United States Patent

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[73] Assignee **General Electric Company**

[54] **DISPENSER FOR TREATING CHEMICAL**
5 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **68/12,** 68/17, 68/20
[51] **Int. Cl.** **D06f 33/02,** D06f 39/02
[50] **Field of Search** 68/12, 17, 20, 207; 134/93; 239/274; 222/70, 517; 137/374; 251/321

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ABSTRACT: In an automatic fabric drying machine including an enclosure rotatable about a nonvertical axis to impart a tumbling action to the fabrics, air heating and circulating means adapted to heat and circulate a stream of air through the enclosure, means adapted to selectively energize and deenergize the air heating and circulating means, an outer protective cabinet having an opening therethrough into the enclosure, and a door pivotally mounted on the cabinet to close the opening; a dispenser is provided for slowly introducing water and treating chemical into the enclosure. The dispenser comprises a valve controlled reservoir tank carried by the door and including a valve operator. An actuating means incorporated in the cabinet is adapted to actuate the valve operator only when the door is in a closed position adjacent the cabinet. In one embodiment the actuating means comprises a portion of the cabinet adapted to contact the valve operator and cause actuation thereof when the door is closed. In another embodiment the actuating means comprises an actuator adapted to contact the valve operator in response to a condition indicating initiation of the fabric treating operation.

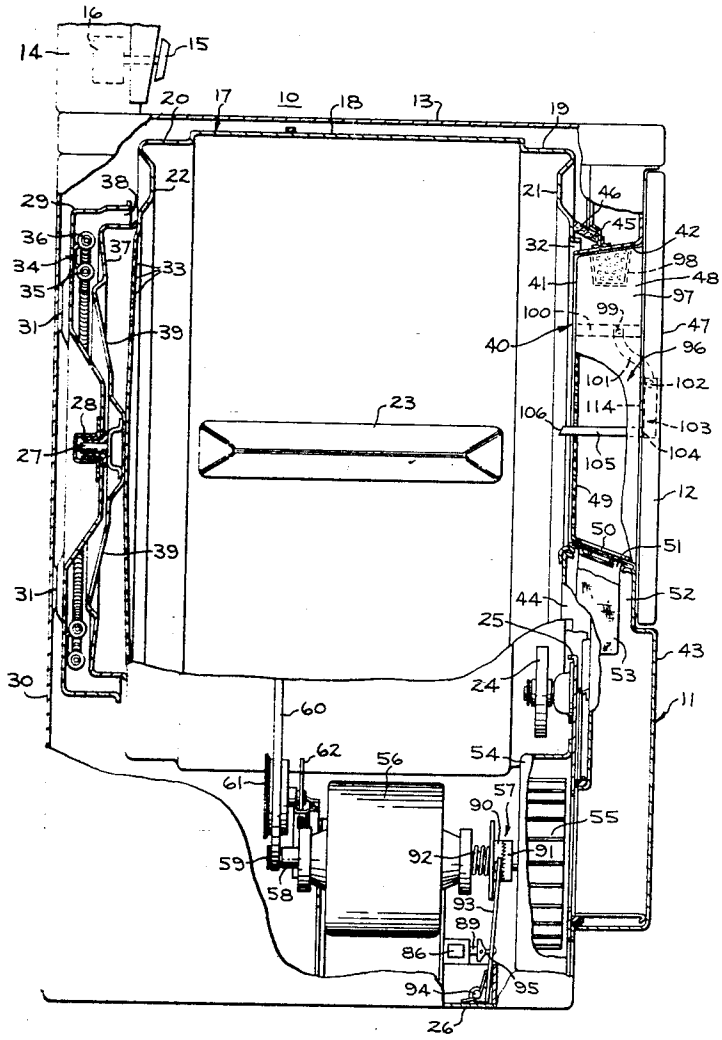

FIG. 1

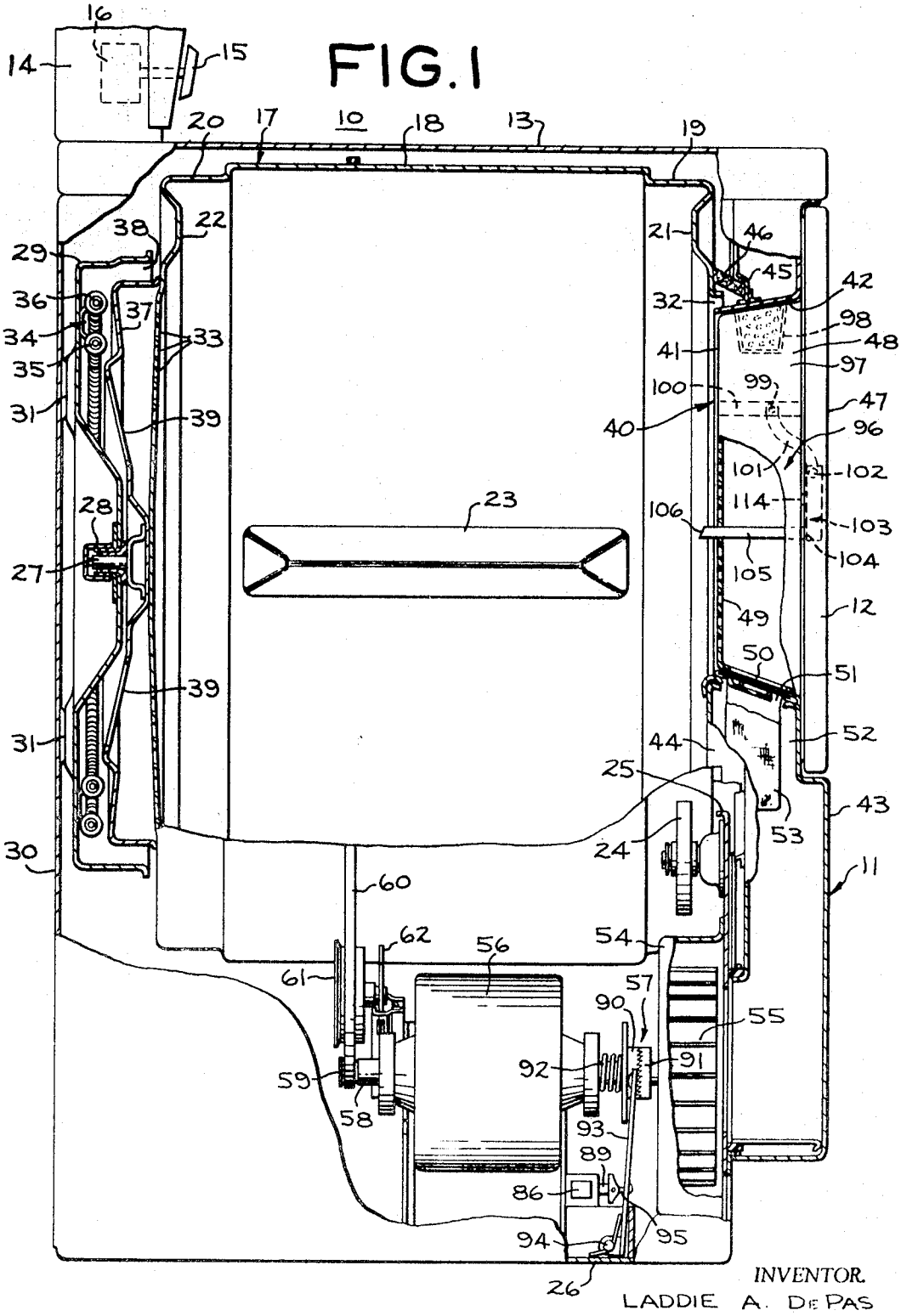

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FIG.2

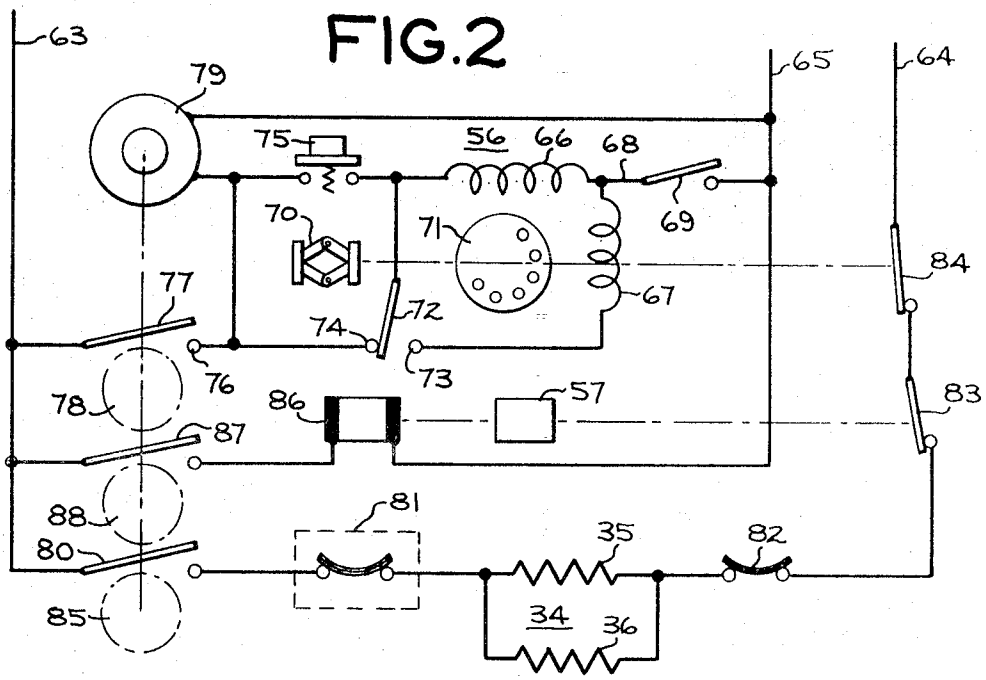
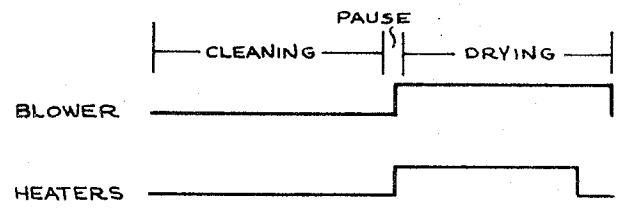


FIG.3



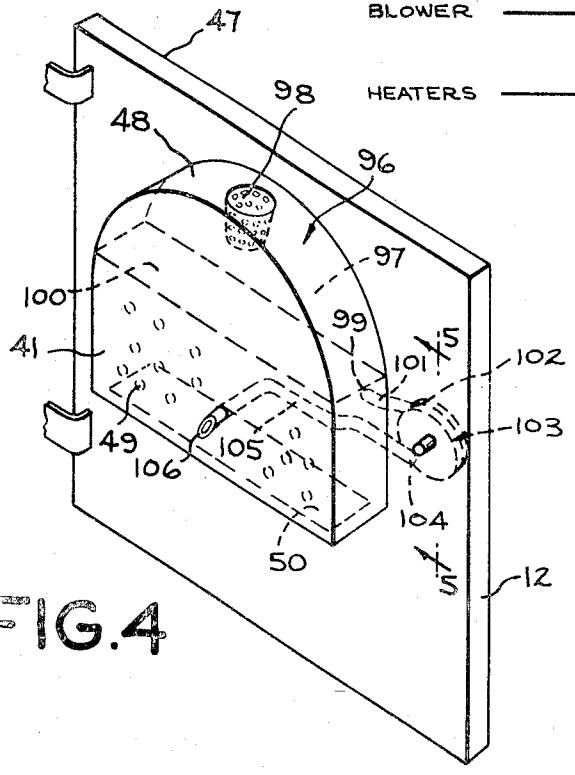


FIG.4

FIG.5

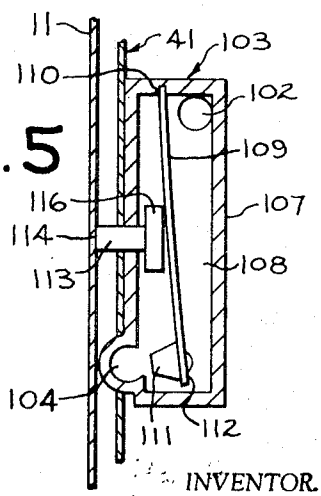


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FIG. 7

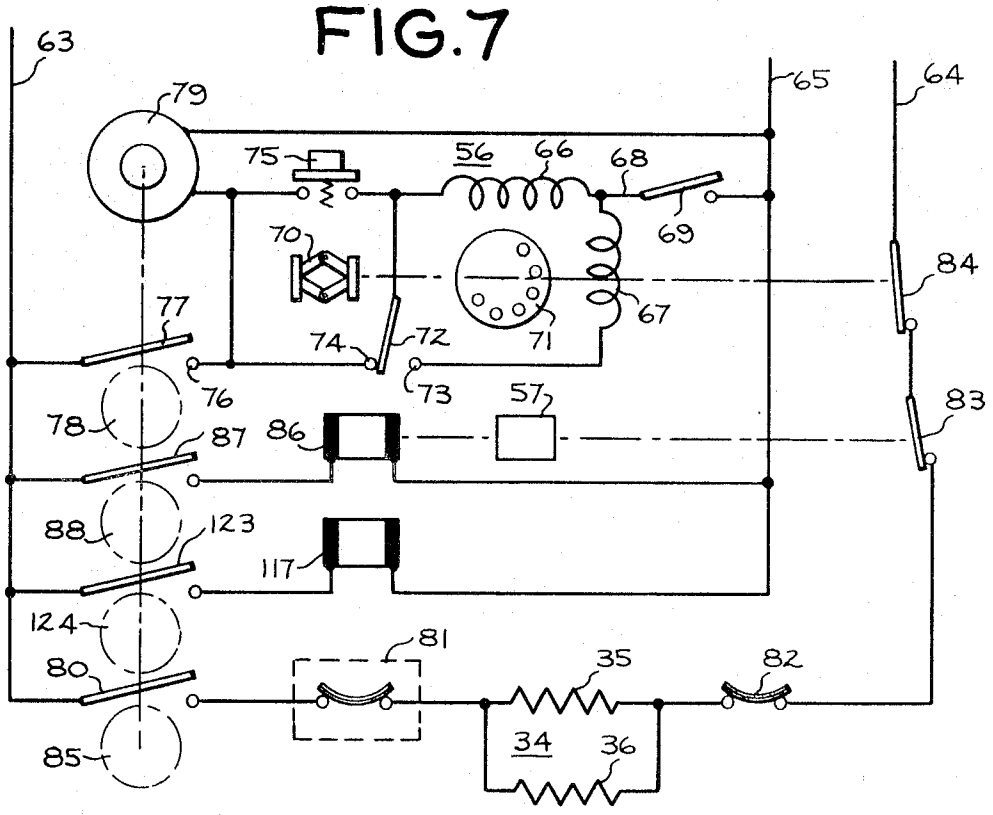
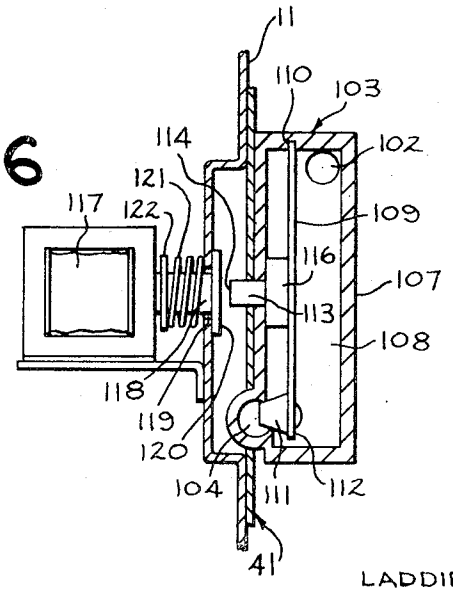


FIG. 6



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DISPENSER FOR TREATING CHEMICAL

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for introducing water and treating chemicals into a domestic automatic fabric drying machine adapted to perform the "dry wash" and "dry rinse" methods of cleaning fabrics as disclosed in applications Ser. No. 879315 (Docket 9D-HL-8495—Ehner) by W. J. Ehner and Ser. No. (9D-HL-8844—Loeb) by L. Loeb, filed concurrently herewith and assigned to the assignee of the instant invention.

The Ehner and Loeb applications disclose, respectively, a "dry wash" process and a "dry rinse" process for cleaning soil from fabrics. These processes characteristically employ a limited quantity of water which is sufficient only to dampen the fabrics. In this regard, the drywash and dry rinse processes differ completely from previously known methods of submergence washing wherein a submergence bath of solution is required to loosen and carry away soil from the fabrics. In accordance with these processes, oleophobic oillike materials such as body oils, cooking oils and greases, as well as nonorganic materials such as clay, sand, dust, grit and the like may be cleaned from fabrics by tumbling the fabrics together with a limited quantity of water, treating chemical and transfer agent. The tumbling causes the water, the treating chemical and the transfer agent to contact the fabrics, and causes soil from the fabrics to be distributed over the combined surface area of the fabrics and the transfer agent. Subsequently, the soiled transfer agent is separated from the fabrics, whereby the fabrics are cleaned of the soil distributed onto the transfer agent.

The treating chemicals employed in the drywash and dry rinse processes vary with the type of treating process to be performed. In the drywash process, for instance, the treating chemical may comprise a liquid detergent. One such commercially available detergent which has been found to perform acceptably in the drywash process is CINCH, manufactured by The Proctor & Gamble Company. In the dry rinse process a fabric softening agent, fireproofing agent, waterproofing agent, etc. may be employed as a treating chemical.

It is desirable in connection with the drywash and dry rinse processes to introduce such treating chemicals onto the surfaces of the fabrics in such fashion as to prevent the development of areas of chemical concentration on the fabrics. It is therefore an object of my invention to provide a means to slowly dispense water and treating chemicals during the initial tumbling operation so as to distribute the water and treating chemicals over the surfaces of the fabrics.

It is a further object of my invention to provide a door-mounted dispenser actuated by means incorporated in the cabinet of a dryer to slowly introduce treating chemicals into the rotatable enclosure of an automatic clothes dryer.

SUMMARY OF THE INVENTION

In accordance with one aspect of my invention, in a domestic fabric drying machine adapted to treat fabrics by tumbling the fabrics therein with a quantity of water, treating chemical and transfer agent, the dryer including: an enclosure rotatable about a nonvertical axis to impart a tumbling action to the fabrics; air heating and circulating means adapted to heat and circulate a stream of air through the enclosure so as to carry moisture away from the fabrics during rotation of the enclosure; means adapted to selectively energize and deenergize the air heating and circulating means so as to selectively permit the rotation of the enclosure without the flow of heated air therethrough during a treating operation; an outer protective cabinet having an opening therethrough into the enclosure; and a door pivotally mounted on the cabinet to close the opening; there is provided the improvement of a dispensing means adapted to slowly introduce the water and treating chemical into the enclosure. The dispensing means includes a reservoir tank carried by the door and adapted to receive and contain the treating chemical. A valve is also carried by the door and is adapted to control the discharge from the tank into the enclosure. The valve includes a valve operator which is positioned so as to be brought into operable relation with an actuating means when the door is closed. The actuating means is incorporated in the cabinet so as to actuate the valve operator only when the door is in closed position adjacent the cabinet.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description of the preferred embodiments taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a clothes dryer incorporating one embodiment of the dispensing means of my invention;

FIG. 2 is a schematic electric circuit diagram illustrating a control circuit for the dryer of FIG. 1;

FIG. 3 is a sequence control chart illustrating the position of the switches in the circuit of FIG. 2 during the sequence of operation of the machine of FIG. 1;

FIG. 4 is a perspective view of the dispenser of my invention as incorporated in the door of the machine of FIG. 1;

FIG. 5 is a cross-sectional view of the valve of the dispensing means of FIG. 4, with the valve open to permit flow therethrough;

FIG. 6 is a cross-sectional view similar to FIG. 5 but showing an alternate embodiment of my actuating means and showing the valve in closed position; and

FIG. 7 is a schematic electric circuit diagram similar to FIG. 2 but adapted to control the actuating means of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with my invention, a new and improved means is provided for introducing treating chemicals and water into the drum of a fabric drying machine, which system has particular application in connection with the "dry wash" and "dry rinse" processes disclosed in the aforementioned Ehner and Loeb applications.

In accordance with the aforementioned Ehner and Loeb dry wash and dry rinse processes, fabrics to be cleaned may be inserted into the drum of a horizontal axis domestic automatic dryer, having certain improvements to be explained below, along with a quantity of water, detergent and transfer agent. The dryer drum or enclosure is then rotated whereby a tumbling action is imparted to the fabrics thereby causing the water, detergent and transfer agent to contact the fabrics, and causing soil from the fabrics to be distributed over the combined surface areas of the fabrics and the transfer agent. The larger the surface area of the transfer agent, the greater the amount of soil cleaner from the fabrics and distributed onto the transfer agent. By such distribution of the soil, area of soil concentration of the fabrics are substantially eliminated. A 3 pound load of fabrics, for instance, may be cleaned by the dry wash process by tumbling together approximately 2 quarts of transfer agent in the form of polyethylene foam cubes measuring one-fourth inch on each side, approximately 75 grams of a liquid detergent such as CINCH manufactured by Proctor & Gamble, and approximately 3 pints of water. The quantity of water employed in both the drywash and dry rinse processes is limited to that quantity which is sufficient only to dampen the fabrics. By the term "dampen", is meant a wetting of the fabrics to a condition where there is some free water present on their surfaces during the cleaning process. The free water should be present in an amount sufficient to give mobility to the treating chemical employed so that it is distributed across all of the fabric and transfer agent surfaces. In this regard, a quantity of water equal to 50 per cent to 150 per cent of the dry weight of the fabrics has been found to be sufficient. In ac-

cordance with my invention a dispensing means mounted in the door of a domestic fabric drying machines is provided for dispensing the water and treating chemicals employed in the dry wash and dry rinse processes slowly onto the fabrics.

In order to perform the dry wash and dry rinse cleaning processes in an automatic clothes drying machine, a number of improvements to the machine are required, as set out in the aforementioned Ehner and Loeb applications. To better enable one skilled in the art to understand the system of my invention, reference is made to the drawings, and initially to FIG. 1 thereof, where there is illustrated a domestic automatic clothes dryer **10** improved to perform the drywash and dry rinse processes. The dryer **10** includes an appearance and protective outer cabinet **11** having a door or closure **12** to provide access to the interior of the cabinet for loading and unloading fabrics. Provided on the top **13** of cabinet **11** is a control panel **14** which may, in a conventional way, include a suitable manual control **15** connected to a control assembly **16** mounted in the panel. By manual setting of control **15**, the machine may be caused to start and automatically proceed through a cycle of operation.

Within cabinet **11** there is provided a clothes tumbling enclosure or drum **17** mounted for rotation on a substantially horizontal axis. Drum **17** is substantially cylindrical in shape, having a center cylindrical wall portion **18**, and outer cylindrical wall portions **19** and **20**, located respectively adjacent an annular front wall **21** and a circular rear wall **22** of the drum. Wall portions **18**, **19**, and **20** are substantially imperforate to enable the drum or enclosure **17** to hold a depth of approximately 1 inch of liquid. On the interior surface of wall portion **18** there are a plurality of clothes tumbling ribs **23** so that clothes are lifted up when the drum rotates, and then permitted to tumble back down to the bottom of the drum. The front of the drum **17** may be rotatably supported within outer casing **11** by suitable idler wheels, one of which is indicated by the numeral **24**. These wheels are rotatably secured to the top of the member **25** which extends up from the base **26** of the machine. The wheels **24** are disposed beneath the drum, in contact with portion **19**, so as to support the portion **19** on each side to provide a stable support.

The rear end of drum **17** receives its support by means of a stub shaft **27** extending from the center of wall **22**. Shaft **27** is secured within a bearing **28** formed in a baffle structure **29** which, in turn, is rigidly secured to the backwall **30** of the cabinet **11** by any suitable means such as welding at a number of points **31**. With the arrangement shown the drum may rotate on a horizontal axis, with rollers **24** providing the front support and stub shaft **27** within bearing **28** providing the rear support.

In order to provide for the flow of a stream of drying air through the clothes drum, it is provided with a central aperture or opening **32** in the front wall **21** and a plurality of perforations **33** in the rear wall **22**. The perforations **33** in the present case are formed to extend around the rear wall in an annulus. The opening **32** is in alignment with the opening in cabinet **11** covered by door **12**, and thus serves a dual purpose in that it also provides access to drum **17** for loading and unloading fabrics.

As has been stated, baffle structure **29** is rigidly secured to the backwall **30** of cabinet **11**. Baffle structure **29** also serves to support heating means **34** which includes two resistance-type electrical heating elements **35** and **36**, appropriately insulated from the baffle member. Elements **35** and **36** may be annular in shape so as to be generally coextensive with perforations **33** in drum **17**. A baffle member **37** is rigidly secured to the rear wall **22** of the drum **17** outside the ring of perforations **33** and within the stationary baffle structure **29**, so that an annular air inlet **38** is defined by baffles **29** and **37**. In this manner a passage is formed for air to enter air inlet **38** between the baffles, pass over the heating means **34**, and then pass through centrally located openings **39** formed in baffle **37** and perforations **33** into the interior of drum **17**.

The front opening **32** of the drum is substantially closed by means of a stationary bulkhead generally indicated by numeral **40**. Bulkhead **40** is made up of a number of adjacent members including the inner surface **41** of the access door **12**, a stationary frame **42** formed as a flange on front wall **43** of the cabinet, the inner surface of an exhaust duct formed by the cooperation of member **44** and the front wall **43** of the cabinet, and an annular flange **45** mounted on the frame **42** of the front wall **43**. It will be noted that a suitable clearance is provided between the inner edge of aperture **32** and the edge of bulkhead **40** so that there is no rubbing between the drum and the bulkhead during rotation of the drum. In order to prevent substantial air leakage through the aperture **32**, a suitable ring seal **46** is secured to the flange **45** in sealing relationship with the exterior surface of the drum wall **21**. Door **12**, whose inner surface forms part of the bulkhead closing the opening, is mounted on cabinet **11** so that when the door is opened fabrics may be inserted into and removed from the drum through the doorframe **42**. It will be noted that the door includes an outer, flat imperforate section **47** and an inwardly extending hollow section **48**, mounted on the flat outer section. Hollow section **48** extends into the doorframe **42** when the door is closed, and the door surface **41** which comprises part of the combination bulkhead **40** is actually the inner wall of the hollow section.

The air outlet from the drum is provided by a perforated opening **49** formed in the inner wall **41** of hollow door section **48**. The bottom wall section of door **12** and the adjacent wall of doorframe **42** are provided with aligned openings **50** and **51**, opening **51** providing an entrance to a duct **52** formed by the cooperation of member **44** with front wall **43**. A lint trap **53** may be positioned in the exhaust duct **52** within opening **51** and supported by the doorframe **42**. Duct **52** leads downwardly and communicates with a housing **54**. Housing **54** contains a blower **55** driven by motor **56** through clutch **57**. The blower draws heated air through the duct **53** and then exhaust it from the cabinet **11** through an appropriate duct (not shown).

In addition to driving the blower, motor **56** constitutes the means for effecting rotation of drum **17**. In order to effect this rotation, motor **56** is provided with a shaft **58** having a small pulley **59** formed at one end thereof. A belt **60** extends around the pulley **59** and also entirely around the wall section **18** and drum **17**. The relative circumferences of the pulley **59** and the wall section **18** cause the drum to be driven by motor at a speed suitable to effect tumbling of fabrics in the drum. In order to effect proper tensioning of the belt **60**, a suitable idler assembly **61** is secured to the same support **62** which supports one end of the motor. Thus, air is pulled through the drum and, at the same time, the fabrics within the drum are tumbled. When the air is being heated by heating elements **35** and **36**, the heated air passing through the drum causes vaporization of the moisture from the clothes, the vapor is carried off with the air as it passes out of the machine.

Referring now to FIG. **2**, there is shown a schematic electric circuit diagram illustrating a basic or simplified control arrangement for the dryer of FIG. **1**. It will be understood that many refinements such as temperature selection means, multiple cycle selection means, and fabric temperature or resistance responsive control means for automatically concluding the operation of the dryer, etc. have not been shown in the circuit of FIG. **2** for the sake of simplicity. As shown, the entire control system of the machine may be energized across a three-wire power supply system which includes supply conductors **63** and **64** and a neutral conductor **65**. For domestic use, conductors **63** and **64** will normally be connected across a 230 volt power supply, with 115 volts appearing between the neutral line **65** and each of the conductors, and with the neutral line being at ground voltage. Motor **56**, connected between conductors **63** and **65**, is a single phase induction motor having a main winding **66** and a start winding **67**, both connected at a common end to a conductor **68**. Through a conventional door switch **69** (which is closed when door **12** is

closed and open when the door is open) conductor 68 is connected to conductor 65.

Start winding 67 is connected in parallel with main winding 66 under the control of a speed responsive device such as that shown at 70, which is schematically shown as connected to rotor 71 of the motor. The speed responsive device 70 controls a switch 72 which is engageable with either a contact 73 or a contact 74. Switch 72 is engaged with contact 73 when the machine is at rest, and moves into engagement with contact 74 as the motor comes up to speed. It can readily be seen that engagement with contact 73 connects the start winding 67 in parallel with main winding 66, while movement of switch 72 away from this position opens the start winding. Thus, as rotor 71 comes up to speed, the start winding becomes deenergized and the motor then continues to run on the main winding 66 alone.

The starting of the motor is provided by a manually operable switch 75 which may, for instance, in the structure of FIG. 1, be moved to its closed position by depressing manual control 15. Switch 75 connects the motor to supply conductor 63 through contact 76 of a switch 77. The switch 75 is normally biased to the open position as shown in FIG. 2. When control 15 is depressed closing switch 75, assuming contacts 76 and 77 and closed, energization of the motor 56 is provided and, within less than a second under normal circumstances, the motor comes up to speed so that switch 72 moves from contact 73 to contact 74. As a result of this movement of centrifugally operated switch 72, the main winding 66 of motor 56 continues to be energized by a bypass around switch 75 when control 15 is released opening switch 75.

The switch 77 is controlled by a cam 78 which, in turn, is controlled by a timer motor 79 of the shut off or timing control means. The cam 78 and timer motor 79 also are connected to manual control 15 so that rotation of the manual control causes the cam to rotate and close switch 77. Thereafter, the cam 78 is controlled by the timer motor 79 and, after a predetermined period of operation of the timer motor, the cam is effective to cause switch 77 to be opened for terminating or interrupting the operation of the machine.

An energizing circuit is also completed for heating means 34 through the following circuit. Starting at conductor 63, the circuits proceeds through a switch 80 and a dryness sensing thermostat 81 to the heater 34, and then through a conventional safety thermostat 82, and through switches 83 and 84 to conductor 64. Switch 80 is controlled by a cam 85 which, in turn, is controlled by timer motor 79. Switch 83 is controlled by a solenoid 86 and is normally closed when solenoid 86 is not energized. Switch 84 is centrifugally responsive to the speed of rotor 71 and is closed only when motor 56 has come up to speed so that there can be no energization of the heating means 34 except when motor 56 is operating properly. Thermostat 81 is positioned so as to sense the temperature of the fabrics within drum 17, or a temperature which varies substantially directly with the clothes temperature. When the clothes are at a temperature which indicates dryness, thermostat 81 will open, deenergizing heater 34.

With the possible exception that the wall portions 18, 19 and 20 of drum 17 which are imperforate, the foregoing description substantially sets forth the configuration and arrangement of known domestic automatic dryers.

In order to carry out the dry wash or dry rinse processes in the machines of FIG. 1, it is necessary that the means adapted to heat and circulate air moving through the enclosure be selectively energizable. It is to be understood that during the dry wash or dry rinse cleaning cycles, it is desirable to deactivate or substantially disable both the air heating and air circulating means, so as to prevent undesired evaporation of the limited amount of water used to wet the fabrics. Therefore means are provided which are adapted to substantially disable the air circulating means or blower 55 and the heating means 34 so as to selectively permit the rotation of the drum or enclosure 17 with or without the flow of heated air therethrough. Such control means, in the embodiment of FIGS. 1 and 2, comprises solenoid 86 connected on one side to neutral conductor 65, and on the other side through a switch 87 to conductor 63. The switch 87 is controlled by a cam 88 which, in turn, is controlled by timer motor 79. Solenoid 86 operates an armature 89 which, when solenoid 86 is energized, disconnects motor 56 from blower 55 by means of clutch 57, and which simultaneously opens switch 83. Thus, when solenoid 86 is energized, blower 55 and heating means 34 are deenergized.

As may best be seen in FIG. 1, clutch 57 comprises two frictionally engageable members 90 and 91, member 90 being connected to output shaft 58 of motor 56, and member 91 being connected to blower 55. Members 90 and 91 are normally held in driving engagement by means of compression spring 92. However, when armature 89 is moved inwardly of solenoid 86 by energization of solenoid 86, lever 93 pivoted at 94 and attached to armature 89 by link 95 operates to move member 90 out of engagement with member 91, thereby disengaging blower 55 from motor 56.

In operation, the machines of FIG. 1 may be programmed to perform the entire cleaning, carrier separation, and drying functions, or separate ones of such functions. Cams 85 and 88 may be so designed such that during the cleaning function, switch 87 is closed causing solenoid 86 to deenergize blower 55 and heating means 34, while during the drying operation, switch 87 is open and switch 80 is closed. By this arrangement, as may be better seen in FIG. 3, the blower 55 is deenergized during cleaning but operates continuously during drying, while the heating means 34 is deenergized during cleaning and selectively energized during drying under the control of sensing means 81. The foregoing description substantially sets forth the basic modifications necessary to perform the dry wash and dry rinse processes in an automatic fabric drying machine.

In accordance with my invention, a dispensing means is provided for dispensing the water and treating chemicals which may be employed in the dry wash and dry rinse processes. Referring to FIG. 4 in conjunction with FIG. 1, a dispensing means 96 is shown positioned within and carried by door 12. Dispensing means 96 comprises reservoir tank 97 positioned between inner door surface 41 and outer section 47, the reservoir including a screened liquid inlet 98 at the top thereof and an outlet 99 adjacent the bottom 100 thereof. Reservoir bottom 100 may be seen to slope toward outlet 99 so as to drain liquid from the reservoir tank toward the outlet. A hose 101 extends from outlet 99 to the inlet 102 of a valve structure 103. From an outlet 104 of valve structure 103 a hose 105 extends through inner door surface 41 and terminates at end 106 positioned to discharge liquid into the interior of drum 17 when door 12 is closed as shown in FIG. 1.

Referring now to FIG. 5 in connection with the dispensing arrangement of FIG. 4, it may be seen that valve structure 103 comprises a housing 107 defining a chamber 108 therein having the aforementioned inlet 102 and outlet 104. Secured within chamber 108 is a resilient biasing member 109 cantilevered from housing 107 at upper end 110 and carrying a resilient sealing block 111 adjacent the lower end 112 thereof. Resilient sealing block 111 is positioned to close outlet 104 and is biased to so close outlet 104 by member 109. Extending through housing 107 and through inner door surface 41 is a valve operator 113 having an outer end 114 and an inner end 116 which is positioned adjacent biasing member 109.

Incorporated in the cabinet 11 is an actuating means adapted to actuate the valve operator 113 only when the door 12 is in the closed position. In one embodiment of my invention, the actuating means may comprise simply a portion of cabinet 11 adapted to depress and thereby actuate valve operator 113 when door 12 is closed, as is shown in FIG. 5. Such an embodiment is shown in FIG. 1 wherein end 114 of valve actuator 113 is depressed by contact with one portion of cabinet 11.

An alternate embodiment of my actuating means is shown in FIG. 6 wherein a solenoid 117 is incorporated within

cabinet 11. Solenoid 117 has an armature 118 extending through an opening 119 in cabinet 11, the outer end 120 being positioned so as to operatively engage end 114 of valve operator 113 when solenoid 117 is actuated. A spring 121 operates between cabinet 11 and a washer 122 secured to armature 118 so as to bias armature 118 to a position wherein outer end 120 normally contacts cabinet 11 and does not contact outer end 114 of the valve operator. By this arrangement, the solenoid 117 acts as an electrically controlled means which, when energized, will actuate valve operator 113 (assuming door 12 is closed) and will cause the liquid within reservoir tank 97 to be slowly dispensed into drum 17.

Control of solenoid 117 may be effected by means of a timer operated switch 123 as shown in FIG. 7. As will be apparent, FIG. 7 presents substantially the same control circuit as shown in FIG. 2 with the addition of relay 117 and switch 123 connected in electrical series between conductors 63 and 65. Switch 123 may be operated by a cam 124 driven by timer motor 79, and as such, may be programmed to initiate dispensing of liquid from reservoir tank 97 at a predetermined desired time in the cycle of operation of the dryer. As will also be apparent, the length of dispensing time, and hence the quantity of treating chemical dispensed, can also be readily controlled by the configuration of cam 124.

It may thus be seen by the aforementioned dispenser construction, a means is provided for slowly dispensing the approximately 2 quarts of liquid which may be employed during the dry wash and dry rinse processes. The diameters of hoses 101 and 105 may be so selected as to cause a slow delivery of the liquid from reservoir tank 97 into drum 17. In normal operation, when reservoir tank 97 has been filled with liquid for use in the dry wash or dry rinse processes and the door 12 has been closed, the cleaning or treating operation will then be initiated by the operator. As the tumbling of the fabrics is initiated within drum 17 it will be apparent that the dispenser of my invention may slowly introduce the solution of water and treating chemical onto the tumbling fabrics thereby enabling distribution of the treating chemical onto the fabrics without the occurrence of significant areas of chemical concentration of the fabrics.

It will now be apparent that in order to perform the dry wash or dry rinse processes in the machine of FIG. 1, the fabrics to be cleaned are placed into drum 17 along with the aforedescribed quantity of transfer agent. Dispensing means 96 is then filled with the aforedescribed mixture of water and treating chemical to be dispensed, and door 12 is closed. Control 15 is then moved to initiate operation of the machine in the dry wash or dry rinse mode wherein heating means 34 and blower 55 are deactivated during rotation of drum 17. As the fabrics are tumbled together with the transfer agent, the water and treating chemical solution is introduced slowly from dispensing means 96 onto the tumbling fabrics thereby enabling distribution of the treating chemical onto the fabrics. As the fabrics are tumbled together with the water, treating chemical and transfer agent, the soil from the fabrics is caused to be distributed over the combined surface areas of the fabrics and transfer agent as previously described. Following this tumbling operation, separation of the transfer agent may be accomplished automatically during the initial portion of a drying operation. By way of illustration, if the transfer agent being used is one-fourth cubes of polyethylene foam, such cubes are sufficiently buoyant to be carried out of drum 17 by the initiation of air circulation therethrough, whereafter such cubes may be caught in lint trap 53 or the like. In the alternative, such separation may be performed manually between the cleaning and drying operation.

As was previously mentioned, the system of my invention is particularly adapted for use in connection with automatic clothes dryers of the type arranged to perform the dry wash and dry rinse processes, wherein it is desirable to dispense the treating chemical in such a manner as to assure distribution thereof over the surfaces of the fabrics without the occurrence of significant areas of chemical concentration of the fabrics. From the foregoing description, it should now be apparent that the present invention, by providing a door mounted dispensing means adapted to introduce a mixture of treating chemical and water in response to either the closing of the door or to actuation by an electrically controlled means incorporated in the cabinet provides such a desired dispensing means.

The dispenser of my invention may also be utilized in processes other than dry wash and dry rinse to dispense a variety of other fabric treating chemicals for such purposes as waterproofing, fireproofing, mothproofing, deodorizing, static prevention and the like. As the dispenser of my invention is particularly adapted to dispense liquids slowly at the initiation of a tumbling operation, and as the aforedescribed machine of FIG. 1 is adapted to provide fabric tumbling without the flow of heated air through drum 17, the system of my invention will enable the performance of such waterproofing, fireproofing and the like processes in an automatic dryer without additional modification.

As will be evident from the foregoing description, certain aspects of the invention are not limited to the particular details of the examples illustrated, and it is contemplated that various other modifications or applications will occur to those skilled in the art. It is therefore intended that the appended claims shall cover such modifications and applications as do not depart from 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 domestic fabric drying machine adapted to treat fabrics by tumbling the fabrics therein with a quantity of water, treating chemical and transfer agent, the machine including: an enclosure rotatable about a nonvertical axis to impart a tumbling action to the fabrics; air heating and circulating means adapted to heat and circulate a stream of air through the enclosure so as to carry moisture away from the fabrics during rotation of the enclosure; means adapted to selectively energize and deenergize the air heating and circulating means so as to selectively permit the rotation of the enclosure without the flow of heated air therethrough during a treating operation; an outer protective cabinet having an opening therethrough into the enclosure; and a door pivotally mounted on the cabinet to close the opening; the improvement of a dispensing means adapted to slowly introduce the water and treating chemical into the enclosure, comprising:
   a reservoir tank carried by the door and adapted to receive and contain the treating chemical;
   a valve carried by the door and adapted to control the discharge from said tank into the enclosure;
   said valve including a valve operator;
   actuating means incorporated in the cabinet to actuate said valve operator only when the door is in the closed position adjacent the cabinet; and
   said valve operator being positioned so as to be brought into operable relation with said actuating means when the door is closed.

2. The invention of claim 1 wherein said actuating means comprises a portion of said cabinet adapted to contact said valve operator and cause actuation thereof when the door is closed.

3. The invention of claim 1 wherein said actuating means comprises electrically controlled means adapted to actuate said valve operator in response to a condition indicating initiation of the fabric treating operation.

4. The invention of claim 3 additionally including a timer operated switch connected in electrical series with said electrically controlled means whereby said valve operator is actuated in response to closure of said timer operated switch.

5. The invention of claim 4 wherein said electrically controlled means comprises a solenoid having an armature adapted to engage said valve operator.