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[illegible]

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Description

[0001] The present invention relates to a laundry drying machine including a drying compartment and a condensing passage in fluid communication the drying compartment, where along an air flowing direction, the condensing passage has an inlet connected to the drying compartment and an outlet at a position higher than that of the inlet.

[0002] A laundry drying machine for automatic drying usually has a path for drying process air. Laundry to be dried is heated by the dried process air in this path and moisture of the laundry is taken away by the dried process air. A process air channel closed in itself includes a drying compartment containing laundry to be dried, a condensing passage communicated with the drying compartment, a fan promoting the process air to flow, and a heating channel for heating the air. The drying compartment usually includes a barrel and a drum rotatable in the barrel. The barrel is spatially communicated with the drum. In a drying program, the process air is driven by the fan to enter the drying compartment from the heating channel and come into contact with wet laundry in the drying compartment, and moisture of the laundry is evaporated, to form high-temperature and high-humidity process air. The high-temperature and high-humidity process air enters the condensing passage, and moisture thereof is separated in the condensing passage. The process air leaves the condensing passage and then enters the air heating channel again, and this process is repeated.

[0003] In a running process of the drying program, the drum rotates at a particular tempo and rotation speed, so that the laundry is moved in the drum. Some tiny textile fibers, which are alternatively referred to as fluff, are separated from the laundry because of friction of the laundry in the moving process, and enter the condensing passage and downstream thereof as the air flows. The fluff is mostly accumulated on an inner wall of the condensing passage. Consequently, a sensor in the condensing passage may become covered by the fluff, and control accuracy be lowered thereby; massively accumulated fluff might increase air flowing resistance and reduce unit air flow, thereby reducing the drying efficiency. Some fluff might enter the fan along with the dried process air, reducing the work efficiency of the fan. Some fluff could even enter the heating channel, and a high-temperature heating device might ignite the fluff, causing a potential security threat.

[0004] The Chinese Patent CN 101 988 260 B discloses a laundry drying machine integrating washing and drying functions. The laundry drying machine intermittently drives a blower in a washing program to lift a liquid level in a barrel, and to generate intermittent sloshing to clean a condensing passage. This cleaning method is effective and feasible, and particularly has significant cleaning effects on an area such as an area near an inlet, in which most fluff is accumulated, at a lower portion of the condensing passage. However, when the fluff fills up an inner

wall of the entire condensing passage or even enters a fan and a heating channel, fluff at an upper portion of the condensing passage and within the fan and the heating channel cannot be processed.

[0005] For some laundry drying machine, a large amount of water is sprayed into a condensing passage to rinse the condensing passage. However, actually only a lower portion of the condensing passage is rinsed, and an upper portion of the condensing passage cannot be efficiently rinsed. Moreover, a fan and a heating channel cannot be rinsed either.

[0006] An objective of the present invention is to overcome or reduce disadvantages in the foregoing prior art, so as to capture fluff in a centralized manner, and to facilitate rinse of a component of a laundry drying machine for removing such captured fluff.

[0007] In view of the foregoing objective, the present invention provides a laundry drying machine, including a drying compartment and a condensing passage in fluid communication with the drying compartment. Along an air flowing direction, the condensing passage has an inlet connected to the drying compartment and an outlet at a position higher than that of the inlet. A fluff capturing device is disposed on an inner wall of the condensing passage. The fluff capturing device includes multiple adjacently disposed grooves and/or protrusions. Fluff entering the condensing passage is captured by the fluff capturing device, so that the fluff is prevented from being attached to another area of the condensing passage, or from entering another area of an airflow channel. The fluff may be cleaned in a centralized manner after accumulating on the capturing device, thereby improving the cleaning efficiency and avoiding necessity for rinsing other components, or other parts of the condensing passage.

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

[0009] The outlet of the condensing passage may be connected to a fan that drives air to enter the condensing passage from the drying compartment.

[0010] Preferably, the fluff capturing device is integrally manufactured with the condensing passage.

[0011] Preferably, the fluff capturing device is disposed in a lower area of the condensing passage. Therefore, a rinsing device may be disposed above the fluff capturing device, to rinse fluff captured on the fluff capturing device. Alternatively, when the laundry drying machine is combined with a washing function, the fluff capturing device located at the lower area of the condensing passage may be rinsed by using washing water in a washing process. The lower area may refer to an area below a middle line in a perpendicular direction of the condensing passage.

[0012] Preferably, the inner wall of the condensing passage on which the fluff capturing device is not disposed is smoothly formed. Therefore, the fluff is prevented from being attached to another area of the condensing passage or the fluff attached to another area of the condens-

ing passage is reduced.

[0013] More preferably, the fluff capturing device is adjacent to the inlet of the condensing passage. Air often flows at a relatively high speed at the inlet of the condensing passage, and lots of fluff is carried. Therefore, it is more effective to dispose the fluff capturing device in the area. In addition, the fluff capturing device located in this area is easier to be cleaned. A position of the inlet is lower than another area of the condensing passage. Therefore, if the laundry drying machine is combined with a washing function, washing water in a washing process is easier to immerse or at least partially immerse the fluff capturing device, and the washing water that sloshes may clean the fluff capturing device. If a water inlet pipe is disposed at a higher position of the condensing passage to supply rinsing water to the fluff capturing device, a better rinsing effect of the water is achieved when a drop height is greater.

[0014] Preferably, the fluff capturing device faces an airflow entering the inlet. In this way, fluff carried by the airflow is directly towards the fluff capturing device, and therefore is easier to be captured.

[0015] Preferably, the condensing passage has a bend, and the fluff capturing device is located at the bend. At the bend, air resistance is great, and air has a low flowing speed and a weak fluff carrying capability. Therefore, fluff may be captured more easily.

[0016] Preferably, each of the grooves has a capturing surface that is substantially perpendicular to the inner wall of the condensing passage on which an edge of the groove is located, and the capturing surface faces an airflow direction. Longer foreign matters such as hairs in fluff may be collected in the grooves. The capturing surfaces may block an airflow and intercept the fluff.

[0017] Further, each of the grooves has an inclined surface connected to the capturing surface. The inclined surface facilitates rinsing of the fluff.

[0018] Preferably, an extension direction of each of the grooves is substantially perpendicular to a direction of an airflow that flows through a position at which the groove is located.

[0019] Preferably, the grooves are elongated-shaped.

[0020] Preferably, the multiple grooves are disposed in parallel to one another.

[0021] Preferably, the protrusions are wedge-shaped. The wedge-shaped structure has less impact on airflow resistance, and has better rinsing effects. Moreover, ridges facilitate capturing of smaller fluff.

[0022] Preferably, each of the wedge-shaped protrusions has a ridge perpendicular to an airflow direction. Such a structure may further facilitate capturing of fluff.

[0023] Preferably, the protrusions are staggered from each other. That is, the protrusions that are distributed in a front-rear direction are staggered from each other in an air flowing direction.

[0024] Preferably, the multiple grooves and the multiple protrusions are alternately disposed.

[0025] Preferably, a control device and a water supply

device supplying water to the drying compartment are included, where the control device is set to be capable of controlling the water supply device to supply water to the drying compartment, and execute a washing program; and in the washing program, a water level in the drying compartment at least partially exceeds the fluff capturing device. Therefore, washing water that sloshes in the washing program is used to rinse fluff attached to the fluff capturing device. The rinsed fluff is discharged with the washing water. The washing program includes a laundry washing program and a drum cleaning program of a drum without laundry, and also includes a complete washing program and a single rinsing program.

[0026] Preferably, the condensing passage is provided with a water supply channel, and a position of the water supply channel is higher than that of the fluff capturing device. Water flowing from the water supply channel may rinse the fluff capturing device.

[0027] Preferred embodiments of the present invention are further described below with reference to the figures of the accompanying drawing. The implementations of the invention are shown in the accompanying drawing and described below by example only, using a washing and drying machine as an embodiment. In particular,

FIG. 1 is a schematic partial composition diagram of a laundry drying machine;

FIG. 2 is a three-dimensional view of a fluff capturing device;

FIG. 3 is a schematic diagram of three implementations of a protrusion on a fluff capturing device;

FIG. 4A is a sectional view of a preferred implementation of a groove on a fluff capturing device; and

FIG. 4B is a sectional view of another implementation of a groove on a fluff capturing device.

[0028] As shown in FIG. 1, a laundry drying machine 1 includes a barrel 2, a drum 3 that accommodates laundry and is rotatably located in the barrel 2, a condensing passage 4 in fluid communication with the barrel 2, a fan 5 at downstream of an air flowing direction of the condensing passage 4, and an air heating channel 6 at downstream of the fan 5. An outlet of the air heating channel 6 is further in fluid communication with the barrel 2. Through holes (not shown in the figures) are distributed all over a wall of the drum 3, so that the drum 3 is spatially communicated with the barrel 2 in space.

[0029] Along the air flowing direction, the condensing passage 4 has an inlet 41 connected to the barrel 2 and an outlet 42 at a position higher than that of the inlet 41. A fluff capturing device 400 is disposed in an area 100 on an inner wall surface 40 of the condensing passage

4 near the inlet 41. The fluff capturing device 400 is integrally formed on the inner wall surface 40 of the condensing passage 4. An area, in which the fluff capturing device 400 is not disposed, on the inner wall surface 40 of the condensing passage is a smooth structure.

[0030] The condensing passage 4 is further provided with a water supply channel 8. A position of the water supply channel 8 is higher than that of the fluff capturing device 400. A first water valve 11 controlled by a control device 10 is disposed on the water supply channel. The first water valve 11 may be opened as needed. Water enters the condensing passage 4 from the water supply channel 8, and rushes down to the fluff capturing device 400, so as to wash off fluff.

[0031] The laundry drying machine 1 is further provided with a water supply device 14 connected to a second water valve 12. The water supply device 14 has an outlet connected to the barrel 2, so as to supply water to the barrel 2. The second water valve 12 is controlled by the control device 10. The control device 10 is preconfigured with multiple washing programs and a drying program. In a washing program, the second water valve 12 is opened, so that water is supplied to the barrel 2 by using the water supply device 14. In at least one washing program, the barrel 2 is supplied with water until a water level at least partially exceeds the fluff capturing device 400. Therefore, fluff on the fluff capturing device 400 may be washed off due to sloshing of water that occurs in the washing process.

[0032] To better capture the fluff, the fluff capturing device 400 is arranged at a bend 43 of the condensing passage 4, and faces an airflow entering the inlet 41.

[0033] FIG. 2 shows a part of a wall 401 of the condensing passage 4, and also shows a part of the fluff capturing device 400. It can be seen from FIG. 2 that, the fluff capturing device 400 includes multiple grooves 410 and multiple protrusions 420 that are adjacently and alternately disposed.

[0034] In another implementation not shown in the figure, the fluff capturing device may include only multiple grooves, or include only multiple protrusions. Shapes and distributions of the grooves and the protrusions are described in the following.

[0035] In the implementation shown in FIG. 2, the grooves 410 are elongated-shaped, and the multiple grooves 410 are disposed parallel to each other. Moreover, an extension direction of the grooves 410 is substantially perpendicular to a direction of an airflow A that flows through a position at which the groove 410 is located. The protrusions 420 are staggered from each other.

[0036] The protrusions 420 are preferably wedge-shaped, and have ridges 421 perpendicular to an airflow direction. In another implementation, the protrusion may be in a structure of a cylinder 420b or a cuboid 420a shown in FIG. 3, or uses a combination of various structures.

[0037] As shown in FIG. 4A and 4B, the grooves 410

have capturing surfaces 412 that are substantially perpendicular to the inner wall surface 40 of the condensing passage on which edges of the grooves are located. The capturing surfaces 412 face a direction in which the airflow A flows.

[0038] The groove 410 is preferably in a structure shown in FIG. 4A. In this implementation, the grooves 410 have inclined surfaces 413 connected to the capturing surfaces 412.

Claims

1. A laundry drying machine, comprising a drying compartment (2) and a condensing passage (4) in fluid communication with the drying compartment, wherein along an air flowing direction, the condensing passage has an inlet (41) connected to the drying compartment and an outlet (42) at a position higher than that of the inlet, **characterized in that** a fluff capturing device (400) is disposed on an inner wall surface (40) of the condensing passage, and the fluff capturing device comprises multiple adjacently disposed grooves (410) and/or protrusions (420).
2. The laundry drying machine according to claim 1, **characterized in that** the outlet (42) of the condensing passage is connected to a fan (5) that drives air to enter the condensing passage (4) from the drying compartment (2).
3. The laundry drying machine according to any preceding claim, **characterized in that** the fluff capturing device (400) is integrally manufactured with the condensing passage (4).
4. The laundry drying machine according to any preceding claim, **characterized in that** the fluff capturing device (400) is disposed in a lower area of the condensing passage.
5. The laundry drying machine according to claim 4, **characterized in that** the fluff capturing device (400) is adjacent to the inlet (41) of the condensing passage.
6. The laundry drying machine according to any preceding claim, **characterized in that** the inner wall surface (40) of the condensing passage, except the area on which the fluff capturing device (400) is disposed is smoothly formed.
7. The laundry drying machine according to any preceding claim, **characterized in that** the fluff capturing device (400) faces an airflow (A) entering the inlet.
8. The laundry drying machine according to claim 7,

characterized in that the condensing passage has a bend (43), and the fluff capturing device (400) is located at the bend.

in the washing program, a water level in the drying compartment at least partially exceeds the fluff capturing device (400).

9. The laundry drying machine according to any preceding claim, **characterized in that** each of the grooves (410) has a capturing surface (412) that is substantially perpendicular to the inner wall surface (40) of the condensing passage on which an edge of the groove is located, and the capturing surface faces an airflow direction (A). 10
10. The laundry drying machine according to claim 9, **characterized in that** each of the grooves (410) has an inclined surface (413) connected to the capturing surface. 15
11. The laundry drying machine according to any preceding claim, **characterized in that** an extension direction of each of the grooves (410) is substantially perpendicular to a direction of an airflow (A) that flows through a position at which the groove is located. 20
12. The laundry drying machine according to any preceding claim, **characterized in that** each of the grooves (410) is elongatedly shaped. 25
13. The laundry drying machine according to any preceding claim, **characterized in that** the multiple grooves (410) are disposed in parallel to one another. 30
14. The laundry drying machine according to any preceding claim, **characterized in that** the protrusions (420) are wedge-shaped. 35
15. The laundry drying machine according to claim 14, **characterized in that** each of the wedge-shaped protrusions (420) has a ridge (421) perpendicular to an airflow direction. 40
16. The laundry drying machine according to any preceding claim, **characterized in that** the protrusions (420) are staggered from each other. 45
17. The laundry drying machine according to any preceding claim, **characterized in that** the multiple grooves (410) and the multiple protrusions (420) are alternately disposed. 50
18. The laundry drying machine according to any preceding claim, **characterized by** comprising a control device (10) and a water supply device (12, 14) supplying water to the drying compartment (2), wherein the control device is set to be capable of controlling the water supply device to supply water to the drying compartment, and execute a washing program; and 55

19. The laundry drying machine according to any preceding claim, **characterized in that** the condensing passage (4) is provided with a water supply channel (8), and a position of the water supply channel is higher than that of the fluff capturing device (400).

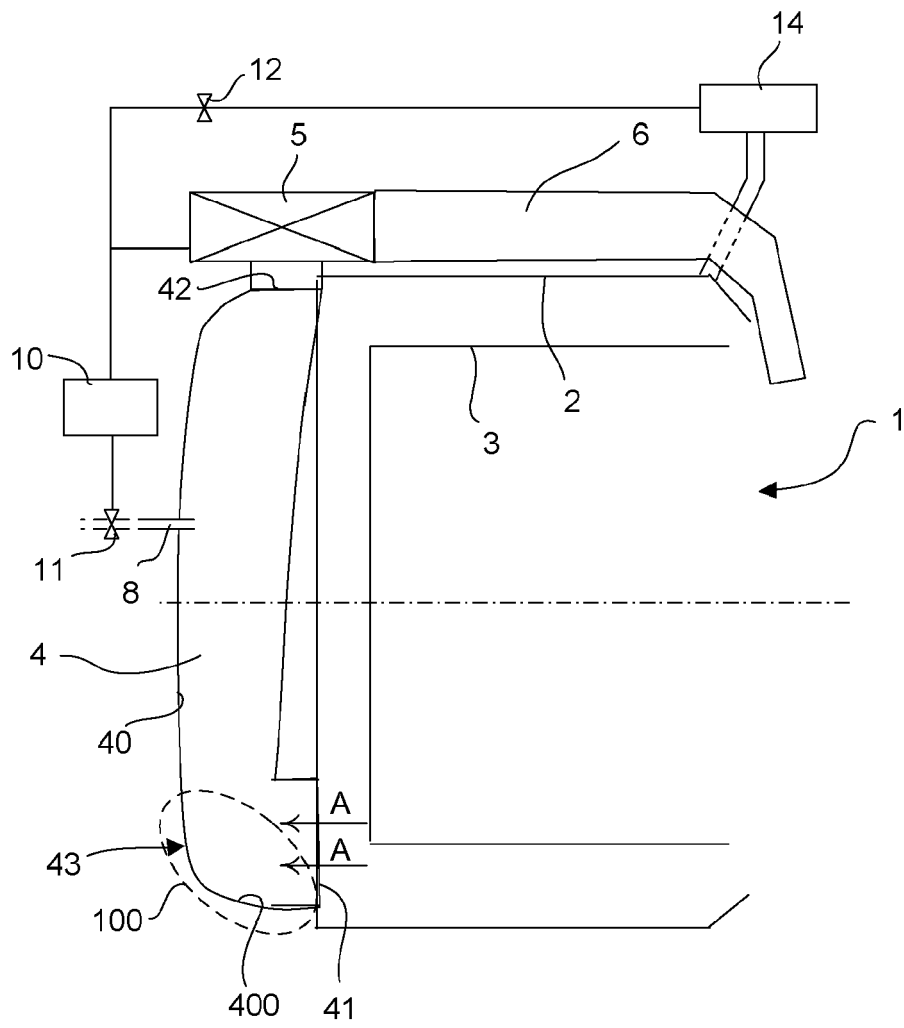


FIG. 1

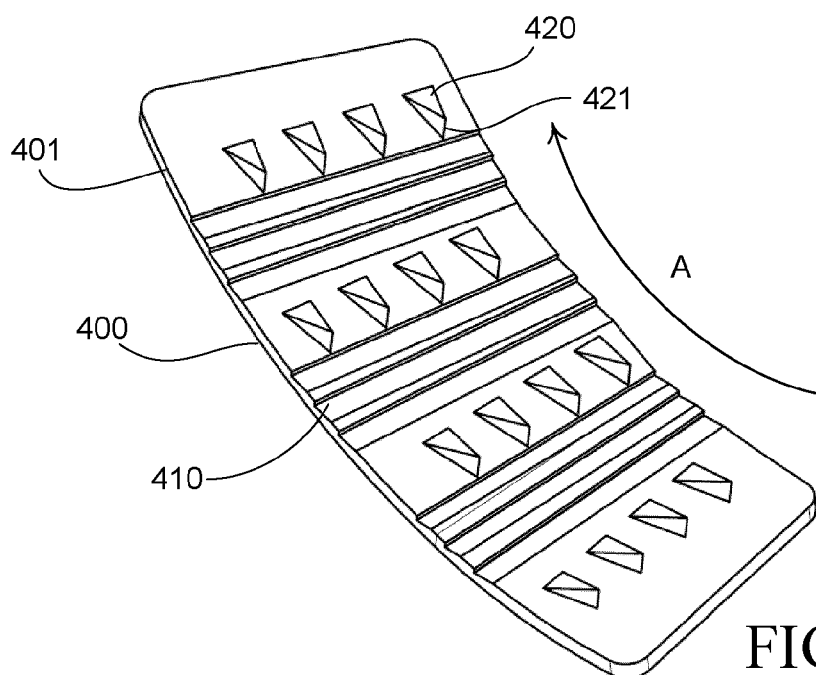


FIG. 2

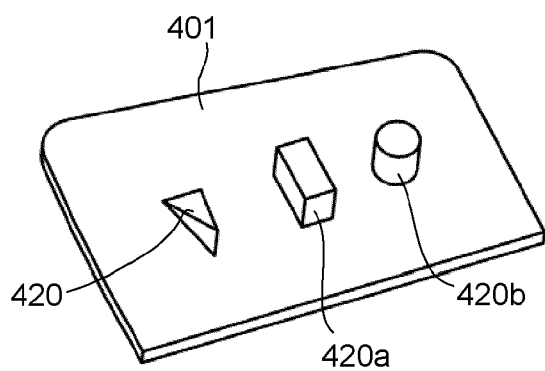


FIG. 3

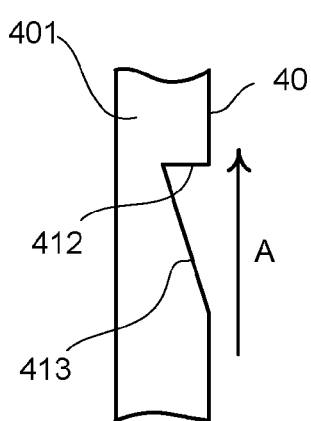


FIG. 4A

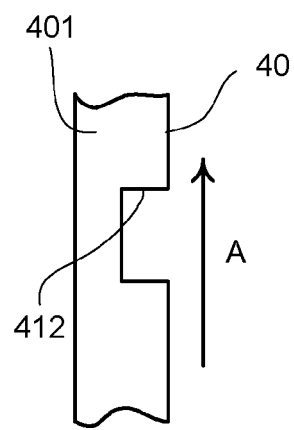


FIG. 4B



EUROPEAN SEARCH REPORT

Application Number
EP 17 17 6873

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X	JP 2008 194373 A (MITSUBISHI ELECTRIC CORP; NIPPON KENTETSU CO LTD) 28 August 2008 (2008-08-28) * paragraphs [0010], [0015] - [0026]; figures 1-26 *	1-19	INV. D06F58/22 D06F58/24
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			D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 August 2017	Examiner Kising, Axel
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 17 6873

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The members are as contained in the European Patent Office EDP file on
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17-08-2017

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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