

Nov. 4, 1958

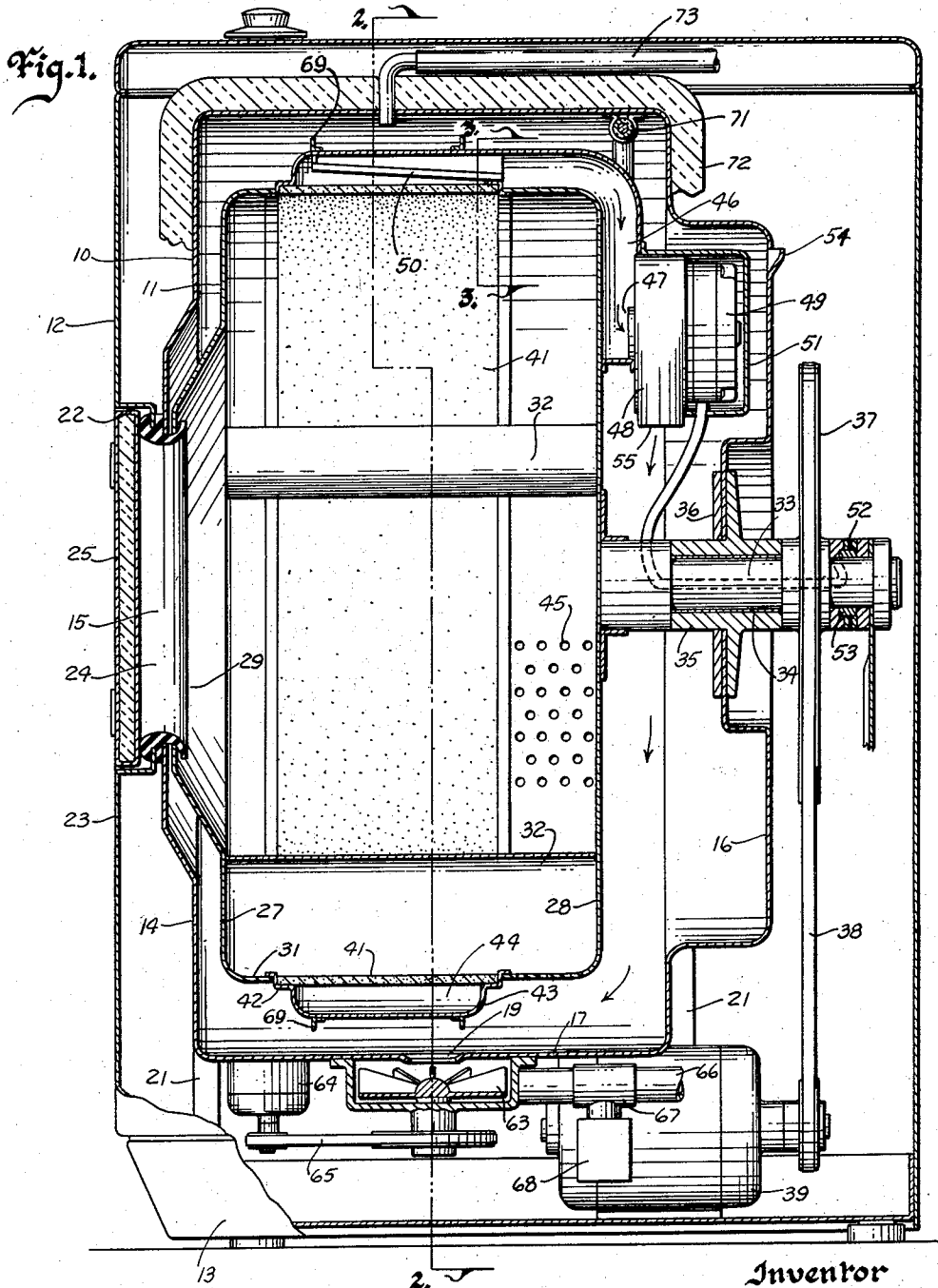
T. R. SMITH

2,858,688

COMBINED CLOTHES WASHING MACHINE AND FLUID EXTRACTOR

Filed May 4, 1954

4 Sheets-Sheet 1



Inventor  
Thomas R. Smith  
by *Wilkinson Juxley Byron & Hume*  
Attorneys

Nov. 4, 1958

T. R. SMITH

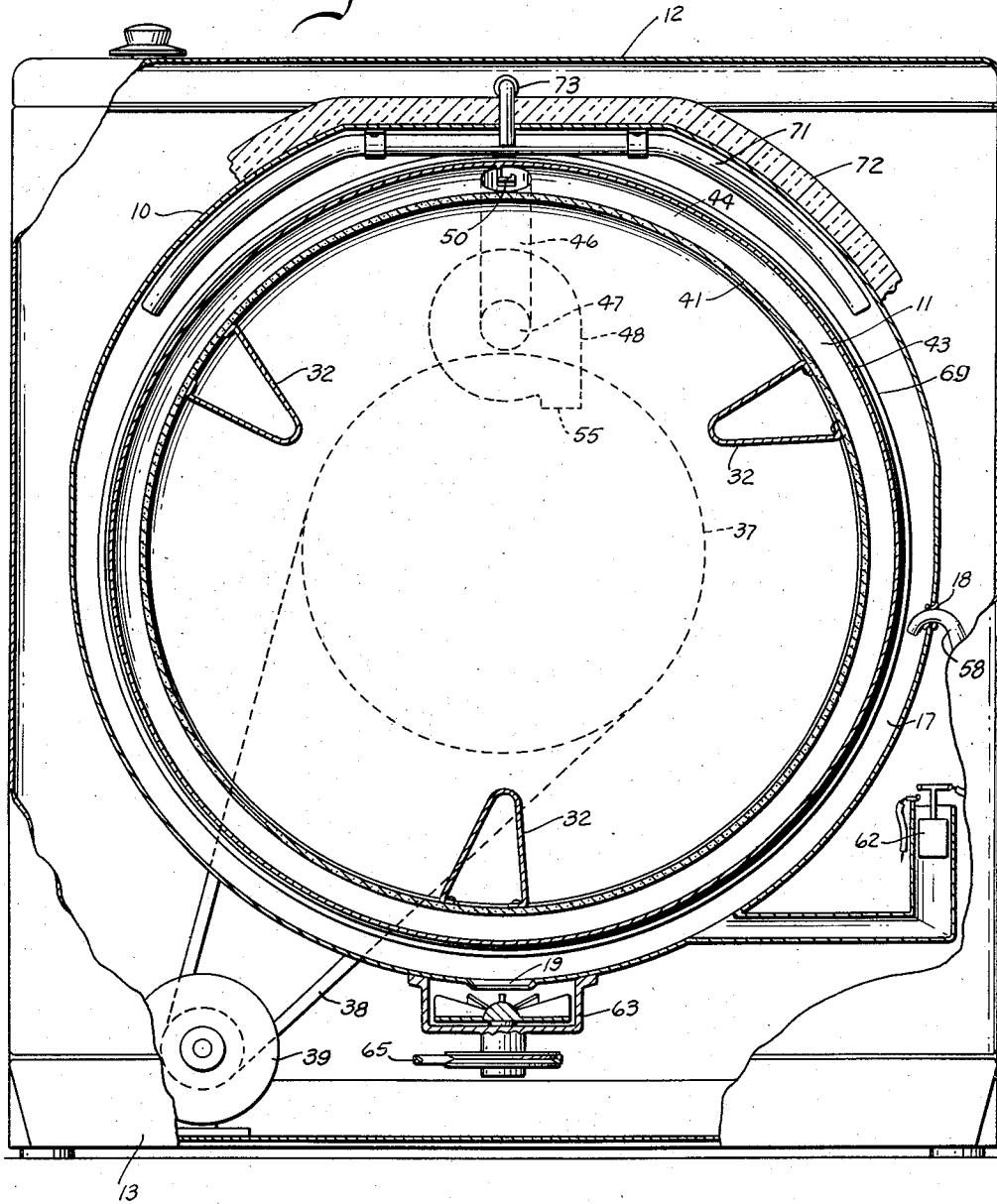
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Fig. 2.



Inventor  
Thomas R. Smith  
by *William A. Insley, Byron E. Anne*  
Attorneys

Nov. 4, 1958

T. R. SMITH

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Fig. 3.

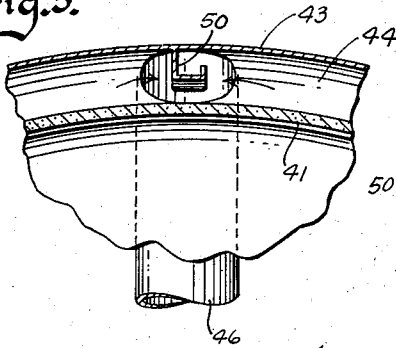


Fig. 4.

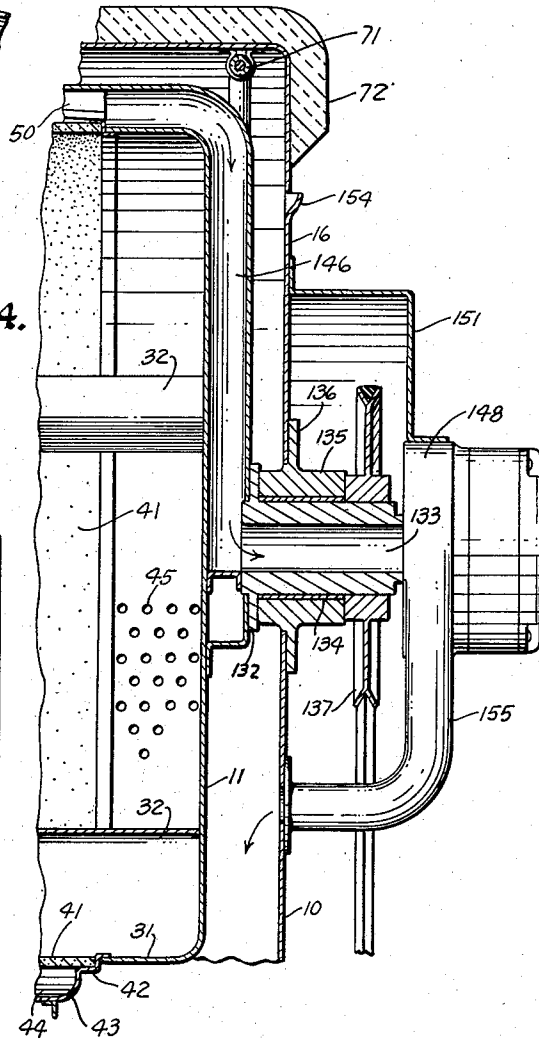
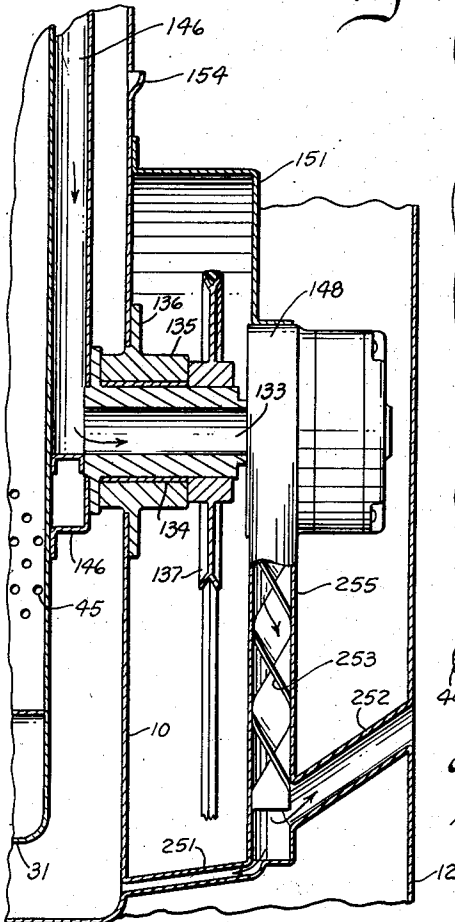


Fig. 5.



Inventor  
Thomas R. Smith  
by William H. H. Bynum & Son  
Attorneys

Nov. 4, 1958

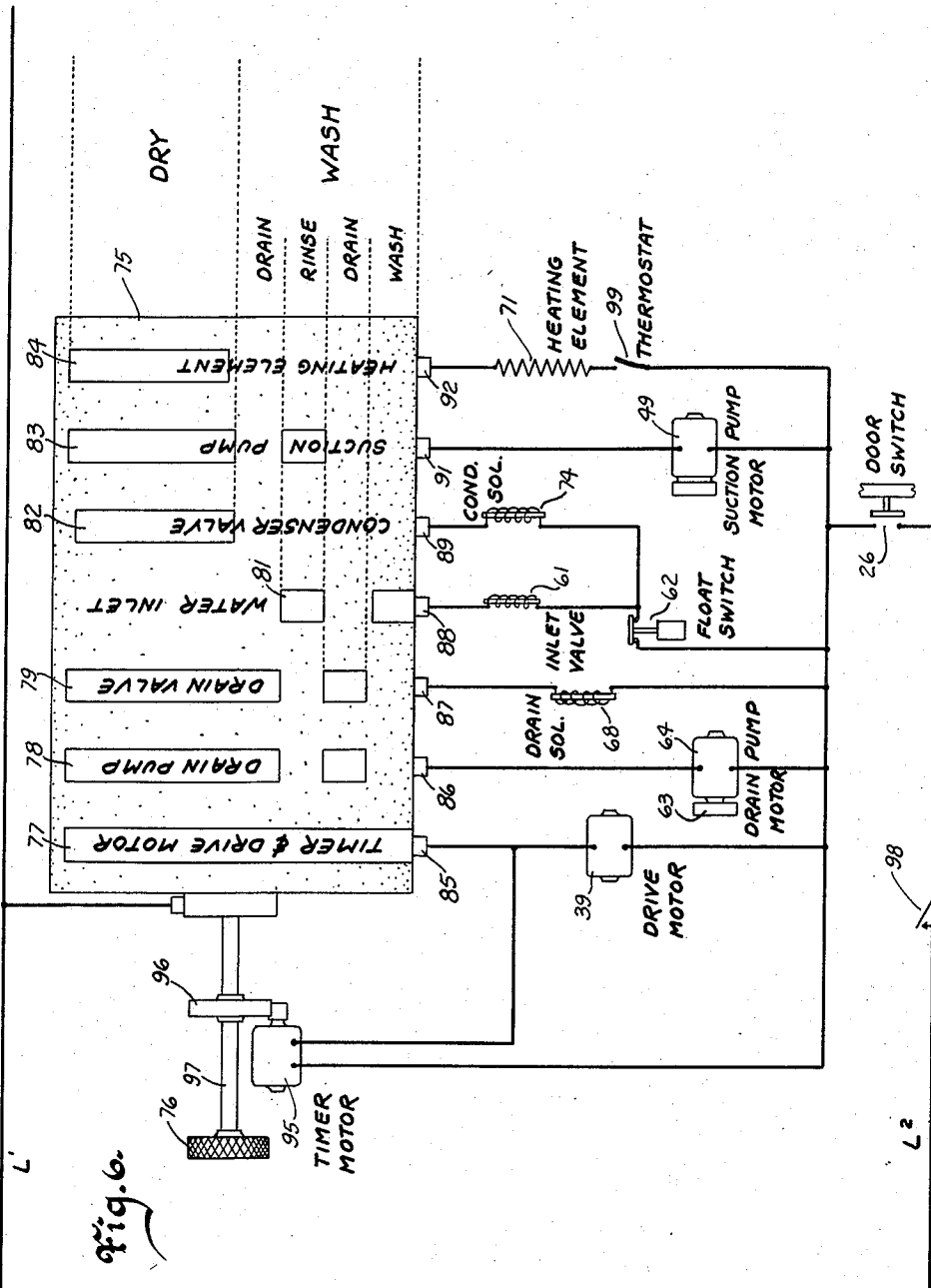
T. R. SMITH

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COMBINED CLOTHES WASHING MACHINE AND FLUID EXTRACTOR

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4 Sheets-Sheet 4



Inventor  
Thomas R. Smith  
by *William Huxley, Byron & Strine*  
Attorneys

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2,858,688

## COMBINED CLOTHES WASHING MACHINE AND FLUID EXTRACTOR

Thomas R. Smith, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa, a corporation of Delaware

Application May 4, 1954, Serial No. 427,533

12 Claims. (Cl. 68—20)

This invention relates to an apparatus for treating fabrics, and more particularly to a method and apparatus for sequentially washing, rinsing and drying clothes and other fabrics within a single container.

In accordance with the invention hereinafter disclosed, there is provided within a stationary container a horizontally rotatable drum having a porous absorbent cylindrical blotter section capable of supporting the weight of liquids and fabrics carried and agitated thereby, and which is operable upon the application of suction or reduced pressures on the exterior surface of the blotter section to remove from the blotter section the liquids absorbed from the wet fabrics in contact with the interior surface of the blotter section within the drum. The suction system used to apply the reduced pressures to the outer blotter surface controls the absorbency of the blotter and also removes from the drum any evaporated vapors contacting the inner blotter surface inside the drum.

In the present automatic washing machines the wash, rinse and spin stages have been performed within a single container to eliminate the handling of the fabrics between these stages by the operator. However, practically all of the present automatic washers require the operator to transfer the fabrics from the automatic washer to another station or machine for the completion of the drying cycle. It is therefore one of the prime objects of this invention to provide a fully automatic washer-dryer capable of washing, rinsing and drying fabrics without necessitating any manipulation or transfer of the fabrics between the various stages of the fabric treatment cycle.

In practically all combination units that have been proposed, complex and costly drive units equipped with various clutches, brakes, high speed balancing devices, speed changers and the necessary additional control circuits have prevented the combination units from realizing a proportionate economic saving from the integration of the washing and drying functions within a single container. Therefore another object is to simplify the tumbler driving and control mechanism in a combination washer-dryer by eliminating the need for the present complex clutches, brakes, counterbalancing means, transmissions, and costly control systems, by providing a washer-dryer in which the tumbler is driven at a relatively constant continuous speed throughout the entire fabric treatment cycle.

Another object is to combine the respective functions of some of the component parts used in the washing and drying apparatus to eliminate the duplication of parts, to reduce the bulkiness, size and weight of a combination washer-dryer, and to obtain a commensurate economic saving in the performance of the washing and drying functions.

Another object is to provide a fabric cleaning apparatus whereby the agitating means for cleaning and rinsing fabrics within the apparatus also serves as a drying device to remove fluids and moisture from the fabrics during the drying cycle.

Another object is to provide an apparatus for removing

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fluids from wetted fabrics by contacting the fabrics with an absorbent blotter to absorb fluids from the fabrics and simultaneously removing the absorbed fluids from the blotter to maintain a high degree of absorbency in the blotter.

Another object is to provide a means for conditioning vapors within a drum preparatory to their transfer through a porous wall of the drum in a continuous absorptive process.

Other objects will become apparent from the specification, appended claims and drawings, in which—

Figure 1 is a diagrammatic partial vertical sectional view of the improved fabric treating apparatus.

Figure 2 is a transverse vertical sectional view of the improved apparatus taken on line 2—2 of Figure 1.

Figure 3 is an enlarged detailed sectional view taken on line 3—3 of Figure 1 showing a portion of the rotatable drum and manifold structure with a water elevating scoop within the manifold.

Figure 4 is a partial vertical sectional view of a modified arrangement of the suction pump as shown in Figure 1.

Figure 5 is a partial detailed sectional view of a further modification of a blotter manifold exhaust system.

Figure 6 is a schematic wiring diagram showing a proposed control circuit for operating the apparatus through a series of predetermined steps.

Referring now in more detail to the drawings, a combined washing and drying machine made in accordance with the present invention is shown as generally comprising a substantially imperforate stationary casing 10 encompassing a drum or tumbler 11 mounted for rotation therein about its horizontal axis. Cabinet 12 encloses and is attached to the entire fabric treating apparatus which is supported and secured to a base 13.

Stationary casing 10 includes a vertical front wall 14 having an access opening 15 therein, an annularly recessed but substantially vertical rear wall 16 and an intermediate cylindrical wall 17 provided with water inlet 18 (Figure 2) and a lower water outlet 19. Walls 14, 16 and 17 are joined together to provide a unitary rigid and leakproof fabric treatment chamber. Stationary casing 10 is rigidly supported on its horizontal axis by webs 21 extending upwardly from base 13.

Cabinet 12, a box-like structure supported on base 13 has access opening 22 in its vertical front wall 23 in alignment with access opening 15 of casing 10. A combined static seal and gasket 24 is carried between the two openings 15 and 22 to provide a seal therebetween as well as providing a seal for door or closure 25 mounted on cabinet 12 in coaxial relationship to openings 15 and 22. Door switch 26 (Figure 6) is placed in the control circuit as a safety feature to prevent entry into cabinet 12 during the fabric treatment operation.

Located within casing 10 is a rotatable drum or tumbler 11 which includes front and rear walls 27 and 28 spaced from casing walls 14 and 16 respectively. Front wall 27 is provided with access opening 29 in alignment with the access openings 15 and 22 carrying seal 24 which extends partially past opening 29 into drum 11 to form a liquid seal between casing 10 and drum 11. Cylindrical wall 31 of drum 11 is joined in a unitary leakproof relationship to front and rear walls 27 and 28 and carries a plurality of elevating vanes 32 on its interior surface to provide a means for elevating and tumbling the fabrics during the rotation of drum 11. Factors such as the dimensions and inner surface characteristics of drum 11 may eliminate the necessity of elevating vanes 32, however.

Secured to and projecting rearwardly from rear wall 28 is a hollow stub shaft 33 which is supported in bear-

ings 34 in housing 35 which is rigidly secured to rear wall 16 of casing 10 by means of spider construction 36. Pulley 37 is keyed or selectively fixed to stub shaft 33 and is driven through a simple speed reduction unit 38 by means of motor 39 which runs at a constant speed during all phases of the fabric treating process.

Drum 11 differs from the conventional tumbler construction in that a relatively large portion of its cylindrical wall 31 is constructed from a porous material 41 having capillaries extending therethrough and interconnecting the opposite sides of the cylindrical wall. Material 41 may be of a ceramic, plastic, sponge, mesh or felt-like material or may be of a filter fabric such as woven cotton, nylon, orlon, etc. A web reinforcing may be used as a backing for wall 41 if a pliable material is chosen or if increased dimensions of the drum require such backing.

A selection of the optimum pore size of material 41 will tend to permit only liquids to be drawn through the porous material 41 to the exclusion of air alone, although some vapors may pass through this wall under certain pressures. Fluids in contact with the inner surface of the blotter-like material 41 are absorbed into its capillaries and may be removed by a suction on the exterior surface of this cylindrical wall. Practical tests have shown that a vacuum of two to four inches of mercury will draw liquid from a saturated wall but will be prevented by the surface tension effect of the declining fluid level on the opposite side of the wall from drawing air from that opposite side to any great extent. However, addition of fluids or contact of any solid with that opposite inner surface will minimize the surface tension effect to permit the vacuum to draw additional fluids through the pores. It should be readily apparent that this optimum system will permit the use of a vacuum pump of small capacity to create the required suction on the outer surface of wall 41.

Material 41 lies within the recessed shoulders 42 to provide a relatively smooth interior contact surface for the fabrics within drum 11. When desired, wall 41 is of one or more sections capable of being removed and replaced during the life of the machine.

Lying between shoulders 42 is an enlarged wall portion 43 circumscribing porous section 41 to provide an annular manifold or chamber 44 whose only connection with drum 11 is through porous material 41. On either or both sides of the porous cylindrical wall 41 are apertures 45 permitting the entrance and exit of fluid therethrough into drum 11 during the washing and rinsing periods.

Fixed to one side of manifold 44 is a duct or passage 46 communicating with inlet 47 of an enclosed suction fan or pump 48 fastened to rear wall 28 at the termination of duct 46. Though suction pump 48 may be of any suitable construction to reduce the pressure in duct 46 and manifold 44 relative to the interior of drum 11, pump 48 is illustrated in Figure 1 as a high speed centrifugal blower driven by motor 49 enclosed in a moisture proof casing 51. Motor 49 is energized during its rotation with drum 11 by means of conductors 52 extending through hollow stub shaft 33 to slip rings 53 which are energized by an external source. Simple counterbalancing means (not shown) for motor 49 may be necessary, depending upon the physical dimensions of the constructed unit. Since suction pump 48 is not designed to remove accumulated liquids from the lowermost portion of manifold 43, scoop 50 anchored to the inner periphery of manifold 43 and angularly disposed to both manifold 43 and duct 46 is provided to drain these liquids into duct 46 on each revolution of drum 11.

The outlet 55 of suction pump 48 is open to the interior of casing 10 and is directed inwardly toward stub shaft 33 allowing the discharge of pump 48 to be expelled from opening 55 in a path parallel to the rear walls 28 and 16. An alternative construction directing the outlet 55 towards either of rear walls 28 or 16 may also be

used. Vent 54 maintains the interior of casing 10 at the pressure of the atmosphere surrounding cabinet 12.

Washing and rinsing fluids enter casing 10 through inlet 18 connected to supply pipe 58. Fluids supplied through pipe 58 are controlled by an external valve (not shown) opened by the energization of solenoid 61. Flow through conduit 58 is terminated when fluid within the lower region of casing 10 reaches a predetermined level to open a float switch such as switch 62, diagrammatically illustrated in Figure 2 and connected in series with solenoid 61 as apparent in Figure 6.

Outlet 19 formed in the lowermost portion of casing 10 provides an inlet to a centrifugal fluid discharge or drain pump 63 operated by pump motor 64 through belt drive 65. The discharge of pump 63 is connected to a drain conduit 66 which is controlled by a normally closed valve 67 operated by solenoid 68. Solenoid 68 is unenergized during the periods when liquid is retained within casing 10.

Heating unit 71 covered by insulation 72 is energized during the latter part of the drying cycle to evaporate the moisture from the fabrics so that the vapor may be condensed and pass through wall 41 by absorption as hereinafter provided. Though indicated as a heating element in Figure 6, unit 71 may be a solenoid to actuate an external circuit in which the actual heating element may be a component part.

Figure 4 shows a partial vertical section of a second method of producing lower relative pressures on the exterior surface of porous wall material 41. In this modification, duct 146, similar to duct 46 of Figure 1, communicates with manifold 44 and extends past the axis of rotation of drum 11 to which it is rigidly attached to provide a supporting means for drum 11. Housing 135 is attached to rear wall 28 by radial flange 136. Journalled within bearing 134 is a hollow shaft 133 which is rigidly fastened to duct 146 by means of radial flanges 132. Belt driven pulley 137 is attached to shaft 133 in a manner similar to that used between pulley 37 and shaft 33 of Figure 1.

Suction pump 148, similar to pump 48 of Figure 1, is supported by housing 151 and discharges through conduit 155 back into the sump or reservoir formed in the bottom of casing 10. Vent 154 in rear wall 16 maintains atmospheric pressure within casing 10.

A further modification of a suction system to produce reduced pressures on the exterior surface of porous material 41 is embodied in Figure 5. With the exception of the blower discharge system, this modification is identical to that of Figure 4 and hence some parts bear the same reference numerals. In this modification conduit 255 is attached to the outlet of blower or suction pump 148 communicating with the interior of casing 10 through a small passage 251 and with the ambient atmosphere through the vertically inclined duct 252. Moisture in the vapor discharged into conduit 255 is separated from the air by the use of a separating unit such as spiral vanes 253 from which it drains back into casing 10 through narrow passageway 251. The remaining air now free from the majority of moisture passes into the atmosphere by way of duct 252.

Both modifications disclosed in Figures 4 and 5 have advantages over the embodiments of Figure 1 in that neither require slip rings to energize their suction producing motors, nor does either need suction motor counterbalancing means, as may be necessary in the construction of Figure 1.

A timer or sequential controller 75 having a manually operable knob 76 may be used to control the apparatus disclosed in Figures 1 to 5. Timer shaft 97 which rotates timer 75 is driven by timer motor 95 through a speed reducing unit 96. Controller 75 has a plurality of camming surfaces 77, 78, 79, 81, 82, 83 and 84 adapted to complete prescribed electrical circuits during various timed intervals when in engagement with respective con-

tacts 85, 86, 87, 88, 89, 91 and 92. Though it is to be understood that the schematic diagram shown in Figure 6 is only representative, L' is illustrated as being electrically connected to the camming surfaces 77 et seq., while L<sup>2</sup> is connected through the various electrical components to the contacts 85 et seq.

In operation, fabrics are placed with a suitable detergent within drum 11 through the access opening closed by door 25. Line switch 98 is then closed and knob 76 is rotated to its starting position as shown in Figure 6. As the knob 76 is rotated to its starting position, the cam surface 77 will contact cam 85 to complete the electrical circuit through timer motor 95 and drive motor 39. At the same time cam surface 81 engages contact 88 to complete the circuit through float switch 62 which is normally closed at lower liquid levels within casing 10. Solenoid 61 is thus energized, opening an external valve in pipe 58 which supplies washing fluid to the interior of casing 10. Upon energization of timer motor 95, controller 75 slowly advances the camming surfaces 77 et seq. into engagement with contacts 85 et seq., while drive motor 39 rotates the drum 11 at a constant speed during the entire fabric treatment operation.

At a predetermined level of liquid within casing 10 float switch 62 opens and solenoid 61 is deenergized, terminating the flow of fluid through conduit 58. Fabrics are washed and tumbled within drum 11 during this period.

After a predescribed timed washing interval has elapsed, drain solenoid 68 and drain pump 63 are energized through their respective cam surfaces 78 and 79 and contacts 86 and 87 to remove the washing fluid from casing 10. Fluid leaves drum 11 by way of apertures 45, so that a majority of fluid is removed from the interior of casing 10 by gravity drain through outlet 19.

Following the draining of casing 10, drain pump 63 and drain solenoid 68 are deenergized and inlet solenoid 61 is again energized to permit rinsing fluid to enter casing 10. At the end of the rinsing operation, the drain pump motor 64 and drain solenoid 68 are again operated to empty casing 10 as at the end of the washing cycle. Shortly thereafter, suction pump motor 49 is energized to reduce the relative pressure in manifold 44 and on the exterior of surface 41.

Seepage through wall 41 during the wash and rinse stages is steadily removed from manifold 44 and recirculated through duct 46 by the action of inclined scoop 50 during the constant rotation of drum 11. Hence pump 48 quickly removes the remaining moisture from manifold 44 and duct 46 upon the energization of motor 49. As the interior of drum 11 is maintained at the pressure of the ambient atmosphere acting through vent 54 in casing 10 and holes 45 in drum 11, the pressure differential on the opposite sides of wall 41 steadily empties the pores or capillaries within that wall as they absorb fluids from the fabrics within the drum. The rate of removal of fluid from the capillaries of this material partially determines the absorbency of wall 41 itself.

Wall 41 when emptied of its absorbed moisture becomes a blotter with an infinite capacity so long as the pump 48 produces an adequate capillary clearing system. Wet fabrics within drum 11 quickly lose moisture to filter blotter material 41 by means of the impact pressure of the tumbling fabrics and the capillary attraction of the absorbent material 41. The drying effect is similar in principle to that used to dry a wet cloth by pressing an infinite number of ordinary ink blotters in contact with the wet cloth.

The fluids removed by pump 48 (or the equivalent pump 148 in Figures 4 and 5) are discharged into the lower portion where they pass through drain 19 into pump 63 and conduit 66. Pump 63 constantly discharges into open conduit 66 during the drying operation. Thus as the fabrics continue to tumble at a uniform speed onto the filter-blotter surface of wall 41, the moisture within

the fabrics is steadily transferred by contact pressure and capillary action into the exhaust and drain systems, leaving the fabrics damp dried or completely dried, depending upon the length of the operating drying cycle.

Though some of the fluids within drum 11 evaporate during tumbling of the fabrics rinsed in warm or hot water, heating unit 71 in series with temperature limiting thermostat 99 is provided to accelerate the rate of evaporation. In the preferred embodiment the heating unit is not energized until the latter portion of the drying cycle.

To insure that the moisture laden vapors leave drum 11, a cooling system to condense these vapors is provided. Cooling liquid enters conduit 73 (Figures 1 and 2) under the control of a valve solenoid 74 (Figure 6) and impinges on the outer periphery of wall 43 adjacent the top of the drum 11. The liquid is confined to a channel extending around the drum formed by two hoops 69 of angle iron, the internal diameter of which agrees substantially with the over-all diameter of the enlarged wall portion 43, around which they extend in parallel spaced relation. Since the cooling liquid is discharged from the conduit 23 above the drum, it flows over the top 180° segment of the drum at any given moment within the channel defined by the confining angle iron hoops 69. This large instantaneous coverage maintains the rotating wall 43 at a relatively low temperature so as to provide a condensing surface at the inner face of the wall 43, which condenses the vapor passing through the permeable capillary wall 41 into the manifold 44. The water channeled between the angle iron hoops 69 also provides a condensing surface for the vapor resident in the atmosphere surrounding the drum 11 outside the manifold 44. Thus as the fluid level within drum 11 diminishes and the corresponding surface tension effect is minimized and then completely eliminated, vapor is drawn through the wall 41 to be partially condensed on wall 43 and partially sucked into pump 48 to rapidly clear the vapors from duct 46. The drying cycle continues until timer motor 95 advances cam surface 77 out of engagement with contact 85. All other camming surfaces and contacts on timer 75 are also separated to terminate the completed operating cycle of the machine.

The modifications of Figure 4 and Figure 5 operate in the same manner as that of Figure 1 with the exception of the manifold exhaust system used. In Figure 4 only duct 146 rotates with drum 11, whereas in Figure 1 motor 49, fan 48 and its exhaust system turned as an integral unit with drum 11. Duct 146 communicates through hollow shaft 133 with fan 148 which is stationary on casing 10 and which discharges directly to casing 10 through conduit 155.

The modification shown in Figure 5 is very similar to that of Figure 4 with the exception of the air and moisture separating vanes 253 which catch the liquid and pass it to conduit 251 to casing 10 while permitting the air to be discharged into the ambient atmosphere through conduit 252.

Thus it should be apparent that a novel method for removing fluids from fabrics has been disclosed, together with an apparatus utilizing this method and being capable of washing, rinsing and drying clothes within a single container. In the apparatus illustrated, the rotatable drum for washing and rinsing fabrics has also been used to dry fabrics by a continuous blotter-like absorption process made possible by a continuous capillary clearing system. Provisions have been made to free the drum from all forms of moisture by equipping the device with an accelerating evaporator and condenser to condition vapors for transfer from the drum by the absorption process.

With a construction of the type described, a relatively simple and effective fabric treating apparatus can be produced. All washing, rinsing and drying can be accomplished by the use of one drum in one casing. Expensive gear trains, gear shifters, clutches and brakes are

eliminated by rotating the drum at a constant speed. Additionally, the costly and exacting balancing equipment usually necessary during high speed fluid extraction is eliminated due to the constant low speed of the rotating tumbler. Also, the overall cost of performing these combined functions of the fabric treatment operation can be reduced due to the elimination of parts previously used in a plurality of machines to separately achieve the same result.

The several representative embodiments described in detail above are intended merely to be illustrative and not restrictive of the invention. Obviously, they are susceptible of numerous changes in form and detail within the scope of the appended claims.

I claim:

1. A fabric treating apparatus comprising, means defining a chamber, a revoluble drum in said chamber, means for admitting and draining liquid to and from said chamber, heating means in said chamber to vaporize liquid resident therein, a permeable liquid absorbent wall having capillaries extending therethrough to interconnect opposite sides of said wall of said drum, means fixed to said drum and cooperating with said wall to define a manifold communicating with said absorbent wall exteriorly of said drum, and means for decreasing the air pressure within said manifold relative to the pressure within said drum to withdraw liquid and vapor from said drum through said wall into said manifold.

2. The apparatus of claim 1, further including means to cool said manifold to condense vapors drawn into it.

3. The apparatus of claim 1, further including cooling means in said chamber to condense vapor resident therein.

4. The apparatus of claim 2, said manifold cooling means being effective to condense vapors exteriorly of said manifold that are resident in said chamber.

5. Apparatus for removing moisture from wet fabrics comprising, a receptacle including absorbent means for contacting wet fabrics placed within said receptacle, power means for moving said fabrics relative to and into contact with said absorbent means to effect a transfer of moisture from said fabrics to said absorbent means, duct means connected to said receptacle and communicating with said absorbent means, and means for applying a suction to said duct means for removing from said receptacle the moisture absorbed by said absorbent means from said fabrics.

6. Apparatus for removing moisture from wet fabrics comprising, a rotatable drum including absorbent means for wet fabrics comprising, a rotatable drum including absorbent means for contacting and absorbing moisture from wet fabrics placed within said drum, means for rotating said drum to tumble said fabrics against said absorbent means to effect a transfer of moisture from said fabrics to said absorbent means, means rigidly connected to said drum and cooperating with said absorbent means to define a manifold communicating with said absorbent means, and suction means for reducing the air pressure within said manifold relative to that within said drum for removing moisture absorbed by said absorbent means from said drum.

7. Apparatus for removing moisture from wet fabrics comprising, a revoluble container having a permeable liquid-absorbent wall portion for absorbing moisture from wet fabrics placed within said container, means for rotating said container to tumble said fabrics against said wall portion and to effect a transfer of moisture from said fabrics to said wall portion, means encompassing and rigidly connected to said container and cooperating with said wall portion to define a manifold communicating with said wall portion, and means for producing a pressure differential on opposite sides of said wall portion for transferring absorbed moisture from said wall portion out of said container.

8. Apparatus for removing moisture from fabrics com-

prising, a revoluble drum having a peripheral wall portion of permeable liquid absorbent material for absorbing moisture from wet fabrics placed within said drum, a manifold encompassing and connected to said drum for rotation with said drum, said manifold covering and communicating with said wall portion, power means for rotating said drum to agitate said fabrics against said wall portion to transfer moisture from said fabrics to said material, and means mounted exteriorly of said drum and communicating with said manifold for transferring moisture from said material and out of said manifold.

9. A combined clothes washing machine and fluid extractor having a wash period and extraction period comprising, a casing, means supplying said casing with washing fluid at the beginning of said wash period, a revoluble drum within said casing including a peripheral wall of absorbent material for absorbing fluids from fabrics placed within said drum, said peripheral wall including capillaries extending through said absorbent material and interconnecting opposite sides of said peripheral wall, means for rotating said drum at a constant speed during said wash and extraction periods to agitate said fabrics within said drum, means for draining said washing fluid from said casing after said wash period, and means including a manifold rigidly connected to said drum and enclosing said peripheral wall for conducting absorbed fluids from said capillaries of said absorbent material during said extraction period.

10. A combined clothes washing machine and fluid extractor comprising, a casing, means supplying said casing with washing fluid, a revoluble drum within said casing including a peripheral wall of absorbent material for drawing moisture and moisture vapor from fabrics placed within said drum, means for rotating said drum to agitate said fabrics within said drum, said peripheral wall including capillaries extending throughout said absorbent material and interconnecting opposite sides of said peripheral wall, means for draining said washing fluid from said casing, an annular member connected to said drum and encompassing said absorbent material to define a manifold enclosing and communicating with said peripheral wall, means co-operating with said manifold to control the rate of absorption of said absorbent material, heater means for evaporating moisture in said drum, and means for condensing moisture vapors evaporated by said heater means and drawn into said manifold through said absorbent material.

11. In an appliance for drying fabrics, a clothes receptacle for receiving and tumbling said fabrics, said receptacle including a blotter wall of porous material having capillaries extending therethrough and interconnecting opposite sides of said blotter wall to absorb moisture from wet fabrics tumbled within said receptacle, means connected to said receptacle and spaced from said blotter wall to form a vacuum manifold communicating with said blotter wall, means for driving said receptacle to tumble said fabrics within said receptacle and against said blotter wall to effect a transfer of moisture from said fabrics to said blotter wall, and means for reducing the air pressure within said manifold below that existing within said receptacle to withdraw absorbed moisture from said capillaries and maintain said blotter wall in a semi-dry condition for the absorption of additional moisture from said fabrics.

12. In an appliance for drying fabrics, a clothes receptacle for receiving and tumbling said fabrics, said receptacle including a blotter wall of porous material having capillaries extending therethrough and interconnecting opposite sides of said blotter wall to absorb moisture from wet fabrics placed within said receptacle, means connected to said receptacle and encompassing said blotter wall to form a vacuum manifold communicating with said blotter wall, means for rotating said receptacle to tumble said fabrics against said blotter wall to effect a transfer of moisture from said fabrics to said blotter wall, and suction means

for applying a suction to the periphery of said blotter wall by reducing the air pressure within said manifold relative to that within said receptacle to withdraw absorbed moisture from said capillaries and maintain said blotter wall in a semi-dry condition for the absorption of additional moisture from said fabrics.

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**UNITED STATES PATENT OFFICE**  
**CERTIFICATE OF CORRECTION**

Patent No. 2,858,688

November 4, 1958

Thomas R. Smith

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 62, for "nad" read -- and --; column 7, line 7, for "elemination" read -- elimination --; lines 48 and 49, strike out "a rotatable drum including absorbent means for wet fabrics comprising,".

Signed and sealed this 3rd day of February 1959.

(SEAL)  
Attest:

KARL H. AXLINE

Attesting Officer

**ROBERT C. WATSON**  
Commissioner of Patents