

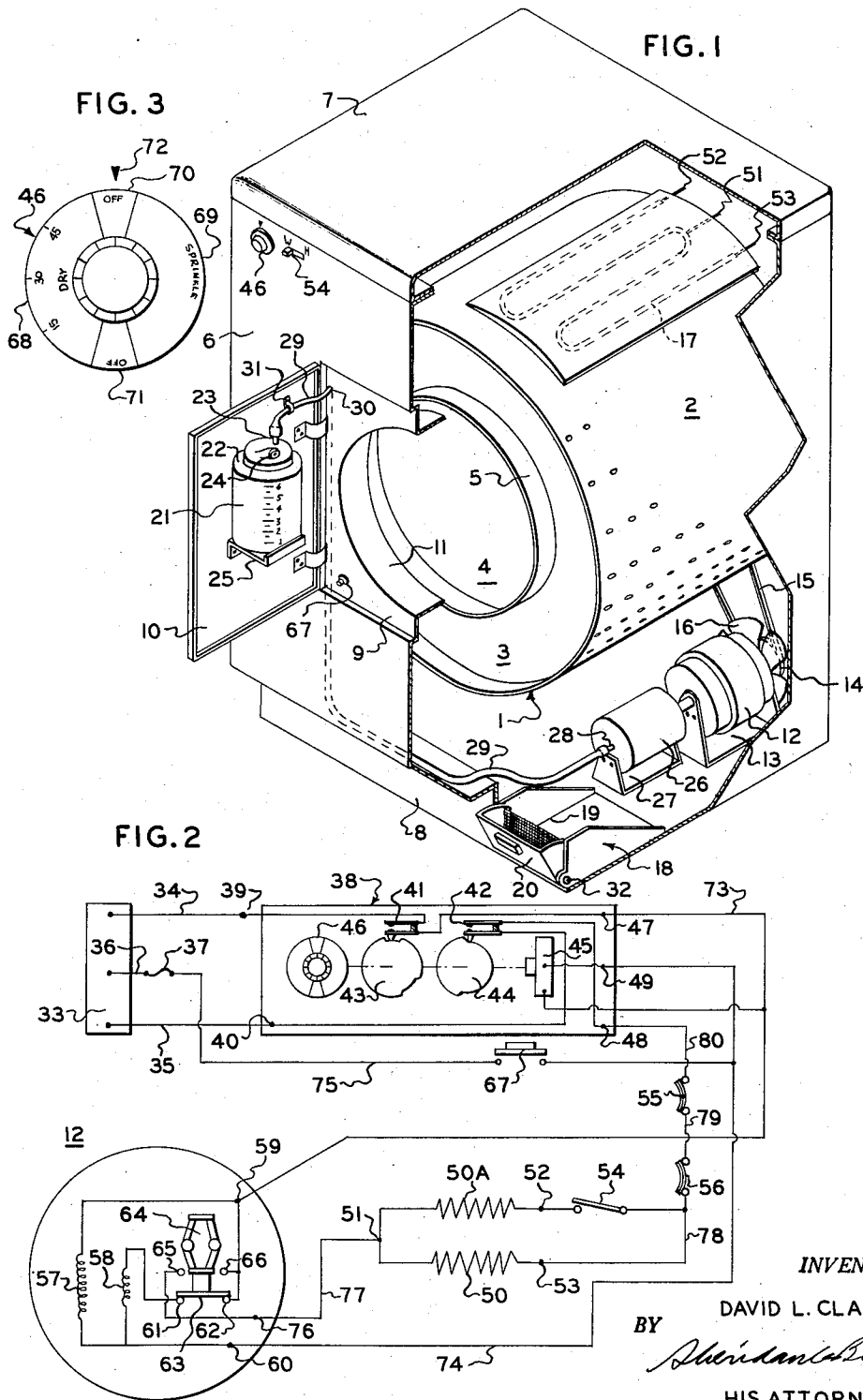
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CLOTHES CONDITIONER

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CLOTHES CONDITIONER

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This invention relates to clothes treating machines of the type tumbling clothes within a basket, and more particularly to means in connection with such machines for conditioning the clothes.

Laundry machines are available for washing the clothes and for subsequently drying. It is also common practice to arrange a clothes dryer to terminate automatic operation when the clothes are in a damp-dry state, ready for ironing. A longer drying period or higher peak temperature within the clothes dryer provides "bone-dry" clothes from the same machine.

If the clothes are taken from the dryer in a damp-dry state, they must be ironed immediately if mildewing is to be avoided. This is often inconvenient; or perhaps the time schedule does not permit immediate ironing. On the other hand, completely dried clothes must be carefully dampened before effective ironing can be performed, which process is laborious and time consuming when done manually.

Accordingly, it is a primary object of this invention to provide, in conjunction with a clothes treating machine having a tumbling basket, means to dampen automatically dry clothes preparatory to further finishing operations.

It is also an object of this invention to provide a clothes dampener or conditioner effective automatically to dampen each piece evenly.

Still another object of this invention is to provide a liquid injection means for a clothes dryer, along with a control to permit machine operation without the heaters normally used in the clothes drying operation.

A further object of the invention is to provide an economical and reliable arrangement for adding a liquid to the interior of a basket in which clothes are tumbled for the purpose of conditioning the clothes.

In carrying out my invention in one form thereof, I provide clothes conditioning apparatus which may be used selectively either as a clothes dryer or as a clothes dampener. The apparatus includes a clothes tumbling basket and drive means for rotating the basket at a clothes tumbling speed. To evaporate moisture from the clothes within the basket, electrical heating means are arranged for supplying heat to them, and for dampening the clothes, a liquid supply device is arranged for passing liquid onto them. The operation of the apparatus is controlled by control means which provide for selectively rotating the tumbling basket with the heating means in operation for drying clothes, and without the heating means and with the liquid supply device in operation for dampening clothes. Thus depending upon the setting of the control means, the apparatus may function either as a clothes dryer or as a clothes sprinkler.

The features of my invention believed to be novel are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which Fig. 1 is a

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perspective view, partially sectionalized, of a clothes conditioning machine embodying my invention; Fig. 2 is a schematic wiring diagram for the device illustrated by Fig. 1; and Fig. 3 is an enlarged view of a component to illustrate details.

While not necessarily limited thereto, the present invention is described as particularly adapted for use in conjunction with a clothes dryer of the type having a tumbling drum or basket 1 rotatable about a substantially horizontal axis within an outer enclosing cabinet or casing. Basket 1 may include a peripheral foraminous wall 2, a back wall, and a front wall 3 having an access opening 4 therein as defined by an outwardly projecting flange 5. The outer cabinet in the usual manner includes side walls 6, a top 7, and a suitable supporting base structure 8. The front wall of the machine includes a recessed area 9 to receive in flush relationship a hinged door 10 for providing access to the machine. The front wall may also be formed with a loading ring 11 in the form of a flange projecting inwardly into basket 1 in concentric relation with flange 5 of the basket.

In a manner well known in the art, basket 1 is supported for rotation about a horizontal axis and is driven by a motor 12 supported on a base bracket 13 and having an output drive pulley 14 attached to its shaft. Through an appropriate drive, for example by belt 15, the basket is rotated to provide tumbling of the clothes placed therein.

Motor 12 may also drive an air circulating means such as a fan 16, functioning to draw air in from the outside, to force it over a heater 17, and through the foraminous cylindrical wall of basket 1 in order to evaporate the moisture from clothes being tumbled within the basket. The warm moist air, after having passed through the basket and the clothes, is exhausted to the exterior of the machine through a lint trap structure indicated generally at 18 and including a lint screen 19 forming a part of a hinged damper structure 20.

It is to be understood in connection with the machine as thus far described that clothes or articles in a damp or wet state may be placed within basket 1, and the machine is operated to tumble the clothes while forcing hot dry air into the basket to extract the moisture from the clothes, with exhaust of the moist air to the outside through the lint trap structure 18.

In accordance with this invention, means are provided for adding a conditioning liquid to the clothes following a drying operation. More specifically, it is contemplated that the arrangement in accordance with this invention can be used to add water to the clothes preparatory to ironing. Obviously, however, the invention would be equally applicable for adding a deodorant, perfume, sanitizer, or other clothes conditioning liquid to the clothes as a part of the over-all laundering operation.

While other devices may be employed for injecting a liquid into the interior of basket 1, I have shown by way of example herein a liquid sprayer in the form of a glass jar 21 with a spray head 22 secured to the top thereof, said spray head including a compressed air inlet 23 and spray nozzle 24. For convenience in use, jar 21 may have graduations to facilitate determination of the quantity of liquid required for a given conditioning operation. For example, the numbering of the graduations may correspond with the number of pounds of clothes contained within basket 1. Thus, if four pounds of clothes are to be conditioned, liquid would be added to jar 21 to the level of index 4. In the illustrated embodiment of my invention jar 21 is removably supported on door 10 in any convenient manner, as by a shelf 25. In this embodiment the liquid sprayer or atomizer must of course be positioned on the door so that when the door is closed,

nozzle 24 will direct the liquid spray directly into basket 1.

To provide motive power for the sprayer, an air pump 26 carried on a supporting base bracket 27 and driven by motor 12 may be employed. Since numerous air pumps of this type are available on the market, I have not shown the details of construction thereof, it being understood that rotation of the motor through the mechanism within the pump provides an air pressure at pump outlet 28, which is connected by means of a flexible hose 29 to pressure connection 23 of the sprayer. A flexible hose is especially convenient for this purpose since it may be extended upwardly within cabinet side walls 6, through an aperture 30 in the vicinity of the door hinges, with securement to the door by a bracket such as 31. Hence when the sprayer is not in use, the flexible hose may be disconnected from the pressure connection 23 and jar 21 may be removed entirely. The air pump may continue to run even though not connected to the sprayer since the small quantity of air delivered will have no adverse effect upon the operation of the machine as a clothes dryer and the load imposed on the motor is inconsequential.

During injection of liquid into the basket, it is of course preferable to block the flow of air from the machine into the room. For this purpose, the lint screen 19 and damper 20 are hinged as at 32 to the cabinet structure so that the operator may close damper 20 to block flow of air from the machine. Fan 16 may continue to operate however to produce a more thorough and uniform conditioning of the clothes being tumbled within the basket.

Referring now to Fig. 2, I have indicated schematically a control system for such a machine. Electrical power is supplied for operation of the machine at a terminal block 33 including terminals for 220 volt incoming supply lines 34 and 35 and a neutral line 36. A fusible link 37 may be employed in the usual manner. The power supply lines 34 and 35 extend to a timer control assembly indicated generally at 38 and are connected thereto at terminals 39 and 40. The electrical circuit corresponding to input terminal 39 extends to a cam operated switch 41; while the circuit from terminal 40 extends to a second cam operated switch 42. Switch 41 has associated therewith an operating cam 43 having valleys and rises as shown to operate the switch from its open to its closed position. Similarly, switch 42 is operated by a cam 44. These cams may be rotated by a timer motor 45, such as a synchronous clock motor, or may be manually rotated by a control knob 46. Timer 45 normally rotates the cams in a clockwise direction. However by the use of slip clutches in a manner well known in the art, knob 46 may be employed to manually rotate the cams in either direction. Timer output terminals 47 and 48, upon closure of the timer switches, are connected to the two sides of the power supply lines, while terminal 49 is an electrical neutral connection for timer motor 45, whereby this motor may be operated on 110 volts. As clearly shown by Figs. 1 and 2, the electrical heater assembly 17 includes two separate heater sections 50 and 50a having a common terminal 51 and end terminals 52 and 53, whereby the heater assembly may be operated with both sections in electrical parallel, or by means of the manually operable temperature selection switch 54, may be operated with only one section of the heater. The electrical heaters further may be under the control of a cycling temperature control thermostat 55 and a safety thermostat 56. The particular construction and arrangement of this temperature control forms no part of the present invention, but is disclosed and claimed in the copending application of Leonard O. Mayhan, S. N. 398,039, filed December 14, 1953, now Patent Number 2,789,367, and assigned to the General Electric Company, assignee of this application.

Motor 12 includes the usual main or run winding 57 and a start winding 58. By means of motor terminals 59 and 60, the main winding is connected between one

side of the electrical power line and the electrical neutral. The motor therefore is operated on 110 volts. Motor start winding 58 is connected to the power supply line through a switch including contacts 61 and 62 adapted to be bridged by an armature 63 of a centrifugal mechanism 64. When the motor is at rest, armature 63 completes the circuit to the start winding from motor terminal 59 to motor terminal 60. However as soon as the motor comes up to speed, centrifugal mechanism 64 lifts armature 63 to open the start winding circuit. As clearly shown by Fig. 2, this same centrifugal mechanism 64 and armature 63 completes the circuit when the motor is running through contacts 65 and 66 in the heater circuit.

For safety reasons, it is preferred to have the entire machine under the control of a door operated switch 67 which is in its closed position when the door is closed permitting operation of the dryer, and is opened when the door is opened to shut down both motor 12 and heater 17.

The dryer control dial or knob indicated more clearly by Fig. 3 includes a "dry" arc 68 calibrated for example in the number of minutes of operation desired. The opposite side of the dial includes a sprinkle arc 69 which similarly might be calibrated in the number of minutes of operation desired for a clothes dampening or condition operation. The dial further may include two off positions 70 and 71 which can be aligned with the index marker 72 to terminate machine operation. Assuming that the machine is to be operated as a clothes dryer, the operator selects the desired operating temperature by switch 54, for example warm or hot, and then rotates control knob 46 in a clockwise direction selecting the period of time desired for the drying operation. As can be seen clearly from Fig. 2, rotation of cams 43 and 44 with the control knob in a clockwise direction is effective to close both switches 41 and 42. A circuit is now completed from line 34 through switch 41 to line 73 connected directly to motor terminal 59. Power is thus supplied to main winding 57 of the motor and to start winding 58 through the centrifugally operated switch contacts 61 and 62 and the circuit is completed through line 74 from motor terminal 60 to the door operated switch 67, line 75, to the electrical neutral 36. As soon as the motor comes up to speed, the circuit to start winding 58 is opened by the centrifugal mechanism as previously described. This same motion of the centrifugal mechanism is effective to bridge contacts 65 and 66 by armature 63. The circuit for the heating elements is therefore completed from line 34 through switch 41 to line 73, motor terminal 59, contacts 66, armature 63, contact 65, a motor terminal 76, line 77, to the common terminal 51 of the heating element. Assuming that the temperature selector switch has been set to the hot position, parallel circuits are completed through both sections 50 and 50a of the electric heating element, through a line 78 to safety thermostat 56, line 79 to the cycling temperature control thermostat 55, line 80 to terminal 48 of the timer, cam operated switch 42, to terminal 40 corresponding to the other side of the electrical supply line 35. It may be noted in this connection that motor 12 must be running before power is supplied to the electrical heaters. It may also be noted that the door operated switch 67 is in both the motor circuit and in the circuit of timer motor 45. Therefore, if at any time during operation of the machine the door is opened, both motors are immediately stopped, and in view of the fact that the heaters are under control of a centrifugal switch in motor 12, the heaters likewise are deenergized.

Operation of both motor 12 and heaters 17 continues until such time as cam 44 rotates to a position opening switch 42, opening the circuit to the heating elements. Switch 41 however remains closed for a short period of time following the opening of switch 42 to continue the driving motor in operation for a period of time commonly referred to as the "cool-down." After approxi-

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mately five minutes of cool-down, the valley in cam 43 opens switch 41 to terminate dryer operation.

If on the other hand the operator desires to operate the machine for dampening or conditioning the clothes, or for fluffing the clothes by operation of the machine to tumble without heater operation, control knob 46 is rotated in the counterclockwise direction to align the sprinkle arc with the indicator. As clearly shown by Fig. 2, this operation closes switch 41 but does not close switch 42. Hence, motor 12 is operative to tumble the clothes and to operate the fan to force air through the clothes, while the heater remains inoperative. In accordance with this invention it is contemplated that during operation of the machine in this manner the water sprayer 21 may be placed in use by placing the container on shelf 25 and connecting the air supply hose 29 to pressure connection 23. The quantity of water to be injected into the basket may be readily determined by measurement of the quantity of liquid placed within container 21. However, the time of operation is also readily under the control of the operator by the proper positioning of control dial 46 with respect to indicator 72, to time the conditioning operation.

In operation, it is found that more uniform results can be obtained by conditioning clothes in the manner heretofore disclosed than is possible with hand sprinkling of the clothes. Furthermore, an entire load consisting, for example, of seven or eight pounds of dry clothes can be conditioned and made ready for ironing in a few minutes, whereas a similar operation by hand would take much longer. This invention also lends itself for convenient application of other liquid conditioning agents for fabrics such as moth-proofing compounds, deodorizing compounds, and the like.

While a specific embodiment of the invention has been disclosed herein, it is obvious that many other modifications may be made by those skilled in the art without actually departing from the invention. For example, other types of liquid injection means may be employed other than the compressed air operated sprayer illustrated herein. Similarly, other types of drive mechanisms for the tumbling basket may be employed, and more elaborate controls may be employed, for example, to actuate the fan only during a drying cycle and to operate the air pump 26 only during a conditioning cycle. It is therefore aimed in the appended claims to cover all such equivalent variations as come 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. A clothes dryer comprising a rotatable basket, means for rotating said basket at a tumbling speed, beating means associated with said basket, means for forcing air over said heater and through said basket, an exhaust air passage including a lint trap therein, a damper associated with said lint trap movable to a closed position to block flow of air through said exhaust passage, means

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spraying atomized liquid into the interior of said basket, and a manually operable control member for selecting operation of the dryer without operation of said heating means while spraying liquid into said basket.

2. A clothes dryer comprising a rotatable basket, a heater associated with said basket, air circulation means for forcing air over said heater and into said basket, drive means for operating said air circulation means and rotating said basket, a manually adjustable control for selectively operating both said drive means and said heater and for operating said drive means without said heater, a liquid sprayer positioned to inject atomized liquid into said basket, a lint trap providing egress for moisture and lint laden air during drying, a damper for blocking air flow through said lint trap during water injection, and means for operating said sprayer to inject atomized liquid into said basket.

3. Clothes conditioning apparatus comprising, a tumbling basket, electrical heating means for evaporating moisture from laundry tumbling within said basket, an air moving device for forcing air flow over said heating means and through said basket, a liquid spraying device directing liquid particles into said basket, pump means for operating said spraying device, common drive means rotating said basket and operating said air moving device and pump means to dampen laundry tumbling within said basket, and control means for selectively energizing said drive means with said heating means for drying laundry and without said heating means and with operation of said spraying device for dampening laundry.

4. In a clothes dryer or the like, a basket in which clothes may be tumbled, drive means for rotating said basket at tumbling speed, electrical heating means positioned adjacent said basket for supplying heat to the laundry tumbling therein to evaporate moisture therefrom, liquid injection means associated in operative relationship with said basket to dampen the laundry tumbling therein, means operated by said drive means to discharge liquid through said liquid injection means into said basket in finely divided particles, and control means for selectively energizing said drive means with said heating means for drying the laundry in said basket and with operation of said liquid injection means and without said heating means for dampening the laundry within said basket.

References Cited in the file of this patent

UNITED STATES PATENTS

1,025,263	Giesler	May 7, 1912
2,079,280	Couch	May 4, 1937
2,166,294	Hetzer	July 18, 1939
2,357,909	Ridge	Sept. 12, 1944
2,434,476	Wales	Jan. 13, 1948
2,553,581	Haffield	May 22, 1951
2,555,268	Chamberlin	May 29, 1951
2,607,209	Constantine	Aug. 19, 1952
2,654,961	Manecke	Oct. 13, 1953