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(54) **LAUNDRY DRYING APPARATUS**

(57) A laundry drying apparatus is provided, including a drying chamber (2) and a condensation channel in fluid communication with the drying chamber. The condensation channel (3) is provided with an outlet (4) located on the top of the condensation channel. A rinsing apparatus is disposed near the outlet. The rinsing apparatus includes a water inlet (11), a water flow channel (12) that is in communication with the water inlet and peripherally extends at least partially surrounding the outlet of the condensation channel, and a plurality of water outlets (14, 141) disposed on a side wall (13) of the water flow channel. The rinsing apparatus is disposed near the outlet of the condensation channel, and can rinse fluffs near the outlet. The water flow channel peripherally extends surrounding the outlet, and the plurality of water outlets is disposed on the side wall of the water flow channel. Water rotates and flows in the water flow channel, and can transversely bump against an inner wall of the condensation channel under the effect of the centrifugal inertial force when flowing out of the water outlets, so that a good rinsing effect is achieved.

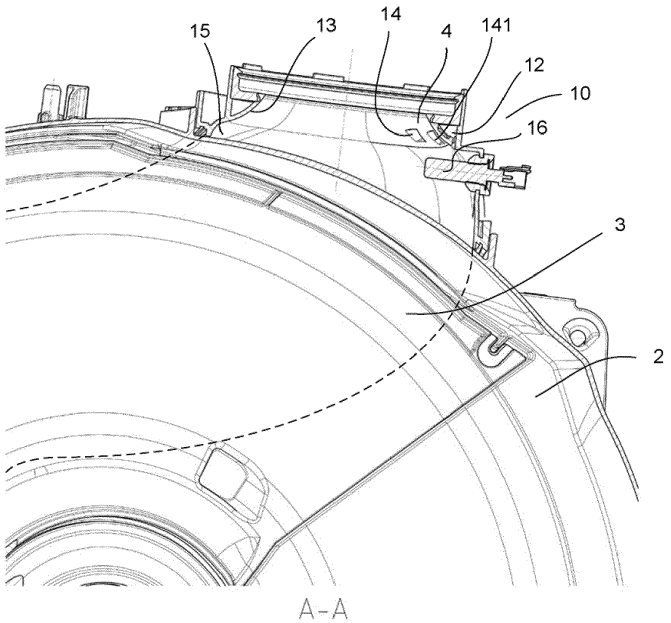

FIG. 2

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Description

[0001] The present invention relates to a laundry drying apparatus, including a drying chamber and a condensation channel in fluid communication with the drying chamber, where condensation channel is provided with an outlet located on the top of the condensation channel.

[0002] A laundry drying apparatus that performs automatic drying usually has a drying process air path. In the path, laundry is heated by drying process air and water is extracted from the laundry. The process air channel includes a drying chamber for accommodating laundry, a condensation channel in communication with the drying chamber, and a fan for promoting process air to flow, and a heating channel for heating air. The drying chamber usually includes a tub and a drum capable of rotating in the tub. The space of the tub is in communication with the space of the drum. In a drying procedure, process air is driven by a fan to enter the drying chamber from the heating channel, and comes into contact with wet laundry in the drying chamber, evaporates water in the laundry, and forms higher temperature and high humidity process air. The higher temperature and high humidity process air enters the condensation channel, and water therein is separated in the condensation channel. The process air enters the air heating channel again after leaving the condensation channel, and the cycle is repeated.

[0003] In the operating process of the drying procedure, the drum rotates at a specific rhythm and rotation speed, so that the laundry tumbles in the drum. Friction of the laundry in the moving process causes some fine fabric fibers, or referred to as fluffs, to separate from the laundry, and enter the condensation channel and downstream thereof as air flows. The place where the fluffs accumulate most is an inner wall of the condensation channel. Consequently, not only the fluffs cover a sensor in the condensation channel, leading to a decrease in the control precision, but also the large quantity of accumulated fluffs increase the air flow resistance, reduce the air unit flow, leading to a decrease in the drying efficiency. Some fluffs enter the fan with the drying process air, and consequently, the working efficiency of the fan is decreased. Some fluffs even enter the heating channel. The high-temperature heating apparatus may ignite the fluffs, leading to potential safety hazards.

[0004] Some laundry drying apparatuses rinse the condensation channel by spraying a large amounts of clean water into the condensation channel. However, usually, only the lower part of the condensation channel is rinsed, and the rinsing effect of the upper part is not obvious. Moreover, due to the gravity effect of the rinsing water flow, water usually directly falls down after leaving an outlet of a water pipe, and consequently, the cleaning effect of a wall surface of the condensation channel, and in particular, a wall surface near the water pipe is poor. However, actually, fluffs also easily accumulate on the top, close to the fan, of the condensation channel.

[0005] An objective of the present invention is to overcome or reduce the defect in the foregoing prior art, to better rinse fluffs in an upper part of a condensation channel.

[0006] To achieve the foregoing objective, the present invention provides a laundry drying apparatus as defined in the attached independent claim. Preferred facultative embodiments of the invention are defined in respective dependent claims where such preferred embodiments may be combined among themselves for yielding further preferred embodiments of the invention, described in the subsequent description, or exhibited in the attached drawing.

[0007] To achieve the foregoing objective, the present invention accordingly provides a laundry drying apparatus, including a drying chamber and a condensation channel in fluid communication with the drying chamber. The condensation channel is provided with an outlet located on the top of the condensation channel. A rinsing apparatus is disposed near the outlet. The rinsing apparatus includes a water inlet, a water flow channel that is in communication with the water inlet and peripherally extends at least partially surrounding the outlet of the condensation channel, and a plurality of water outlets disposed on a side wall of the water flow channel, where the side wall, provided with the water outlets, of the water flow channel is approximately perpendicular to a horizontal plane or is inclined downwards by an angle less than 90 degrees from a plane perpendicular to the horizontal plane.

[0008] The laundry drying apparatus may be simply a laundry drying machine, or a laundry washing and drying machine integrated with laundry washing and drying functions.

[0009] The rinsing apparatus is disposed near the outlet of the condensation channel, and can rinse fluffs near the outlet, and can also rinse most areas below the outlet when water flows downwards. The water flow channel peripherally extends surrounding the outlet, and a plurality of water outlets is disposed on the side wall of the water flow channel, so that the entire periphery near and below the outlet can be rinsed. In addition, water rotates and flows in the water flow channel, and can transversely bump against an inner wall of the condensation channel under the effect of the centrifugal inertial force when flowing out of the water outlets, so that a good rinsing effect is achieved. In addition, the side wall, provided with the water outlets, of the water flow channel is approximately perpendicular to a horizontal plane or is inclined downwards by an angle less than 90 degrees from a plane perpendicular to the horizontal plane. Then water is tightly close to the inner wall of the condensation channel when flowing out, so as to well rinse the wall surface.

[0010] Preferably, an opening direction of the at least one water outlet is a tangential direction of a cross section of the side wall, on which the water outlet is disposed, of the water flow channel. The water outlet in the tangential direction makes water flowing out of the water outlet closer to the side wall of the water flow channel, and fluffs

can be better rinsed in this way.

[0011] Preferably, the opening direction of the at least one water outlet is approximately horizontal. The horizontal opening direction can make water flow out in an approximately horizontal manner and rinse higher areas rather than directly flush downwards.

[0012] Preferably, a detection element is disposed below the water flow channel. An opening direction of the water outlet above the detection element faces the detection element. Then fluffs covered by the detection element can be rinsed.

[0013] Preferably, the side wall of the water flow channel is in smooth transition with a wall of the condensation channel, so as to prevent fluffs from gathering in a transition area, and better facilitate rinsing.

[0014] Preferably, the water flow channel and the condensation channel are an integral structure.

[0015] Preferably, the water inlet is disposed along a tangential direction of the water flow channel. Such a configuration makes water have a relatively high speed along the tangential direction, to generate a centrifugal force.

[0016] Preferably, the water flow channel is annular.

[0017] Preferably, the side wall, provided with the water outlets, of the water flow channel being inclined downwards includes being inclined by a radian.

[0018] Preferably, the water outlets are disposed close to the water inlet. At the position, the impact force of the water flow is relatively large, and then the impact force of output water is also relatively large.

[0019] The present invention will be further described below with reference to the accompanying drawing. The disclosure will become more fully understood from the detailed description given hereinbelow for illustration only, and thus not limitative of the disclosure. In the drawing:

FIG. 1 is a schematic diagram of a part of a drying chamber and a condensation channel integral with the drying chamber of a laundry drying apparatus; and

FIG. 2 is a cross-sectional view taken along an A-A direction in FIG. 1.

[0020] As shown in FIG. 1 and FIG. 2, a laundry drying apparatus includes a drying chamber 2 for accommodating laundry. A condensation channel 3 is integrally disposed on the drying chamber 2. The drying chamber 2 is in fluid communication with the condensation channel 3, so that air in the drying chamber 2 can enter the condensation channel 3 to be condensed. The condensation channel 3 is provided with an outlet 4 located on the top of the condensation channel 3. A rinsing apparatus 10 is disposed near the outlet 4.

[0021] The rinsing apparatus 10 includes a water inlet 11, a water flow channel 12 that is in communication with the water inlet 11 and peripherally extends surrounding the outlet 4 of the condensation channel, and a plurality of water outlets 14 disposed on a side wall 13 of the water flow channel 12. The water inlet 11 is disposed along a tangential direction of the water flow channel 12, and the water flow channel 12 is annular.

[0022] The water flow channel 12 and the condensation channel 3 are an integral structure. The side wall 13 of the water flow channel is inclined downwards by a radian, and is in smooth transition with a wall 15 of the condensation channel. The inclining angle is suitably less than an angle parallel to a horizontal plane, and preferably a steep angle, so that water flowing out of the water outlets 14 is closer to the side wall 13 of the water flow channel and the wall 15 of the condensation channel.

[0023] In a preferred implementation, the water outlets 14 are disposed close to the water inlet 11. In this way, water flows provided by the water outlets 14 are more concentrated and stronger than water flows provided by water outlets that are dispersedly distributed.

[0024] In a preferred implementation, an opening direction of the water outlet 14 is a tangential direction of a cross section of the side wall 13, on which the water outlet 14 is disposed, of the water flow channel. In addition, the opening direction of the water outlet 14 is approximately horizontal.

[0025] A detection element 16 is disposed below the water flow channel 12. Exceptionally, the opening direction of the water outlet 141 above the detection element 16 faces the detection element 16.

Claims

1. A laundry drying apparatus, comprising a drying chamber (2) and a condensation channel (3) in fluid communication with the drying chamber; the condensation channel being provided with an outlet (4) located on the top of the condensation channel, **characterized in that,** a rinsing apparatus (10) is disposed near the outlet (4); the rinsing apparatus comprises a water inlet (11), a water flow channel (12) that is in communication with the water inlet and peripherally extends at least partially surrounding the outlet (4) of the condensation channel, and a plurality of water outlets (14, 141) disposed on a side wall (13) of the water flow channel, wherein the side wall, provided with the water outlets, of the water flow channel is approximately perpendicular to a horizontal plane or is inclined downwards by an angle less than 90 degrees from a plane perpendicular to the horizontal plane.

2. The laundry drying apparatus according to claim 1, **characterized in that**: an opening direction of the at least one water outlet (14) is a tangential direction of a cross section of the side wall (13), on which the water outlet is disposed, of the water flow channel.

3. The laundry drying apparatus according to claim 2,

characterized in that: the opening direction of the at least one water outlet (14) is approximately horizontal.

4. The laundry drying apparatus according to claim 1, **characterized in that**: a detection element (16) is disposed below the water flow channel (12), and an opening direction of the water outlet (141) above the detection element faces the detection element.

5. The laundry drying apparatus according to claim 1, **characterized in that**: the side wall (13) of the water flow channel is in smooth transition with a wall (15) of the condensation channel.

6. The laundry drying apparatus according to claim 1, **characterized in that**: the water flow channel (12) and the condensation channel (3) are an integral structure.

7. The laundry drying apparatus according to claim 1, **characterized in that**: the water inlet (11) is disposed along a tangential direction of the water flow channel (12).

8. The laundry drying apparatus according to claim 1, **characterized in that**: the water flow channel (12) is annular.

9. The laundry drying apparatus according to claim 1, **characterized in that**: the side wall (13), provided with the water outlets (14, 141), of the water flow channel being inclined downwards comprises being inclined by a radian.

10. The laundry drying apparatus according to claim 1, **characterized in that**: the water outlets (14, 141) are disposed close to the water inlet (11).

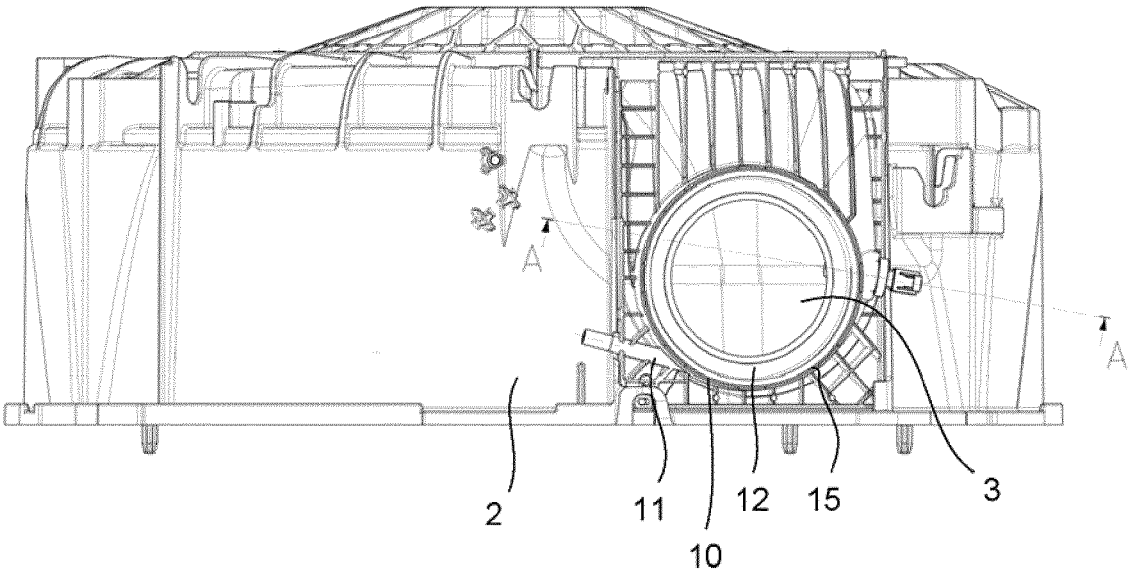

FIG. 1

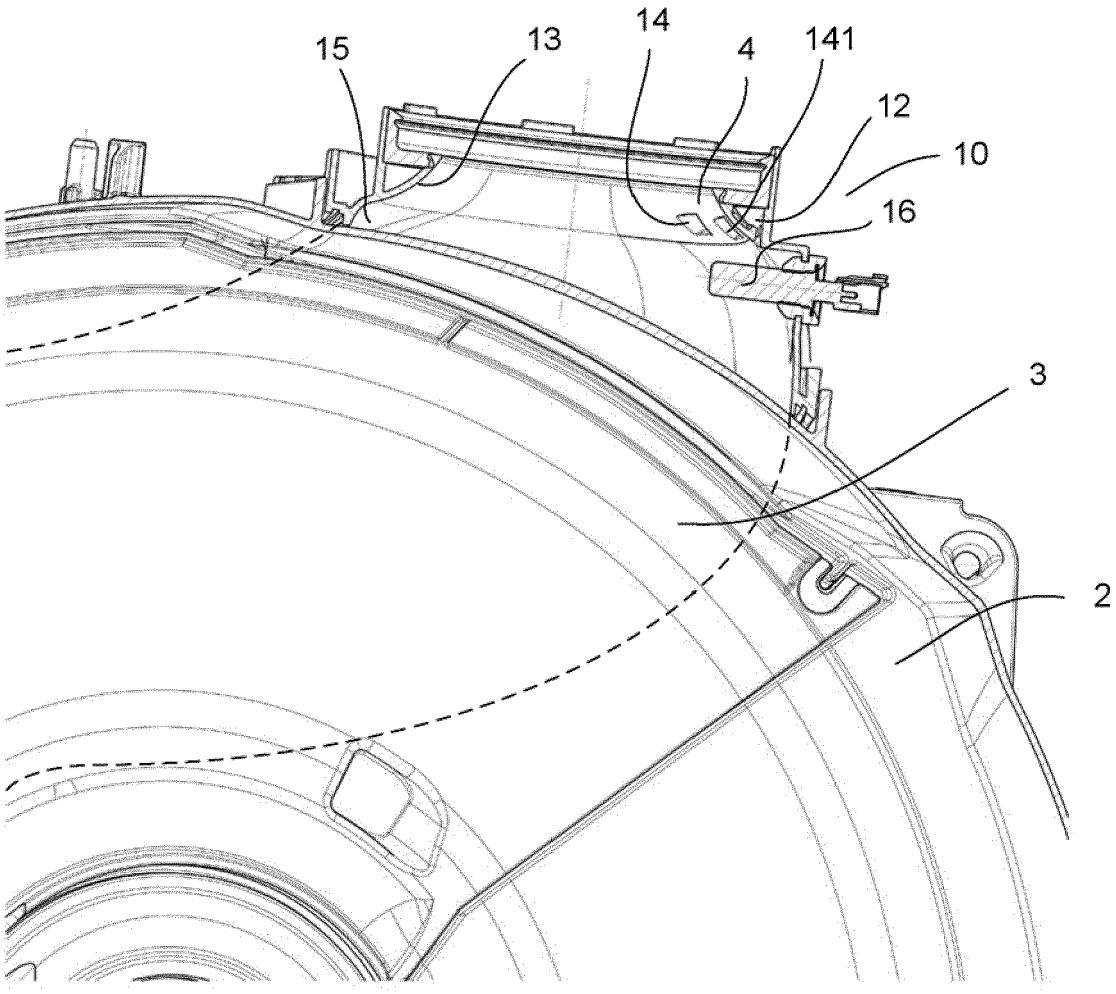

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 6401

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X Y A	EP 0 695 826 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 7 February 1996 (1996-02-07) * abstract; figures *	1-3,5, 7-10 4 6	
Y	EP 2 714 981 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 9 April 2014 (2014-04-09) * paragraph [0027]; figure 1 *	4	

TECHNICAL FIELDS SEARCHED (IPC)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 February 2018	Diaz y Diaz-Caneja

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 19 6401

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28-02-2018

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