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(72) Inventors:
• Dey, Uwe
10589 Berlin (DE)
• Li, Maoyin
Nanjing, 211500 (CN)
• Xu, Yonggang
Nanjing, 210046 (CN)
• You, Qixia
Nanjing, 210048 (CN)
• Zhang, Qi
Nanjing, 210046 (CN)

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(71) Applicant: BSH Hausgeräte GmbH
81739 München (DE)

(54)

LAUNDRY DRYER

(57) Disclosed is a laundry dryer (100), comprising a cabinet (1), a drying chamber (2), an air heating channel (7) associated with the drying chamber (2), and a fan (6) facilitating air to flow in the drying chamber (2) and in the air heating channel (7), the fan (6) being disposed neighboring the air heating channel (7), the fan (6) having a primary air channel (11) formed by a housing (10), and the primary air channel (11) being in fluid communication with the drying chamber (2) and the air heating channel (7), wherein the housing (10) is covered by a cover (12) outside, a secondary air channel (15) having an inlet (13) and an outlet (14) is formed between the cover (12) and the housing (10), impellers (62) rotating with a rotator (61) of a motor are provided in the secondary air channel (15), the impellers (62) are such disposed that when the impellers (62) rotate with the rotator (61), air is driven to enter the secondary air channel (15) from the inlet (13) of the secondary air channel (15) and exit from the outlet (14) of the secondary air channel (15), and the inlet (13) and the outlet (14) of the secondary air channel (15) respectively extend by using a first pipe (16) and a second pipe (17). When the fan (6) operates, the rotator (61) drives the impellers (62) located in the secondary air channel (15) to rotate, so that air flows through the secondary air channel (15), thereby removing heat generated by the motor of the fan (6), and achieving cooling.

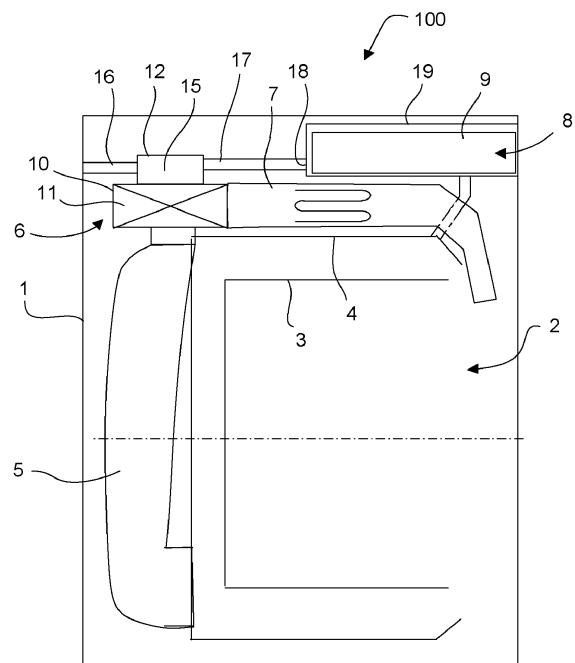


FIG. 1

Description

[0001] The present invention relates to a laundry dryer, including a cabinet, a drying chamber, an air heating channel associated with the drying chamber, and a fan facilitating air to flow in the drying chamber and in the air heating channel, where the fan is disposed neighboring the air heating channel, and the fan has a primary air channel formed by a housing.

[0002] Many laundry dryers generally have a drying chamber, an air heating channel connected to the drying chamber, and a fan facilitating air to flow inside the drying chamber and around the air heating channel. A motor of the fan generates a great amount of heat after the fan operates for a long time, and if not dissipated in time, the great amount of heat may affect performance and a life of the fan. To cool the fan, impellers rotating with a rotator may be provided outside the motor of the fan. When the impellers rotate, air is driven to flow, thereby cooling the motor of the fan.

[0003] However, because the fan is generally disposed neighboring the air heating channel, flowing of air outside the fan causes heat in the air heating channel to significantly loss, resulting in a heat loss.

[0004] An objective of the present invention is to dissipate heat generated by a motor of a fan while avoid a heat loss of an air heating channel.

[0005] For the foregoing objective, the present invention provides an improved laundry dryer according to the independent claim attached. Facultative preferred embodiments are defined in dependent claims as well as in the subsequent description, and are exhibited in the drawing attached. The invention also includes combinations of preferred embodiments thus disclosed.

[0006] Accordingly the present invention provides an improved laundry dryer, including a cabinet, a drying chamber, an air heating channel associated with the drying chamber, and a fan facilitating air to flow in the drying chamber and in the air heating channel, the fan being disposed neighboring the air heating channel, the fan having a primary air channel formed by a housing, and the primary air channel being in fluid communication with the drying chamber and the air heating channel, where the housing is covered by a cover outside, a secondary air channel having an inlet and an outlet is formed between the cover and the housing, impellers rotating with a rotator of a motor are provided in the secondary air channel, the impellers are such disposed that when the impellers rotate with the rotator, air is driven to enter the secondary air channel from the inlet of the secondary air channel and exit from the outlet of the secondary air channel, and the inlet and the outlet of the secondary air channel respectively extend by using a first pipe and a second pipe.

[0007] When the fan operates, the rotator drives the impellers located in the secondary air channel to rotate, so that air flows through the secondary air channel, thereby removing heat generated by the motor of the fan, and

achieving cooling. In addition, the secondary air channel is isolated from an ambient space of the air heating channel by using the cover, the first pipe, and the second pipe, and rotation of the impellers does not disturb ambient air of the air heating channel, thereby avoiding a heat loss of the air heating channel arising therefrom. In addition, because the inlet and the outlet of the secondary air channel respectively extend by using the first pipe and the second pipe, lengths and extending directions of the first pipe and the second pipe may be appropriately set, so that air entering and exiting from the secondary air channel is far away from the ambient space of the air heating channel, thereby further reducing an effect on the air heating channel.

[0008] Preferably, the inlet and the outlet of the secondary air channel are isolated from an ambient space in which the air heating channel is located. In such a setting manner, disturbing to ambient air of the air heating channel by airflow in the secondary air channel is reduced to the minimum, thereby decreasing a heat loss arising therefrom to the lowest.

[0009] Preferably, an outlet of the second pipe connecting to the outlet of the secondary air channel is close to an apparatus that needs to be cooled. Thereby, air leaving the secondary air channel from the second pipe can remove at least some heat of the apparatus that needs to be cooled.

[0010] Preferably, the inlet of the secondary air channel introduces ambient air from the outside of the cabinet through the first pipe. In this way, not only air in the cabinet is not unnecessarily disturbed, but also a temperature of the ambient air is usually lower than a temperature of the air in the cabinet.

[0011] The apparatus that needs to be cooled includes at least one of a circuit system, an outer wall of the drying chamber, and a detergent adding apparatus.

[0012] The detergent adding apparatus includes an accommodating chamber adapted to store a detergent for multiple washing processes, and the outlet of the second pipe faces the accommodating chamber. Air from the secondary air channel removes heat of the accommodating chamber, reduces a temperature in the accommodating chamber, thereby avoiding deterioration of the detergent or a decrease in chemical performance of the detergent due to a high temperature.

[0013] Preferably, at least a part of the rotator of the motor of the fan is located in the secondary air channel between the housing and the cover, and the impellers are disposed in a peripheral direction of the part of the rotator of the motor that is located in the secondary air channel. In such a setting manner, an occupied space is small, a structure is simple, and manufacturing costs are low.

[0014] The present invention is further described below with reference to the accompanying drawings.

[0015] The disclosure will become more fully understood from the detailed description of preferred embodiments shown in the drawing attached, and given here-

inbelow for illustration only, and thus not limitative of the disclosure, In the drawing:

FIG. 1 is a schematic structural diagram of a dryer;
and

FIG. 2 is three-dimensional diagrams of a housing
and a cover of a fan in a separate state.

[0016] As shown in FIG. 1, a laundry dryer 100 has a cabinet 1. A drying chamber 2 is provided in the cabinet 1. The drying chamber 2 includes a rotatable drum 3 and an tub 4 located outside the drum 3. Spaces of the drum 3 and the tub 4 communicate. Pieces of laundry are dried in the drum 3. The tub 4 sequentially connects to a condensation channel 5, a fan 6, and an air heating channel 7. An outlet of the air heating channel 7 communicates with the space of the tub 4 again. After the fan 6 is started, air is driven to sequentially circulate in a direction of the fan 6, the air heating channel 7, the drying chamber 2, the condensation channel 5, and the fan 6.

[0017] In the specific implementation shown in FIG. 1, the laundry dryer 100 further includes a detergent adding apparatus 8. The detergent adding apparatus 8 includes an accommodating chamber 9 adapted to store a detergent for multiple washing processes. The detergent adding apparatus 8 is disposed neighboring the air heating channel 7. Therefore, heat radiating from the air heating channel 7 causes a temperature of the detergent adding apparatus 8 to increase.

[0018] With reference to FIG. 1 in combination with FIG. 2, the fan 6 has a primary air channel 11 formed by a housing 10. The primary air channel 11 is in fluid communication with the drying chamber 2 and the air heating channel 7. The housing 10 is covered by a cover 12 outside. A secondary air channel 15 having an inlet 13 and an outlet 14 is formed between the cover 12 and the housing 10. The inlet 13 and the outlet 14 of the secondary air channel 15 respectively extend by using a first pipe 16 and a second pipe 17. At least a part of a rotator 61 of a motor of the fan 6 is located in the secondary air channel 15 between the housing 10 and the cover 12. Impellers 62 are provided in a peripheral direction of the part of the rotator 61 of the motor that is located in the secondary air channel 15. When the impellers 62 rotate with the rotator 61, air is driven to enter the secondary air channel 15 from the inlet 13 of the secondary air channel 15 and exit from the outlet 14 of the secondary air channel 15.

[0019] The inlet 13 of the secondary air channel 15 connects to the outside of the cabinet 1 by using the first pipe 16, so as to introduce ambient air with a lower temperature from the outside of the cabinet 1.

[0020] An end of the second pipe 17 connecting to the outlet 14 of the secondary air channel 15 connects to a frame 19 provided around a detergent accommodating chamber 9. An outlet 18 of the second pipe 17 faces the accommodating chamber 9. Therefore, after ambient air

with a lower temperature enters the secondary air channel 15, some heat of the fan 6 is removed, and the ambient air continues flowing and blows into the detergent accommodating chamber 9, thereby cooling the detergent accommodating chamber 9. The outlet 14 of the secondary air channel 15 is isolated by using the frame 19 from an ambient space in which the air heating channel 7 is located.

[0021] In another implementation not shown in FIG. 1, the outlet 18 of the second pipe 17 may be close to another apparatus that needs to be cooled, for example, a circuit system or an outer wall of the drying chamber 2. However, when the circuit system or the drying chamber 2 is cooled, the outlet 18 of the second pipe 17 is preferably far away from the ambient space in which the air heating channel 7 is located, and is better isolated therefrom in space.

REFERENCE NUMERALS

[0022]

1	Cabinet
2	Drying chamber
3	Drum
4	Tub
5	Condensation channel
6	Fan
7	Air heating channel
8	Detergent adding apparatus
9	Accommodating chamber
10	Housing
11	Primary air channel
12	Cover
13	Inlet
14	Outlet
15	Secondary air channel
16	First pipe
17	Second pipe
18	Outlet
19	Frame
61	Rotator
62	Impeller
100	Laundry dryer

Claims

1. A laundry dryer (100), comprising a cabinet (1), a drying chamber (2), an air heating channel (7) associated with the drying chamber (2), and a fan (6) facilitating air to flow in the drying chamber (2) and in the air heating channel (7), the fan (6) being disposed neighboring the air heating channel (7), the fan (6) having a primary air channel (11) formed by a housing (10), and the primary air channel (11) being in fluid communication with the drying chamber (2) and the air heating channel (7), **characterized in that**

the housing (10) is covered by a cover (12) outside, a secondary air channel (15) having an inlet (13) and an outlet (14) is formed between the cover (12) and the housing (10), impellers (62) rotating with a rotator (61) of a motor are provided in the secondary air channel (15), the impellers (62) are such disposed that when the impellers (62) rotate with the rotator (61), air is driven to enter the secondary air channel (15) from the inlet (13) of the secondary air channel (15) and exit from the outlet (14) of the secondary air channel (15), and the inlet (13) and the outlet (14) of the secondary air channel (15) respectively extend by using a first pipe (16) and a second pipe (17).

2. The laundry dryer (100) according to claim 1, **characterized in that** the inlet (13) and the outlet (14) of the secondary air channel (15) are isolated from an ambient space in which the air heating channel (7) is located.

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3. The laundry dryer (100) according to claim 1, **characterized in that** an outlet (14) of the second pipe (17) connecting to the outlet (14) of the secondary air channel (15) is close to an apparatus (2, 8) that needs to be cooled.

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4. The laundry dryer (100) according to claim 3, **characterized in that** the inlet (13) of the secondary air channel (15) introduces ambient air from the outside of the cabinet (1) through the first pipe (16).

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5. The laundry dryer (100) according to claim 3, **characterized in that** the apparatus (2, 8) that needs to be cooled comprises at least one of a circuit system, an outer wall of the drying chamber (2), and a detergent adding apparatus (8).

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6. The laundry dryer (100) according to claim 5, **characterized in that** the detergent adding apparatus (8) comprises an accommodating chamber (9) adapted to store a detergent for multiple washing processes, and the outlet of the second pipe (17) faces the accommodating chamber(9).

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7. The laundry dryer (100) according to claim 1, **characterized in that** at least a part of the rotator (61) of the motor of the fan (6) is located in the secondary air channel (15) between the housing (10) and the cover (12), and the impellers (62) are disposed in a peripheral direction of the part of the rotator (61) of the motor that is located in the secondary air channel (15).

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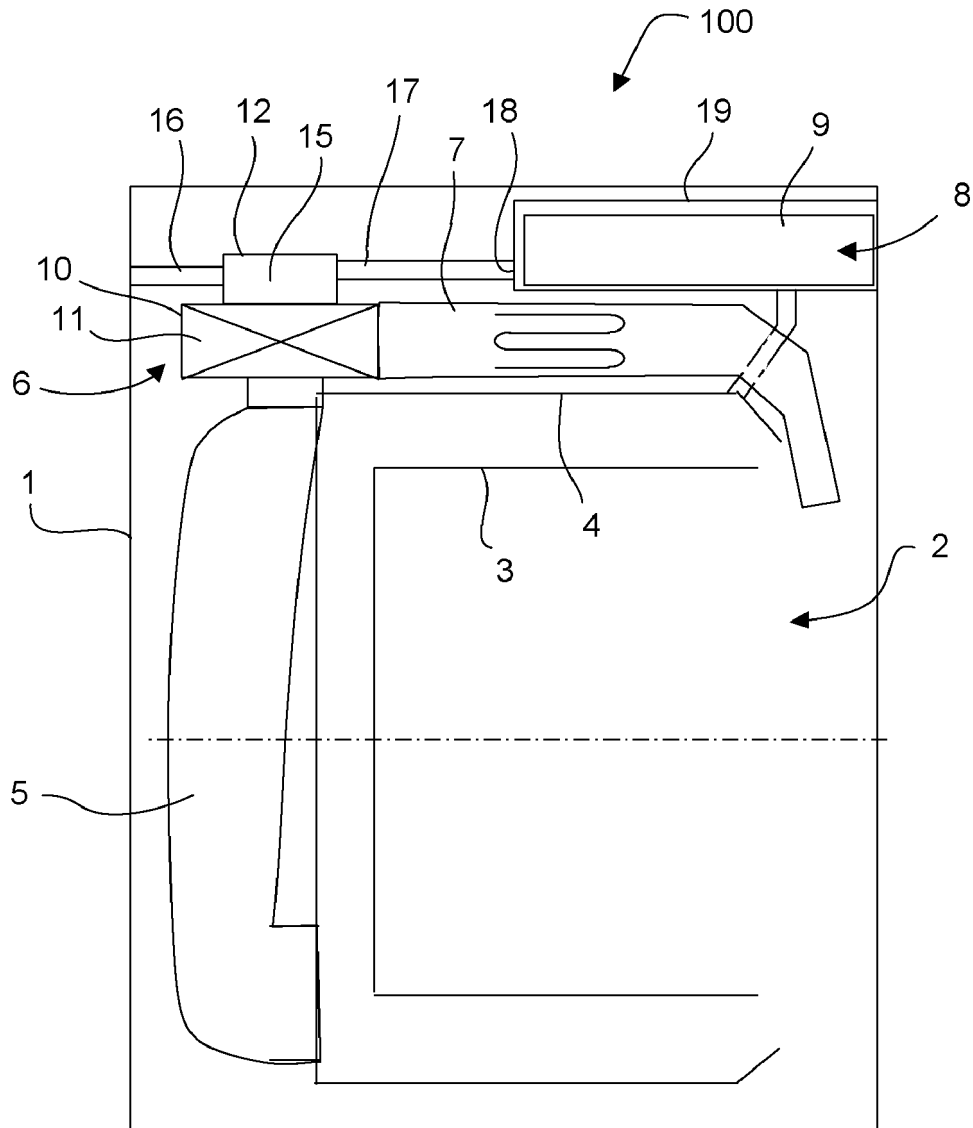


FIG. 1

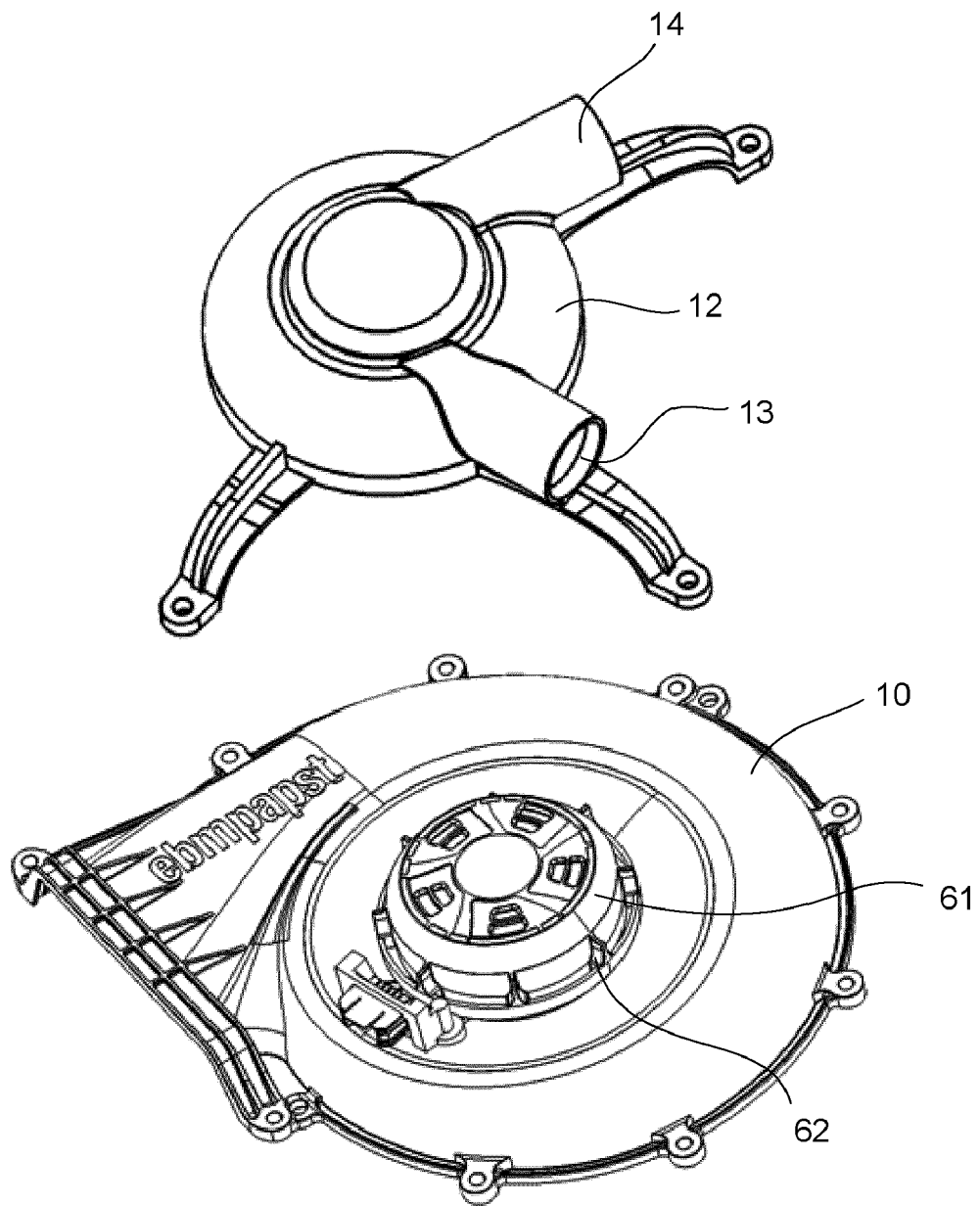


FIG. 2



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 18 2736

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Place of search Munich		Date of completion of the search 20 September 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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