold," and if not, replaced by cold water from the reserve tank 750. Likewise, this control could be a thermocouple and would be used to determine if circulation of very cold water from tank 750 was needed. Similar systems are provided for the other tanks 750B and 750C, except there is no refrigeration and tank 750C has a heating element, such as a steam coil or other type heater, to make hot water.

As noted means could be used to control such circulation, say operated in response

to the thermocouples as noted. When desired, each of the tanks 750A,B and C can be drained via a line and tank drain valve(s) which connect to the main drain line.

Additionally, a recirculation supply line with its control is connected to the reserve tank 750A. This line connects to a circulating means for recirculating very cold water  
5 such as a pump for circulating very cold water from the reserve water tank 750A to fill the supply tank 730 and drum 713 back to the tank 750A..

Referring to Figure 8, a frontal view of the washer 710 of the method an apparatus of the present invention of Figures 6 and 7 is shown. In this embodiment where structure is similar to that of the earlier figures, it is given a similar reference number but uses an  
10 800 series. For example the door 219 of Figure 2 would be 819 in Figure 8. Door 819 is attached to washer 710 by hinge 819A. Latch 819B is attached to door 819 and allows for the opening and closing mechanism of door 819. Below door 819 is a bumper 808 to prevent damage by carts typically used at a commercial laundry or cleaner to load and unload the washer. In the upper right hand corner of the front panel is bin means 794  
15 having four rectangular compartments, 801, 802, 803 and 804. Soap may be placed in compartment 801. Bleach may be placed in compartment 802. Sour may be placed in compartment 803, and starch may be placed in compartment 804. The "dumping" of these ingredients, soap, bleach, sour, etc. are computer controlled and made at the appropriate time in the wash cycle. This embodiment has a control panel 777 on one side of the  
20 washer 710 of the method and apparatus of the present invention. This control panel provides for regulation of the water temperature and wash cycles. Situated next to control panel 777 is water level monitor 792.

Referring to Figure 9 a schematic of the water flow for an additional embodiment washer 910 is illustrated. In this embodiment where the structure is similar to that of  
25 earlier figures it is given similar reference numbers but uses a 900 series. For example, the washer drum 12 of Fig. 1 is 912 in Fig. 9. This embodiment includes 3 water tanks 950A,B and C. Each tank has a separate discharge valve at the base of the tank. 950A has valve 3, 950B has valve 2 and 950C has valve 1.

Water can be drained from the drum 912 via button trap 992 and valves 8 and 5.  
30 This embodiment of the washer mechanism includes a single pump means 987 for recirculating flow that carries out many of the features and functions of the washer during



various parts of the wash cycles. In addition to valves 1, 2 and 3, valves 6-9 and a closeable vent 10 are provided. The various valve positions and pump 987 operations for filling of the drum 912, for a wash or a rinse, or for draining the drum and during very cold water recirculation from tank 950A having the cooling coil 960 therein, is set forth in Figure 10. It should be understood that no quick fill tank is provided, and that pump 987 drains water from one of the tanks 950 A-C and discharges it directly into the drum 912 in a very quick manner. The same pump by changing setting of valves 1-9 and vent 10 can be used for recirculating very cold water from the drum 912 back to the tank 950A and then adding cooled water back into the drum. Digital drive for the pump permits the computer control (like 777) to set pump motor speed to give a desired delivery rate, high for fill and slower for recirculation.

Line 951 is connected to the city water supply and is utilized to keep in tanks 950A,B and C full. Optionally, a valve (not shown) may be used in line 951, to close that line, particularly when doing very cold water recirculation.

Referring to Figure 10 is a chart of the same of the operating conditions for the valves 1-9, vent 10 and pump 987 of this embodiment. In this operating chart "C" means "closed" and "O" means "open". The operation of the embodiment 910 is apparent from the chart in Fig. 10.

While not shown or discussed, the washers shown have the normal motor drive to rotate the basket and a control unit to operate the various valves and motor as needed for the various portions of the wash cycle. If desired, the motor may rotate the basket in either direction of rotation. It is believed that the specifics of such control operations of the valves and motor drive would be known to person's skilled in the art from the disclosure herein and particularly the flow paths shown herein. Also if desired only one or the other of the quick fill or quick drain features could be used. Likewise, the embossed or a conventional basket could be used. All this could be provided in a new washer specially constructed, or adapted to an existing washer by installing the necessary new parts, such as from an installation kit. As used herein clothes, includes all forms of clothes and the materials or cloths whether in the form of clothes or not. The equivalent of the elements and steps described above of the present invention are understood to be included herein and within the scope of the appended claims.

**What Is Claimed Is:**

1. A quick fill washer for washing clothes, said washer being used with a public water supply and having wash chamber means for containing cloths to be washed, comprising quick fill means for filling said wash chamber means with water in about 15 seconds or less, said quick fill means being supplied with water by said public water supply, whereby said washer may be quickly filled with water.

2. A quick fill washer as in Claim 1, further comprising quick drain means for quickly draining water from said wash chamber means in 15 seconds or less, whereby said washer chamber may be quickly drained of water.

3. A quick fill washer as in Claim 1, wherein said quick fill means comprises one of quick fill tank means and quick fill pump means.

4. A quick fill washer as in Claim 3, wherein said quick fill means includes at least one water storage tank filled by said public water supply, and said quick fill means includes a quick fill tank above said wash chamber means, said quick fill tank receiving water from said at least one water storage tank.

5. A quick fill washer as in Claim 3, wherein said quick fill means includes at least one water storage tank filled by said public water supply, and said quick fill means includes a quick fill pump, said quick fill pump taking water from said at least one storage tank to fill said wash chamber means.

6. A quick fill washer as in Claim 3, wherein said quick fill means includes at least two water storage tanks filled by said public water supply.

7. A quick fill washer as in Claim 6, wherein said at least two storage tanks are for containing two of very cold water, city water and hot water.

8. A quick fill washer as in Claim 6, wherein said at least two storage tanks contain very cold water and city water.

9. A quick fill washer as in Claim 6, wherein said at least two storage tanks contain city water and hot water.

10. A quick fill washer as in Claim 6, wherein said at least two storage tanks contain very cold water and hot water.

11. A quick fill washer as in claim 3, wherein said quick fill means includes at least three water storage tanks filled by said public water supply.

12. A quick fill washer as in Claim 11, wherein one of said storage tanks is filled with very cold water.

13. A quick fill washer as in Claim 6, wherein one of said storage tanks is filled with very cold water.

14. A quick fill washer as in Claim 6, wherein one of said storage tanks is a water heater.

15. A quick fill washer as in Claim 6, wherein one of said storage tanks is a water chiller.

16. A quick fill washer as in Claim 1, wherein said quick fill means can provide very cold water to said wash chamber means.

17. A quick fill washer as in Claim 16, further including means for chilling the water supplied to said quick fill means.

18. A quick fill washer as in Claim 17, wherein said means for chilling includes refrigeration means.

19. A quick fill washer as in Claim 4, further comprising chiller means for  
5 said at least one water storage tank.

20. A quick fill washer as in Claim 4, further comprising refrigeration means for cooling water to a cold temperature.

10 21. A quick fill washer as in Claim 1, wherein said water supplied said wash chamber means is 50°F or less.

22. A quick fill washer as in Claim 1, wherein said water supplied said wash chamber means is about 40°F.

15

23. A quick fill washer as in Claim 1, wherein said water supplied said washer chamber means is 40°F or less.

24. A quick fill washer as in Claim 4, wherein said water supplied said  
20 wash chamber means is 50°F or less.

25. A quick fill washer as in Claim 6, wherein said water supplied said wash chamber is about 40°F.

25 26. A quick fill washer as in Claim 4, further including recirculation means for recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means.

27. A quick fill washer as in Claim 6, further including recirculation means  
30 for recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means.

28. A quick fill washer as in Claim 24, including pump means for causing the recirculating flow.

29. A quick fill washer as in Claim 26, wherein said pump means for  
5 causing the recirculating flow is the same pump means as used to fill said wash chamber means.

30. A quick fill washer as in Claim 3, at least one water storage tank filled by said public water supply, at least one storage tank is for containing very cold water, in said  
10 storage tank is a water chiller, said quick fill means can provide very cold water to said wash chamber means, said water supplied said wash chamber means is 50°F or less, further including recirculation means for recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means, including pump means for causing the recirculating flow.

15

31. A quick fill washer as in Claim 1, wherein said water supplied said wash chamber means is about 40°F.

32. A quick washer for washing clothes, said washer being used with a public  
20 water supply and having wash chamber means for containing cloths to be washed, comprising fill means for filling said wash chamber means with water, and fill means being supplied with water by said public water supply, said fill means comprises one of a fill tank means and a fill pump means, quick drain means for quickly draining water from said wash chamber means in 15 seconds or less, whereby said washer chamber may  
25 be quickly drained of water, whereby said washer may be quickly drained of water.

33. A quick washer as in Claim 32, wherein said fill means includes at least one water storage tank filled by said public water supply, and said fill means includes a fill tank above said wash chamber means, said fill tank receiving water from said at  
30 least one water storage tank.

34. A quick washer as in Claim 32, wherein said fill means includes at least one water storage tank filled by said public water supply, and said fill means includes a fill pump, said fill pump taking water from said at least one storage tank to fill said wash chamber means.

35. A quick washer as in Claim 32, wherein said fill means includes at least two water storage tanks filled by said public water supply.

36. A quick washer as in Claim 35, wherein said at least two storage tanks are for containing two of very cold water, city water and hot water.

37. A quick washer as in Claim 32, wherein said fill means includes at least three water storage tanks filled by said public water supply.

38. A quick washer as in Claim 37, wherein one of said storage tanks is filled with very cold water.

39. A quick washer as in Claim 38, wherein one of said storage tanks is a water heater.

40. A quick washer as in Claim 37, wherein one of said storage tanks is a water chiller.

41. A quick washer as in Claim 40, further comprising refrigeration means for cooling water to a very cold temperature.

42. A quick washer as in Claim 32, wherein some of said water supplied said wash chamber means is 50°F or less.

43. A quick washer as in Claim 32, wherein some of said water supplied

said wash chamber means is about 40°F.

44. A quick washer as in Claim 41, wherein some of said water supplied said wash chamber is about 40°F.

5 45. A quick washer as in Claim 42, further including recirculation means for recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means.

46. A quick washer as in Claim 45, including pump means for causing the  
10 recirculating flow.

47. A quick washer as in Claim 46, wherein said pump means for causing the recirculating flow is the same pump means as used to fill said wash chamber means.

15 48. A quick washer as in Claim 33, comprising at least two water storage tanks filled by said public water supply, said at least two storage tanks are for containing two of very cold water, city water and hot water, refrigeration means for cooling water to a very cold temperature, said water supplied said wash chamber  
20 means is about 40°F, recirculation means for recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means, pump means for causing the recirculating flow.

49. A quick washer as in Claim 32, wherein said quick drain means  
25 includes a discharge from said washer means of a flow area greater than four square inches.

50. A quick washer as in Claim 32, wherein said quick drain means is one or more drain pipes or lines having a diameter of more than two inches.

30

51. A quick washer as in Claim 32, wherein said quick drain means

includes more than one drain.

52. A quick washer as in Claim 48, wherein said quick drain means has a  
5 drain flow area of greater than four square inches to permit a quick drain.

53. A washer for washing clothes normally dry cleaned with "perc," said  
washer being used with a public water supply and having wash chamber means for  
containing clothes to be washed, comprising means for filling said wash chamber  
10 means with water, said fill means being supplied with water by said public water  
supply, drain means for draining water from said wash chamber means, at least one  
water storage tank filled by said public water supply, wherein said storage tank is filled  
with very cold water, said fill means can provide very cold water to said wash chamber  
means, means for chilling the water supplied to said quick fill means, whereby said  
15 washer may be used to clean fine clothes including woolens, rayons, acetates.

54. A washer as in Claim 53, wherein said quick fill means includes at least  
two water storage tanks filled by said public water supply.

20 55. A washer as in Claim 50, wherein said at least two storage tanks are for  
containing two of very cold water, city water and hot water.

56. A washer as in Claim 53, wherein said quick fill means includes at least  
three water storage tanks filled by said public water supply.

25 57. A washer as in Claim 56, wherein one of said storage tanks is filled  
with very cold water, one of said storage tanks is a water heater, wherein one of said  
storage tanks is a water chiller.

30 58. A washer as in Claim 49, wherein some of said water supplied said  
wash chamber means is 50°F or less.



59. A washer as in Claim 53, wherein some of said water supplied said wash chamber means is about 40°F.

60. A washer as in Claim 49, further including recirculation means for  
5 recirculating very cold water from said wash chamber means to said storage tank of very cold water and back to said wash chamber means.

61. A washer as in Claim 59, further including recirculation means for  
recirculating very cold water from said wash chamber means to said storage tank of  
10 very cold water and back to said wash chamber means.

62. A washer as in Claim 60, including pump means for causing the  
recirculating flow.

15 63. A washer as in Claim 62, wherein said pump means for causing the  
recirculating flow is the same pump means as used to fill said wash chamber means.

64. A washer for washing clothes as in Claim 55, said washer being used  
with a public water supply and having wash chamber means for containing clothes to  
20 be washed, comprising means for filling said wash chamber means with water, said fill  
means being supplied with water by said public water supply, wherein said storage  
tank is filled with very cold water, said fill means can provide very cold water to said  
wash chamber means, means for chilling the water supplied to said fill means, said  
means for chilling includes refrigeration means.

25

65. A fill washer as in Claim 64, wherein said fill means includes at least  
three water storage tanks filled by said public water supply.

66. A fill washer as in Claim 65, wherein one of said storage tanks is filled  
30 with very cold water, one of said storage tanks is a water heater, wherein one of said  
storage tanks is a water chiller.

67. A kit for converting a conventional washer for doing environmentally safe alternative cleaning to dry cleaning, comprising:

5 a water tank for containing very cold water, said water tank being adapted to supply water to the washer,

a cooling means for cooling the water to below 50°F and to be supplied to said very cold water tank washer,

means for moving water from said very cold water tank and by cooling means and adapted to be provided to said washer,

10 whereby the washer may be provided with cold water provided by said cooling means to effect cleaning at a temperature below 50°F for cleaning clothes made of one of wool, rayon, acetate or the like that was of the type that was hand washed or dry cleaned.

15 68. A method for operating a washer for doing environmentally safe alternative cleaning to conventional dry cleaning, comprising:

(a) filling a water tank with very cold water of 50°F or less,

(b) quickly transferring very cold water from said water tank into the washer,

20 (c) washing clothes in said washer with said very cold water,

(d) quickly draining the water from said washer,

(e) filling the washer from the water tank with rinse water,

(f) quickly draining the rinse water from the washer,

(g) removing the clothes from said washer,

25 whereby the washer may be quickly provided with very cold water for washing and rinse water to effect cleaning at a temperature below 50°F for cleaning clothes made of one of wool, rayon, acetate, or the like or of a type that was hand washed or dry cleaned.

30 69. A method for operating a washer having a wash chamber and at least one rinse, including at least one water supply tank, a wash chamber and a drain,

comprising:

- (a) continuously filling the water supply tank,
- (b) periodically filling the washer chamber with water from the water supply tank within fifteen (15) seconds with water for one of a wash and rinse,
- (c) carrying out one of the wash and rinse,
- (d) periodically draining the wash chamber to the drain within fifteen (15) seconds,

whereby wash and rinse may be quickly carried out in the washer without waiting more than fifteen (15) seconds for a fill or drain of the wash chamber.

70. A washer basket for a washer, said basket having embossments formed thereon to increase the surface area of the washer basket in contact with clothes to be washed.

71. A washer basket as in Claim 70, wherein said washer basket embossments have openings therein to increase the liquid flow area for flowing water therethrough.

72. A method of making a washer comprising the steps of:

- (a) installing a wash chamber,
- (b) providing at least one quick fill means for filling said wash chamber within fifteen (15) seconds,
- (c) providing a quick fill connection between said quick means and said wash chamber,
- (d) providing a quick drain connection from said wash chamber for draining said wash chamber within fifteen (15) seconds,

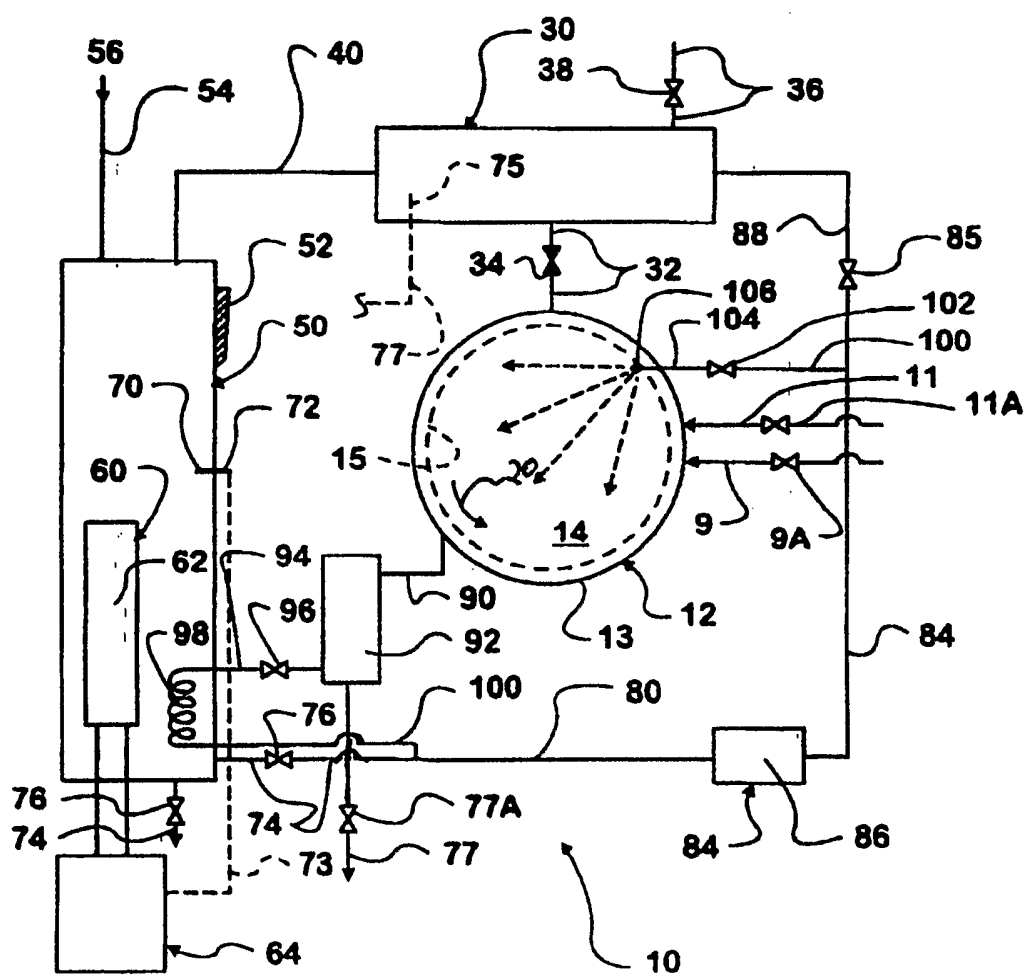
whereby the washer can quickly do wash without waiting more than fifteen (15) seconds for either a fill or drain of the wash chamber.

73. A method of Claim 72, including the further step of embossing the

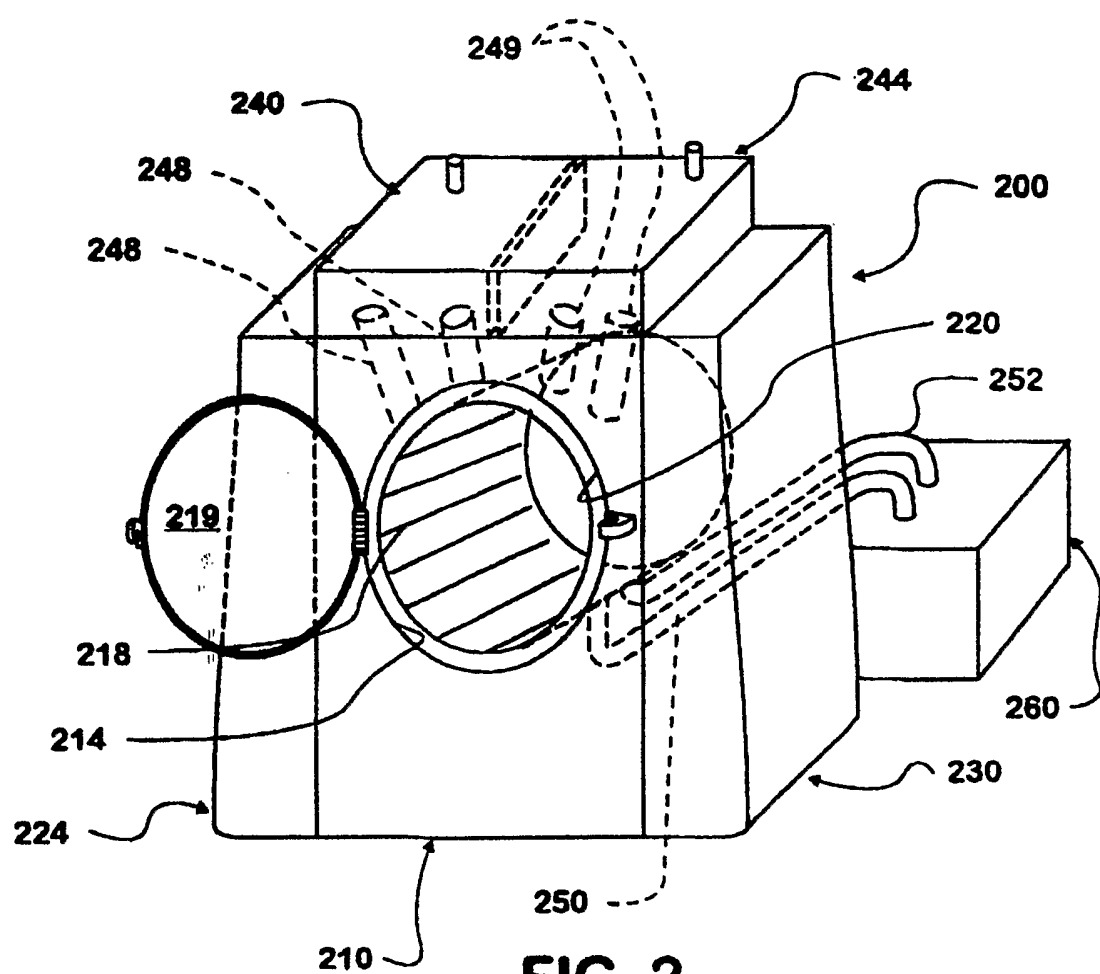
surface of a washer basket, and providing an embossed surface washer basket in said washer.

74. The method of Claim 72, and including the step of providing at least a very cold water tank,

- 5           (a)     installing cooling means for said cold water tank,
- (b)     connecting said very cold water tank to fill said quick fill means,
- whereby said assembled washer can be used to clean clothes of a type that was previously hand washed or dry cleaned.



**FIG. 1**

**FIG. 2**

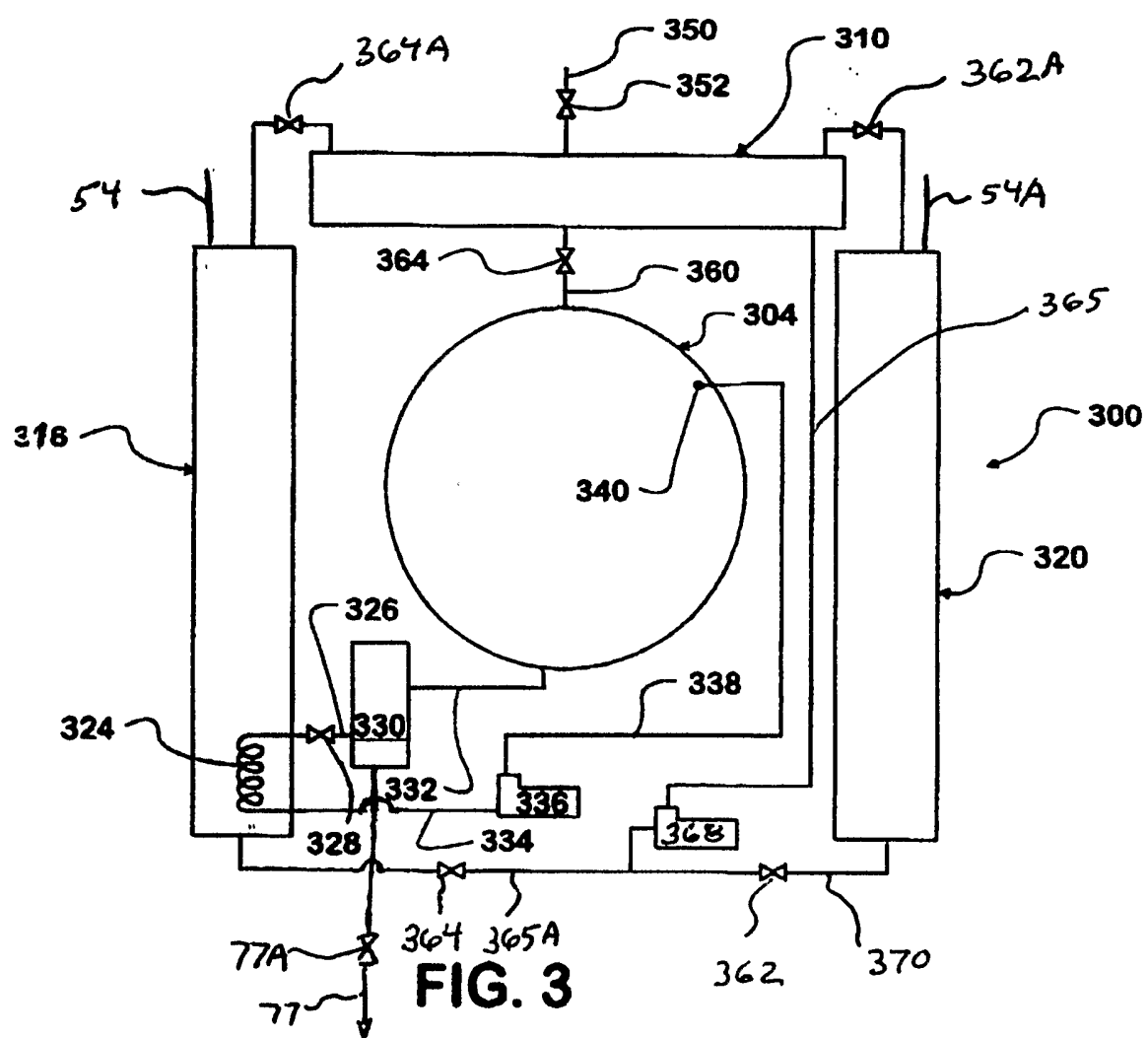


FIG. 4

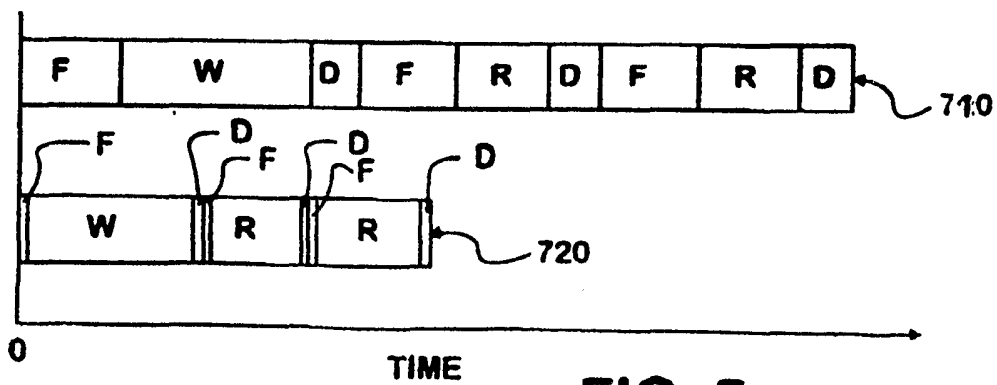
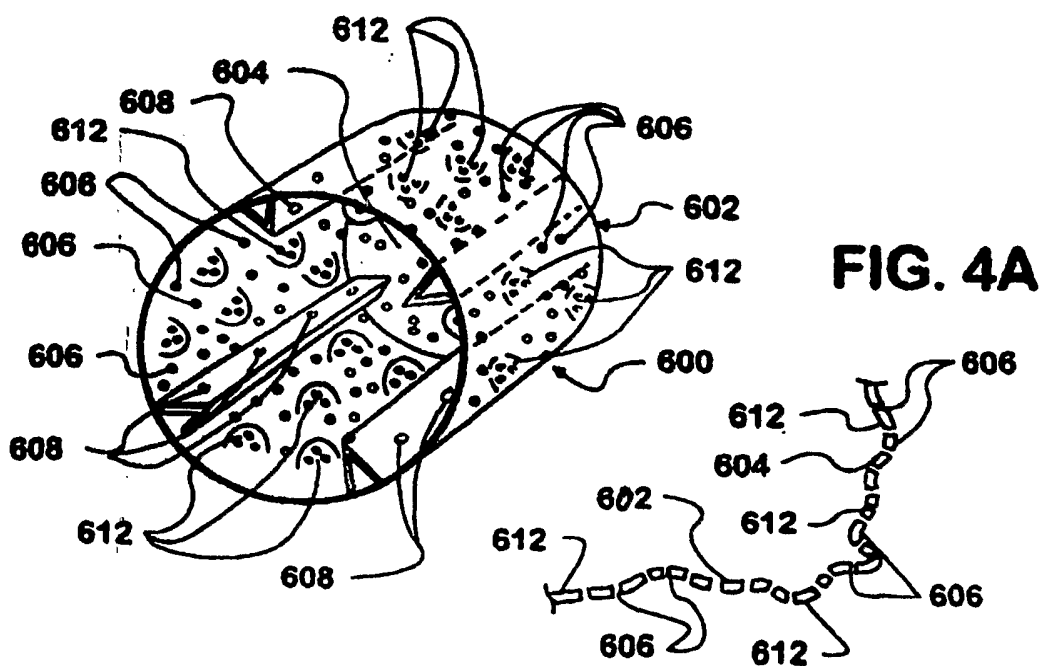
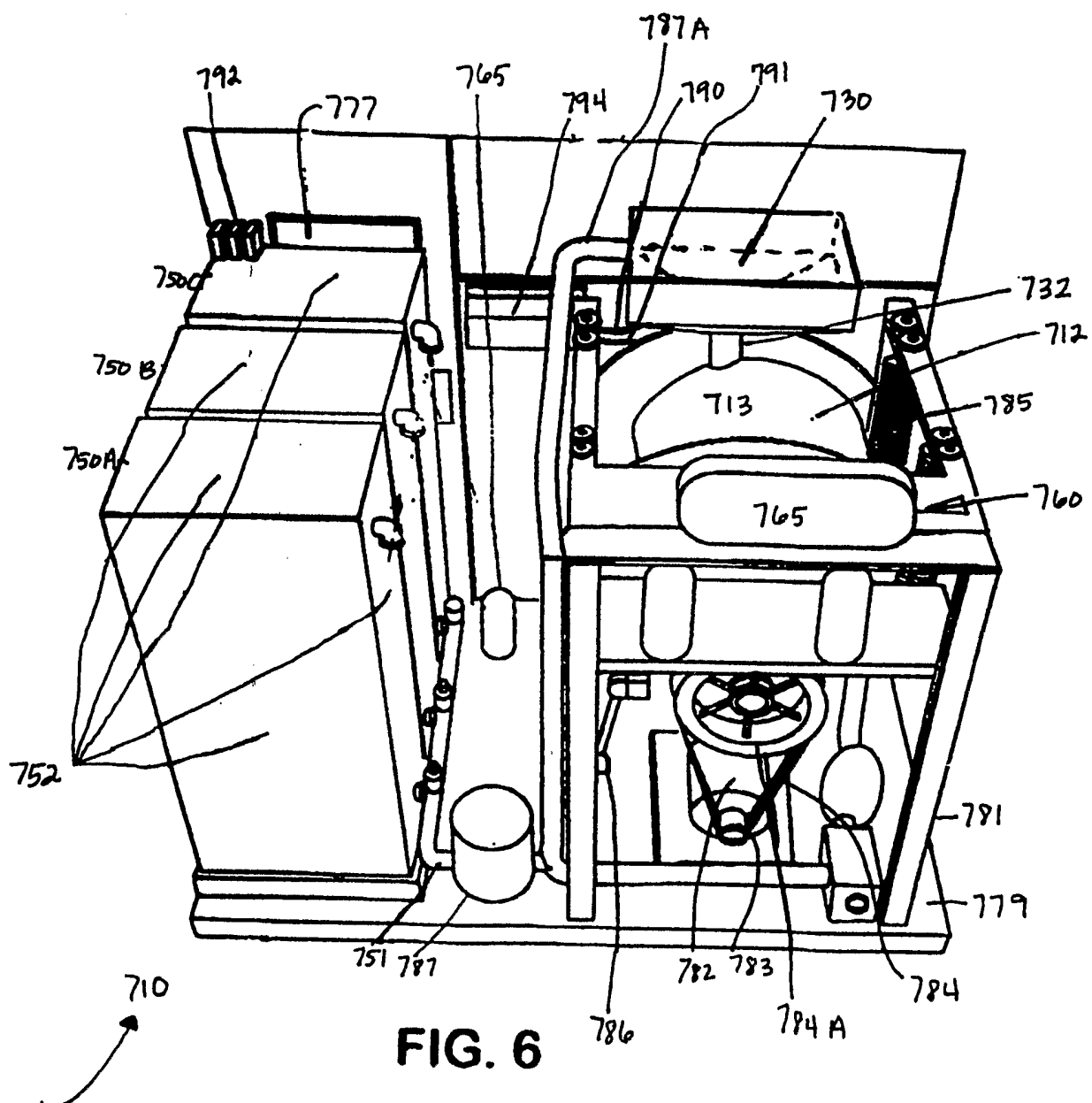
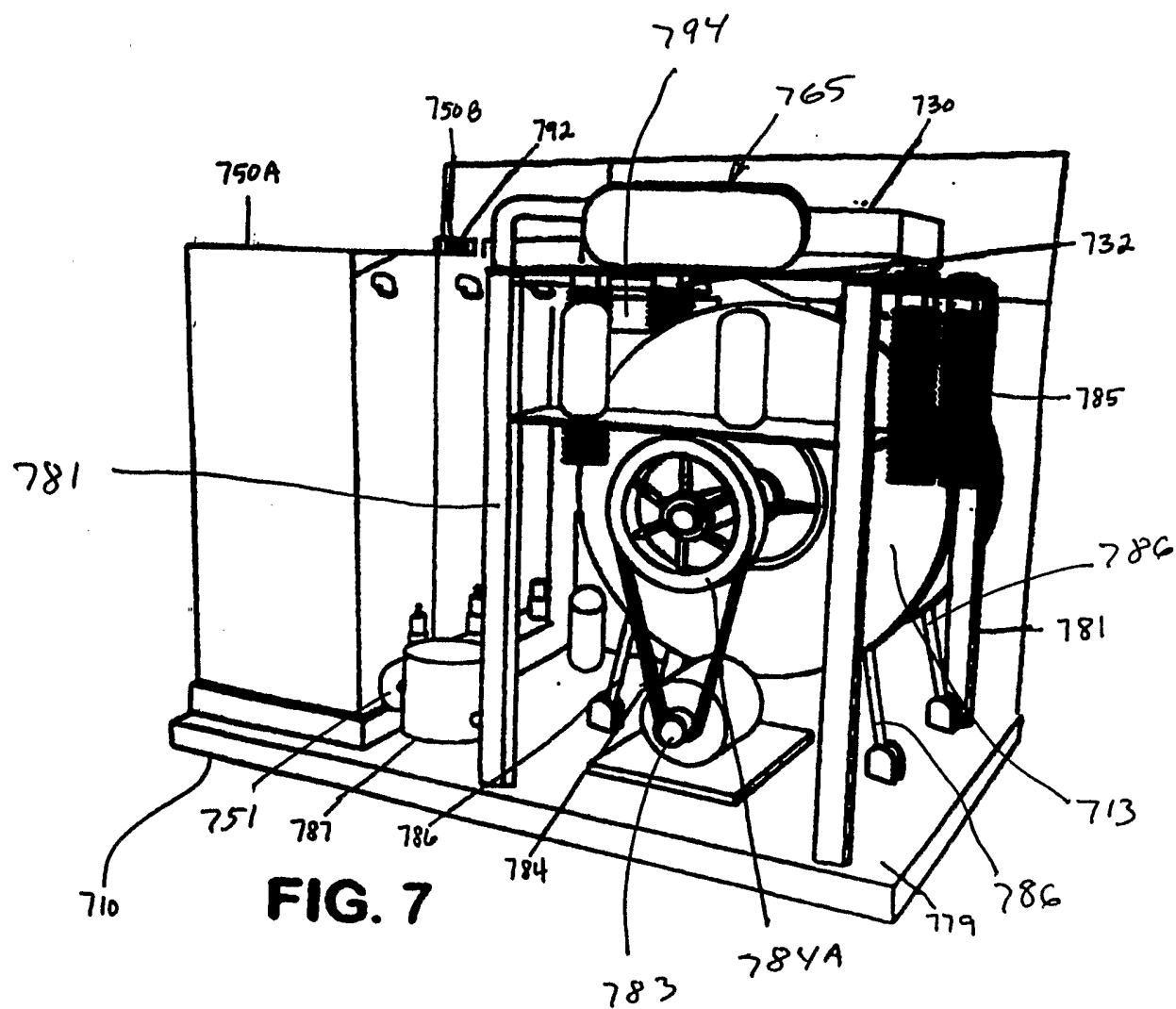


FIG. 5







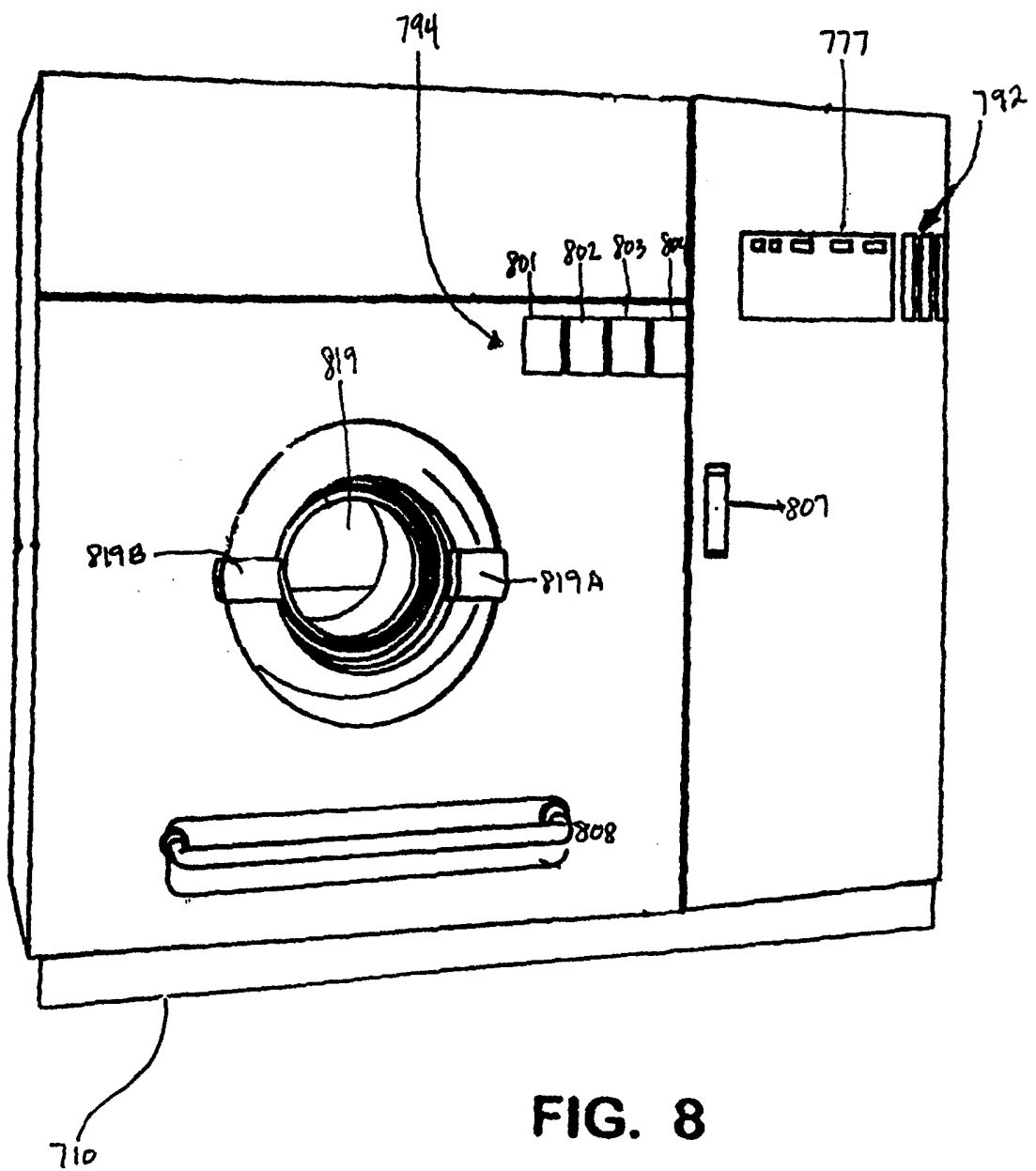


FIG. 8

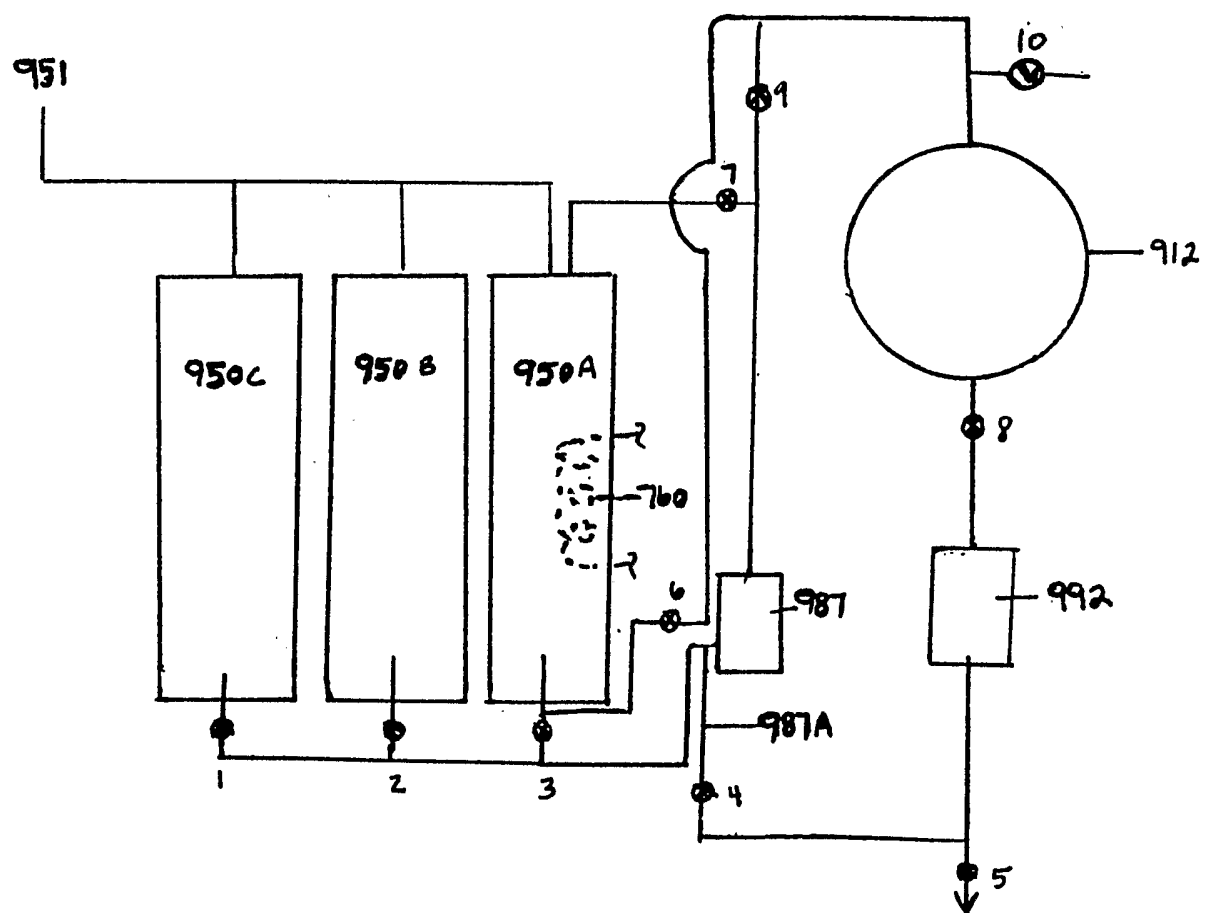


FIG. 9

	VALVE 1	VALVE 2	VALVE 3	VALVE 4	VALVE 5	VALVE 6	VALVE 7	VALVE 8	VALVE 9	VENT 10	PUMP
FILL DRUM HOT	0	C	C	C	C	C	C	C	0	C	ON
FILL DRUM CITY	C	0	C	C	C	C	C	C	0	C	ON
FILL DRUM COLD	C	C	0	C	C	C	C	C	0	C	ON
DRAIN DRUM	C	C	C	C	0	C	C	0	C	0	OFF
RECIRCULATE COLD	C	C	C	0	C	0	0	0	C	C	ON

FIG. 10

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/12156

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : D06F 39/08

US CL : 68/207

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 68/207, 208, 142, 181R, 184; 137/387, 391

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A —	US 1,505,881 A (FISHER) 19 AUGUST 1924 (19.08.1924).	1-74
X ✓	US 1,563,822 A (ANDERSON) 01 DECEMBER 1925 (01.12.1925), see pages 1-4.	70, 71
X ✓	US 1,594,043 A (BUTTERFIELD) 27 JULY 1926 (27.07.1926), see pages 1-2.	70, 71
Y —	US 3,024,138 A (SCHLOTT) 06 MARCH 1962 (06.03.1962), see cols. 1-6.	1-3
A —	US 3,247,690 A (KAHN) 26 APRIL 1966 (26.04.1966).	1-74
Y ✓	US 3,850,199 A (STONE et al.) 26 NOVEMBER 1974 (26.11.1974), see cols. 1-12.	1-3
A —	US 4,267,711 A (KOLZE) 19 MAY 1981 (19.05.1981).	1-74
A ✓	UA 4,485,509 A (PELLERIN et al.) 04 DECEMBER 1984 (04.12.1984).	1-74

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

27 July 2003 (27.07.2003)

Date of mailing of the international search report

13 AUG 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
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Paralegal

# INTERNATIONAL SEARCH REPORT

PCT/US03/12156

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 5,285,545 A (PAYNE et al.) 15 FEBRUARY 1994 (15.02.1994).	1-74
A	US 5,689,846 A (CHEYNE et al.) 25 NOVEMBER 1997 (25.11.1997).	1-74
A	US 6,499,321 A (RHODES et al.) 31 DECEMBER 2002 (31.12.2002).	1-74