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(54) **Laundry drying equipment comprising a blower**

(57) A laundry drying equipment is provided, which includes a tub combination 13, an air heating passage 20, a condensing system 16 connected between the tub combination 13 and the air heating passage 20, and a blower 18, 38 that allows air to pass through the condensing system 16. The blower 18, 38 includes an air amplifier 40. Through the air amplifier 40, the flow amount and speed of the air passing through the condensing system 16 are greatly increased, so that the condensation efficiency is improved, thereby improving the drying efficiency of the equipment.

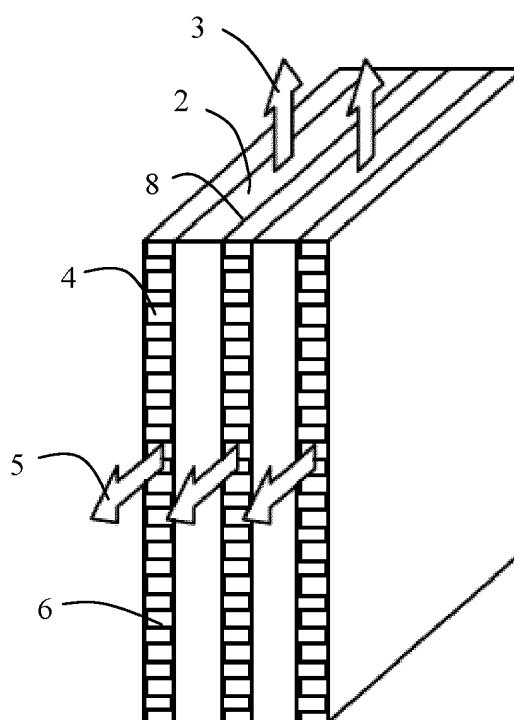


FIG. 2

Description

[0001] The present invention relates to a household appliance for drying laundry, and more particularly to a blower in a condensing system of the household appliance.

[0002] An existing laundry drying equipment such as a washer-dryer integrating washing and drying functions is commonly disposed with a tub combination formed by a machine tub and a drum rotatably located in the machine tub, and laundry to be processed is dried in the drum. In a simple laundry dryer the tub combination may be simply a drum. The tub combination is connected to a condensing system and an air heating passage in turn. After a drying procedure of the laundry drying equipment is started, dry air is heated in the air heating passage to form dry hot air, and then enters the tub combination to exchange heat with wet laundry to take away moisture in the laundry to form relatively wet hot air. The wet hot air enters the condensing system, and after the condensation action of the condensing system, moisture in the wet hot air is condensed into water. The condensed air becomes relatively dry cold air. The relatively dry cold air is guided into the air heating passage under the action of the fan to enter the next cycle. The process is repeated until the drying process ends.

[0003] Document DE 37 38 031 C2 discloses a condensing system using ambient air which is air drawn from the ambient of the laundry drying equipment as a condensing medium. The condensing system using air as the condensing medium generally includes at least one drying air passage and at least one cooling air passage in communication with ambient air. The relatively wet and hot air discharged from the tub combination flows through the drying air passage, and the ambient air flows through the cooling air passage. The relatively wet hot air and the ambient air exchange heat so that the wet hot air is cooled, and water vapor in the wet hot air is condensed into water and separated from the air.

[0004] As an alternative to using ambient air for cooling, the condensing system may complete the cooling and dehumidification of the drying air through a heat absorber of a heat pump or sprayed water.

[0005] For the purpose of enabling the drying air to circularly flow in the tub combination, the condensing system and the air heating passage, a driving device for driving the drying air is generally disposed in the circulation passage. Furthermore, for the condensing system using ambient air as the condensing medium, an air driving device also needs to be disposed in the cooling air passage so that ambient air continuously enters the cooling air passage and exchanges heat with the wet hot air in the drying air passage.

[0006] During the operation of the laundry drying equipment, a lot of energy and time need to be consumed, so how to increase the drying efficiency is an objective to be achieved in this field.

[0007] An objective of the present invention is to in-

crease the drying efficiency of a laundry drying equipment.

[0008] To achieve the above objective, the present invention adopts the technical solution defined by the independent claim attached. Preferred embodiments of the invention are defined in dependent claims as well as in the subsequent disclosure.

[0009] According to the invention a laundry drying equipment includes a tub combination, an air heating passage, a condensing system connected between the tub combination and the air heating passage, and a blower that allows air to pass through the condensing system, wherein the blower includes an air amplifier.

[0010] An advantage of the invention is that, through the air amplifier, the flow amount and speed of the air passing through the condensing system are greatly increased, so that the condensation efficiency is improved, thereby improving the drying efficiency of the equipment.

[0011] Preferably, the condensing system includes a drying air passage and a cooling air passage, and the air amplifier is connected with at least one of the drying air passage and the cooling air passage. The air amplifier is disposed on the drying air passage, so that the volume of air condensed in unit time can be increased, and the air amplifier is disposed on the cooling air passage, so that more cold air can participate in cooling in unit time, thereby taking away more heat and improving the condensation efficiency.

[0012] Preferably, the air amplifier includes an annular wall, a high-pressure air inlet is disposed on the annular wall, and the high-pressure air inlet is connected to an air pressurizer.

[0013] Preferably, the air pressurizer is a fan.

[0014] Preferably, the air pressurizer is a turbofan.

[0015] Preferably, the cooling air passage is adjacent to the drying air passage.

[0016] Preferably, a heat exchange device is disposed in the cooling air passage.

[0017] Preferably, two ends of the cooling air passage are in communication with outer atmosphere.

[0018] The detailed implementation of a preferred embodiment of the present invention will be described in the following, with reference to the attached drawing. In the drawing,

FIG. 1 is a schematic structural view of a laundry drying equipment; and

FIG. 2 is a schematic view showing the operating principle of a condensing system in FIG. 1.

[0019] As shown in FIG. 1, a laundry drying equipment 10 includes a machine tub 12 and a drum 14 capable of rotating after being driven by an electrical motor and mounted in the machine tub 12. Laundry to be processed is dried in the drum 14. Numerous through holes (not shown) are formed in a wall of the drum 14. The drum 14 and the machine tub 12 communicate with each other

in space through the through holes. The machine tub 12 and the drum 14 form a tub combination 13. The machine tub 12 is connected to a condensing system 16 and a heating passage 20 in turn to form an air circulation passage 22. A first blower 18 is mounted on the air circulation passage 22 to drive drying air to circularly flow in the air circulation passage 22 to take away moisture in the laundry.

[0020] Specifically, a work flow of the laundry drying equipment 10 is as follows. Circulating air enters the drum 14 after being heated by the heating passage 20, and exchanges heat with wet laundry to take away the moisture in the laundry to form high-moisture and high-temperature air. The high-moisture and high-temperature air enters the condensing system 16 from the machine tub 12. Under the condensation action of the condensing system 16, moisture in the high-moisture and high-temperature air is condensed into water. The water flows into the machine tub 12 and is finally drained through a drainage system 24. Condensed drying air is guided into the heating passage 20 again under the action of the first blower 18 to enter the next cycle.

[0021] The condensing system 16 includes a cooling air inlet 34 and a cooling air outlet 36 communicating with the outside. A second blower 38 sucks ambient air from the cooling air inlet 34 into the condensing system 16, which exchanges heat with drying air passing through the condensing system 16 to take away a part of heat of the drying air, and then is discharged from the cooling air outlet 36.

[0022] As shown in FIG. 2, the condensing system 16 includes a drying air passage 2 and a cooling air passage 4 isolated from each other by a separation wall 8. The cooling air passage 4 is installed with a heat exchange piece 6. When flowing through the drying air passage 2, the circulating drying air 3 delivers the temperature to the separation wall 8, thereby delivering the temperature to the heat exchange piece 6 through the separation wall 8. Outer cool air 5 entering the cooling air passage 4 passes through the heat exchange piece 6 to take away most heat to cool the wet hot drying air 3, so that moisture in the drying air 3 is condensed.

[0023] Referring to FIG. 1 again, the second blower 38 includes an air amplifier 40. The air amplifier 40 includes an annular wall 42. A high-pressure air inlet 44 is disposed on the annular wall 42. An air pressurizer 46 is connected to the high-pressure air inlet 44. The air pressurizer 46 sucks air from the outside and injects pressurized air from the high-pressure air inlet 44 into the annular wall 42, so that high-speed high-volume air enters the cooling air passage 4 through the annular wall 42. Preferably, the air pressurizer 46 is a turbofan 46.

[0024] In brief, in the air amplifier 40, the Coanda air amplification effect (a basic principle of hydromechanics) is used. A small amount of compressed air is fed and used as power, so as to form a reduced pressure region at one end of the annular wall and enable surrounding air to enter the reduced pressure region and be combined

with the original compressed air to form a high-speed high-volume air flow passing through the annular wall of the air amplifier 40.

[0025] Since a large amount of high-speed outer cold air passes through the cooling air passage 4, a large amount of heat can be taken away, so that the heat exchange efficiency is obviously higher than that obtained in the case that only a common fan is used to drive the cooling air, thereby effectively improving the drying efficiency.

[0026] In other implementations, the air amplifier 40 may also be disposed in the first blower 18 to increase the flow speed and amount of the circulating drying air, so that more moisture is condensed in unit time, thereby improving the drying efficiency.

[0027] In other implementations, for laundry drying devices using water or a heat pump for condensation or other laundry drying devices not using outer cold air for condensation, an air amplifier 40 may also be disposed in a blower 18 connected with a circulating air passage, so as to increase the flow speed and volume of circulating drying air passing through the condensing system.

[0028] The specific implementations described above description and shown in the accompanying drawings are merely provided for describing the present invention, but are not intended to limit the present invention. Any variation made to the present invention by persons of ordinary skill in the art within the scope of the basic technical idea of the present invention shall fall within the protection scope of the present invention.

Claims

1. A laundry drying equipment, comprising a tub combination (13), an air heating passage (20), a condensing system (16) connected between the tub combination and the air heating passage, and a blower (18, 38) that allows air to pass through the condensing system, **characterized in that**, the blower (18, 38) comprises an air amplifier (40).
2. The laundry drying equipment according to claim 1, **characterized in that** the condensing system (16) comprises a drying air passage (2) and a cooling air passage (4), and the air amplifier (40) is connected with at least one of the drying air passage and the cooling air passage.
3. The laundry drying equipment according to one of claims 1 and 2, **characterized in that** the air amplifier (40) comprises an annular wall (42), a high-pressure air inlet (44) is disposed on the annular wall, and the high-pressure air inlet is connected with an air pressurizer (46).
4. The laundry drying equipment according to claim 3, **characterized in that**, the air pressurizer (46) is a

fan (46).

5. The laundry drying equipment according to claim 4,
characterized in that, the air pressurizer (46) is a
turbofan (46). 5
6. The laundry drying equipment according to claim 2,
characterized in that, the cooling air passage (4)
is adjacent to the drying air passage (2). 10
7. The laundry drying equipment according to claim 6,
characterized in that, a heat exchange device (6)
is disposed in the cooling air passage. 15
8. The laundry drying equipment according to claim 6,
characterized in that, two ends (34, 36) of the cool-
ing air passage are in communication with outer at-
mosphere. 20

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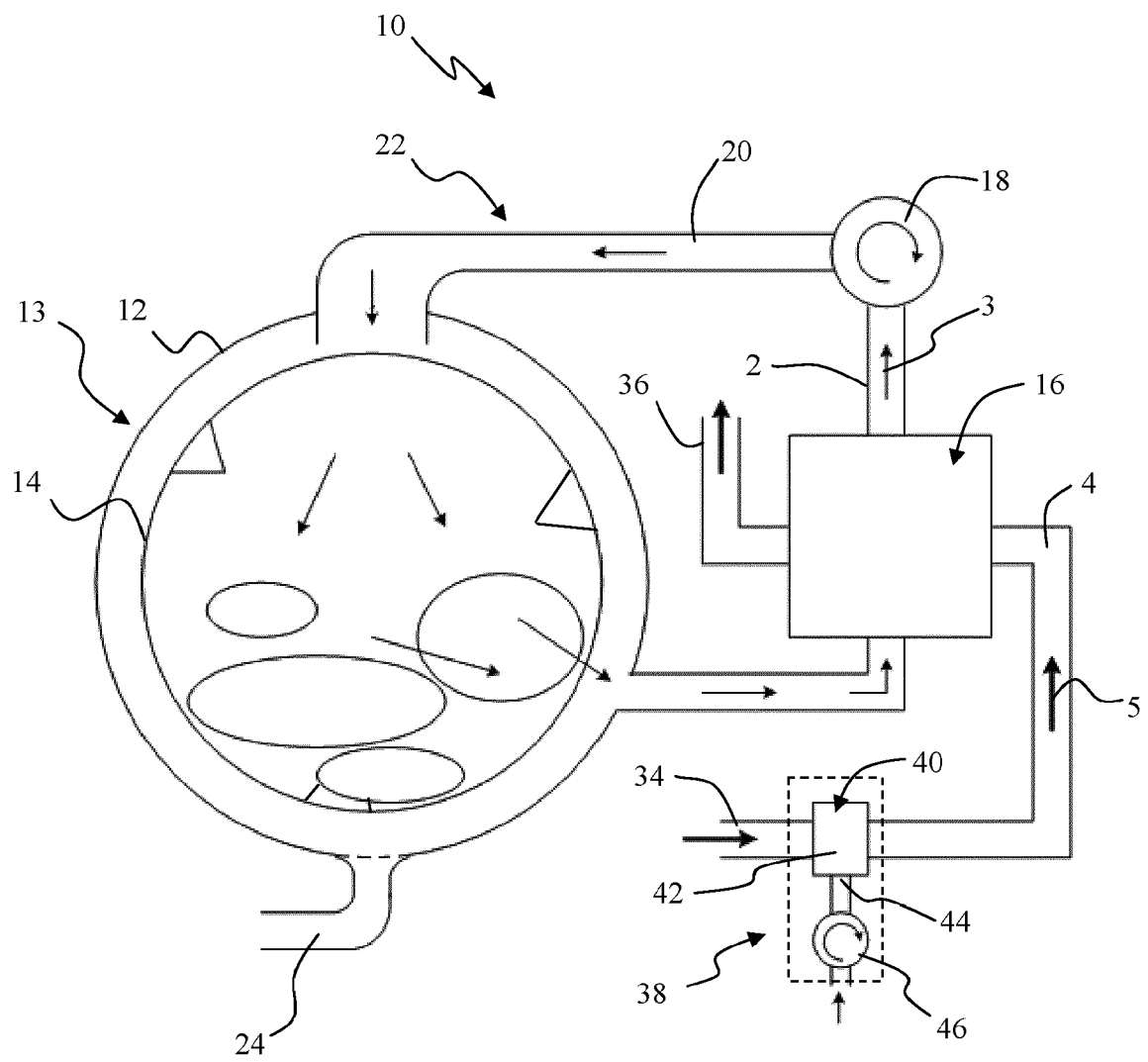


FIG. 1

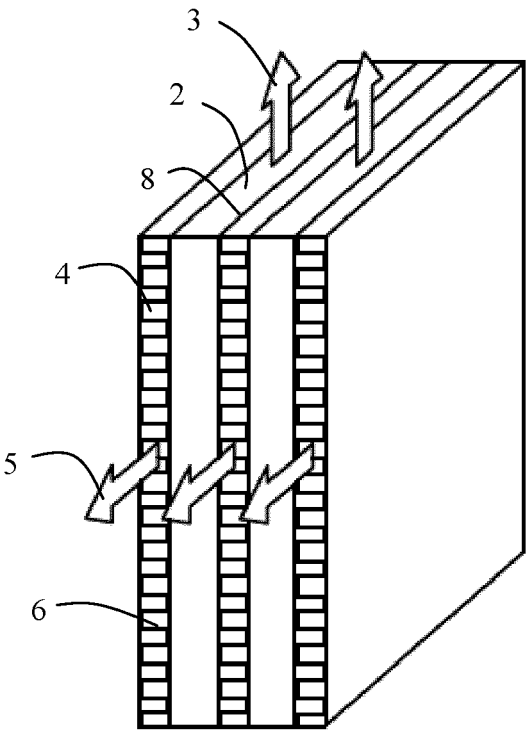


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 11 18 9924

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 March 2012	Examiner Fachin, Fabiano
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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