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(54) Laundry dryer machine

(57) A laundry dryer machine is described comprising a basket (5) for the containment of the laundry to be dried, means (30) for the conveying of heated air inside said basket (5), heat exchanger means (6) passed through by the air coming from the basket (5), at least

one tank (13; 130, 131) for the collection of the condensation water produced by the heat exchanger means (6). The machine comprises balance means (20) for the detection of the reaching of a pre-established level of water (P) inside the tank (13; 130, 131).

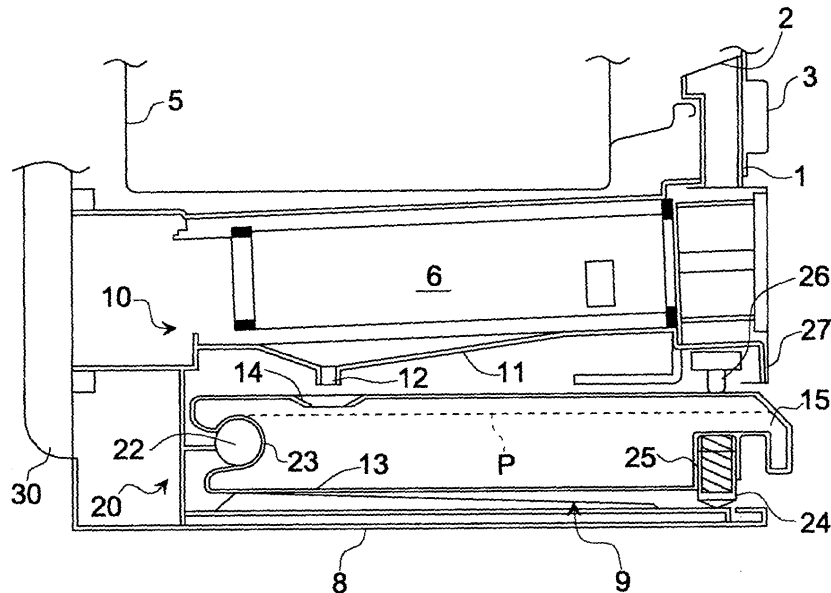


Fig.1

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Description

[0001] The present invention refers to a laundry dryer machine.

[0002] Dryer machines are known which are provided with devices for the detection of the level of the condensation water. In fact most part of said machines are provided with tanks for the collection of the condensation water due to the flow of humid warm air coming out of the basket where the laundry to be dried is contained. The humid air when condensing is collected in tanks usually arranged under the condenser; said tanks can be fixed or of the removable type.

[0003] When the condensation water in said tanks reaches a pre-established level, normally a level near the level of the tank's full load, the water contained in the same tank must be discharged.

[0004] The devices normally used for the detection of said pre-established level in the condensation water tank are pressure switches.

[0005] In view of the state of the art herein described, an object of the present invention is to provide a laundry dryer machine with a new device for the detection of the level of the water in the tank containing the condensation water.

[0006] According to the present invention, this object is obtained by means of a laundry dryer machine comprising a basket for the containment of the laundry to be dried, means for the conveying of heated air inside said basket, heat exchanger means passed through by the air coming from the basket, at least one tank for the collection of the condensation water produced by said heat exchanger means, characterised in that it comprises balance means for the detection of the reaching of a pre-established water level inside said tank.

[0007] The characteristics and the advantages of the present invention will become evident from the following detailed description of embodiments thereof, which are illustrated as non limiting examples in the enclosed drawings, in which:

Figure 1 is a partial schematic side view of a laundry dryer machine according to a first embodiment of the present invention;

Figure 2 is a schematic side view of a laundry dryer machine according to a second embodiment of the present invention.

[0008] In Figure 1 a laundry dryer machine according to a first embodiment of the present invention is shown. Said machine is provided with a cabinet 1 having an opening 2 for the loading of the laundry on the front wall 3 of the cabinet 1. The laundry dryer machine comprises a door (not visible in figure) suitable to close the opening 2 of the cabinet 1 and a basket 5 suitable to contain the laundry that must be dried. The basket 5 can be fixed or it can be made rotate by an electric motor and opportune kinematical means. The basket 5 comprises an opening

lined up with the opening 2 of the cabinet 1 for the loading of the laundry to be dried.

[0009] The laundry dryer machine comprises a heat exchanger device 6 through which the humid air coming from the basket 5 passes. The humid air which passes through the device 6 gets cooled by means of cool air coming from an opportune fan driven by a motor, not visible in figure; in this way droplets of water are produced by the device 6. The air coming from the device 6 is sent toward a duct 30 and there it gets heated by the resistances present inside the duct 30; the heated air gets directed by means of another fan (not visible) toward the basket 5 in order to dry the laundry. The device 6 is preferably arranged under the basket 5.

[0010] Under the device 6 a unit 10 for the collection of the condensation water coming from the same device 6 is arranged. Said unit 10 comprises means 11 made up of a metal sheet shaped as a funnel suitable to collect the condensation water coming from the device 6. Said metal sheet has a hole 12 for the outflow of the condensation water being collected. Under said metal sheet 11 a tank 13 is arranged having a hole 14 for the inlet of water which corresponds to the hole 12 of the metal sheet 11. The tank 13 is arranged in proximity of the bottom 8 of the laundry dryer machine inside an interspace 9 obtained within the bottom part of the machine. Preferably the tank is of the removable type and it has a handle 15 for the extraction of the same from the interspace 9 from the front part of the laundry dryer machine.

[0011] The unit 10 comprises balance means 20 for the detection of the reaching of a pre-established level P of water inside said tank 13. Said balance means 20 comprise a spherical pin 21 integral with the back part 4 of the cabinet 1; around the pin 22 a cavity 23 of the tank 13 is arranged. The cavity 23 has a shape such as to allow the tank 13 to rotate around the pin 22 but also to disengage from the same pin during the removal of the same tank 13.

[0012] The means 20 comprise a spring pin 24 arranged in proximity of the front wall 3 of the cabinet 1 under the tank 13. More precisely said tank 13 comprises a cavity 25 in which said spring pin 24 is engaged. The latter rests on the bottom 8 of the cabinet 1 and it bears the weight of the tank 13.

[0013] The means 20 comprise a switch 26 arranged above the tank 13 in a cavity 27 obtained in proximity of the front wall 3 of the cabinet 1.

[0014] The tank 13, in the presence of a greater amount of condensation water being collected, compresses the spring of the pin 24 and the cavity 23 rotates clockwise around the pin 22; the tank 13 therefore gets lowered toward the bottom 8 of the cabinet 1. When the amount of water inside the tank 13 reaches the pre-established level P, the tank 13 is almost adjacent to the bottom 8 and the switch 26 gets activated in order to signal that the tank 13 is full. The switch 26 is for example of the type working with pressure on the active electric contacts.

[0015] In figure 2 a laundry dryer machine according to a second embodiment of the present invention is shown. Said machine comprises, differently from the laundry dryer machine of the first embodiment, a metal sheet 110 suitable to take the condensation water coming from the heat exchanger 6 toward a tank 130 fastened to the cabinet 1 and arranged in the back part of the cabinet in a way adjacent to the bottom 8.

[0016] The tank 130 is in hydraulic connection with a tank 131 arranged above the basket 5 in an interspace 51 arranged in proximity of the top 50 of the cabinet 1. Said hydraulic connection is made by means of a pump 41 which allows the transport of the condensation water from the tank 130 to the tank 131 through a duct 42. The pump 41 is connected with the tank 130 from which it takes the condensation water which is brought by means of the duct 42 to the tank 131 through an inlet hole 43.

[0017] Preferably the tank 131 is of the removable type and it has a handle 44 for the extraction of the same from the interspace 51 from the front part of the laundry dryer machine.

[0018] The unit 10 comprises balance means 200 for the detection of the reaching of a pre-established water level P inside said tank 131. The means 200 comprise a spring pin 240 arranged in proximity of the front wall 3 of the cabinet 1 under the tank 131 in a cavity 250 obtained in the interspace 51; the pin 240 bears the weight of the tank 13.

[0019] The means 200 comprise a rocking lever 241 hinged in a spherical pin 242 arranged in an opportune cavity of the interstice 51 and capable to rotate in said cavity. Above the lever 241 the tank 131 is arranged and the bottom part of the lever 241 is in contact with the pin 240. The unit which comprises the lever 242, the spherical pin 241 and the spring pin 240 makes up a balance unit.

[0020] The means 200 comprise a switch 26 arranged above the tank 131 in proximity of the top 50 and the front wall 3 of the cabinet 1.

[0021] The tank 131 in presence of a greater amount of condensation water being collected compresses the spring of the pin 240 and it lowers toward the bottom of the interspace 51. When the amount of water inside tank 131 reaches the pre-established level P, the tank 131 is almost adjacent to the bottom of the interspace 51 and the switch 26 gets activated in order to signal that the tank 131 is full. The switch 26 is for example of the type working with pressure on the active electric contacts.

[0022] If, for instance, the laundry dryer machine gets loaded with 5 or 7 Kg of laundry and considering a centrifugal efficiency equal to 70% and a condensation efficiency equal to 50%, the recovery of water can be estimated between 2.5 and 2.8 litres. The tank for the recovery of the condensation water must be dimensioned for such quantity of water plus a safety volume, as for example it can contain between 3 and 3,5 litres. The spring of the pin 24 or 240 must be calibrated between 2,5 and 2,8 litres, that is it must be such so as to trigger the signal

indicating the full tank when the amount of water reaches the amount comprised between 2,5 and 2,8 litres.

5 Claims

1. Laundry dryer machine comprising a basket (5) for the control of the laundry to be dried, means (30) for the conveying of heated air to inside said basket (5), heat exchanger means (6) passed through by the air coming from the basket (5), at least one tank (13; 130, 131) for the collection of the condensation water produced by said heat exchanger means (6), **characterised in that** it comprises balance means (20, 200) for the detection of the reaching of a pre-established water level (P) inside said tank (13; 130, 131).
2. Machine according to claim 1, **characterised in that** said balance means (20, 200) comprise a spring pin (24, 240) and a spherical pin (22, 242), said tank (13, 131) being coupled in revolving way to the spherical pin (22, 242) and being resting on said spring pin (24, 240).
3. Machine according to claim 2, **characterised in that** said balance means (20, 200) comprise a switch (26) arranged above the tank (13, 131), said switch being activated at the reaching of a pre-established water level (P) inside said tank (13; 130, 131).
4. Machine according to claim 2, **characterised in that** said balance means (200) comprise a rocking lever (241) arranged under the tank (131) and connected with said spherical pin (242).
5. Machine according to any one of the previous claims, **characterised in that** it comprises a first (130) and a second (131) tank in hydraulic connection with each other, said balance means (20) operating on said second tank (131).
6. Machine according to claim 5, **characterised in that** said first tank (130) is fastened to the laundry dryer machine and said second tank (131) is removable from the laundry dryer machine.
7. Machine according to claim 6, **characterised in that** said first tank (130) is arranged under the basket (5) and said second tank (131) is arranged above the basket (5).
8. Machine according to any one of the claims from 1 to 3, **characterised in that** it comprises a single tank (13) arranged under the basket (5), said tank (13) being removable from the laundry dryer machine.

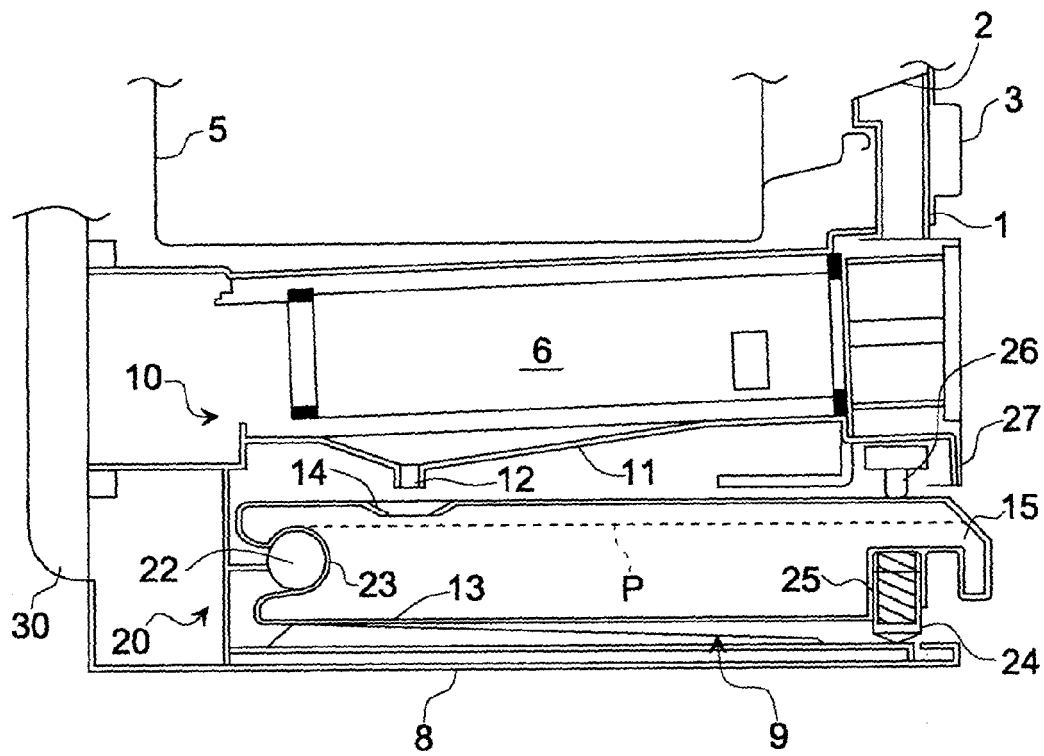


Fig.1

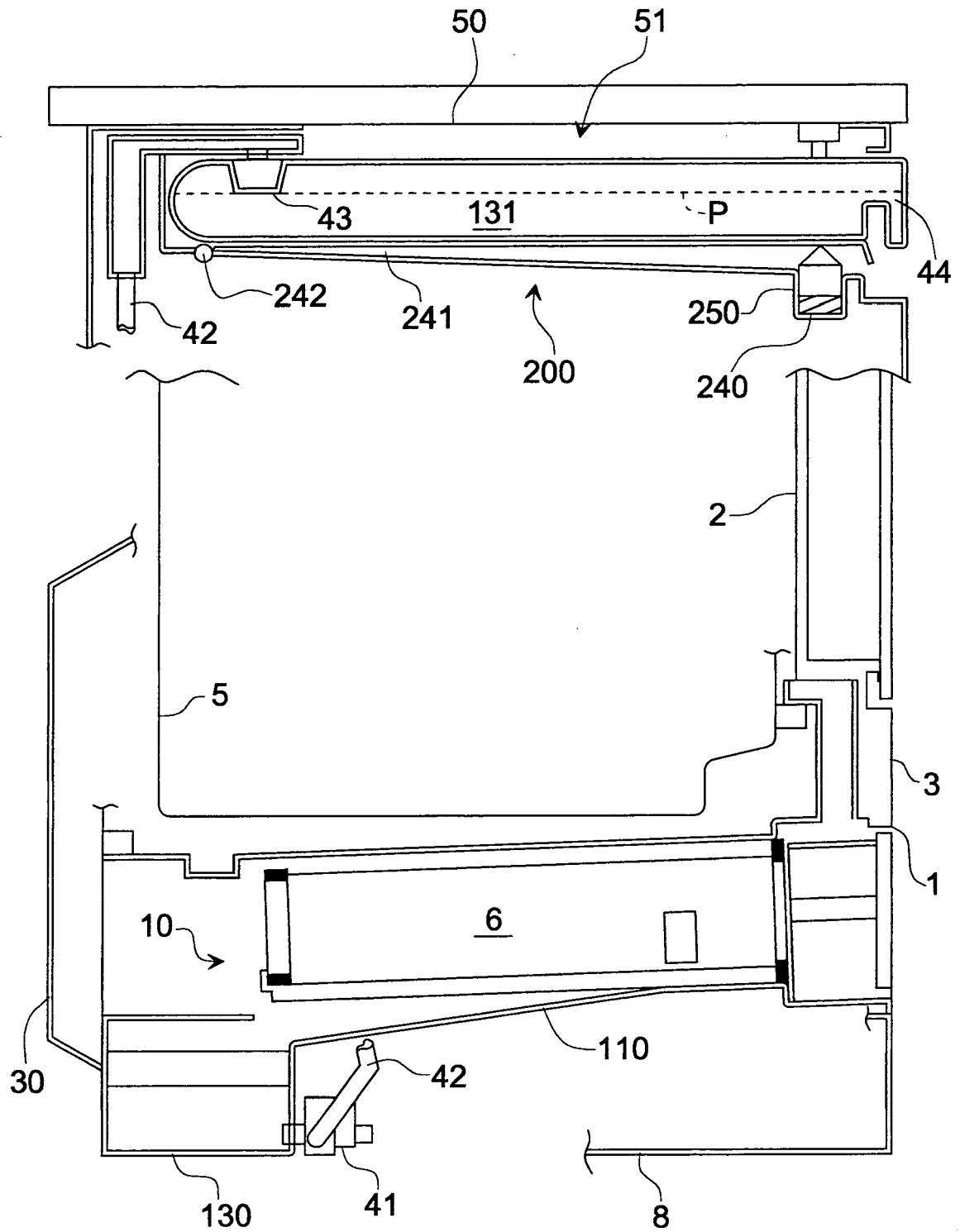


Fig.2



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 June 2005	Examiner Norman, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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