

Feb. 27, 1962

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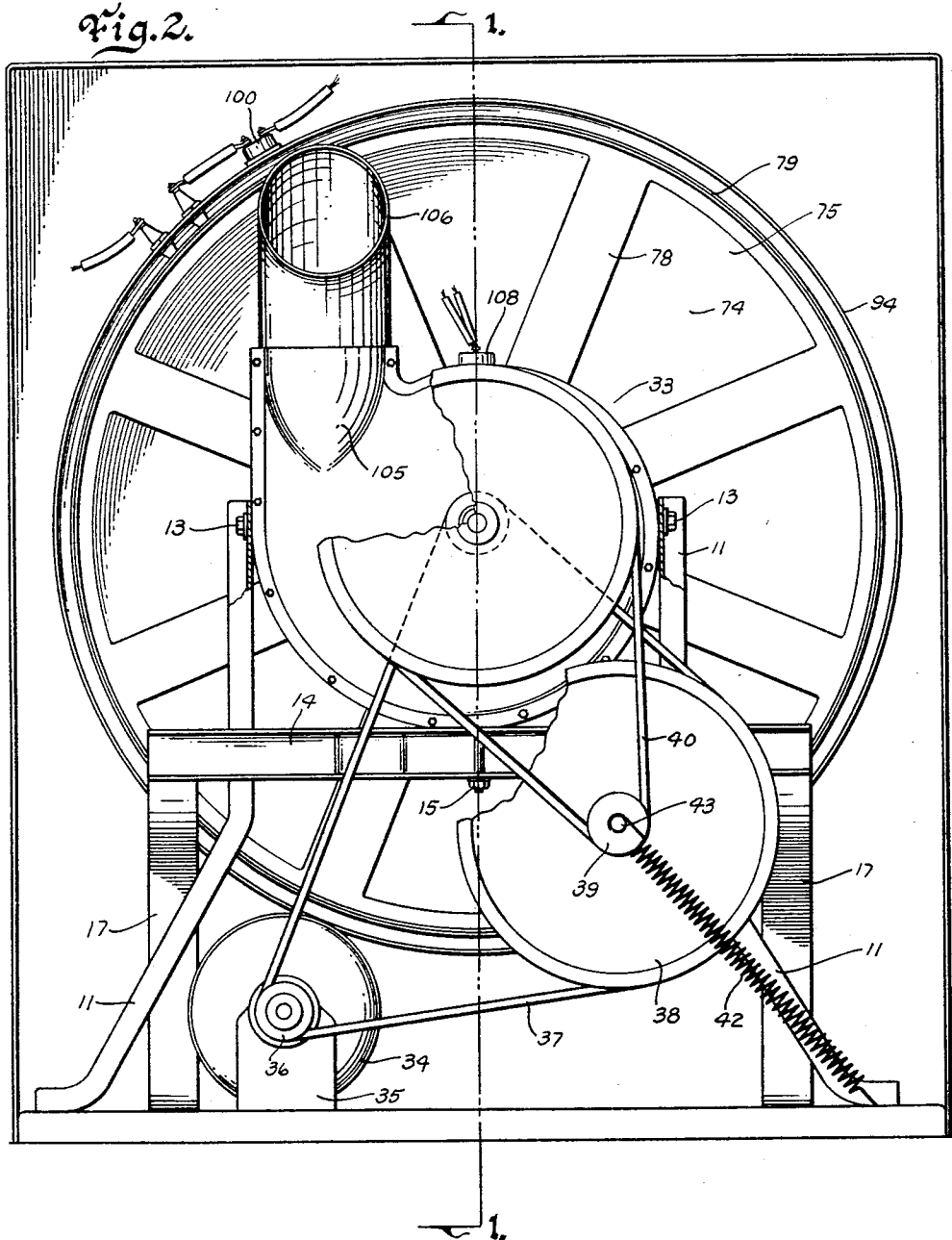
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CLOTHES DAMPENING APPARATUS

Filed May 22, 1957

5 Sheets-Sheet 2

Fig. 2.



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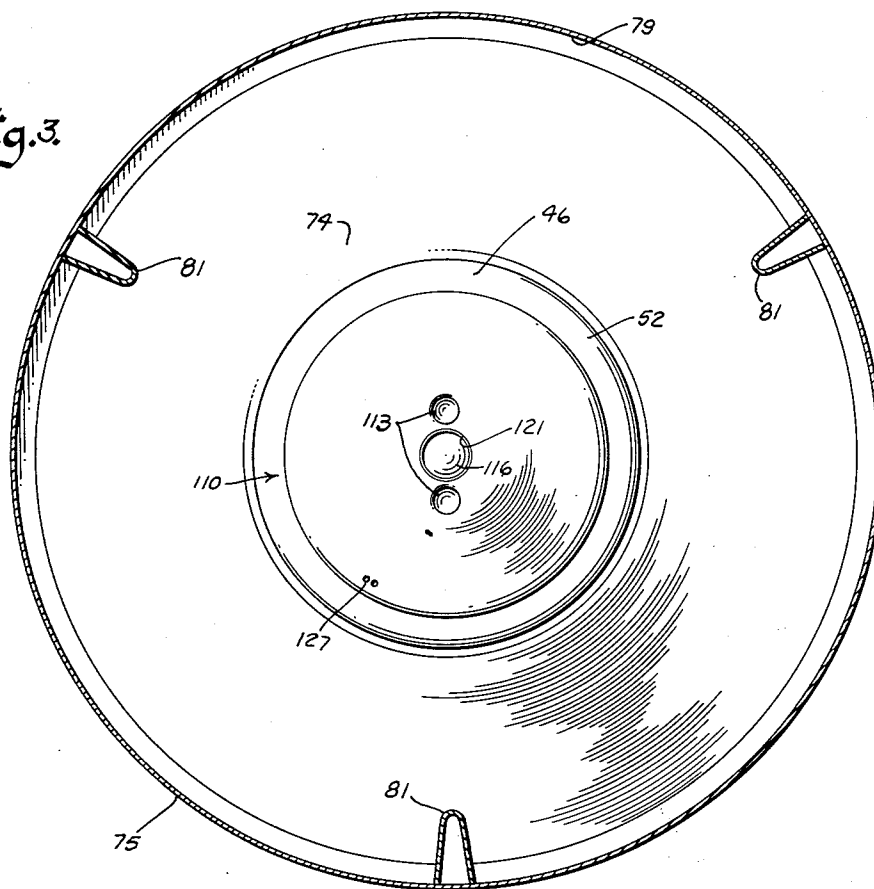
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Fig. 3



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Fig. 4.

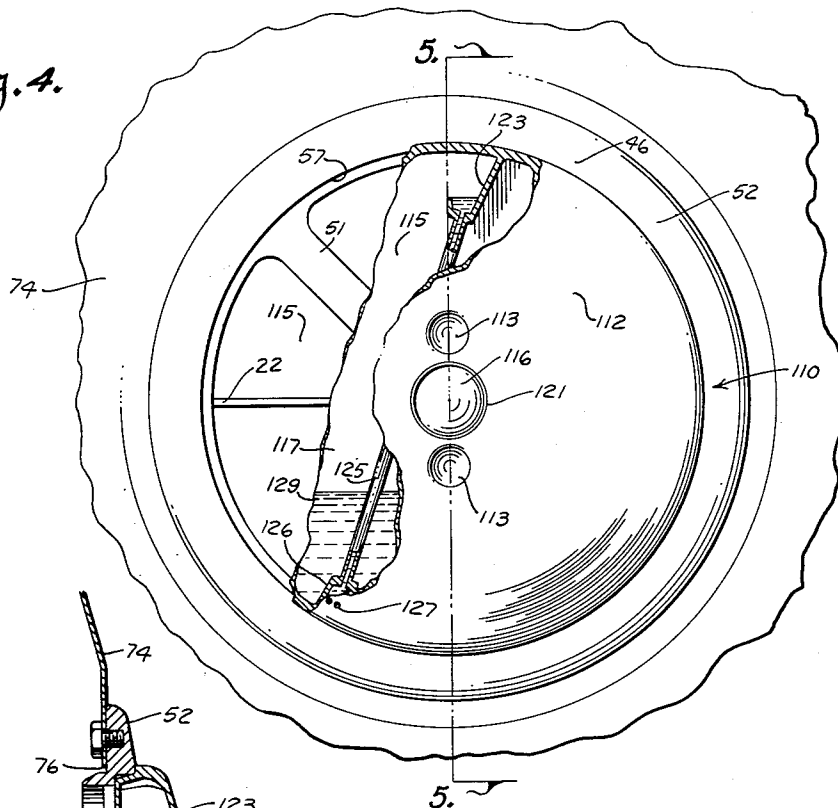
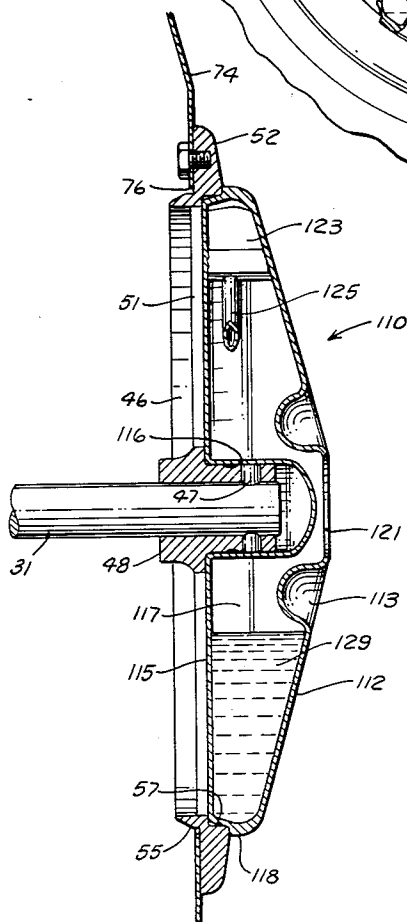


Fig. 5.

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Fig. 6.

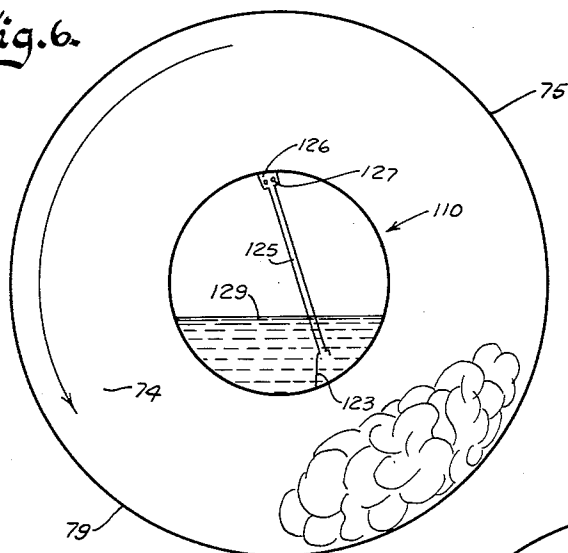


Fig. 7.

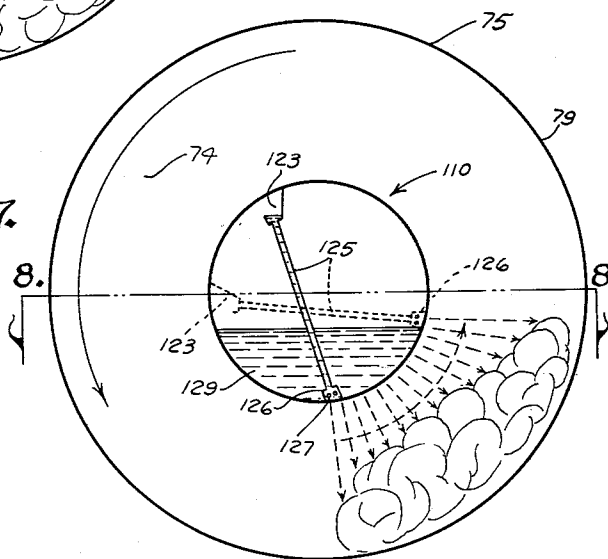
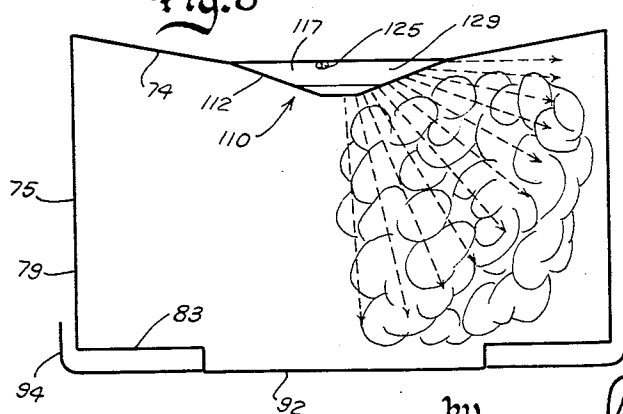


Fig. 8.



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CLOTHES DAMPENING APPARATUS

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6 Claims. (Cl. 34-60)

This invention relates to an automatically operated device for dampening fabrics within a revoluble receptacle.

While some synthetic materials may be ironed by the application of heat and pressure alone, certain moisture absorbent fabrics such as wools and cottons require the presence of moisture in the ironing process to soften the material fibers and render them more pliable and responsive to the application of heat and pressure to produce the desired ironed surfaces. These fabrics which require dampening prior to ironing have usually been sprinkled manually or merely removed from clothes driers in a damp dry condition subsequent to their being washed and partially dried.

Neither of these dampening processes is desirable in every respect since hand sprinkling is laborious and time consuming whereas partially drying fabrics in a clothes drier fails to produce uniform dampening. In the latter case, close control over the degree of dryness cannot be accurately determined by most drier mechanisms especially in view of the fact that in mixed loads different garments dry at different rates. In addition, garments having hemmed or multi-layered portions may themselves dry at varying rates due to the different thicknesses of the different parts of the garments. Finally, it may not be desirable to iron fabrics immediately after their removal from a clothes drier in which case prolonged dampness may cause the fabrics to mildew.

In the use of the invention disclosed hereinafter, an automatic sprinkling of fabrics is produced by tumbling them within a revoluble receptacle to which a sprinkling device is attached. In the illustrative device shown in the accompanying drawings, a clothes drier drum is provided with a hollow reservoir member which contains the water to be sprinkled on the fabrics placed within that clothes tumbler. The preferred form of the reservoir member includes an imperforate wall which spans an air exhaust opening which is located in the central portion of the rear drum wall and is capable of receiving a lint trap assembly for filtering lint from air passing through that opening during normal clothes drying operations. This positioning of the hollow reservoir member allows the blower which moves air through the air exhaust opening during the drying cycle to produce a difference in air pressures on opposite sides of the imperforate reservoir wall and maintain the reservoir member in an upstanding position during fabric dampening operations.

The reservoir member includes an internally positioned fluid pickup scoop displaced from the axis of rotation of the reservoir member and with a fluid discharge tube leading from that scoop and terminating in effluent orifices opening into the clothes tumbler. With this simple construction the rotation of the clothes tumbler not only tumbles the clothing within the receptacle but also causes the scoop to pick up a charge of fluid from the reservoir cavity and discharge it onto the fabrics under the pressure head created by elevating the fluid filled scoop above the end of the discharge tube during each revolution of the clothes tumbler.

In the accompanying drawings:

FIGURE 1 is a side elevational view of a clothes drier capable of incorporating my invention;

FIGURE 2 is a rear elevational view, partially broken away, of the drier shown on FIGURE 1;

FIGURE 3 is a sectional view taken on line 3-3 of FIGURE 1 showing the clothes tumbler of FIGURE 1

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provided with the clothes sprinkling device forming the subject matter of this invention;

FIGURE 4 is a view showing an enlarged fragmentary view of the clothes sprinkling device shown in FIGURE 3;

FIGURE 5 is a fragmentary sectional view taken on line 5-5 of FIGURE 4;

FIGURE 6 is a diagrammatic front elevational view showing the positioning of the tumbling fabrics within the clothes receptacle shown in the previous figures and the means by which the fluid pickup scoop is filled during rotation of that clothes receptacle;

FIGURE 7 is a diagrammatic view similar to that of FIGURE 6 showing the clothes receptacle rotated into a position 180° counterclockwise from that of FIGURE 6 and the spray pattern produced by additional rotation from that latter angular position; and,

FIGURE 8 is a diagrammatic view taken on line 8-8 of FIGURE 7 showing the receding spray pattern produced by the additional amount of rotation shown in FIGURE 7.

Now referring to the accompanying drawings in detail there is shown a clothes drier provided with a base frame 10 which serves as a support for the two upstanding channel brace members 11 which are connected at their upper ends to opposite sides of the hollow blower housing casting 12 by means of the tap bolts 13.

Blower housing 12 is prevented from pivoting about bolts 13 by the horizontal channel member 14 which is fastened to the lower periphery of housing 12 by means of the bolt 15 located midway between the opposite ends of channel member 14. Channel member 14 is welded to the vertical brace members 11 to provide a rigid three point support for the blower housing 12 and has its ends welded in turn to the two channel members 17 which form an acute angle with base frame 10 to which they are rigidly connected near the front edge of that base member. This construction not only supports blower housing 12 and all structures supported thereby but prevents blower housing 12 from being moved back and forth about the lower ends of the vertical brace members 11.

Casting 12 includes a tubular portion 21, a divider wall 20 having a rearwardly flared inner portion defining an intake into an impeller chamber, and four internal radially directed longitudinal webs 22 which converge toward each other to provide a bearing retainer member 23 containing bearings 24. Member 23 cooperates with the tubular member 21 to define a passageway 26 of four segments located between the tubular portion 21 and the bearing retainer member 23. Since the supporting webs 22 are longitudinally continuous for support purpose only, the four part passageway or conduit 26 is equivalent to a singular passageway concentric to the bearing retainer member 23.

Mounted within the bearings 24 is the revoluble drum drive shaft 31 which projects from both ends of casting 12. Drum drive shaft 31 carries affixed at its rear, or left end as shown on FIGURE 1, a large pulley 33 which is driven by motor 34 through motor pulley 36, main drive belt 37, integral pulleys 38 and 39 and belt 40 to reduce the speed of motor 34 to the desired tumbling speed of approximately 50 revolutions per minute. Mounting bracket 35 anchors the motor 34 to frame 10.

The spring 42 connected between base frame 10 and the shaft 43 carrying pulleys 38 and 39 maintain belts 37 and 40 under the desired degree of tension by means of a slider block (not shown) fastened to shaft 43 and retained in a guide block (not shown) carried by one of the braces 11.

The opposite or forward end of the drum drive shaft 31 is rigidly pinned to the drum spider member 46 by means of a crosspin 47 piercing both the members 31

and 46. Drum spider member 46 is provided with a hub portion 48 which is connected to the four radiating spokes 51 connected in turn to the rim 52 of member 46. A heat resistant gland or felt sealing member 54 encircles the front periphery of the blower housing 12 and the circular shoulder 55 formed on the portion of drum spider member 46.

The rim 52 of spider member 46 is formed with a circular recess 57 which receives and cooperates with a two part lint trap assembly including the lint screen retainer member 61 and the lint screen 62.

It will be seen that rim 52 of the drum spider member 46 is rigidly fastened to the rear wall 74 of the clothes drum 75 adjacent the periphery of the air exhaust opening 76 blanked out of the central portion of the rear wall 74 so as to receive the drum spider 46. The rear drum wall 74 is provided with a plurality of radial supporting ribs 78 embossed in the rear drum wall 74 to strengthen and reinforce drum 75.

Rear wall 74 is imperforate except for the centrally located air exhaust opening 76. The periphery of rear wall 74 is flanged to form a supporting shoulder for the imperforate cylindrical side wall 79 which carries the clothes elevating vanes 81 for tumbling clothing within drum 75 during the rotation of the latter member.

Cylindrical sidewall 79 is connected to the front drum wall 83 provided with a centrally located access opening 84 aligned with the exhaust opening 76 and several circular bands of holes 85 in its outermost portion to define an air intake into drum 75.

The cabinet 87 which is fastened to the base frame 10 and which encloses the entire drying mechanism is provided with an access opening 88 which is aligned with the drum access opening 84 thereby allowing both of the access openings 84 and 88 to receive a door gasket 91 which is fitted into the cabinet access opening 88 and which protrudes through the access opening 84 into drum 75. The door panel 92 hinged to cabinet 87 abuts the door gasket 91 to form an air tight seal for cabinet 87.

Fastened to cabinet 87 around opening 88 and located between that cabinet and drum wall 83 is the shroud or cowl member 94. Shroud 94, which is substantially circular in shape with its rearwardly flanged periphery extending just beyond the junction of drum walls 79 and 83, is provided with a blanked out centrally located opening to permit its encompassing of the door gasket 91 which is maintained in place by the cooperation between this stationary shroud member 94 and cabinet 87.

Located between the shroud member 94 and the front drum wall 83 and maintained in place by the insulated wire clips 98 fastened to shroud 94 is the open coil electric heating element 99 which extends completely around the inside of member 94 to raise the temperature of air drawn into drum 75 through the holes 85 in the front drum wall 83. Air flow into drum 75 through these holes 85 and into the blower housing casting 12 is produced by this rotation of the revoluble impeller member 101 located in the scroll-shaped rear portion of the blower housing 12.

The high limit switch 100 mounted on the periphery of shroud 94 and connected in series with heating element 99 opens at a predetermined temperature, for example 170°, to disconnect heater 99 in case the air temperature within shroud 94 should rise to an unreasonably high value. Such a temperature rise could result from a reduction in air flow due to a clogged lint trap or a break in main driving belt 37 which rotates impeller 101.

Impeller 101, which is integrally formed with the pulley 102 driven by the main drive belt 37, is resiliently mounted on and bonded to two small bushings journaled on the rear stepdown portion of the drum drive shaft 31. This stepdown portion of shaft 31 prevents axial movement of impeller member 101 toward the divider wall 20 of housing 12 while pulley 33 limits axial movement of impeller member 101 in the opposite direction.

Impeller 101 is enclosed by the divider wall 20, the tubular portion 21 and by the scroll-shaped blower housing cover 104 which cooperates with and fits against casting 12 in a juxtapositional relationship to form an air discharge passageway 105 connected to the exhaust elbow 106 for venting the hot moist air expelled from the interior of drum 75 into a remote atmosphere.

The blower housing 12 includes an opening near the upper portion of that housing to accommodate a cycling thermostat 108 which is connected in series with the heating element 99 in order to maintain the interior of drum 75 at a proper selected drying temperature. In practice, this switch is set to open at approximately 135° whenever the air exhausted through tubular portion 121 reaches that temperature level.

With the machine thus far described, it is possible to dry damp fabrics placed within drum 75 by supplying power to motor 34 and to heater element 99 through an external circuit (not shown) in order to rotate drum 75 at approximately 50 revolutions per minute to tumble the fabrics while rotating impeller 101 at approximately 1625 revolutions per minute to move approximately 150 cubic feet of air per minute past the open coil heating element 99 and through drum 75 by way of the air exhaust opening 76 and the exhaust elbow 106. During this operation high limit switch 100 prevents the overheating of the drier mechanism in case of an absence of or material reduction in the air flow through drum 75 while cycling thermostat 108 interrupts the supply of power to heating element 99 once the fabrics have dried and no further evaporation of the fabrics within drum 75 takes place.

Assuming now that it is desirable to dampen certain fabrics preparatory to their being ironed, the two part lint trap assembly including the lint screen retainer member 61 and the lint screen 62 are removed from the spider hub 48.

In place of that lint trap assembly is fitted a fabric sprinkling device which is received in the circular recess 57 formed in spider 46 and which is generally indicated by the reference arrow 110. While the fabric dampening assembly 110 could be fitted onto hub 48 in a manner similar to the lint trap assembly connection or be wedged into recess 57 in an interference fit, the assembly 110 is supported on spider member 46 in a somewhat different fashion.

Assembly 110 includes a conical front wall 112 provided with a pair of diametrically opposed finger recesses 113 and a substantially vertical imperforate rear wall 115 joined at its periphery to the front wall 112 and provided with a centrally located recess 116 which receives hub 48 of the drum spider member 46 in a loose fit. The hollow generally conical reservoir member formed by the cooperation of walls 112 and 115 defines a fluid tight cavity 117 capable of retaining, in this illustrative embodiment, approximately 2½ cups of water for dampening fabrics placed within the clothes tumbler 75.

The periphery of this conical reservoir member formed by members 112 and 115 is loosely received in the recess 57 in drum spider member 46 so that during the operation of motor 34 fabrics are not only tumbled within drum 75 but the rotation of impeller 101 reduces the air pressure adjacent the back wall 115 causing the air pressure on the front wall 112 to force assembly 110 into its upstanding position against rim 52 as shown in FIGURE 5 with its peripheral flange 118 abutting and substantially forming an airtight seal with the front surface of rim 52 to maintain assembly 110 in this position.

This makes the manual positioning and removal of assembly very simple and necessitates no complex or exacting fittings as well as being economical in its manufacture. It should be noted here that even though air pressure is used to maintain assembly 110 in its operating position as shown in FIGURE 9 that an absence of pres-

sure differential on assembly 110 will not cause that assembly to drop into drum 75 due to the degree of penetration of the spider hub 48 into recess 116.

Assembly 110 further includes a water loading opening 121 located in the central portion of the front wall 112 so that cavity 117 may be partially filled as shown in FIGURES 4 and 5 by removing assembly 110 and filling it with a measuring cup or directly from a water faucet.

Positioned within the fluid cavity 117 and sealed to the inner sides of the walls 112 and 115 is the fluid pickup scoop 123 which openly faces its direction of rotation with assembly 110 and which is capable of picking up a small quantity of water during each revolution of that assembly.

Scoop 123 is connected to and communicates with a tube 125 which has an internal diameter of approximately a quarter of an inch and which extends across cavity 117 to join a fluid junction box structure 126 sealed to the front wall 115. Junction box 126 which is merely a continuation of tube 125 is provided with a pair of discharge ports 127 directed toward the interior of the clothes tumbler 75. These ports are in practice about 0.04 of an inch in diameter and may be parallel to the axis of rotation of assembly 110 or may be staggered relative to that axis and to each other in order to produce a broader spray pattern from these ports.

The junction box 126 is located practically diametrically opposite the pickup scoop 123 and is limited, in this illustrative embodiment, from being exactly 180° removed from that fluid pickup scoop by the contact between the straight tube 125 and the walled recess 116 in the rear wall 115. While the straight tube 125 is used to ease the manufacturing and assembly operations, it should be apparent that the use of a curved tube between scoop 123 and junction box 126 would easily make such a 180° positioning possible.

The reason for the remote positioning of junction box 126 from scoop 123 is, of course, to develop a maximum fluid pressure head on the fluid ports 127 whenever scoop 123 is positioned in an elevated position such as is shown in FIGURE 4. This maximum fluid pressure head, as determined by the difference in elevation between scoop 123 and the fluid ports 127, will cause fluid from scoop 123 to be injected forcefully into receptacle 75 and onto its fabric contents. The remote spacing of elements 123 and 126 from each other also prevents an inadvertent continuation of fluid discharge from reservoir member 110 in case receptacle 75 is ever stopped in a position in which ports 127 are located below the water level within reservoir member 110.

In the operation of this fabric dampening device, assembly 110 is slipped onto the drum spider hub 48 and motor 34 is then energized to the exclusion of heater 99 by an external control circuit forming no part of this invention. This rotates the impeller member 101 at approximately 1625 revolutions per minute while rotating the clothing receptacle 75 at approximately 50 revolutions per minute to tumble the fabrics placed within that tumbler. The assembly 110 is then sucked against the spider rim 52 by the difference in air pressure created on opposite sides of that reservoir member by impeller 101 so that it rotates in unison with the receptacle 75.

While assembly 110 rotates at this tumbling speed, the fabric dampening fluid 129, which has previously been poured into cavity 117 through the loading opening 121 prior to the positioning of this assembly on spider hub 48, remains in the lower portion of cavity 117 in response to gravitational forces acting on that fluid. However, since scoop 123, tube 125 and the fluid junction box 126 rotate at this tumbling speed, each of these parts moves through the body of fluid 129 during the rotation of receptacle 75. As diagrammatically shown in FIGURE 6, scoop 123 is filled with water from cavity 117 as it moves counterclockwise through this fluid.

By the time scoop 123 has rotated 180° from its position of FIGURE 6 to the full line position of the diagrammatic FIGURE 7, the difference in elevation between scoop 123 and the effluent ports 127 causes water to flow from these latter ports. The pressure head developed by this elevational difference between parts 123 and 126 projects the fluid from cavity 117 completely across the cylindrical drum wall 79 and continues to do so under a decreasing pressure head until the pressure head decreases to zero when the tube 125 assumes a nearly horizontal position as shown in the dotted lines in FIGURE 7. This varying pressure head during the rotation of drum 75 produces a sweeping spray pattern which recedes from the front drum wall 83 during this rotation as diagrammatically illustrated in FIGURE 8.

It should be noted in the diagrammatic FIGURES 7 and 8 that the spray pattern illustrated in these figures extends over a region of the tumbling fabrics which primarily occupy the lower right quadrant of the tumbler when that clothes receptacle is moving in a counterclockwise direction as shown in those figures. This spray pattern of approximately 90° rotation could easily be extended to nearly 180° so as to produce a fluid discharge whenever scoop 123 is elevated above ports 127 if the remaining parts 125 and 127 were constructed on a larger scale. However, these elements are purposely constructed on a smaller scale to produce the limited 90° spray pattern occurring in the region in which the greatest proportion of the fabric load is tumbled.

This is accomplished by the use of small orifices or ports 127 of the size previously mentioned to build into the apparatus a time lag in the initiation of the spray injection. In noting the nearly horizontal dotted line positioning of the tube 125 in the diagrammatic view of FIGURE 7, it will be appreciated that further counterclockwise rotation of this tube will cause most of the water within that tube, the fluid junction box 126 and scoop 123 to drain back into the cavity 117. Additional counterclockwise rotation of tube 125 into the inverted position shown in FIGURE 6 will allow practically all of the water within these parts to be replaced by air so that by the time scoop 123 begins to rise again from the fluid 129 in cavity 117 as in FIGURE 6, the trapped air in these parts must be first exhausted from the air column in tube 125 before any water picked up by scoop 123 and retained therein will flow through the ports 127. By regulating the orifice and tube sizes as well as taking into consideration the rotational speed of the assembly 110, it is possible to vary the fluid injection initiation point, the fluid discharge interval and the interior drum area covered by the spray injections. In practice this time lag is about a quarter of a second though it could be within a tenth to a half second if desired.

It is also possible through the use of such small orifices and the suggested operating conditions to break up the water injected into the clothes receptacle 75 into a droplet form rather than a steady fluid stream so as to achieve a similar and somewhat equivalent result to hand sprinkling.

While it is possible with the disclosed embodiment to load cavity 117 with at least two and one half cups of water, the amount and type of clothes load to be sprinkled may be used as the determining factor in the loading of the reservoir cavity 117. For example, a cotton dress shirt may be dampened with three ounces of water while the pillowcase may be dampened satisfactorily with two ounces of water. Assembly 110 may therefore be provided with various indicia or graduations to indicate the proper amount of water to be carried within cavity 117 for different types and quantities of fabrics to be dampened within receptacle 75.

I claim:

1. In an appliance including a clothes receptacle revolvable about a horizontal axis, a device for dampening fabrics placed within said receptacle and revolvable there-

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with comprising, fluid reservoir means supported by said receptacle and aligned with said axis, said reservoir means defining a cavity for the storage of a body of fabric dampening fluid, fluid pickup means carried by said reservoir means and radially displaced from said axis within said cavity, conduit means extending from said fluid pickup means and having an effluent port spaced from said fluid pickup means and opening into said receptacle, and means for rotating said receptacle and reservoir whereby said fluid pickup means is angularly rotated about said axis and through said body of fluid to elevate said fluid pickup means above said effluent port, said conduit means being constructed and disposed to receive a charge of fluid from said pickup means and inject said charge of fluid into said receptacle to dampen said fabrics.

2. In an appliance including a clothes receptacle revoluble about a horizontal axis, a device for dampening fabrics placed within said receptacle and revoluble therewith comprising, fluid reservoir means supported by said receptacle and aligned with said axis, said reservoir means having a fill opening aligned with said axis, said reservoir means further defining a cavity for the storage of a body of fabric dampening fluid within said fluid reservoir means, a fluid pickup scoop means positioned within said cavity and revoluble with said reservoir, conduit means communicating with the interior of said fluid pickup scoop means and provided with a discharge port opening into said receptacle, and means for rotating said reservoir with said fluid pickup scoop means through said body of fluid, said conduit means being constructed and disposed to receive a charge of fluid from said pickup scoop means and to automatically inject said charge of said fluid into the interior of said receptacle by way of said discharge port during each revolution of said fluid pickup scoop means.

3. In an appliance, a clothes receptacle revoluble about an axis and provided with a rear wall having an opening aligned with said axis, a hollow fluid reservoir member positioned adjacent said opening and having at least one wall member defining a cavity for the retention of fluid, means on said receptacle to support said reservoir, means producing a differential in air pressure in said opening on opposite sides of said wall member of said reservoir member for maintaining said reservoir member in position, a fluid pickup scoop means displaced from said axis and positioned within said hollow reservoir member, a conduit means having an intake end opening into said fluid pickup scoop means and a discharge end spaced from said scoop means and directed into the interior of said receptacle, and means for rotating said receptacle and said reservoir member with said scoop means to move said scoop means through the fluid within said cavity to

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pick up a charge of said fluid for injection into said receptacle, said conduit means being constructed and disposed to receive said charge from said scoop means and inject said charge into said receptacle under the pressure head developed by elevating said fluid scoop means above said discharge end during each revolution of said reservoir member.

4. The invention of claim 3 in which said receptacle includes a hub member aligned with said axis and said reservoir member includes a recess receiving said hub member for retaining said reservoir member in position relative to said receptacle.

5. A clothes dampening device comprising, a revoluble receptacle for receiving and tumbling fabrics to be dampened, a hollow reservoir member revoluble with said receptacle and mounted on said receptacle, said hollow reservoir member being defined by wall means to retain fluid for dampening said fabrics, a fluid pickup member carried within said reservoir member, discharge orifice means spaced from said fluid pickup member, conduit means interconnecting said fluid pickup member and said discharge orifice means, and means for rotating said receptacle to tumble said fabrics and move said fluid pickup means through the fluid retained within said reservoir member to elevate a charge of said fluid above said discharge orifice means, said discharge orifice means being constructed and disposed relative to said fluid pickup member to receive said charge with a varying pressure head for discharging said fluid charge transversely of said receptacle in a varying spray pattern to dampen said fabrics during each revolution of said receptacle.

6. The invention of claim 5 in which said conduit means includes a hollow tube of a length to define an air column which requires purging of trapped air through said discharge orifice means during each revolution of said receptacle and thereby creates a time lag between the creation of said pressure head and the dispensing of said fluid charge from said discharge orifice means.

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