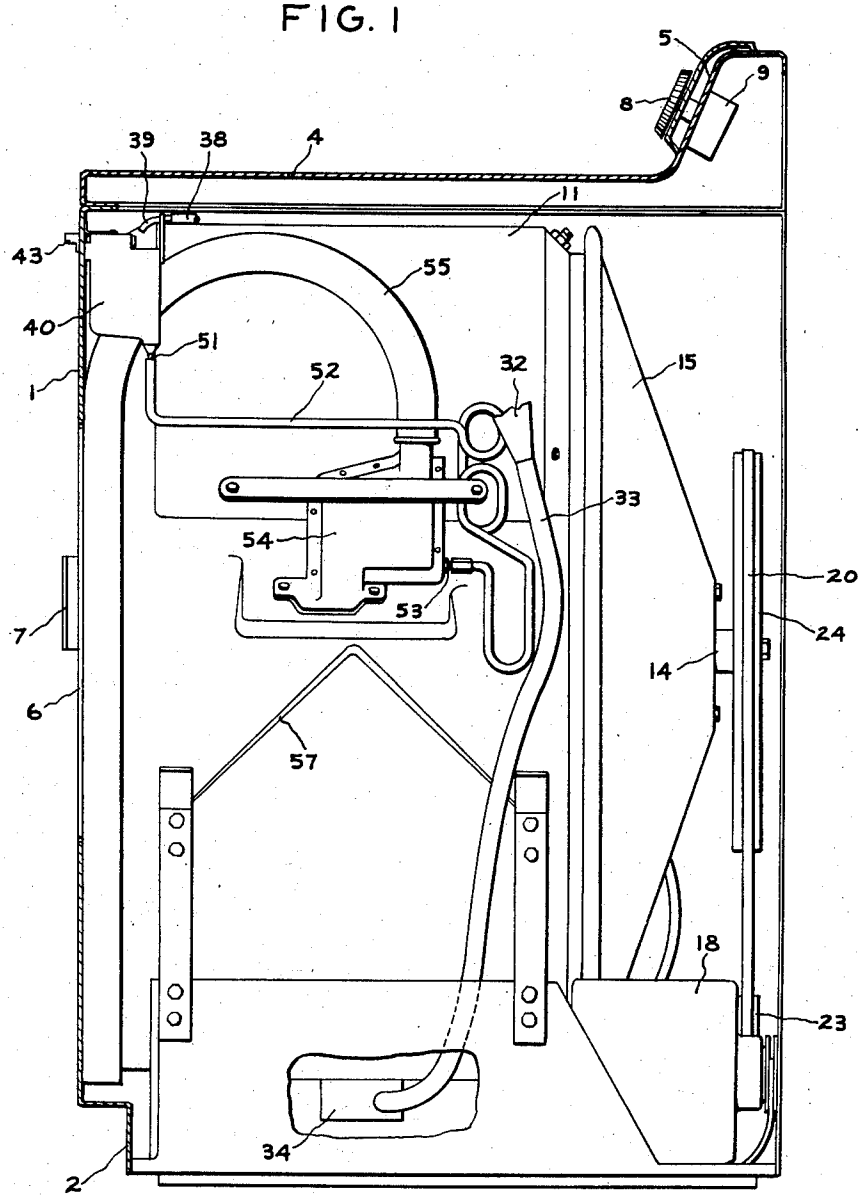
May 26, 1959 G. N. JENNINGS 2,887,862

MATERIAL DISPENSING SYSTEM FOR COMBINATION CLOTHES WASHING AND DRYING MACHINES

Filed March 24, 1958 4 Sheets-Sheet 1

FIG. 1



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MATERIAL DISPENSING SYSTEM FOR COMBINATION CLOTHES WASHING AND DRYING MACHINES

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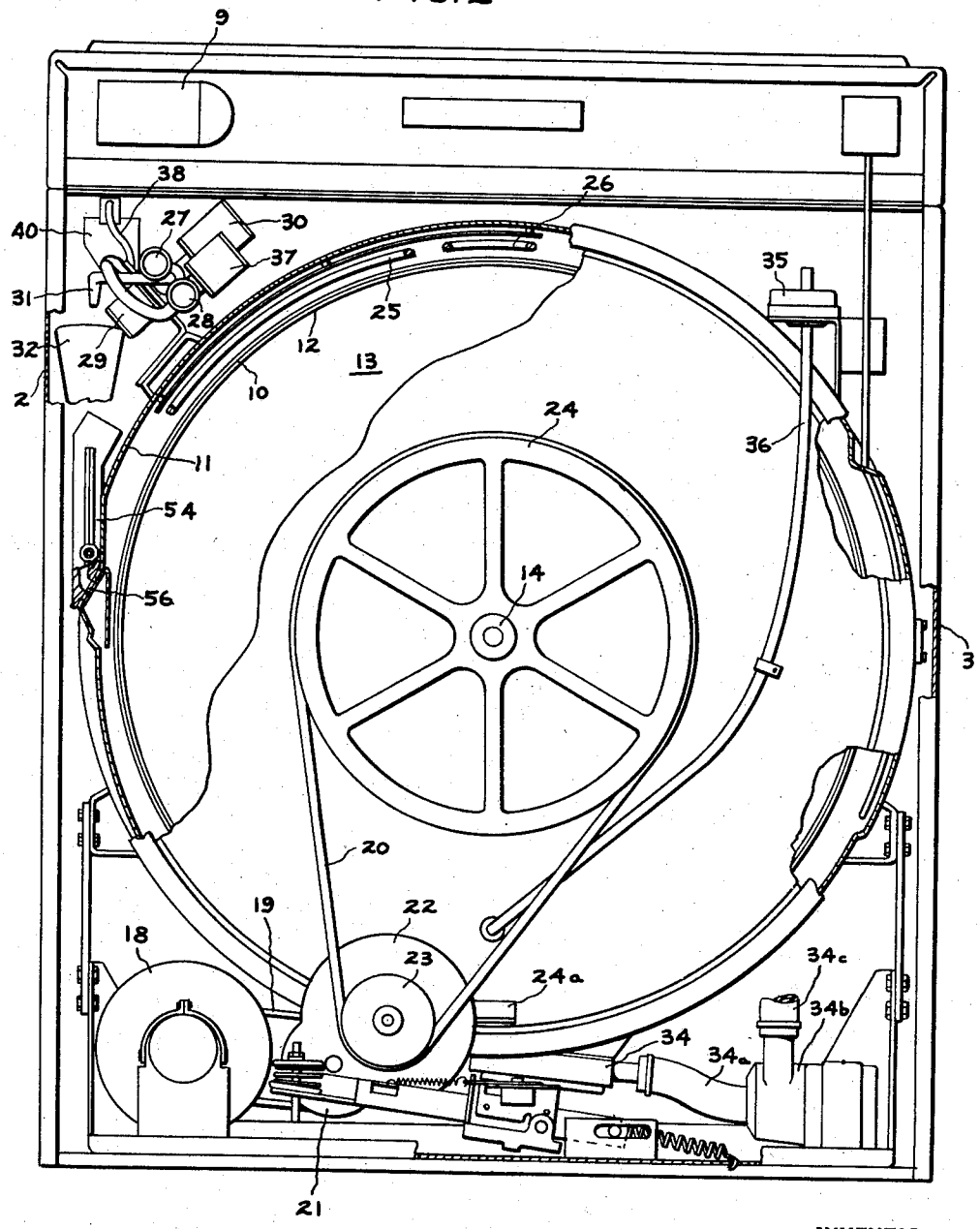
FIG. 2



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MATERIAL DISPENSING SYSTEM FOR COMBINATION CLOTHES WASHING AND DRYING MACHINES

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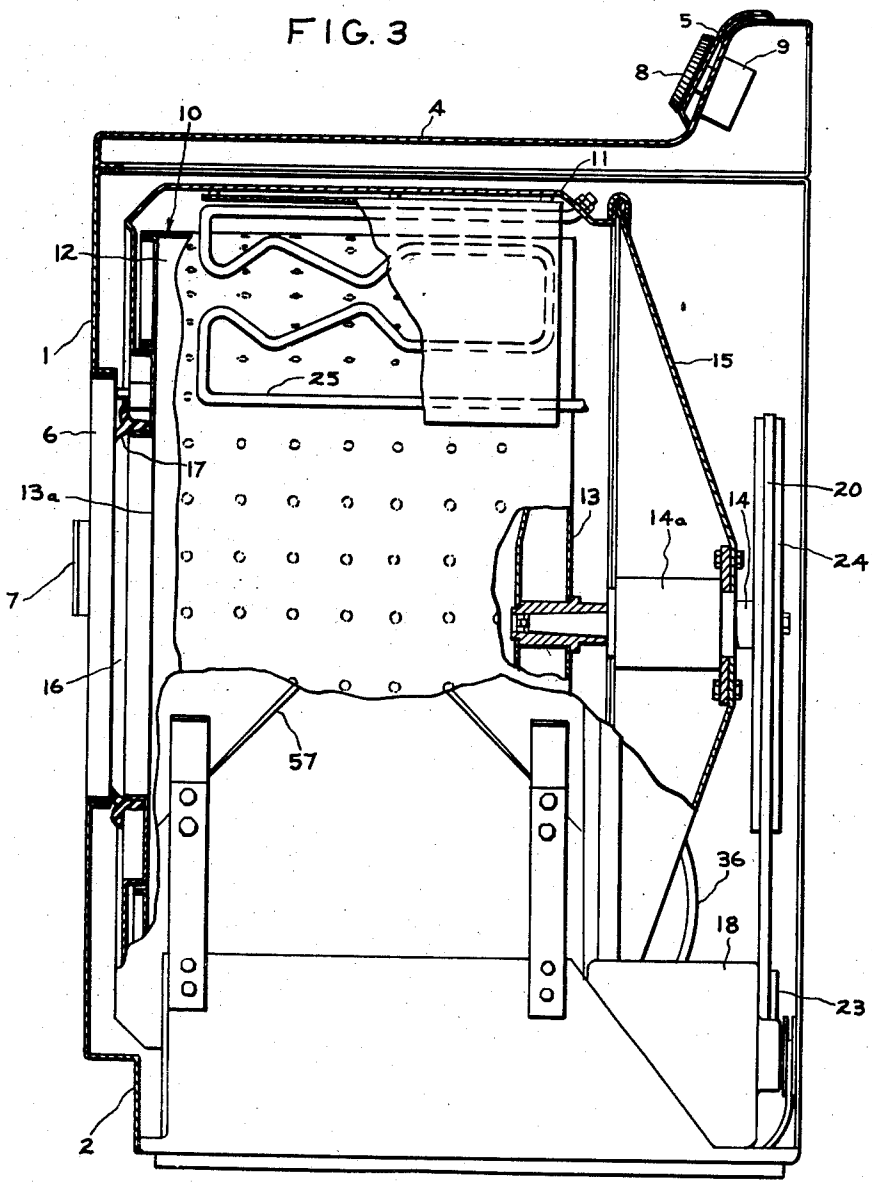
FIG. 3



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MATERIAL DISPENSING SYSTEM FOR COMBINATION CLOTHES WASHING AND DRYING MACHINES

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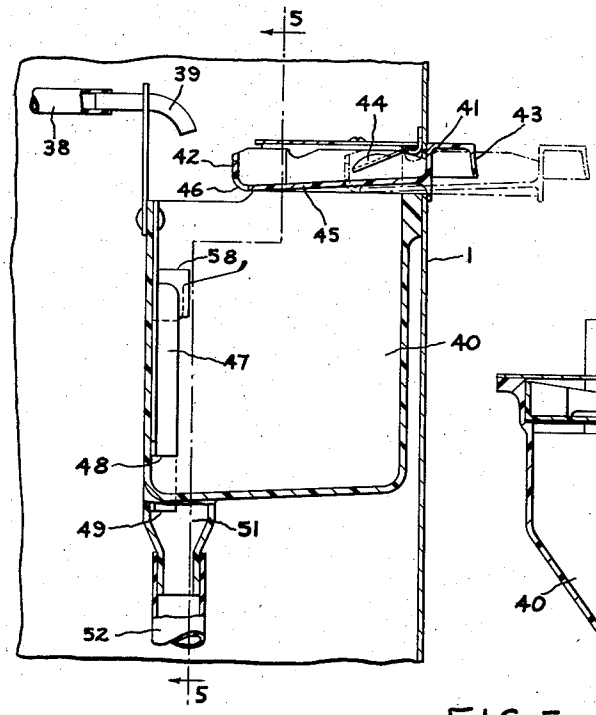
FIG. 4



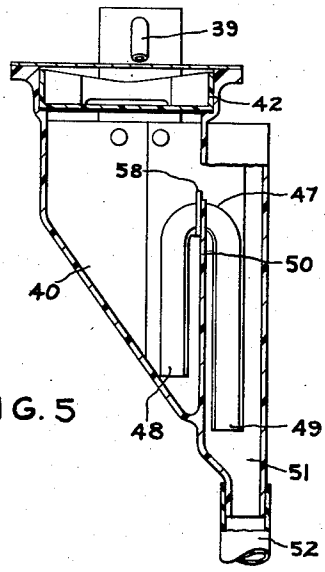


FIG. 5

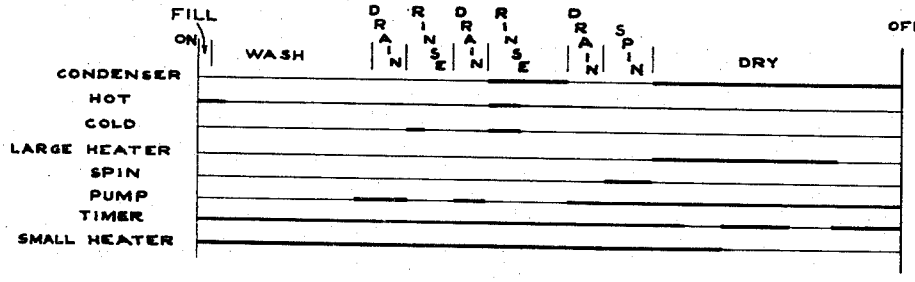


FIG. 6

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United States Patent Office 2,887,862
Patented May 26, 1959

2,887,862

MATERIAL DISPENSING SYSTEM FOR COMBINATION CLOTHES WASHING AND DRYING MACHINES

Gresham N. Jennings, Louisville, Ky., assignor to General Electric Company, a corporation of New York

Application March 24, 1958, Serial No. 723,385

4 Claims. (Cl. 68—12)

This invention relates to a system for dispensing a conditioning agent to the clothes container of a combination washing and drying machine, and more particularly to such a system where the material is carried to the clothes container by the same means which provides water for dehumidifying the heated air used in the drying operation of such machines.

Automatic clothes washing and drying machines customarily proceed through a sequence of operations in order to wash, rinse and dry the clothes. The sequence ordinarily includes a washing operation, a draining of the wash water from the clothes container, a rinsing operation in which the clothes are rinsed in clean water, an extraction operation in which the rinse water is removed from the clothes, and a heat drying operation in which the air in contact with the clothes is heated to vaporize the remaining moisture out of the clothes. Depending upon the type of machine, variations on the basic sequence may be provided; for example, many machines include several rinses and drainings, and some provide an extraction after the washing and preliminary rinsing operation as well as after the final rinse. Another very well known variation which is often provided is a spray rinse. However, the basic sequence of washing, draining, rinsing, spinning, and drying is almost always provided.

In order to obtain the most desirable results from these machines, it has been found advantageous that a treating agent be added to the rinse water during the final rinsing operation. Various treating agents, such as water softeners and fabric softeners, hereinafter referred to generally as rinsing or rinse agents, may be added to the rinse water to produce different results. If a water softener is added, a better rinsing action is obtained leaving less detergent in the clothes. The water softener removes mineral constituents in the rinse water which would otherwise react with part of the detergents and be retained as deposits in the clothes. As a result, less graying and yellowing of the clothes occurs. If a fabric softener is added to the rinse water, a softer feeling is imparted to the clothes because the softener leaves a film on the clothes which creates this result. The fabric softeners also result in less wrinkling of the clothes and in their being easier to iron. Further, they tend to prevent electrostatic charges from being formed on synthetic fabrics.

In the automatic washing and drying machines to which this invention relates, it is most desirable that the rinsing agent be added automatically, that is, that it be introduced into the clothes container at the proper time during the washing operation without attendance by the operator. It is accordingly an object of this invention to provide a new and improved rinse agent dispenser, particularly adapted for use in automatic washing and drying machines, which may be filled before the machine is set in operation and which will then introduce the agent automatically into the clothes basket at the start of the appropriate rinsing operation.

Most combination washing and drying machines for domestic use provide a closed heating cycle during the drying portion of the operation. In other words, the air which is heated to vaporize the moisture in the clothes is then dehumidified and used again rather than continually using a new supply of air and exhausting the humid air from the machine. To effect the dehumidification, the air is brought into contact with cool water which is provided to the machine during the drying operatio for that purpose. Thus, in addition to the water supply means for filling the container with water during the washing and drying sequences, combination machines also include a second water supply for the dehumidifying effect. A second object of this invention is to make use of this second water supply to cause the dispenser to provide the treating agent to the clothes container at the proper time with virtually no increased cost in the control of the machine.

The treating agents are frequently relatively thick viscous liquids which tend to form gummy deposits which clog relatively small conduits. Because of this tendency, it is important that the receptacle and conduits which are in contact with the treating agent be kept clean so that the conduit to the clothes container will not become stopped up. Accordingly, it is another object of this invention to provide an automatic dispensing arrangement which will be self-cleaning without requiring any attention whatsoever from the operator.

Yet another object of the invention is to cause this cleaning to be effected through the use of the water supply means which are already necessarily provided for the air dehumidification as described above.

In one aspect of this invention, it relates to a combination clothes washer and dryer having the usual sequence which includes a washing operation and a subsequent drying operation. The machine includes the standard provisions of a clothes container, means for heating the air in the container, means for dehumidifying the air by contact with cool water or water-cooled surfaces, and water supply means communicating with the container to provide water therein for washing and rinsing purposes.

My invention provides a material dispenser which has a receptacle positioned above the maximum liquid level reached in the container. A second water supply means is in communication with the receptacle, and conduit means are provided with one end communicating with the receptacle so as to receive liquid therefrom when it has been filled up to a predetermined liquid level. My invention further contemplates providing the cooling water from the aforementioned conduit means, which accordingly is arranged so that its other end communicates with the dehumidifying means and with the container. A suitable control is provided to cause the main water supply means to provide the container with water as needed for washing and rinsing during the washing operation, and to cause the heater and the cooling water supply means to operate during the drying operation to effect the necessary heating and dehumidifying of the air. The control means also cause operation of the cooling water supply means substantially concurrently with the first water supply means at a predetermined time during the washing operation, when it is desired that the material in the dispenser be introduced into the container. This fills the receptacle so that the mixture of material and water flows from the dispenser receptacle through the conduit into the container.

The primary intent is to use such a construction to effect automatic introduction of the rinse agent into the clothes container at the appropriate time. However, it will be recognized that the concept of the invention may also be utilized to effect introduction of any material at

any desired point in the cycle. Thus, for instance, it is conceivable that the identical construction could be used to effect introduction of a suitable detergent in a clothes container at the appropriate time. The only difference would be in the time of causing simultaneous operation of both water supply means.

The subject matter which forms this invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. The invention however, both as to organization and method of operation, together with further objects and advantages, may best be understood by reference to the following description taken in conjunction with the accompanying drawings.

In the drawings,

Fig. 1 is a side elevational view of the improved machine of this invention, partially in section and with certain surfaces broken away to show details;

Fig. 2 is a rear view of the machine, with the rear panel removed to illustrate details;

Fig. 3 is another side elevational view of the machine, partially in section, and broken away along different surfaces from Fig. 1 in order to show additional details;

Fig. 4 is an enlarged fragmentary view, partially in section, of the improved material dispenser forming a part of this invention;

Fig. 5 is a view along line 5—5 in Fig. 4; and

Fig. 6 is a cam chart illustrating the control sequence provided by the control apparatus of the improved combination machine.

Referring now to Figs. 1, 2, and 3, I have shown my invention in one form as applied to a domestic laundry machine comprising a combination washer and dryer. The operating elements of the machine are included within an outer cabinet structure including a front panel **1** (Fig. 1) and side panels **2** and **3** (Fig. 2). The panels are supported on a base and toe board assembly **2**, and in turn support a top closure **4** provided with an integral backsplash portion **5**. Access to the interior of the machine is provided by a door **6** which may be mounted on panel **1** by concealed hinges and opened by suitable means such as a knee operated latch control **7**.

The machine is so constructed that when a load of soiled clothes is placed therein, it proceeds through a sequence of operations, first washing the clothes and then drying them. In order to provide completely automatic and flexible operation of the machine, operator controls such as **8** are mounted on the backsplash panel **5** and connected to control apparatus **9** secured to the backsplash panel. While the particular controls provided do not form any part of this invention, they normally include suitable means for turning the machine on and off, for selecting hot or warm water for the wash, and for causing the various operations to be performed in proper sequence. A suitable control for machines of this type is, for instance, described and claimed in Patent 2,819,540, Toma et al., issued on January 14, 1958, and assigned to General Electric Company, assignee of the present invention.

As shown in Figs. 1, 2, and 3 the machine is of the horizontal axis type with a clothes basket or drum **10** mounted for rotation on a generally horizontal axis within an outer enclosing tub structure **11**. The basket **10** comprises a cylindrical shell **12** which is closed at its rear by means of a suitable wall **13**, and which has a front wall with a suitable loading opening **13***a*. The basket is rotatably supported by a shaft **14** mounted in a suitable bearing **14***a* supported from the rear wall **15** of tub **11**. The tub is provided with an opening **16** in the front wall thereof which is aligned with the access opening **13***a* to the basket and with door **6** so that clothes may be placed into or removed from the basket. The door seals against a suitable gasket **17** to close this opening during operation of the machine. Basket **10** and tub **11** thus form a container for the clothes during the treatment thereof.

During machine operation, basket **10** is rotatably driven by an electric motor **18** through a drive including a pair of flexible belts **19** and **20**. Belt **19** connects the motor to the input pulley **21** of a transmission assembly **22**, and belt **20** connects output pulley **23** of the transmission assembly to a basket drive pulley **24** mounted on shaft **14** of the clothes tumbling basket **10**. The transmission assembly **22** is of the multiple speed type so that the ratio thereof can be changed to cause the basket to be driven at two different speeds, providing one basket speed for clothes tumbling for washing and for heat drying and another basket speed for centrifugal liquid extraction. The ratio of the transmission assembly is changed by any suitable means such as, for instance, a suitably arranged solenoid actuated plunger **24***a*. Basket **10** is continuously rotated by means of this drive during the operation of the machine.

To heat the air contacting the clothes during the drying portion of the cycle there are provided a pair of heaters **25** and **26**, mounted within the upper portion of the tub **11** so that when energized they heat the basket **10**. The heating elements are preferably of the sheathed type in which the resistance wire is maintained in spaced relation with an outer sheath by a highly compressed granulated heat-conducting electrically-insulating compound such as magnesium oxide. If so desired, one or both heaters may be energized during the washing cycle to maintain the water at a desirably warm temperature. The water heating effect is obtained as a result of the heaters first heating the basket and then, as the basket dips into the wash water at the bottom of the tub, heating the water by contact with the basket. In other words, the rotating basket serves as an effective heat transfer means between elements and the water or other washing liquids. When the heaters are energized during the drying cycle, the heat transferred to the basket and the air is then passed on to the clothes to cause vapor migration out of the clothes. Also, the outer cylindrical shell of the basket is perforated, and some of the heat from the heating elements passes directly to the clothes by radiation. It will be understood that in machines which have air circulating devices therein, the heater may be physically more distant from the basket; the important point is that heat is provided to the clothes to vaporize the moisture therein.

The means whereby water is admitted to and discharged from the tub **11** during operation of the machine is particularly shown in Figs. 1 and 2. The water supply means includes connections **27** and **28** (Fig. 2) through which hot and cold water is supplied to the machine. For the wash operation, a valve controlled by a solenoid **29** admits hot water to the machine and a valve controlled by an opposed solenoid **30** admits cold water to the machine. The hot and cold water valves under the control of solenoids **29** and **30** discharge from a common outlet conduit **31** across a suitable air gap (provided to prevent syphoning of water from the machine back to the water supply line) into a funnel **32**. As best seen in Fig. 1, funnel **32** discharges into a line **33** which leads to a sump **34** provided at the bottom of the tub **11**. A conduit **34***a* connects the sump to a drain pump **34***b* which discharges through a line **34***c* to a suitable drain (not shown) at the appropriate times to remove water from tub **11**. In the illustrated machine, a pressure-actuated sensing device or water level control **35** controls both solenoids **29** and **30** to maintain the proper water level in the machine during the washing operation. This sensing device is connected to the interior of tub **11** by a suitable line **36**, and achieves its control over the solenoids in a manner well known in the art and which is not further described or illustrated herein.

The combination machine uses cold water during the drying cycle for condensing the moisture out of the air after it has been vaporized from the wet clothes. The condenser water is admitted to the machine through a valve controlled by a solenoid **37** which is energized during the drying operation and during an appropriate part

of the washing operation as will be explained herebelow. When solenoid 37 is energized, the valve passes water at a slow rate appropriate for condensing moisture extracted from the clothes. As shown, the condenser water valve discharges into a line 38.

In accordance with my invention, line 38 discharges at 39 into a rinse agent dispenser receptacle 40 (Figs. 4 and 5) provided above the maximum liquid level reached within tub 11, preferably adjacent the top front portion of the machine within the cabinet. A suitable opening 41 is provided in the front panel 1 of the machine cabinet and a tray 42 is slidably mounted in opening 41 and is provided with an appropriate handle 43 by means of which the tray may be slid out to the position shown in phantom in Fig. 4. Appropriate stop means 44 are preferably provided to limit the outward movement of the tray. The tray has a bottom section 45 which slopes downwardly from the outer edge thereof adjacent the cabinet wall 1 to the inner edge thereof where there is provided an opening 46. In any position of the tray, opening 46 is directly over the receptacle 40 so that when a suitable treating material such as a liquid rinse agent is introduced into tray 42 it flows along the sloped bottom 45 and through opening 46 into the receptacle 40.

A syphon 47 has its short leg 48 extending into receptacle 40 and its longer leg 49 extending through wall 50 of receptacle 40 down into the opening 51 of a conduit 52. Conduit 52 extends at its other end 53 into a trap 54 which is designed to seal the tub and basket from atmosphere when water is flowing in conduit 52, and to vent to atmosphere through a vent tube 55 at other times. The vent trap 54 forms no part of the present invention, being fully described and claimed in Patent 2,800,008, Raczynski, issued on July 23, 1957, and assigned to General Electric Company, assignee of the present invention. Liquid from conduit 52 then passes through the vent trap 54 and enters tub 11 through an opening 56 (Fig. 2) provided therein for that purpose. The water so entering the tub is spread over the side of the tub by an inverted V-shaped bead 57 (Fig. 1) formed on the tub wall directly below the trap. The condenser water being so spread out cools a substantial portion of the area of the tub wall so as to provide a large cool surface for condensing from the air the moisture which has been extracted from the clothes.

Referring now particularly to Fig. 6, the operation of the improved combination washing and drying machine of the invention will be described. It is to be understood that Fig. 6 is in effect a development of the peripheries of the operating cams (not otherwise shown) of the control mechanism 9 when provided in combination with suitable control circuit means such as described and claimed in the aforementioned Toma et al. patent. The heavy lines show the cam rises, when the devices controlled by the cams are caused to operate.

Let it be assumed for purposes of explanation that the control knob 8 is set to provide a standard washing and drying operation, wherein it is intended that hot water be provided for the wash, and that the water be heated by the small heater during the washing operation. To initiate the action, the control is manually advanced to a position just beyond the "on" line in Fig. 6. It is understood, of course, that previous to this time tray 42 has been pulled out, a suitable amount of rinse agent deposited therein and the tray returned to its closed position. The size of the receptacle is such that the rinse agent alone is insufficient to reach the top of syphon 47 to initiate the syphoning action.

As the selected cycle is started it can be seen that the hot water supply, the timer (not otherwise shown) and the small heater are energized. This energizes the solenoid 29 to open its associated valve and permit hot water to flow into the tub 11 through conduit 33 and sump 34 to fill the tub to an appropriate level. At the same time, the small heater 26 is in operation to maintain the wash water at a suitably high washing temperature. When an appropriate amount of water has been provided, pressure-sensitive switch causes the flow to stop and the washing action is then provided by the continued tumbling of basket 10 which, as has been stated, is normally rotated during the entire operation from start to finish. At the end of a predetermined amount of washing time, as determined by the timer, the pump is actuated to drain the water out of the tub 11. Clean water (preferably cold) is then introduced to provide a first rinsing action which continues for a predetermined amount of time, and then the pump is reactivated to drain off the rinse water. It will be observed that the small heater may be continually energized during this period, if so desired, and that the timer is running in order to control the sequence of operations. It will further be observed that up to this point no water has been introduced through the valve controlled by solenoid 37 so that the rinse agent in receptacle 40 still remains there.

At the start of the last rinse, in addition to the water used to fill the container (in this instance, both hot and cold water are used to provide a warm rinse), the solenoid 37 is energized to cause the condenser water to be introduced into conduit 38. Thus, at the same time that the tub 11 is being filled through conduit 33, receptacle 40 is being filled through conduit 38. It will readily be understood that the only control modification required from that which is normally provided to control the action of the condenser solenoid 37 is a modification in the outline of the controlling cam.

Receptacle 40 fills up until the liquid level rises to the top of syphon 47, at which point there is a liquid mixture of water and rinse agent in the receptacle. As soon as the level reaches the top of the syphon, syphoning action will be started with the liquid flowing up through leg 48 of the syphon and down through leg 49 into conduit 52. If the liquid enters receptacle 40 faster than syphon 47 can remove it, it flows over edge 58 and then into conduit 52. This action continues until the liquid level in receptacle 40 falls so low as to permit air to enter leg 48 of the syphon. As can be seen, leg 48 extends almost to the bottom of the receptacle 40 so that it is almost empty at the time this occurs. However, this does not come about immediately since liquid is still being introduced from conduit 38; thus, there is a substantially continuous flow down through conduit 52 and into the tub 11 from the time it starts. It will, of course, be recognized that syphon 47, although its use is preferred is only one of various mechanisms which can be used to conduct liquid from receptacle 40 to conduit 52. Thus, for instance, the function could also be performed by letting the liquid flow over edge 58 into conduit 52 and providing valve means for dumping the remaining liquid from the receptacle at the end of a cycle.

The liquid is spread out over the wall of the tub by bead 47 as previously explained. However this is substantially immaterial at this point, the important point being that the mixture of rinse agent and water has been introduced into the tub so that it can flow down to join the remainder of the rinse water. Thus the clothes are subjected to the action of the rinse agent after it has been suitably mixed with a preliminary quantity of water in receptacle 40 and then introduced into the tub.

As usual, the introduction of water from the main water supply is terminated when the liquid in the tub is at the appropriate level. The relatively small flow from the condenser water inlet may also be stopped at this time or it may be continued throughout the rinse cycle. Continuing the condenser water flow adds relatively little water to the tub, but does serve the desired purpose of continually running water into receptacle 40 to provide a preliminary cleaning-out effect; thus, when the final rinse is terminated, the small quantity of liquid which remains at the bottom of the receptacle 40 is mostly

water and has only a very small quantity of rinse agent therein.

At the end of the final rinse the pump is again operated to drain the water out of the machine, and then the spin solenoid is energized to cause a centrifugal liquid extraction operation by rapid rotation of the basket. Operation of the pump is normally continued through to the end of the cycle to remove the water collected in the sump from the centrifugal extraction and, in the subsequent drying operation, to remove the mixture of condenser water and condensed vapor. At the end of the spin, an appropriate drying cycle is commenced, with the condenser, both heaters, and the pump being in operation. As can be seen from the timer cam in Fig. 6, energization of the timer during drying may be intermittent to effect a substantially automatic drying operation controlled primarily by the dryness of the clothes rather than by time alone. However, this does not form any part of the present invention and thus is not explained further; it is explained in greater detail in the aforementioned patent issued to Toma et al. However one aspect of the drying cycle important to the present invention is that for at least a substantial part thereof the condenser water is introduced in order to effect the necessary action of condensing the vaporized moisture out of the air. This condenser flow passes of course through receptacle 40, syphon 48, and conduit 52 so that a very thorough cleaning of all three is provided. This prevents any tendency of the rinse agent to clog up the openings in the system.

The drying operation is continued for a suitable period and then is terminated by the timer, either alone, or, as described in the Toma et al patent, in cooperation with thermostatic apparatus. The complete cycle is then finished, and the washed dry clothes are ready to be removed from the machine.

It will be observed that the rinse agent is introduced at the appropriate time in a completely automatic manner, without any attention from the operator being required; this is done with only the very smallest of modifications to the control system, which down to every last element would have been required even if no rinse agent dispenser had been provided. It will further be observed that after the rinse agent is introduced, the ordinary action of the condenser during the drying operation serves to provide a complete cleaning of all interior parts which have been contacted by the rinse agent. The only part which is not so cleaned is the tray 42 which, by reaching in and elevating stop 44 manually, may very easily be removed and cleaned occasionally by the operator as necessary.

While in accordance with the patent statutes I have described what at present is considered to be the preferred embodiment of the invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and I therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a combination clothes washer and dryer having a sequence including a washing operation and a subsequent drying operation: a clothes container; first water supply means communicating with said container; a material dispenser comprising a receptacle positioned above the maximum liquid level reached in said container, second water supply means communicating with said receptacle, a syphon extending through a wall of said receptacle and having a first shorter leg positioned within said receptacle and a second longer leg extending outside said receptacle, and conduit means communicating at one end thereof with said longer leg of said syphon to receive liquid therefrom when the liquid level in said receptacle extends to the top of said syphon; means for heating the clothes in said container; means for dehumidifying by contact with cool water the air which has absorbed moisture from the clothes, said conduit means communicating at its other end with said dehumidifying means and with said container; and control means for both said water supply means and said heating means, said control means causing said first water supply means to operate during the washing operation to provide said container with water for washing and rinsing, said control means causing said heating means and said second water supply means to operate during the drying operation to heat the clothes in said container and to supply water to dehumidify the air respectively, said control means also causing operation of said second water supply means substantially concurrently with said first water supply means at a predetermined time during said washing operation to fill said receptacle to said predetermined level therein and thereby flow a mixture of material and water from said dispenser through said syphon and said conduit means into said container.

2. A combination clothes washer and dryer having a squence including a washing operation and a subsequent drying operation and comprising a cabinet; a clothes container positioned within said cabinet; first water supply means within said cabinet communicating with said container; a material dispenser comprising a receptacle positioned within said cabinet adjacent a wall thereof and above the maximum liquid level reached in said container, said cabinet having an opening therein adjacent said receptacle, means extending from said opening to said receptacle to guide material introduced into said opening to said receptacle, second water supply means within said cabinet communicating with said receptacle, and conduit means communicating at one end thereof with said receptacle to receive liquid therefrom when a predetermined liquid level is reached therein; means in said cabinet for heating the clothes in said container; means in said cabinet for dehumidifying by contact with cool water the air which has absorbed moisture from the clothes, said conduit means communicating at its other end with said dehumidifying means and with said container; and control means for both said water supply means and said heating means, said control means causing said first water supply means to operate during the washing operation to provide said container with water for washing and rinsing, said control means causing said heating means and said second water supply means to operate during the drying operation to heat the clothes in said container and to supply water to dehumidify the air respectively, said control means also causing operation of said second water supply means substantially concurrently with said first water supply means at a predetermined time during said washing operation to fill said receptacle to said predetermined level therein and thereby flow a mixture of material and water from said dispenser into said container.

3. In a combination clothes washer and dryer having a sequence including a washing operation and a subsequent drying operation: a clothes container adapted to receive liquid for treatment of clothes therein, said container comprising a rotatable cylindrical basket having a perforated outer wall and an enclosing stationary liquid retaining tub, means forming a sump at the bottom of said tub below said basket, means for draining water from said tub, said tub having a substantial portion of a wall thereof formed to spread out a flow of water into a thin sheet for dehumidifying warm moist air within said container; first water supply means communicating with said sump; a material dispenser comprising a receptacle positioned above the maximum liquid level reached in said container, second water supply means communicating with said receptacle, and conduit means communicating at one end thereof with said receptacle to receive liquid therefrom when a predetermined liquid level is reached therein; means for heating the clothes

in said container; means defining an opening in said tub provided above said wall portion formed to spread water out into a sheet, said conduit means communicating at its other end with said opening in said tub; and control means for both said water supply means and said heating means, said control means causing said first water supply means to operate during the washing operation to provide said container with water for washing and rinsing, said control means causing said heating means and said second water supply means to operate during the drying operation to heat the clothes in said container and to supply water to dehumidify the air respectively, said control means causing operation of said second water supply means substantially concurrently with said first water supply means at a predetermined time during said washing operation to fill said receptacle to said predetermined level therein and thereby flow a mixture of material and water from said dispenser into said container, said control means causing said draining means to empty said container of liquid subsequent to washing and rinsing and to remove condensed vapor and water introduced through said opening of said container during said drying operation.

4. In a combination clothes washer and dryer having a sequence including a washing operation and a subsequent drying operation, said washing operation including a period of washing and at least one subsquent period of rinsing: a clothes container; first solenoid controlled water supply means communicating with said container; a material dispenser comprising a receptacle positioned above the maximum liquid level reached in said container,

second solenoid controlled water supply means communicating with said receptacle, and conduit means communicating at one end thereof with said receptacle to receive liquid therefrom when a predetermined liquid level is reached therein; means for heating the clothes in said container; means for dehumidifying by contact with cool water the air which has absorbed moisture from the clothes, said conduit means communicating at its other end with said dehumidifying means and with said container; and control means for energizing both said solenoid-controlled water supply means and said heater, said control means energizing said first water supply means to introduce water to said container during the washing period and the rinse periods thereby to provide said container with water for said operations, said control means energizing said heating means and said second water supply means during the drying operation to heat the clothes in said container and to supply water to dehumidify the air respectively, said control means also causing energization of said second water supply means during the last rinse of said washing operation to fill said receptacle to said predetermined level therein and thereby flow a mixture of material and water from said dispenser into said container.

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