Oct. 15, 1968 R. R. CANDOR ETAL 3,405,452

LAUNDRY DRYING APPARATUS OR THE LIKE USING ELECTROSTATIC METHOD AND MEANS

Filed May 18, 1967 2 Sheets-Sheet 1

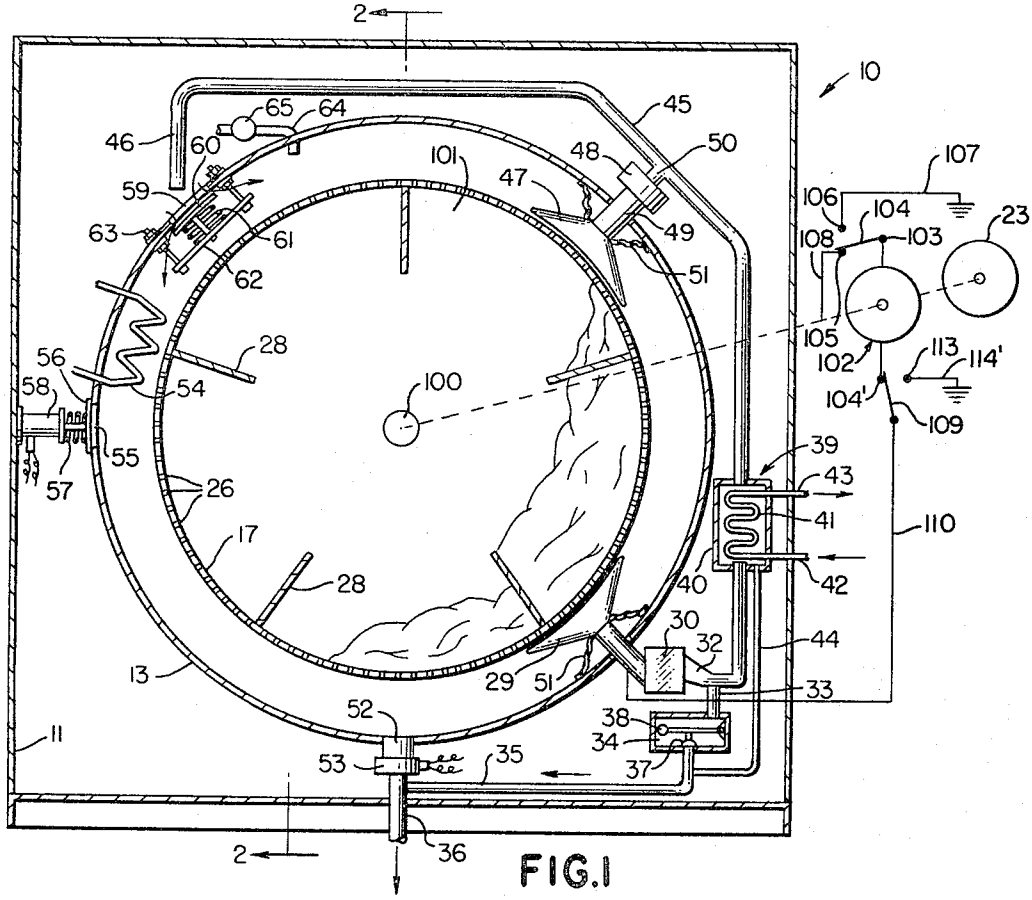


FIG.1

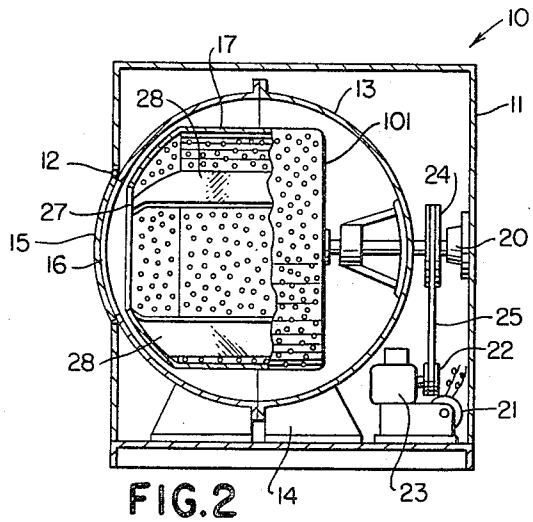


FIG.2

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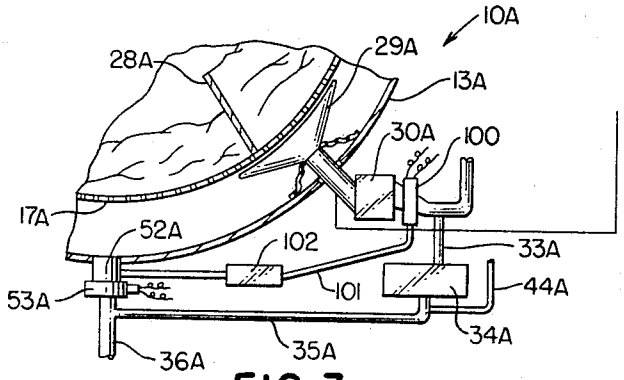


FIG. 3

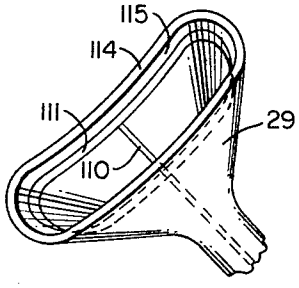


FIG. 4

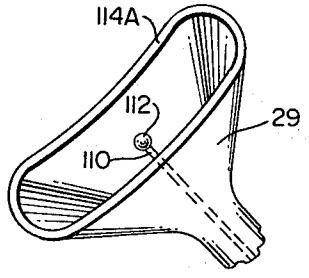


FIG. 5

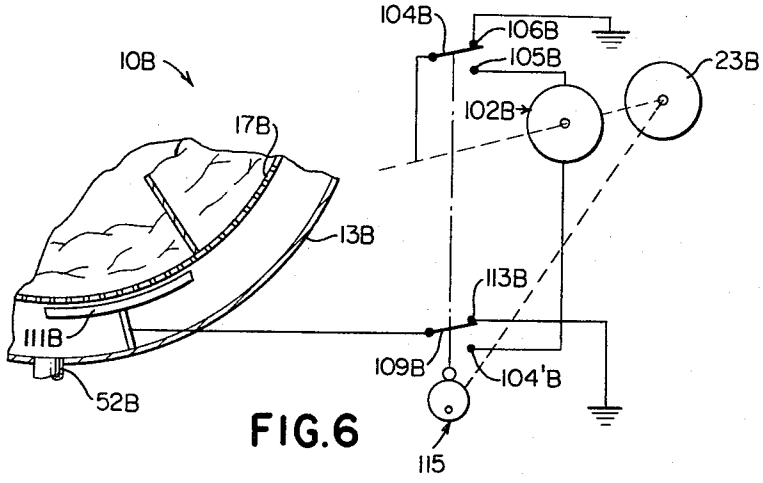


FIG. 6

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LAUNDRY DRYING APPARATUS OR THE LIKE USING ELECTROSTATIC METHOD AND MEANS

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Continuation-in-part of application Ser. No. 532,266, Mar. 7, 1966, which is a continuation-in-part of application Ser. No. 219,587, Aug. 27, 1962. This application May 18, 1967, Ser. No. 639,354
16 Claims. (Cl. 34—1)

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a laundry apparatus or the like wherein the moisture in the wet laundry disposed therein is removed by an electrostatic means that provides a differential in the potential of the moisture in the laundry and an electrode means for the moisture to tend to cause the moisture to leave the laundry and move toward the electrode means. Such electrode means can comprise a suction nozzle which tends to draw a large volume of air through the laundry adjacent thereto to also tend to direct the moisture from the laundry toward the electrode means.

This application is a continuation-in-part of its copending patent application Ser. No. 532,266 filed March 7, 1966, now U.S. Patent No. 3,330,136, which in turn, is a continuation-in-part of its copending patent application Ser. No. 219,587, filed Aug. 27, 1962, now Patent No. 3,238,750.

This invention relates to an improved laundry machine and to an improved method for treating laundry and the like.

In particular, one embodiment of this invention comprises a substantially airtight and noncollapsible confining means or structure having a rotatable foraminous carriage being adapted to support laundry or the like therein. Means are provided for selectively reducing and maintaining the air pressure inside the confining means at any selected pressure below the air pressure outside of the confining means.

In this manner, when the laundry machine is being utilized as a drying machine for removing moisture from wet laundry disposed in the foraminous carriage, the moisture in the wet laundry more readily evaporates in the reduced atmosphere in the confining means than it would evaporate if the confining means contained air at normal atmospheric conditions.

By heating the reduced atmosphere in the confining means to a temperature to cause the moisture in the wet laundry to boil, more rapid evaporation is effected without having to raise the temperature thereof to the normal boiling point of the moisture. In this same vein, auxiliary heating means can be dispensed with if the air pressure in the confining means is lowered to such an extent that the latent heat of the wet laundry is sufficient to cause the moisture to boil at the reduced atmospheric conditions.

When the laundry machine is being utilized to treat laundry with water or the like, the atmosphere in the confining means can be lowered to such an extent that the latent heat of the water causes it to boil whereby the bubbling action of the boiling water further enhances the treating of the laundry by the water or the like disposed in the laundry machine. In this same vein, auxiliary heating means may be utilized to supplement the raiding of the temperature of the water to boil at the reduced air pressure.

Therefore, it can be seen that the apparatus of this invention can be a washing machine, a drying machine, or a combination washing and drying machine and is thus designated as a "laundry machine" but may have uses other than operating on laundry and is not to be limited to such use. For example, the same can be utilized for a dry cleaning machine, etc.

Accordingly, it is an object of this invention to provide an improved laundry machine having one or more of the novel features set forth above as hereinafter shown or described.

Another object of this invention is to provide an improved method for treating laundry and the like having one or more of the novel features set forth above or hereinafter shown or described.

Other objects, uses and advantages of this invention are apparent upon a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIG. 1 is an axial cross-sectional view of an improved laundry machine of this invention.

FIG. 2 is a reduced cross-sectional view of the machine illustrated in FIG. 1 and is taken on line 2–2 thereof.

FIG. 3 is a view similar to FIG. 1 and illustrates another embodiment of this invention.

FIG. 4 is a fragmentary perspective view of a typical nozzle means for the apparatus of FIGS. 1 or 3 and illustrates the electrode means therefor.

FIG. 5 is a view similar to FIG. 4 and illustrates another embodiment of this invention.

FIG. 6 is a view similar to FIG. 3 and illustrates still another embodiment of this invention.

Referring now to FIGS. 1 and 2, an improved laundry machine of this invention is generally indicated by the reference numeral **10** and comprises an outer frame or casing **11** having an opening **12** for the passage of laundry and the like into and out of the machine **10**.

A substantially air-tight, stationary drum **13** is disposed in the casing **11** and is supported therein by suitable supports **14**. The drum **13** may have any desired configuration other than the spheroidal configuration illustrated, the important feature being that the drum **13** will not collapse when the air pressure inside the drum **13** is lowered to the desired pressure in a manner and for a purpose hereinafter described.

The drum **13** has an opening **15** provided therein for the passage of laundry and the like into and out of the drum **13**. A suitable door **16** is hingedly mounted to the drum **13** and is adapted to open and close the opening **15** in the drum **13**, the door **16**, when in the closed position, being substantially airtight and noncollapsible.

A foraminous carriage **17** is disposed in the drum **13** and is carried on a shaft **18** passing through the drum **13** and rotatably supported in bearings **19** and **20** respectively carried by the drum **13** and the casing **11**. In this manner, the carriage **17** can be rotated in the drum **13** by a motor **21** driving a pulley **22** through a reducer **23**, the pulley **22** being interconnected to a pulley **24** carried on the shaft **18** by a suitable belt drive **25** or the like.

The carriage **17** has a plurality of openings **26** passing therethrough, the openings **26** being large enough to readily permit the passage of water or air or both therethrough.

An opening **27** is formed in one end of the carriage **17** to permit the passage of laundry into and out of the carriage **17**, the opening **27** being aligned with the openings **15** and **12** provided respectively in the drum **13** and casing **11**.

Suitable baffles **28** are carried on the inside peripheral surface of the carriage **17** to lift clothes on the rising side of the carriage **17** as the carriage rotates.

A suction nozzle **29** is disposed between the carriage **17** and drum **13** and is operatively interconnected to the

inlet side of a suitable suction pump 30 by a conduit means 31.

The suction nozzle 29 has its open end disposed adjacent the outer peripheral surface of the carriage 17 and can extend completely across the carriage 17 or partially across the same, as desired. Further, the nozzle 29 may be movable toward and away from the carriage 17 in any of the manners set forth in the copending application Ser. No. 839,232, filed Sept. 10, 1959, and entitled Laundry Machine.

In any event, the suction pump 30, when operating, is adapted to suck moisture and air from wet laundry disposed in the carriage 17 directly through the foraminous carriage 17 into the nozzle 20 and, thus, into the inlet side of the pump 30 in a manner more fully described hereinafter.

The moisture, vapor and air drawn from the drum 13 is forced out of the outlet side of the pump 30 into a conduit means 32 which decreases in cross-sectional area to cause the air delivered by the pump 30 to be compressed in the conduit means 32 and, thereby, give up at least part of its moisture into the conduit means 32.

The moisture present in the conduit means 32 flows downwardly through a conduit 34 into a compartment 34, the bottom of the compartment being interconnected to a conduit 35 leading to a drain conduit 36.

A suitable float valve 37 is disposed in the compartment 34 and normally closes off the conduit 35. However, as the moisture collects in the compartment 34, the rising level of the moisture floats the float 38 upwardly to open the valve 37 and let part of the moisture in the compartment flow to the drain 36.

In this manner, the compressed air in the conduit 32 does not pass to drain 36 because there is always a certain amount of moisture covering the inlet of the conduit 35.

The conduit means 32 lead to a suitable condenser 39 comprising a compartment 40 having a cooling coil 41 disposed therein. Suitable cooling means, such as water and the like, can enter the coil 41 through the inlet 42 and be expelled out through the outlet 43.

In this manner, the air being forced into the compartment 40 from the conduit 32, passes over the cooling coil 41 whereby any vapor in the air condenses and falls to the bottom of the compartment 40, the outlet end of the conduit 32 being disposed above the bottom of the compartment 40 to prevent the condensed moisture from entering the conduit 32.

Condensed moisture in the compartment is fed to the conduit 35 by a conduit 44, the end of the conduit 44 disposed in the compartment 40 being below the free end of the conduit 32.

After the air passes over the cooling coil 41, the dried air can be expelled to the atmosphere or vented, as desired.

Alternately, the air can be fed from the cooling chamber 40 through a conduit 45 having an outlet end 46 so positioned for a purpose hereinafter described.

A second suction means can be carried by the machine 10 and can comprise a suction nozzle 47 disposed closely adjacent the carriage 17 and inside the drum 13, the nozzle 47 being interconnected to the inlet side of a suction pump 48 by a conduit 49.

The outlet side of the pump 48 is interconnected to the inlet side of a suction pump 48 by a conduit 49.

The outlet side of the pump 48 is interconnected to the conduit 45 by a branch conduit 50.

The conduits 31 and 49 pass through the drum 13 and have flexible sealing means 51 connected thereto and to the drum 13 to prevent air and water leakage from drum 13 into the housing 11.

The interior of the drum 13 is interconnected to the drain conduit 36 by a conduit 52, the conduit 52 having a suitable solenoid operated valve 53 therein.

An electrical heater 54 is disposed between the drum 13 and carriage 17 and is operated in a conventional manner.

The drum 13 has an opening 55 formed therein which is controlled by a valve member 56 normally urged to the closed position by a spring 57. The valve member 56 is moved to the opened position thereof by the energization of a solenoid 58.

Another opening 59 is formed in drum 13 adjacent the outlet 46 of the conduit 45, the opening 59 being controlled by a valve member 60 normally being urged to its closed position by a spring 61 disposed between the valve member 60 and a support 62 adjustably carried on bolts 63 attached to the drum 13.

In this manner, the force of the compression spring 61 tending to hold the valve member 60 in the closed position thereof can be selectively varied.

Water is adapted to be fed into the drum 13 by a conduit 64 having conventional valve means 65.

The operation of the laundry machine 10 will now be described.

Soiled laundry or the like and soap or detergent are introduced into the carriage 17 of the laundry machine 10 through the door 15 in a conventional manner.

Thereafter, the door 15 is closed and wash water of the desired temperature is adapted to be introduced into the drum 13 through the conduit 64, the valve means 65 and 53 being selectively operated to permit the water introduced into the drum 13 to rise to the desired level.

Thereafter, the carriage 17 is rotated to cause a tumbling action of the clothes through the wash water in a conventional manner.

During this washing cycle, the solenoid 58 can be operated to open the valve member 56 so that the washing action can take place with normal atmospheric conditions existing in the drum 13.

Alternately, one feature of this invention can be utilized during the washing cycle of the laundry machine 10.

In particular, the solenoid 58 can be so actuated that the valve member 56 is disposed in sealing relation against the opening 55 in the drum 13.

Thereafter, the suction pump 48 is operated to cause the suction nozzle 47 to tend to reduce the pressure of the air in the drum 13 below normal atmospheric conditions existing outside the drum 13.

By proper regulation of the force of the compression spring 61 acting on the valve member 60, the suction means 47 and the valve means 60 permits the air pressure inside the drum 13 to be reduced to and maintained at a selected pressure below normal atmospheric pressure.

The amount of reduction of the air pressure in the drum 13 coupled with the latent heat of the wash water will cause the wash water to boil even though the wash-water is at approximately 140 degrees Fahrenheit or the like.

It is believed that this boiling action of the wash water during the wash cycle will enhance the dirt removing action of the wash water on the soiled laundry or the like.

While the heater 54 is illustrated as being in the upper region of the laundry machine 10 it is to be understood that the heater 54 can be disposed in the lower region thereof whereby the same will be submerged in the wash water so that the heater 54 can be utilized to heat up or maintain the temperature of the wash water at a selected temperature so that the suction means 47 can cause the wash water to continuously boil during the wash cycle.

Alternately another heater could be utilized.

Thereafter, the wash water is drained through the drain 52 by opening the solenoid valve 53 in a conventional manner and opening the valve member 56.

Subsequently, one or more rinse cycles can be utilized whereby rinse water is introduced through the conduit 64 in much the same manner as the wash water and the carriage 17 is rotated to tumble the laundry through the rinse water.

During the rinsing cycle it may be desired to also use

the suction means **47** to reduce the air pressure in the drum **13** below normal atmospheric pressure, and, in combination with the valve means **60**, to maintain the air pressure in the drum **13** at a selected reduced air pressure.

Thus, the rinse water will also tend to bubble or boil, the rinse water either being hot itself or being heated by the heater means **54** as desired.

After the rinse water has been drained from the drum **13**, the laundry machine **10** is now adapted to perform a drying operation.

After the water has been drained from the drum **13** by opening the valve means **53**, the suction pump **30** is turned on whereby the suction nozzle **29** forms a sucking action on the clothes being accumulated in the carriage **17** to tend to draw moisture therefrom out to the outlet **32** as set forth in the aforementioned copending application.

During this drying action, the carriage **17** can be continuously rotated to continuously bring new accumulations of clothes adjacent to the suction nozzle **29**.

However, while the suction nozzle **29** is removing moisture from the wet laundry, the valve means **56** can be closed and the suction means **29**, in combination with the valve means **60**, can reduce and maintain the air pressure in the drum **13** at a selected air pressure below the normal atmospheric air pressure outside the drum **13**.

If the air pressure inside the drum **13** is reduced to such an extent that the latent heat of the wet laundry in combination with the reduced air pressure will cause the moisture in the wet clothes to more readily evaporate than if the air pressure was not reduced.

Further, the heater element **54** can be turned on whereby the air that is drawn through the valve means **60** passes over the heater **54** to heat up the wet laundry so that the moisture in the wet laundry more readily tends to evaporate in the reduced atmosphere produced in the drum **13**.

Thus, as the moisture is being continuously withdrawn or sucked from the wet laundry by the suction means **29**, the suction means **29** also cooperates with the valve means **60** to reduce and maintain the air pressure in the drum **13** at a selected reduced air pressure below the normal atmospheric air pressure outside the drum **13** to more readily evaporate the moisture from the wet laundry.

If desired, the suction means **47** can also be operating during this time to assist the nozzle in reducing the air pressure in the carriage **13**.

Alternately, only the suction means **47** can be utilized during the drying action whereon the suction means **47** cooperates with the valve means **60** to reduce the air pressure in the drum **13** to such an extent that, in combination with either the heated air coming through the valve means **60** and over the heater element **54** or the latent heat of the wet laundry, the moisture in the wet laundry tends to readily evaporate and pass out through the suction nozzle **47** in the above manner.

If desired, the combination of the heat of the wet laundry and the reduced air pressure can be so arranged that moisture in the wet laundry actually boils at a low temperature that will not adversely effect the laundry.

Therefore, it can be seen that the method and apparatus of this invention not only provide improved means for treating laundry or the like with water or the like by causing the water to boil or bubble, but also the method and apparatus of this invention provide improved means for removing moisture from wet laundry by a suction action and/or by an evaporative action for drying the laundry.

After the laundry has been dried in the above manner, the operation of the machine **10** is terminated and the dry laundry can be removed from the laundry machine **10** in the conventional manner.

While the above operation of the laundry machine **10** has been described as being a continuous operation, it is to be understood that each of applicant's novel features can be separately used or in various combinations thereof in other laundry machines or the like.

For example, applicants' drying apparatus need not be utilized with a washing machine and conversely, applicants' washing apparatus may not be utilized with a drying machine.

While the laundry machine **10** has been described as completely drying the wet laundry, it is to be understood that the drying operations of applicants' invention can be utilized merely for removing enough moisture from the wet laundry thereof for the desired purpose whereby the conventional centrifuging operation can be eliminated.

Another embodiment of this invention is generally indicated by the reference numeral **10A** and parts thereof similar to the embodiment of FIGURE 1 are indicated by like reference numerals followed by the reference letter A.

As illustrated in FIGURE 3 the pipe **32A** has a solenoid operated valve **100**, which, when energized during the wash cycle, prevents the outflow from the suction means **30A** from passing beyond the valve means **100** and directs the outflow of the suction means **30A** into a pipe **101** leading to the drain pipe **52A** above the valve means **53A**, the pipe **101** having a filter means **102** therein. When the valve **100** is de-energized, the valve closes the pipe **101** from the outflow of the suction means **30A** and permits the outflow from the suction means **30A** to pass beyond the valve means **100** into the pipe **32A** for the moisture removal cycle previously described.

When the machine **10A** is being utilized in the wash cycle thereof, the suction means **30A** is turned on and the valve means **100** is energized whereby the suction means causes a large volume of the body of wash water in the confining means **13A** to be drawn through the laundry on the foraminous carriage **17A** and through the foraminous carriage **17A** into the nozzle inlet means **29A** and suction means **30A** and, by means of the valve means **100**, through the pipe **101** and filter **102** back to the confining means **13A** because the valve means **53A** is closed below the pipe **101** at the drain pipe **52A**.

In this manner, the suction means **30A** cause the wash water to thoroughly wash the laundry as the carriage **17A** is rotating because a large volume of wash water is being forced through the laundry into the aligned nozzle means **29A**, the filter **102** removing dirt and lint from the wash water before it is returned to the confining means **13A**. This wash cycle can also be accomplished with the other features of the washing operation of the machine **10** previously described. Of course, the rinsing operation could be the same for the machine **10A** as the described wash cycle therefore.

When the machine **10A** performs its moisture removal cycle, the valve means **100** is de-energized and the valve **53A** is opened whereby the body of liquid drains out of the confining means **13A** through the pipe **36A**. Thereafter, the suction means **30A** is utilized in the same manner as the suction means **30** previously described for the moisture removal and/or drying operation for the wet laundry remaining in the confining means **13A**.

While the apparatus **10** and **10A** are previously described as relying on the large volume of air being drawn through the laundry and foraminous portions **17** and **17A** into the nozzle inlet means **29** and **29A** to remove the moisture from the laundry for a drying operation, it is to be understood that such moisture removal portion can be assisted by an electrostatic feature which forms the new part of this continuation-in-part application and now to be described.

As illustrated in FIGURE 1, the motor means **23** of FIGURE 2 is illustrated schematically in FIGURE 1 for rotating a shaft means **100** of the apparatus **10** that is interconnected to the end wall **101** of the foraminous carriage **17** so as to be in electrical conductive relationship with the carriage **17** while being electrically insulated from

its surrounding tub **13** and frame means **11** as well as from the motor **23** as will be apparent hereinafter.

The shaft **100** rotates an electrostatic machine or apparatus **102** in unison with its rotation of the foraminous drum **17** whereby the electrostatic device **102** creates a differential between two terminal means **103** and **104'** thereof when the shaft **100** is rotated by the motor **23** in a manner well known in the art.

A switch blade **104** is electrically interconnected to the terminal **103** of the electrostatic device **102** and is adapted to be moved between terminals **105** and **106**, the terminal **106** being interconnected to the ground by a lead **107** and the terminal **105** being interconnected to the conductive portion of the shaft **100** by a lead **108**.

Another switch blade **109** is provided and is electrically interconnected by a lead **110** to an electrode means inside the suction nozzle means **29**, such as the electrode means **111** of FIGURE 4 or electrode means **112** of FIGURE 5. The switch blade **109** is movable between the terminal **104'** of the electrostatic machine **102** and a terminal **113** interconnected to ground by a lead **114'**.

The electrode means **111** for the nozzle means **29** of FIGURE 4 is recessed below the opened end **114** thereof and extends completely around the inside peripheral surface **115** thereof, the electrode **111** being completely electrically insulated from the nozzle means **29** in any suitable manner, such as by forming the nozzle means **29** from a non-conductive material. However, in the embodiment of FIGURE 5, the electrode **112** is disposed centrally in the open end **114A** of the nozzle **29** while being recessed below the open end **114A** and also being suitably electrically insulated from the nozzle means **29** of the supporting lead means **110**.

The operation of the apparatus **10** utilizing the electrostatic means **102** will now be described in connection with a drying operation.

After the laundry has been washed in the manner previously described and the body of treating liquid has been removed through the drain **52** in the manner previously described, the drum **17** is rotated by the motor **23** and tumbles the laundry in the drum **17** while the pump **30** is being operated to tend to draw a large volume of fluid through the laundry and foraminous surface **17** into the nozzle inlet means **29** for the drying operation previously described.

During this drying operation, the switch blades **109** and **104** are either manually or automatically moved from their respective ground terminals **113** and **106** against the terminals **104'** and **105** to create a potential differential between the drum **17** and the electrode means **111** or **112** of the suction nozzle means **29**. Because a potential differential now exists between the electrode **111** or **112** of the nozzle means **29** and the moisture in the laundry being tumbled in the rotating drum **17**, not only does the large volume of air being directed into the nozzle inlet means **29** through the laundry and foraminous portion **17** by the pump **30** cause the moisture in the laundry to enter the nozzle inlet means **29** in the manner previously described, but also the potential differential between the moisture in the laundry and the electrode **111** or **112** of the nozzle means **29** causes the moisture to enter the nozzle means **29** in a manner believed to be at a faster rate than if the electrostatic device **102** was not utilized.

Further, by providing the foraminous drum **17** with a potential by the electrostatic device **102**, such potential is also created for the moisture in the laundry as the same comes into contact with the drum **17** so that a relatively large potential differential is created between the moisture in the layer of laundry disposed against the drum **17** and the electrode **111** or **112** of the nozzle means **29** when that particular layer of laundry comes into alignment with the nozzle inlet opening **114** or **114A** to cause the moisture to pass from the laundry through the foraminous surface **17** into the nozzle inlet means **29**.

Of course, in the above operation of the apparatus **10**, when utilizing the electrostatic device **102**, the electrostatic device could still create such potential differential with only the switch blade **109** disposed against the terminal **104'** and the switch blade **104** being connected to the terminal **106** leading to the ground so that the drum **17** need not be charged by the electrostatic device **102** to still accomplish the electrostatic moisture removal operation set forth above.

While the apparatus **10** has been described as requiring or utilizing the electrostatic device **102** in combination with the suction pump **30**, it may be found that the suction means **30** can be completely eliminated and that moisture removal can be provided solely by electrostatic means.

For example, another embodiment of this invention is generally indicated by the reference numeral **10B** in FIGURE 6 and parts thereof similar to the apparatus **10** of FIGURE 1 are indicated by like reference numerals followed by the reference letter B.

As illustrated in FIGURE 6, the foraminous drum **17B** is rotated by the electric motor means **23B** which also drives the electrostatic device **102B** in the manner previously described and being adapted to have its terminals **104B'** and **105B** respectively interconnected to an electrode means **111B** and the foraminous drum **17B** by switch blades **109B** and **104B**.

However, the electrode means **111B** is not disposed in a nozzle means **29** in the manner previously described and merely comprises a relatively large plate disposed closely adjacent the rotating drum **17B**. The switch blades **109B** and **104B** are adapted to be cycled in unison between the terminals **113B** and **106B** leading to ground and the terminals **104B'** and **105B** leading to the electrostatic device **102B** by a camming arrangement **115** driven by the motor means **22B**.

In this manner, both the plate means **111B** and drum **17B** will be cycled by the cam means **115** to ground and to the electrostatic device **102B** to respectively have a like potential and a potential differential.

When the plate **111B** is cycled to the ground, any moisture being retained thereon by the charged plate **111B** would immediately run off the same by gravity and pass out of the tub **13B** through the drain means **52B**. However, when the potential differential is created between the plate **111B** and the moisture in the laundry being tumbled by the rotating drum **17B**, such potential differential causes the moisture in the tumbled laundry to be attracted to the plate **111B** and pass out of the laundry and through the drum **17B** as the laundry comes into alignment with the plate **111B**.

Therefore, it can be seen that the improved features of this continuation-in-part application is to utilize either an electrostatic means by itself to remove moisture from wet laundry or the like or in combination with a suction device that also removes the moisture by tending to draw a large volume of air through the laundry and into a suction nozzle means. Also, it may be found that when the suction nozzle means is utilized in combination with the electrostatic means, the suction power required may be less than without the electrostatic means and the nozzle means may not be required to be in sealed relation with the drum, but only closely adjacent thereto whereby no friction or nozzle wear-out problems will exist.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. In an apparatus for removing moisture from moisture bearing material, supporting means for supporting said moisture bearing material on one side of said supporting means, electrode means disposed adjacent the other side of said supporting means, means for creating

one potential on at least part of said moisture while said material is supported on said supporting means, and means for creating an opposite potential on said electrode means so that the resulting potential differential between said part of the moisture in said material and said electrode means tends to cause said part of the moisture to leave said material and go toward said electrode means.

2. In an apparatus as set forth in claim 1, means for tending to create a fluid flow through said material toward said electrode means to tend to assist said potential differential in removing said moisture from said material.

3. In an apparatus as set forth in claim 1, means for moving said supporting means relative to said electrode means to bring different portions of said material adjacent said electrode means.

4. In an apparatus as set forth in claim 3 wherein said moving means causes said supporting means to repetitively bring portions of said material adjacent said electrode means.

5. In an apparatus as set forth in claim 1, said supporting means comprising rotatable drum means for tumbling said material therein as said drum means is rotated, and means for rotating said drum means.

6. In an apparatus for removing moisture from moisture bearing material, means for supporting said moisture bearing material, electrode means disposed adjacent said supporting means, means for creating a potential differential between the moisture in said material and said electrode means to tend to cause said moisture to leave said material and go toward said electrode means, said supporting means comprising rotatable drum means for tumbling said material therein as said drum means is rotated, means for rotating said drum means, and a suction means having a nozzle inlet means disposed adjacent said drum means and tending to draw moisture from said material into said nozzle inlet means.

7. In an apparatus as set forth in claim 6, said electrode means being carried by said nozzle inlet means.

8. In an apparatus as set forth in claim 7, said drum means being foraminous and supporting said material on one side thereof, said nozzle inlet means being disposed on the other side of said foraminous drum means and drawing said moisture from said material through said foraminous drum means.

9. In an apparatus as set forth in claim 8, said nozzle inlet means being disposed in substantially sealed relation against said other side of said foraminous drum.

10. In a method for removing moisture from a moisture bearing material, the method steps of supporting said material on one side of a supporting means, disposing electrode means adjacent the other side of said supporting means, creating one potential on at least part of said moisture while said material is supported on said supporting means, and creating an opposite potential on said electrode means so that the resulting potential differential between said part of the moisture and said electrode means tends to cause said part of the moisture to leave said material and go toward said electrode means.

11. In an apparatus as set forth in claim 1, said means for creating said one potential on at least part of said moisture comprising means for imposing said one potential on said supporting means so that said moisture has said one potential imposed thereon as it contacts said supporting means.

12. In an apparatus as set forth in claim 11, said supporting means when having said one potential imposed thereon tending to cause said moisture to be drawn toward the same from said material, said electrode being disposed spaced from said supporting means.

13. In an apparatus for removing moisture from moisture bearing material, means for supporting said moisture bearing material, electrode means disposed adjacent said supporting means, means for creating a potential differtial between the moisture in said material and said electrode means to tend to cause said moisture to leave said material and go toward said electrode means, said supporting means comprising movable support means for carrying said material therewith as said support means is moved, means for moving said support means, and suction means having nozzle inlet means disposed adjacent said support means and tending to draw moisture from said material into said nozzle inlet means.

14. In an apparatus as set forth in claim 13, said electrode means being carried by said nozzle inlet means.

15. In an apparatus as set forth in claim 14, said support means being foraminous and supporting said material on one side thereof, said nozzle inlet means being disposed on the other side of said foraminous support means and drawing said moisture from said material through said foraminous support means.

16. In an apparatus as set forth in claim 15, said nozzle inlet means being disposed in substantially sealed relation against said other side of said foraminous support means.

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