

Sept. 22, 1931.

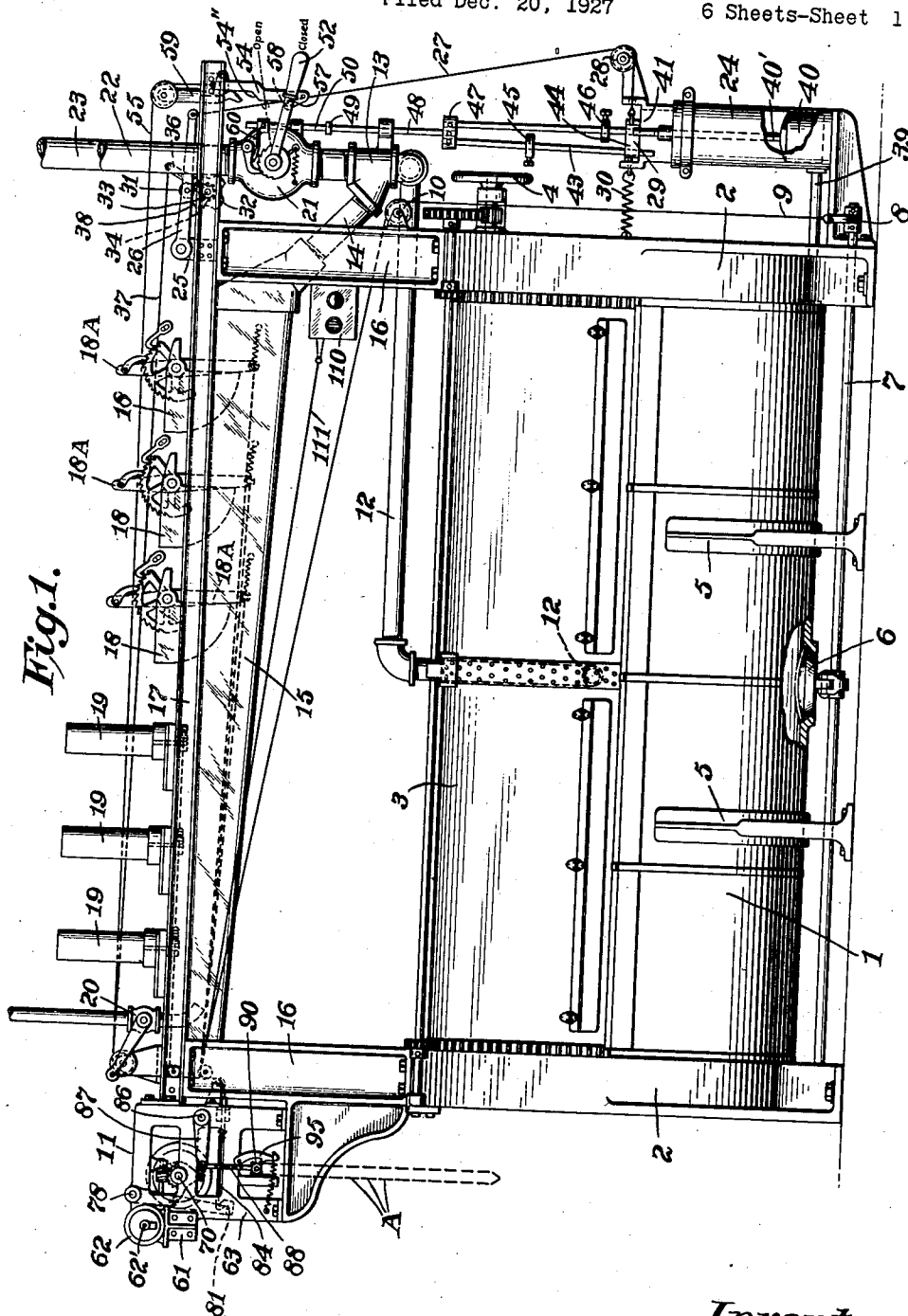
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1,824,237

WASHING MACHINE AND AUTOMATIC CONTROL THEREFOR

Filed Dec. 20, 1927

6 Sheets-Sheet 1



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6 Sheets-Sheet 2

Fig. 2.

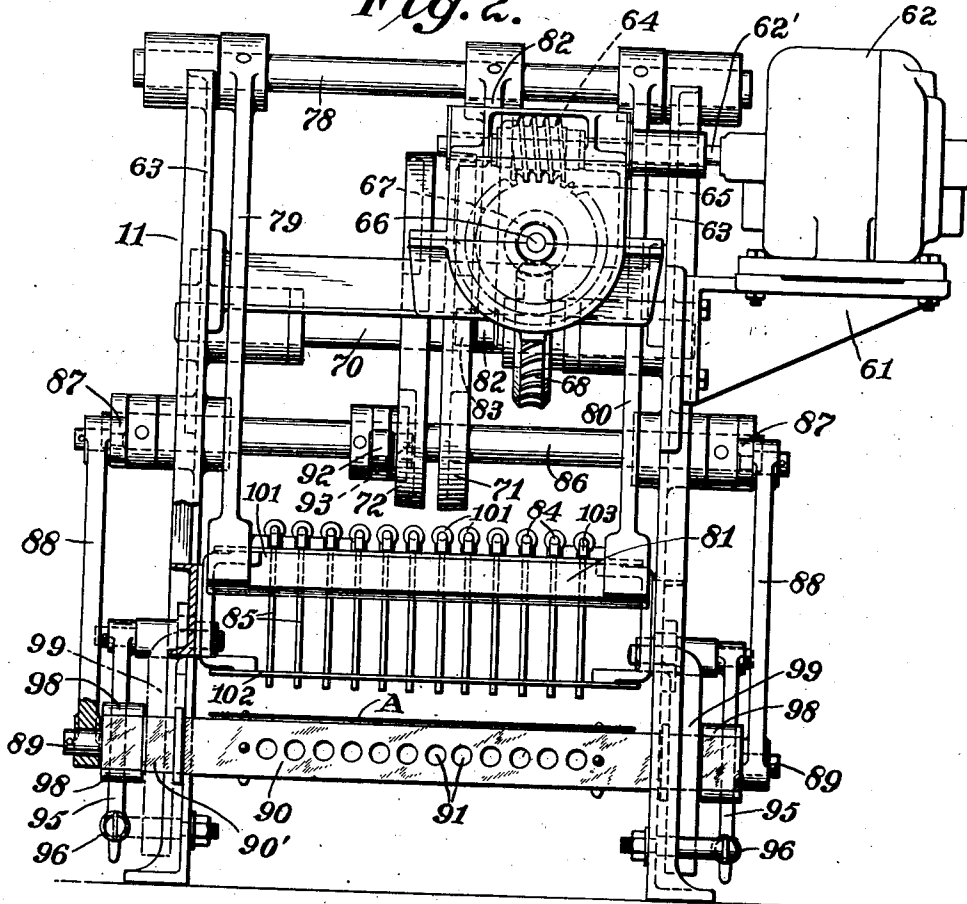
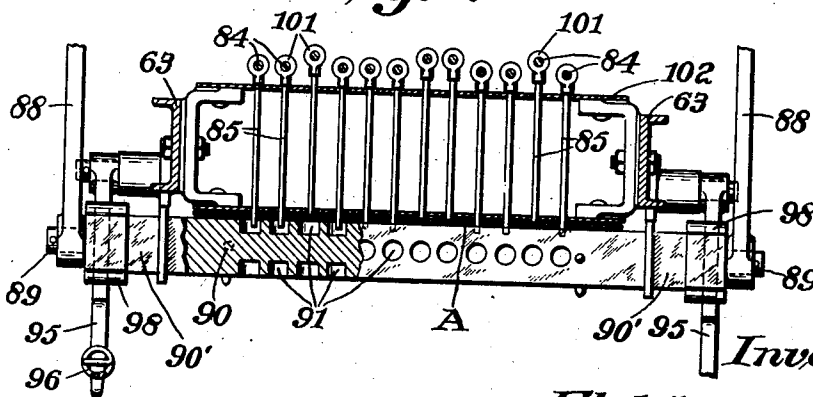


Fig. 3.



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6 Sheets-Sheet 3

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6 Sheets-Sheet 4

Fig. 5.

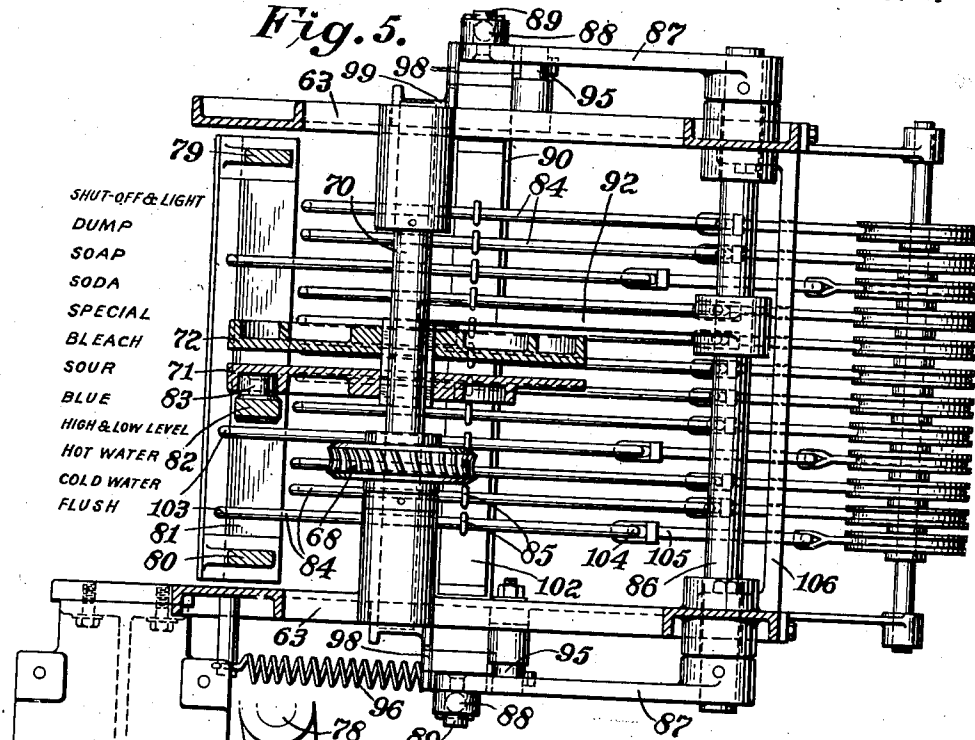


Fig. 6.

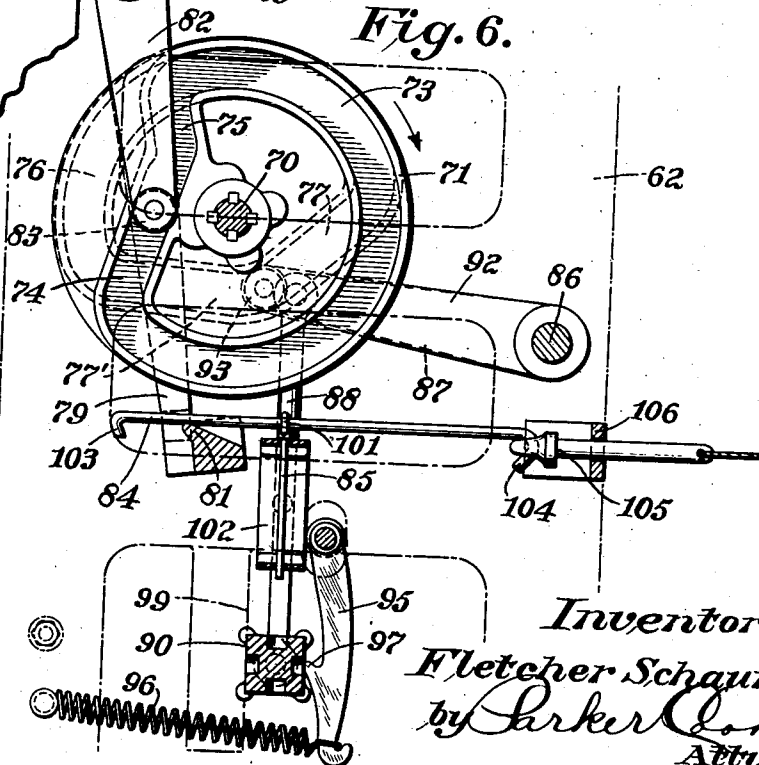
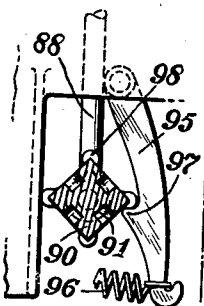


Fig. 7.



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1,824,237

WASHING MACHINE AND AUTOMATIC CONTROL THEREFOR

Filed Dec. 20, 1927

6 Sheets-Sheet 5

Fig. 10.

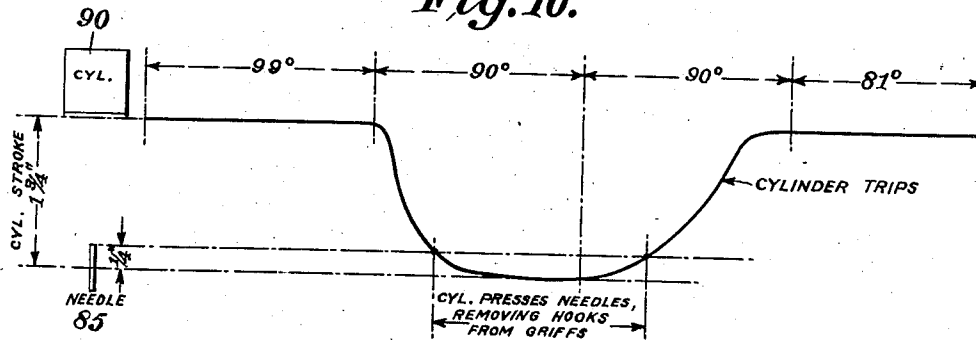


Fig. 11.

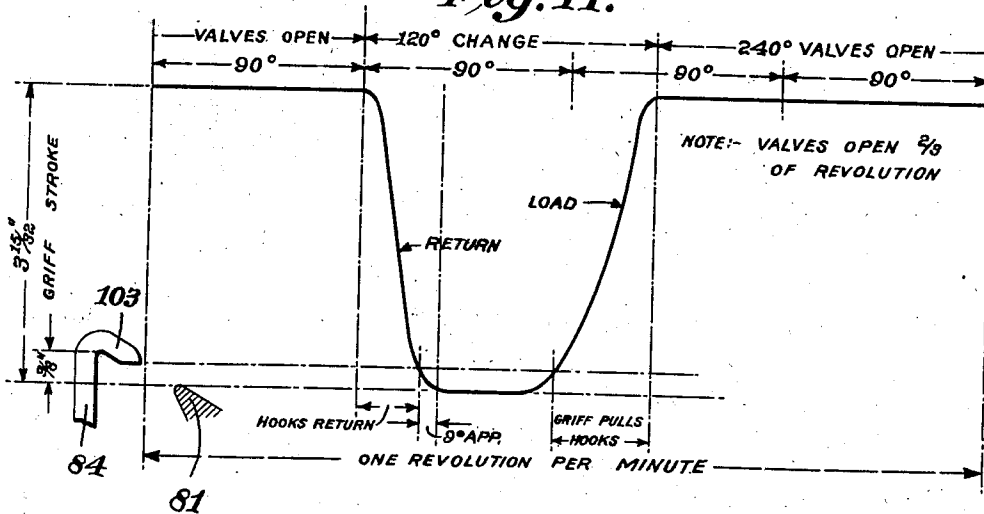
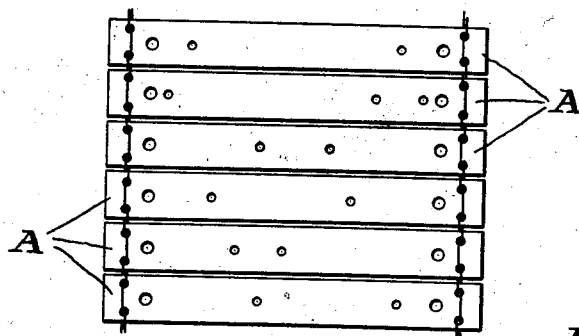


Fig. 12.



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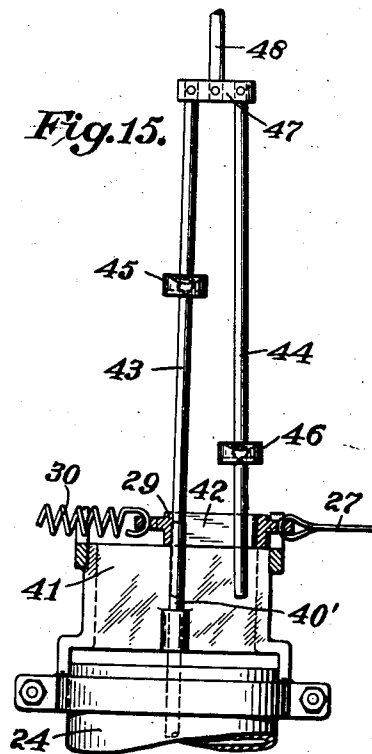
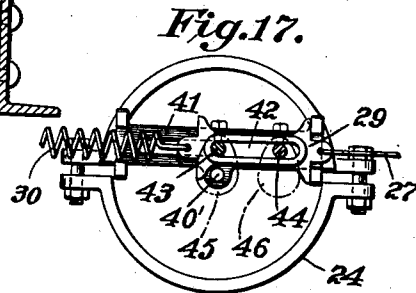
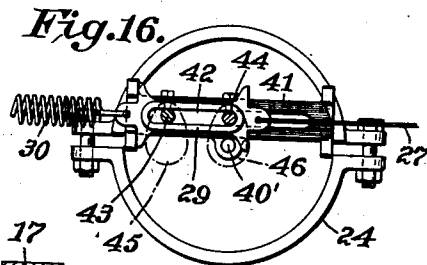
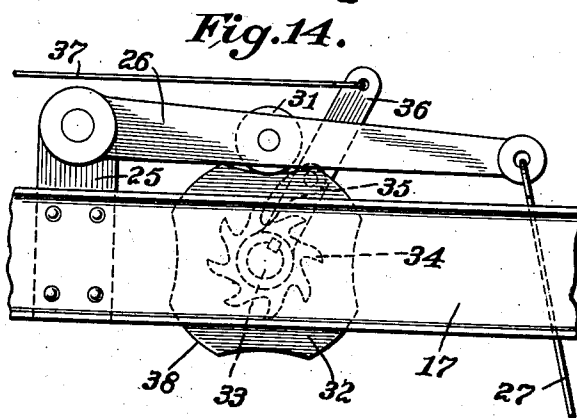
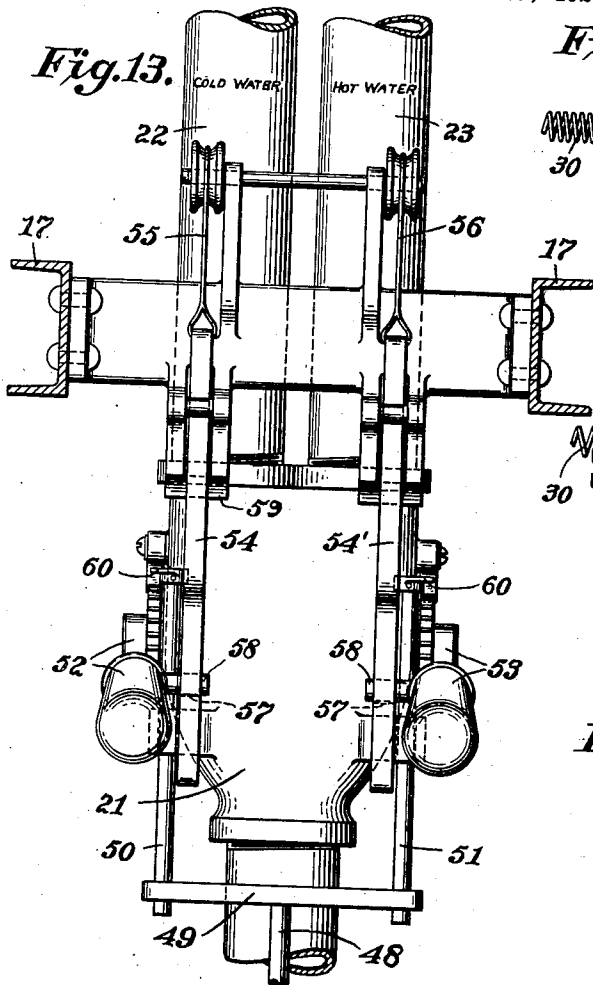
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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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WASHING MACHINE AND AUTOMATIC CONTROL THEREFOR

Application filed December 20, 1927. Serial No. 241,318.

My invention relates to new and useful improvements in washing machines of the type that are used in laundries and more particularly to the means for automatically controlling the different steps that take place during the washing and also automatically controlling the supply of the ingredients that are at predetermined times fed to the washing machine.

As is well known in these large washers, means are provided for automatically and at predetermined times supplying the bluing, sour, bleach, soap, soda and hot and cold water. Also the washer is flushed at certain times, dumped at other times and likewise the hot and cold water are fed at predetermined times, in the cycle of the washing of the clothes.

One of the objects of the invention is to provide a washing machine wherein means are provided for holding the separate ingredients above mentioned and wherein certain valves are provided for the feeding of the hot and cold water; also valves for the dumping and flushing and especially wherein an automatic control is provided for operating these several parts at predetermined times and in proper sequence.

Another object of the invention is to provide an automatic form of washing machine with means for holding the several ingredients to be fed thereto and to provide an automatic means for operating these holding means which operating means in its broadest aspect is in the form of a jacquard mechanism. The operation of the feeding of the ingredients, the flushing of the valves and the supplying of the water are all properly regulated by a chain of jacquard cards.

Still another object of the invention is to provide a form of jacquard mechanism that is to be located on the washing machine and wherein cables or ropes extend from the hooks of the jacquard mechanism to the different means that are to be operated, so that

after the proper chain of cards is made up and placed in the machine, the washer and jacquard mechanism may be started and the different ingredients will be fed at the proper time and the cycle of operations completed. After all of the necessary operations are completed the machine will automatically stop and the clothes will have been completely and thoroughly washed without the intervention of human hand.

Still another object of the invention is to provide a washing machine with means for holding the separate powder ingredients, and means for holding the separate liquid ingredients that are to be fed to the washing machine, and to provide a number of different valves, all of which parts will be selected and operated by the jacquard mechanism and the cycle of operation, covering a complete washing of the clothes, carried out automatically.

Still another object of the invention is to provide an automatic control that is regulated by a series or chain of jacquard cards, which cards may be arranged to either operate one or a number of mechanisms at the one time, and the order of the operating of the several parts or mechanisms can be predetermined and controlled, it only being necessary to have the desired cards arranged in proper places within the chain.

In some of the forms of automatic washing machines now in use, different operations are made to take place in a progressive manner, but it is impossible to complete say a certain operation, perform another and then repeat say the former operation. In other words there may be progressive steps, but not a retrogressive one.

Still another object of the invention is to provide a washing machine, having a plurality of holders for the several ingredients and provide a jacquard mechanism, so that any step at any time may be performed

simply depending upon the insertion of the proper card in the card train.

Still another object of the invention is to provide a washing machine wherein the jacquard mechanism is so arranged that about once every minute there is a complete revolution of the master cam shaft that will operate any of the selected controls.

Still another object of the invention is to provide a washing machine that is exceedingly simple in construction, accurate in its operations and relatively cheap to assemble and manufacture.

With these and other objects in view, the invention consists in certain new and novel arrangements and combinations of parts that will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings showing the preferred embodiment.

Figure 1 is a view in elevation of a washing machine with the control mechanism shown as attached thereto.

Figure 2 is a front elevation partly in section of the jacquard control mechanism, on an enlarged scale,

Figure 3 is a detail section showing the cylinder elevated to throw out certain of the needles,

Figure 4 is a side elevation of the same, Figure 5 is a sectional plan taken on line 5—5 of Figure 4,

Figure 6 is a fragmentary vertical section of the control mechanism showing the cams having moved the parts into a different position from that shown in Figure 4,

Figure 7 is a fragmentary detail showing the card cylinder partly turned by the throw pawl,

Figure 8 is an elevation of the griff operating cam and associated mechanism,

Figure 9 is a reversed view of the cylinder cam to show in full lines the cam groove,

Figure 10 shows a graph of the cylinder travel,

Figure 11 is a similar view of the griff travel and results,

Figure 12 is a plan of the card belt or chain, the needle openings however being illustrative only and not in any regular sequence.

Figure 13 is an end elevation on an enlarged scale of the hot and cold water inlets and their valves,

Figure 14 is a fragmentary detail of the means for controlling the high and low water float mechanism.

Figure 15 is a fragmentary view of the upper part of the high and low level float valve,

Figure 16 is a top plan of the same with the valve set for low level, and

Figure 17 is a similar view set for high level.

Before going into a detailed description

of the actuating control mechanism, it might be well to set out the general purpose and utility of the machine.

As is well known to those skilled in the art, a schedule or cycle is set up for each washing machine depending somewhat on the different classes of clothes to be washed.

In the present instance, the clothes are to be placed in the several receptacles in the washing machine, the jacquard cards having previously been properly arranged in the chain, so that at predetermined times the several washing compounds are automatically introduced in measured quantities to the washing machine, hot and cold water introduced and cut off at either one of two levels, fresh water inserted and finally the washer emptied and the machine stopped.

As is also well known in the art, hot and cold water are to be introduced at different intervals, likewise soda, soap, bleach, sour and blue and in the present instance I have provided certain forms of containers for holding the liquid ingredients and others for holding the powder ingredients.

The form of container for the liquid ingredients with slight modifications is shown in a separate application filed by me on June 13, 1927, bearing Serial No. 198,525.

Referring now more in detail to the drawings and to Figure 1 for the moment, there is shown a laundry machine or washer of the well known "cylinder type" consisting of the outer shell 1, the end frames 2, and the cover 3, that is so geared that it may be operated by the wheel 4 which is general in this class of machines.

There is of course an inner cylinder in which the clothes are placed to be washed, which cylinder will be rotated or rocked in the ordinary manner.

There is also shown the supports 5, while at the bottom of the shell may be seen a dump valve 6 that is connected to the shaft 7 while at the end of the shaft is a lever 8, to which is connected the cable 9 which cable extends over the sheave 10 up to the control mechanism 11 which of course will be shortly explained.

There will also be seen the inlet pipe 12 for the washer, which extends to the Y-branch 13, from which leads a small pipe 14 which is in turn connected to a trough 15 that extends practically the length of the washer. This trough is supported by the braces or frames 16, while on the top of these braces also are supported the beams 17 on which in turn are properly fastened the buckets 18 for dispensing the liquid ingredients for the washing machine. Likewise the powder containers 19 are disposed on these beams, and will be shortly referred to.

In regard to the buckets 18, these are arranged to dispense a predetermined

amount of liquid and are also so arranged that after dispensing a predetermined amount of liquid, they drop back slightly so that the level of the liquid will be below the mouth of the bucket, so that no liquid will continue to drop from the mouth after the bucket is operated.

These buckets of slightly different species are the subject matter of a separate application heretofore mentioned.

In this application the bucket is shown somewhat diagrammatically, but it will be understood that the bucket 18 is in the form of a tiltable container and there is an arm 18—A which when actuated by a cable connected at its lower end to the control mechanism 11 will spill a certain amount of its liquid in the trough 15 so that it will flow through the pipe 12 into the washing machine.

As shown in Figure 1, there are three of these dump buckets provided, one of which may contain the bleach, another the sour and the other the blue and each will have a cable from its respective arm 18—A to one of the hooks, to be mentioned, of the control mechanism.

In a like manner I have shown diagrammatically three containers 19 for the powder ingredients, one of which may hold soda and the other may hold soap. The third cylinder may be used for holding additional soap or soda or might be used for any other desired powdered ingredient. These containers also form the subject matter of a separate application, but it will be understood that there is a gate mechanism for dispensing a fixed amount of powder in the bottom of each container to which will extend a cable and each cable in turn will extend back to a hook of the control mechanism, so that when one of the respective hooks to these containers or hoppers is operated, it will permit a certain amount of the desired washing powder to drop into the trough.

There is also shown diagrammatically a flush valve 20, the outlet of which extends into the trough 15, so that upon the dispensing of a powder or liquid ingredient into the trough, the flush valve will be operated by a card in the automatic control, as it also has a cable to a hook of the automatic control, to thus wash the liquid or the powder down the trough into the washing machine through the pipe 12.

There is an important feature to be mentioned here and that is by dispensing the powders and liquid into a trough and flushing the trough at the same time the liquid or powders are thoroughly mixed with the water before they reach the washing machine.

This is an advantage, as otherwise if the bluing or any of the other ingredients were simply dispensed into the machine without a thorough mixing with the water they might

act on the clothes adjacent the point of entrance but not evenly on all the clothes throughout the washing machine.

Hot and cold water valve and double level float mechanism

Connected with the Y-branch 13 there is a double valve 21 to which leads a cold water pipe 22 and a hot water pipe 23 and it will be seen that by using the form of branch shown and passing the hot and cold water through this valve, the entrance of the hot and cold water will have a tendency to help draw the liquid from the trough 15 by suction into the pipe 12 and into the washing machine.

As will be noticed in Figure 1, there is shown attached to the beam 17, a small support 25, to which is pivoted an arm 26, while from the outer end of this arm extends a wire or cable 27 that passes over a sheave 28 mounted on the float tank 24, which cable 27 is connected at its lower end to a small shiftable carriage 29 which is normally held in position by the spring 30.

Going back to the arm 26 for the moment, it will be seen that it is provided with a small roller 31, which in turn bears on the edge cam 32. This cam is keyed to a shaft 33 that is provided with a ratchet wheel 34. For operating this ratchet, there is a small pawl 35 mounted on the pivotal arm 36, which arm in turn is connected by the cable 37 to a hook of the jacquard control which control will be shortly described.

The cam 32 is provided with four high spots 38 as may be seen in Figure 14, so that when the cam roller rests on one of these high points, the lever 26 will be slightly elevated which in turn will cause the cable 27 to pull the shiftable carriage 29 to the right or the position shown in Figure 17.

When the roller 31 is on one of four corresponding low spots of the cam, the shiftable carriage will be in the position shown in Figure 16.

Now the purpose of having this shiftable carriage and the lever and cam above mentioned is so that the hot and cold water may be cut off by the float valve either when the water has reached a predetermined high or low level in the washing machine.

Referring for the moment to the tank 24, it will be noticed that there is an inlet pipe 39 which connects with the shell of the washer 1, while situated within the tank is the float 40 provided with the stem 40' which extends for a short distance above the top of the tank 24.

Also located on the top of the tank 24 is a cross piece 41 in which slides the shiftable carriage 29 heretofore mentioned.

Extending down within a slot 42 in the carriage 29 are the two rods 43 and 44 on

which are mounted the adjustable stops 45 and 46. These stops are pear-shaped in plan, as may be seen in Figures 16 and 17. The rods 43 and 44 are in spaced relation to each other, and, it will be remembered, extend within the carriage 42 which carriage is operated by the cable 27 so that the stem 40' will engage either the stop 45 or 46, depending upon whether the carriage is in the position shown in Fig. 16, or the position shown in Fig. 17. A small head or cross bar 47 connects the upper ends of these two rods 43 and 44 and from this head 47 extends the valve trip rod 48.

This valve trip rod at its upper end has a cross piece 49 from which also extends the two short arms 50 and 51. There is a handle 52 for the cold water and a handle 53 for the hot water, which handles operate the double valve for respectively introducing the cold and hot water to the washing machine so the same may be manually operated if ever desired.

As may be seen in Figures 1 and 13, there are provided two release arms 54' and 54'', one for each half of the double valve, these arms being each respectively connected by cables 55 and 56 which cables extend to the control mechanism. Each of the arms 54 and 54' also have a small jaw 57 thereon which is adapted to engage respectively a small pin 58 on each of the handles.

Now in line with each of the movable arms 54 and 54', there is respectively positioned a small foot 59 and as they are alike, a description of one is a description of both. This small foot 59 is directly in the path of the arm 54 and this arm, it might be mentioned, is provided with an off-set portion 54'', so that after the arm 54 has been raised for a certain distance, the arm will be kicked outwardly, due to its off-set portions striking the foot 59 to thus disengage the jaw of the arm from the pin of the handle. The water will continue to flow through the valve then until the valve is closed and inasmuch as the hook is from beneath the pin, this may be easily accomplished as will shortly be described.

Thus far it will be seen that to open the hot or cold water valves, the respective cable 55 or 56 is operated and the rising arm 54 or 54' will pull the handle upwardly and thus open its valve to allow the water to flow into the supply pipe for the washer.

Now these hot and cold water valves illustrated are of a well known type. However, the valve trip rod and the means for allowing the valve to close are different. It will be understood that the actual valves themselves and the actual mechanism for causing them to close is of no importance. The means for elevating them is of importance and the means for kicking the jaw from the pin of the handle is important,

but the actual construction of the valve and the means for closing them after they have been tripped may be any desired type.

I have shown a trip mechanism 60 connected to the small rods 50 and 51, which arms will be remembered are connected to the valve trip rod 48, so that when the float rises in the tank, it will cause a pawl 60' to release a ratchet 60'' of this small trip mechanism 60, so that if both halves of the valve have been opened they may automatically shut or if one has been opened, the trip mechanism will not effect the one that has not been opened and allow the other one to close.

This is accomplished by raising both pawls clear of the ratchet. When the pawls are clear of the ratchet they will hit against the stop (not shown) and the rods 50 and 51 will have no further movement. The vertical movement of the rod 48 is limited so that the pawls will never be raised to such an extent that they may not quickly fall back in place.

A cut off for the hot and cold water of this type is desirable as the valves will be opened by the automatic control, that is the jacquard control, but it is necessary to have the valves closed or cut off before another movement of the jacquard mechanism. In other words the jacquard control operates about once a minute and it is desired often to have these valves close in six seconds, so that providing an automatic float cut off mechanism, the valves can be arranged to close in any number of seconds desired.

In other words the valves are opened by the automatic control and the valves are closed by the arrangement of the float mechanism just described.

The double level float arrangement with its shiftable carriage and the arm and foot for releasing the valves at different levels of water in the washer, is described but briefly, but on the other hand full enough so that the complete combination may be understood.

It also might be mentioned here that a card to be later mentioned of the jacquard train for setting the high and low level of the float will just precede a card which causes the hot or cold water to be introduced. In other words the high or low level will be selected just previously to the introduction of the hot or cold water, so that the desired level will be fixed before the float valve begins its operation, which float valve, it will be remembered, will be dependent upon the amount of water in the washing machine.

The use of high and low levels in the washing machine is well known, as it saves fuel by saving hot water, it saves soap and supplies, because less supplies are required

to produce a suds in the correct amount of water.

Control mechanism

5 Secured to the frame 63 is the small bracket 61 on which there is mounted a motor 62, the shaft 62' of which extends through the frame 63 supporting the automatic mechanism 11, and mounted on this shaft 62' is the worm gear 64, in turn meshing with the reducing gear 65. This reducing gear 65 is mounted on a shaft 66 which also in turn carries a worm gear 67 meshing with the gear 68. A journal 69 is shown for the outer end of the shaft 66.

15 With the reducing gear as shown, and the gear 68 being mounted on the shaft 70, said shaft 70 is designed to turn about one revolution per minute. Also mounted on this shaft 70 are the face cams 71 and 72, the cam 71 being shown more in detail in Fig. 8. It will be seen that the cam path 73 extends about the face substantially three-quarters of the circumference, then extends sharply toward the center as at 74 and again outwardly and to the periphery as at 75.

25 I have not shown the detail manner of keying this cam to the shaft, but this may be done in any appropriate manner so that the cam may be properly timed.

30 Referring now for the moment to the other face cam 72, it will be seen that its path 76 extends about one-half around the periphery of the cam, while the remainder of the path extends towards the center as at 77 and again to the periphery as at 77', this path of travel giving a reciprocatory motion to the arm 92 which arm is later mentioned.

Before explaining the cam rollers and the action resulting from the operation of these 40 cams, a short description follows of the shafts and parts actuated by these cams.

Referring to Figs. 2 and 4 for the moment, there will be seen a rock shaft 78 mounted near the top of the frame 63, to which are 45 secured the hanging rocker arms 79 and 80, which at their lower ends support the griff or knife 81.

For rocking this shaft 78 and the arms 79 and 80 with their knife, there is provided 50 the arm 82 likewise fastened to the shaft 78, and provided with the small roller 83 travelling in the cam path 73 of the cam 71.

The rotation, therefore, of the cam 71 rocks the shaft 78 at certain intervals and in turn, causes the arms 79 and 80 to swing inwardly and outwardly, and it is these arms, it will be remembered, that carry the knife 81 which pulls in turn the hooks 84, shortly to be described.

60 In Figure 11 is shown a graph of the griff travel and results and it is to be understood that the word "valves" in this Figure 11 might mean any of the instrumentalities that are to be operated by the jacquard mechanism. It will be noticed that for about two-

thirds of the revolution of the cam, the knife is in its advanced position and during the other one-third of the time it is returning and moving outwardly.

Before explaining the operation and results, from the movement of the other cam 70, a description will follow of the hooks 84, the needles 85 and the cylinder for operating these needles, so that the griff will operate the selected hooks.

75 Referring now for the moment to Figure 2, there will be seen another cross-shaft 86 properly mounted in the frame 63 and mounted on the opposite ends of this shaft, and beyond the edge of the frame, are the two arms 87, to the outer ends of which are 80 connected the arms 88, in turn connected at their lower ends to the shaft 89 on which is mounted the cylinder 90, which cylinder is provided with a plurality of openings 91 extending inwardly from the four faces of the cylinder. This cylinder is the ordinary form that is used in jacquard controls.

To rock the shaft 86 there is provided the arm 92, on which is mounted the roller 93 in turn travelling within the cam groove 76 90 of the cam 72, so that as the cam revolves, it will rock the shaft and arms and this will raise and lower the cylinder 90 at certain timed intervals, and it is the raising of this cylinder, over which pass the cards A, that select certain of the hooks 84 to be operated by the knife 81. The timing of the rise and fall of this cylinder with relation to the operation of the griff, is shown in Fig. 10.

100 Referring now to Figure 4, there is shown one of a pair of pawls 95, together with a spring 96, which pawls 95 are each provided with a jaw 97 to engage one of the four lugs 98 that are provided on the ends of the cylinder 90. In other words, on the carriage moving, one of these projections 98 at each end of the cylinder will strike the jaw of the pawl and as the carriage is continued in its downward movement, the pawls retaining one of these respective projections, will 110 cause the cylinder to revolve one-quarter of a revolution. This is shown in Figure 7.

This manner of turning the cylinder is well known in the art of jacquard mechanisms, and is also explained in Patent 1,767,901, issued to me June 6, 1930.

It is sufficient to say that just before the completion of the downward stroke of the cylinder, the cylinder is revolved one-quarter turn by projections engaging with the pawls 95. In Figure 4 the cylinder is shown starting on its upward movement, the projecting lug being just about to drop behind the jaw 97 of the pawl.

125 There are also two fixed guideways 99, (see Fig. 2) located at the opposite ends of the cylinder which form a part of the frame and against which the bearing surfaces 90 of the cylinder ride, so that the carriage or 120

cylinder may revolve and may travel in a vertical direction, but cannot swing out of place. This is also the usual construction in the cylinders that carry the jacquard cards, and per se, forms no part of the present invention.

In the present application, I have shown twelve hooks 84 and likewise twelve needles 85. These needles may be small wire rods provided with eyelets 101 at their upper end and are mounted in a support 102. Extending through the eyelet of each needle 85 is a hook 84 which hook has its outer end bent over as at 103, and its inner end also bent as at 104 in which is placed another small fastening member 105 mounted as shown at 106 (Fig. 8) to which fastening member is connected a cable in turn leading to one of the parts to be operated.

As before mentioned in the present application, there are twelve needles and twelve hooks properly mounted and positioned as may be seen in Fig. 3, and in this view I have shown four of the needles and hooks which have not registered with the holes in jacquard cards, which needles being raised will in turn raise the hooks so that on a movement of the knife, they will be out of the path of said knife and will not be operated thereby. It will be understood however, that there may be as many hooks and needles as desired.

In Figure 1, there is shown in dotted lines, a plurality or train of jacquard cards A, that is, cards provided with certain spaced holes with blanks. These are similar to the ordinary form of jacquard cards. Now, when the cylinder is raised that carries these cards, certain of the needles will pass into certain of the holes and the hooks threaded in these needles, will be operated by the knife. Other of the needles however that strike the blank face in the uppermost card will be elevated and their hooks thrown out of the path of the outwardly swinging knife or griff 81.

The cards will be properly punched and properly placed in the train to carry out the desired cycle, and the washing machine will be started and likewise the motor for the automatic control.

The timing of the cam 71 with relation to the timing of the cam 72 is shown in Figs. 8 and 9, and of course this timing will be kept throughout the cycle of operation. It will be seen in Fig. 8 that the knife is holding one of the hooks in its outermost position, and it is just about to start on its inward travel. The cam in Figure 9 is shown as travelling the opposite direction from Figure 8, but this cam has been turned over to more clearly illustrate the same, as it is mounted on the same shaft as Figure 8, and in reality travels in the same direction as

the came 71. The cylinder 90 is near its lowermost position and will be held in this position until the knife has moved inwardly and while the knife starts outwardly, the cylinder will have raised or forced some of the needles upwardly, while others, having passed through the holes in the jacquard card will remain normal, thus leaving the hooks in the path of travel of the knife 81 to be operated thereby. As the knife starts outwardly, it will engage the hooks or hook that have not been moved upwardly by the needles and the knife will operate these hooks, which in turn pull the cables that are attached to the desired mechanism to be operated.

Before the knife reaches its innermost position again, the cylinder will have moved downwardly, revolved 90 degrees and by the time the knife is again ready to engage the hooks, the next jacquard card in the train will have selected the desired needles and, thus the hooks to be operated on by the next outward movement of the knife, will be selected.

Before setting out a working cycle, it might be mentioned that in Figure 1, I have shown diagrammatically a switch 110, in which there will be two pull chain sockets from which chains there will be a cable 111 to the control mechanism and in one of the sockets will be a red light while connected with the other socket will be a switch, so that the final card in the jacquard mechanism will operate this cable 111 and thus light the red light and shut off the motor that operates the control mechanism 11.

The switch 110 is connected to the control for turning on the motor for starting the washing machine, and also for stopping the motor that runs the washing machine.

If the washing machine is belt-driven, there will, of course, be an idle pulley and a belt shifter, so that the machine may be stopped or started when desired.

In actual operation I have found that the cycle for the washing machine should approximate sixty minutes, although the time can be lengthened or shortened and to set out a cycle of operation, I have compiled a chart wherein there are from fifty-five to sixty minutes consumed in the cycle, the five minutes additional over the chart being allowed to insert or remove clothes between operations and also to allow for any slight drag that might occur.

In the chart the letter "S" signifies that the valves or mechanisms under their column are shut, while the letter "O" means that the valves or mechanisms are open. I have not inserted the change of the high and low level, but cards may be put in to have this occur when desired, as may be quickly understood from the description.

Cycle of washing operation

Time	Dump valve	Flush valve	Hot water	Cold water	Soda	Soap	Bleach	Sour	Blue
7.00	o	o	o	o to 6"	o	o	o	o	o
7.01	o	o	o	o	o	o	o	o	o
7.02	o	o	o	o	o	o	o	o	o
7.05	o	o	o	o	o	o	o	o	o
7.06	o	o	o	o	o	o	o	o	o
7.07	o	o	o to 6"	o	o	o	o	o	o
7.19	o	o	o	o	o	o	o	o	o
7.20	o	o	o to 6"	o	o	o	o	o	o
7.21	o	o	o	o	o	o	o	o	o
7.29	o	o	o	o	o	o	o	o	o
7.30	o	o	o to 10"	o	o	o	o	o	o
7.33	o	o	o	o	o	o	o	o	o
7.34	o	o	o to 10"	o	o	o	o	o	o
7.44	o	o	o	o	o	o	o	o	o
7.45	o	o	o to 6"	o	o	o	o	o	o
7.49	o	o	o	o	o	o	o	o	o
7.50	o	o	o	o to 6"	o	o	o	o	o
7.55	o	o	o	o	o	o	o	o	o

Light automatically lights and motor cuts off.

It will be understood in connection with the above table, that the time allowance for the closing of the hot and cold water valves is influenced by the float mechanism and not by a jacquard card.

The amount of soap, soda and bleach may be determined and as specific quantities form no part of the invention, the quantities are not set out.

It will be noticed that the soap or soda containers or hoppers must be opened once or twice as called for during the one cycle of the machine.

From the foregoing it will be seen that I have produced a washing machine with a plurality of separate mechanisms for holding the ingredients to be inserted through the washing machine, that I have provided hot and cold water pipes and valves and that I have provided automatic controls in the form of a jacquard card mechanism for operating these several means when and as desired.

The controls may be operated once or a number of times during the cycle, all depending upon the properly perforated card in the jacquard train.

The steps may be progressive or retrogressive or at any intervals desired.

I have also provided a float mechanism for closing the hot and cold water supplies as quickly after they are operated as desired, so that to shut off the hot and cold water valves it is not necessary to wait for another movement of the jacquard mechanism.

It will also be understood that any other controls might be applied and operated by simply placing the proper card in the train and connecting a cable to another hook in the jacquard mechanism.

The machine as shown has proven extremely effective in actual use and as heretofore stated, the machine may be started and the cycle of operations will be completed within fifty-five or sixty minutes without

in any way being touched or regulated by human hand.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination of a washing machine, means for holding powder ingredients and means for holding liquid ingredients for the said machine, hot and cold water inlets, a flush valve and a dump valve, a jacquard control mechanism for operating the means for holding the powder ingredients and the liquid ingredients and the jacquard control mechanism controlling the opening of the hot and cold water inlets, a float mechanism for cutting off the hot and cold water inlets and means determining at what height the hot and cold water inlet shall be cut off, said means being operated by the jacquard mechanism.

2. The combination of a washing machine, a hot and cold water supply for said washing machine, a jacquard control mechanism for turning on the supply at desired intervals, a float mechanism for closing the hot and cold water supply at one of two heights of the water in the machine and means connected with the jacquard mechanism for selecting either of said heights.

3. In combination with a washing machine, means for holding liquid ingredients and means for holding powder ingredients to be fed to the machine, said holding means to be opened and closed respectively by respective movement of cables, hot and cold water pipes and valves therein to be opened by the pull of respective cables, a dump valve and a cut-off switch also to be operated by respective cables, cables from all of said means to a jacquard control mechanism, the said control mechanism selectively operating said holding means and operating said dump valve and said cut-off switch and for opening the hot and cold water valves, a float mechanism for allowing said hot water valves to close at predetermined heights of liquid in the washing machine and a control connected to the jacquard for determining whether the valves shall be tripped at a high or low water level in the washing machine.

4. In combination with a washing machine, a plurality of ingredient holding and dispensing means for the washing machine, a hot and cold water supply and valves in said supply, a flush valve and a dump valve connected with the washing machine, an automatic control connected with the dispensing means and the said hot and cold water supply valves, and flush valve and dump valve; said automatic control comprising a plurality of needles and hooks, jacquard cards for selecting the needles which control the hooks, a trip level setting means connected with the hot and cold water supply

valves, and means guided by the trip level setting means for operating the hot and cold water supply valves to control the admission of water into the washing machine, cables
 5 connected from the respective hooks to the respective dispensing means and valves above mentioned and to the trip level setting means, means for operating the hooks
 10 selected by the needles to thus operate the cables and the said dispensing means and the valves above mentioned to which the cables are connected.

5. In combination with a washing machine, a plurality of means for dispensing
 15 ingredients to the machine, a flush valve and a dump valve for the machine, a hot and cold water supply and valves in said hot and cold water supply, an automatic control mechanism for operating the dispensing means and the said valves, said automatic control mechanism comprising needles and hooks, a plurality of jacquard cards
 20 for selectively operating said needles controlling the hooks, cables from said hooks to the said dispensing means and said valves, and means for operating the hooks to thus operate the said dispensing means and valves, a float mechanism also connected
 25 with the hot and cold water supply valves and said float mechanism having a trip level setting means for operating the valves to control the admission of water into the washing machine for tripping the said hot and cold water supply valves independent of
 30 the first-mentioned automatic control mechanism and a cable connected to the trip level setting means and to the automatic control.

6. An automatic washing machine comprising in combination, ingredient holding
 40 means, a hot and cold water supply, valves in said supply, a jacquard control mechanism, and a float mechanism for automatically controlling the water supply valves, and the float mechanism also being operably
 45 connected with the said jacquard control mechanism whereby the supply valves are affected both by the jacquard control and the float mechanism.

7. In combination with a washing machine, ingredient holding and dispensing
 50 means associated therewith, a hot and cold water supply provided with valves, a jacquard control mechanism for operating said holding and dispensing means and for opening
 55 the said valves of the hot and cold water supply together with a double level float mechanism for providing a high and low level of water in the washing machine, a cable connected between the double level
 60 float mechanism and the jacquard control mechanism and the said double level float mechanism comprising means for automatically closing the hot and cold water supply at either of the levels determined by the
 65 double level float mechanism.

8. In combination with a washing machine, a hot and cold water supply provided with valves, a jacquard control mechanism for turning on the supply at desired intervals, a float mechanism for automatically
 70 closing the hot and cold water supply at one of two predetermined heights of water in the machine, manual means for also closing the hot and cold water supply, and the float mechanism provided with means to be
 75 controlled by the jacquard mechanism to determine at which height the float mechanism will cut off the hot and cold water supply.

9. In combination with a washing machine, ingredient holding and dispensing
 80 means associated therewith, a hot and cold water supply provided with valves, a jacquard control mechanism for controlling the ingredient holding and dispensing means
 85 and for opening the supply valves of the hot and cold water, a double level float mechanism operably connected to said valves for turning off the hot and cold water supply valves, the jacquard control mechanism comprising means arranged to selectively position the double level float mechanism so that it may automatically cut off the hot and cold water supply valves at either of the
 90 desired levels. 95

10. In combination with a washing machine, means for holding ingredients to be introduced to said washing machine, a control mechanism operably connected to said
 100 means, a hot and cold water supply means, the hot and cold water supply means adapted to be turned on by the said control mechanism, a trip means for allowing the hot and cold water supply means to close after
 105 being opened and when tripped, rods operatively associated with said trip means, adjustable abutments on said rods, and float means for engaging said abutments to effect tripping of said trip means at different
 110 water levels, and means for selecting either of said rods for actuating the trip means.

In testimony whereof I affix my signature.
 FLETCHER SCHÄUM.

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