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(54) **Container for collecting the condensed water in a clothes dryer and clothes dryer thereof**

(57) The present invention relates to a container (10) for collecting condensed water in a clothes dryer (1), in particular of the condensation type, said container (10) being removably associated with a housing (A) in a frame (2) of the clothes dryer (1).

The invention is characterized in that the container (10) comprises:
- a first aperture (11) for supplying condensed water into the container (10) and for quickly draining the condensed water from the container (10);
- a second aperture (12) for a precision drainage of the condensed water from said container (10).

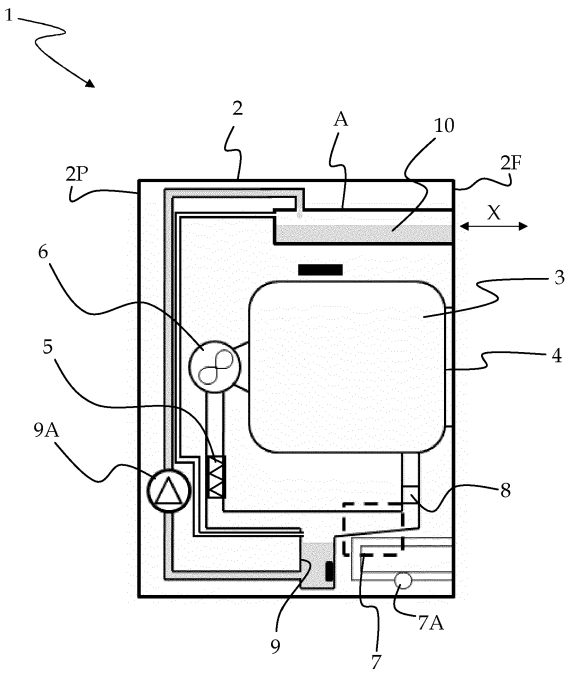

Fig. 1

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Description

[0001] The present invention relates to a container for collecting condensed water in a clothes dryer according to the preamble of claim 1. The present invention also relates to a clothes dryer equipped therewith. In particular, the invention is applicable to the field of condensation-type clothes dryers.

[0002] Clothes dryers, in particular of the condensation type, are per se known and typically comprise a drum containing laundry to be dried by an air jet generated by a fan and heated by an electric resistor or by a condenser device in a machine fitted with a heat pump.

[0003] The hot air jet flows through the laundry in the drum, thereby subtracting moisture therefrom, and then flows through a filter that removes any lint and other impurities from the air jet.

[0004] Said air jet also flows through a heat exchanger, where it cools down through the effect of thermal exchange with colder environmental air, thus condensing and yielding water, which flows into a collection tank usually located in the lower part of the machine; from the collection tank, the water is conveyed by a pump into a removable container typically arranged in the upper part of the machine, in a position easily accessible to a user, who can then periodically remove and empty said container.

[0005] It is clear that the clothes dryers known in the art may not include a collection tank; in such cases, they are only equipped with the container for collecting condensed water, said container being usually positioned in the lower part of the machine.

[0006] As a consequence, the clothes dryers, in particular of the condensation type, known in the art comprise:

- a frame that houses a drum for containing laundry to be dried,
- first means for delivering heated air into said drum,
- heat exchanger means crossed by the air coming from the drum,
- at least one container for collecting the condensed water produced by said heat exchanger means.

[0007] However, the known condensed water containers suffer from some drawbacks, in that they have a condensed water supply aperture which is also used for emptying the container; said supply aperture is usually rather large, thus not allowing for a precise drainage of the condensed water present in the container.

[0008] A further drawback of the condensed water containers of the clothes dryers known in the art is that they are difficult to carry after having been extracted from the respective housing in said clothes dryers. In particular, this problem is especially felt by the user when the containers are full of condensed water and are therefore quite heavy.

[0009] In this frame, it is the main object of the present invention to overcome the above-mentioned drawbacks by providing a container for collecting condensed water in a clothes dryer and a clothes dryer equipped therewith, said container being so designed as to allow for a precise drainage of the condensed water present therein, if necessary.

[0010] It is another object of the present invention to provide a container for collecting condensed water in a clothes dryer and a clothes dryer equipped therewith which are so designed as to facilitate the transportation of the container after the latter has been extracted from the respective housing in said clothes dryer, in particular when the container is full of condensed water and is therefore quite heavy.

[0011] Said objects are achieved through a container for collecting condensed water in a clothes dryer and a clothes dryer equipped therewith which incorporate the features set out in the appended claims, which are intended as an integral part of the present description. Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 schematically shows a clothes dryer according to the present invention;
- Figs. 2a and 2b are a perspective view and a top view, respectively, of a container for collecting condensed water of the clothes dryer of Fig. 1, designed in accordance with the present invention.

[0012] Referring now to the annexed drawings, in Fig. 1 reference numeral 1 designates as a whole a clothes dryer, in particular of the condensation type, according to the present invention.

[0013] The clothes dryer 1 comprises a frame 2 that houses a drum 3 adapted to contain laundry (not shown) to be dried, said drum 3 being accessible from the outside through a door 4 usually fitted with sealing gaskets (not shown).

[0014] In addition, the clothes dryer 1 comprises first means 5,6 for blowing heated air into said drum 3, said first means comprising in particular an electric resistor 5 and a fan 6. As an alternative (not shown in the annexed drawings), in a clothes dryer equipped with a heat pump said first means may comprise a condenser device and a fan.

[0015] The clothes dryer 1 further comprises second means 7 for exchanging heat, said second means 7 being crossed by the air coming from the drum 3; preferably, said second means comprise an exchanger 7, where the humid air coming from the drum 3 condenses.

[0016] The clothes dryer 1 also comprises at least one container 10 for collecting the condensed water produced by said second means 7 for exchanging heat.

[0017] In particular, the humid air exiting the drum 3 flows through a filter 8 for removing any lint and/or other impurities from the air jet; in said second means 7 the

hot humid air is then cooled through thermal exchange with fresh air (normally at ambient temperature) conveyed by a second fan 7A.

[0018] The condensed water present in a collection tank 9 is delivered by a pump 9A towards the container 10, wherein it is collected.

[0019] The one described above is a basic scheme of a clothes dryer, in particular of the condensation type, which is useful for understanding the operation thereof; in practice, however, the machine 1 may include additional components which have been omitted in the present description for simplicity.

[0020] The container 10 is removably associated with a housing A in the frame 2 of the clothes dryer 1; as a consequence, it can be removed for draining.

[0021] Preferably, the container 10 extends in said housing A substantially horizontally from a front portion 2F of the frame 2 towards a rear portion 2P of said frame 2; in particular, said container 10 is of the drawer type and can be extracted from the housing A and/or inserted into the housing A with a substantially horizontal movement (see arrow "X" in Fig. 1).

[0022] Furthermore, the container 10 of the machine 1 shown in Fig. 1 is arranged in an upper part of the frame 2; this improves the ergonomics of the machine 1, in that said container 10 can be easily reached by a user. It is however clear that the container 10 may also be arranged in a lower part of the machine 1 according to the present invention; in such a case, said machine 1 may even lack the collection tank 9 and/or the pump 9A.

[0023] Figs. 2a and 2b are a perspective view and a top view, respectively, of the container 10; as can be seen in particular in these drawings, the container 10 comprises a first aperture 11 for supplying condensed water into the container 10.

[0024] Said container 10 also comprises a cover 20 for closing said first aperture 11; preferably, said cover 20 is of the self-closing type, i.e. it is so designed as to allow:

- the first aperture 11 to close automatically when the drawer is extracted from the housing A in the frame 2;
- the first aperture 11 to open automatically when the drawer is inserted into the housing A in the frame 2.

[0025] In Figs. 2a and 2b one can see that the container 10 is shaped substantially like a parallelepipedon; it must be pointed out that the following references to the surfaces of the container 10 (i.e. the terms "top surface" and "side surface") are to be intended as referring to a container 10 inserted in the housing A in the frame 2. The aperture 11 for supplying condensed water into the container 10 is positioned on a top surface 10S of said container 10; it is clear that said aperture 11 can also be used for quickly draining the container 10, in particular after having removed the cover 20. In fact, said cover 20 is of the removable type and can be removed from the first aperture 11 in order to drain the condensed water quickly from the container 10.

[0026] In accordance with the present invention, the container 10 comprises a second aperture 12 for a precision (or fine) drainage of the container 10, said second aperture 12 having a smaller surface or area than the first aperture 11 for supplying condensed water into the container 10; it is clear that the smaller surface or area of the second aperture 12 determines a lower flow rate of said second aperture 12 compared with the flow rate of the first aperture 11 when emptying the container 10, thus ensuring a more precise drainage.

[0027] In particular, said second aperture 12 is positioned on a side surface 10A, 10B, 10C, 10D of the container 10. Preferably, said second aperture 12 is positioned on a face 10F obtained between a first side surface 10A and a second side surface 10B of the container 10; in particular, said face 10F is obtained by bevelling a corner comprised between said first side surface 10A and said second side surface 10B.

[0028] Preferably, the first side surface 10A corresponds to that surface of the container 10 which is closest to the rear portion 2P of the frame 2 when the container 10 is inserted in the housing A; also, when the container 10 is inserted in the housing A, the first side surface 10A is substantially parallel to the rear portion 2P of said frame 2.

[0029] As can be seen in particular in Fig. 2b, said face 10F substantially lies in a plane P (indicated by a dashed-dotted line in Fig. 2b) that forms an angle □ of 30° to 60° with the first side surface 10A and an angle □ of 30° to 60° with the second side surface 10B. Preferably, said second aperture 12 is closed by a cap 12A.

[0030] The special provision of said second aperture 12 allows the container 10 to be drained with precision, so that the condensed water collected in said container 10 can be easily reused, e.g. for filling the boiler of a steam iron and for steam production, said filling operation being facilitated by the presence of the second aperture 12, as well as by the particular position and size thereof.

[0031] Still in Figs. 2a and 2b, it can be observed that the container 10 comprises a first handle 13 for extracting said container 10 from the housing A in the frame 2; in particular, said first handle 13 is associated with a third side surface 10C, opposite to the first side surface 10A.

[0032] Said first handle 13 allows the container 10 to be carried upright, i.e. with the third side surface 10C facing upwards. This allows the container 10 to be carried easily, and without taking up much space, even when it is full of condensed water; in fact, it must be taken into account that the container 10 is particularly heavy when it is full of condensed water, since the container 10 may have a capacity of up to approx. six litres of condensed water.

[0033] Advantageously, the container 10 comprises a second handle 14 that facilitates the task of fine-draining the condensed water through the second aperture 12 of the container 10 and facilitates the steps of extracting the container 10 from the housing A in the frame 2 and

inserting it into said housing A.

[0034] In particular, said second handle 14 is associated with a fourth side surface 10D, opposite to the second side surface 10B.

[0035] Preferably, the second handle 14 is associated with a substantially intermediate portion of the fourth side surface 10D of the container 10, so that the weight of the container 10 can be better balanced when draining the condensed water through the second aperture 12.

[0036] Furthermore, said second handle 14 is obtained in a recess 15 of the container 10, so that it does not protrude from the outer profile of said container and therefore it does not hinder the operations of extracting and inserting the container 10 from/into the housing A in the frame 2; in particular, said recess 15 is obtained in said fourth side surface 10D, preferably in said intermediate portion of the fourth side surface 10D.

[0037] The advantages of a container 10 for collecting condensed water in a clothes dryer and of a clothes dryer equipped therewith according to the present invention are apparent from the above description.

[0038] In particular, said advantages consist in the fact that the special provision of said second aperture 12 on the container 10 allows for a fine and precision drainage of said container 10 and makes it easier to reuse the condensed water collected inside the container 10. Another advantage of the container 10 and of the clothes dryer 1 equipped therewith according to the present invention is that the second handle 14 obtained on said container 10 facilitates the task of fine-draining the condensed water through the second aperture 12 of the container 10 and facilitates the steps of extracting the container 10 from the housing A in the frame 2 and inserting it into said housing A.

[0039] The container for collecting condensed water in a clothes dryer and the clothes dryer equipped therewith described herein by way of example may be subject to many possible variations without departing from the novelty spirit of the inventive idea; it is also clear that in the practical implementation of the invention the illustrated details may have different shapes or be replaced with other technically equivalent elements.

[0040] It can therefore be easily understood that the present invention is not limited to the above-described container for collecting condensed water in a clothes dryer and clothes dryer equipped therewith, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. A container (10) for collecting condensed water in a clothes dryer (1), in particular of the condensation type, said container (10) being removably associated with a housing (A) in a frame (2) of the clothes dryer (1),
characterized in that
the container (10) comprises:

   - a first aperture (11) for supplying condensed water into the container (10) and for quickly draining the condensed water from the container (10);
   - a second aperture (12) for a precision drainage of the condensed water from said container (10).

2. A container (10) according to claim 1, **characterized in that** said second aperture (12) has a smaller area than the first aperture (11).

3. A container (10) according to one or more of the preceding claims, **characterized in that** said container (10) is shaped substantially like a parallelepipedon.

4. A container (10) according to claim 3, **characterized in that** said second aperture (12) is positioned on a side surface (10A, 10B, 10C, 10D) of the container (10).

5. A container (10) according to claim 4, **characterized in that** said second aperture (12) is positioned on a face (10F) obtained between a first side surface (10A) and a second side surface (10B) of the container (10).

6. A container (10) according to claim 1, **characterized in that** said first aperture (11) for supplying condensed water into the container (10) is positioned on a top surface (10S) of said container (10).

7. A container (10) according to claim 1, **characterized in that** it comprises a cover (20) for closing said first aperture (11), said cover (20) being of the removable type and therefore being removable from the first aperture (11) for draining the condensed water quickly from the container (10).

8. A container (10) according to one or more of the preceding claims, **characterized in that** it comprises a first handle (13) for extracting said container (10) from the housing (A) in the frame (2).

9. A container (10) according to claim 8, **characterized in that** said first handle (13) is associated with a third side surface (10C), opposite to the first side surface (10A).

10. A container (10) according to one or more of the preceding claims, **characterized in that** it comprises a second handle (14) that facilitates the task of fine-draining the condensed water through the second aperture (12) of the container (10) and facilitates the steps of extracting the container (10) from the hous-

ing (A) in the frame (2) and inserting the container (10) into said housing (A).

11. A container (10) according to claim 10, **characterized in that** said second handle (14) is associated with a fourth side surface (10D) opposite to the second side surface (10B), in particular said second handle (14) being associated with an intermediate portion of said fourth side surface (10D).

12. A container (10) according to one or more of claims 10 to 11, **characterized in that** said second handle (14) is obtained in a recess (15) of the container (10), in particular said recess (15) being obtained in said fourth side surface (10D) of the container (10).

13. A container (10) according to one or more of the preceding claims, **characterized in that** said container (10) extends in said housing (A) substantially horizontally from a front portion (2F) of the frame (2) towards a rear portion (2P) of said frame (2).

14. A container (10) according to one or more of the preceding claims, **characterized in that** it is of the drawer type and can be extracted from the housing (A) in the frame (2) and/or inserted into said housing (A) with a substantially horizontal movement (X).

15. A clothes dryer (1), in particular of the condensation type, comprising a container (10) for collecting condensed water in accordance with one or more of the preceding claims 1 to 14.

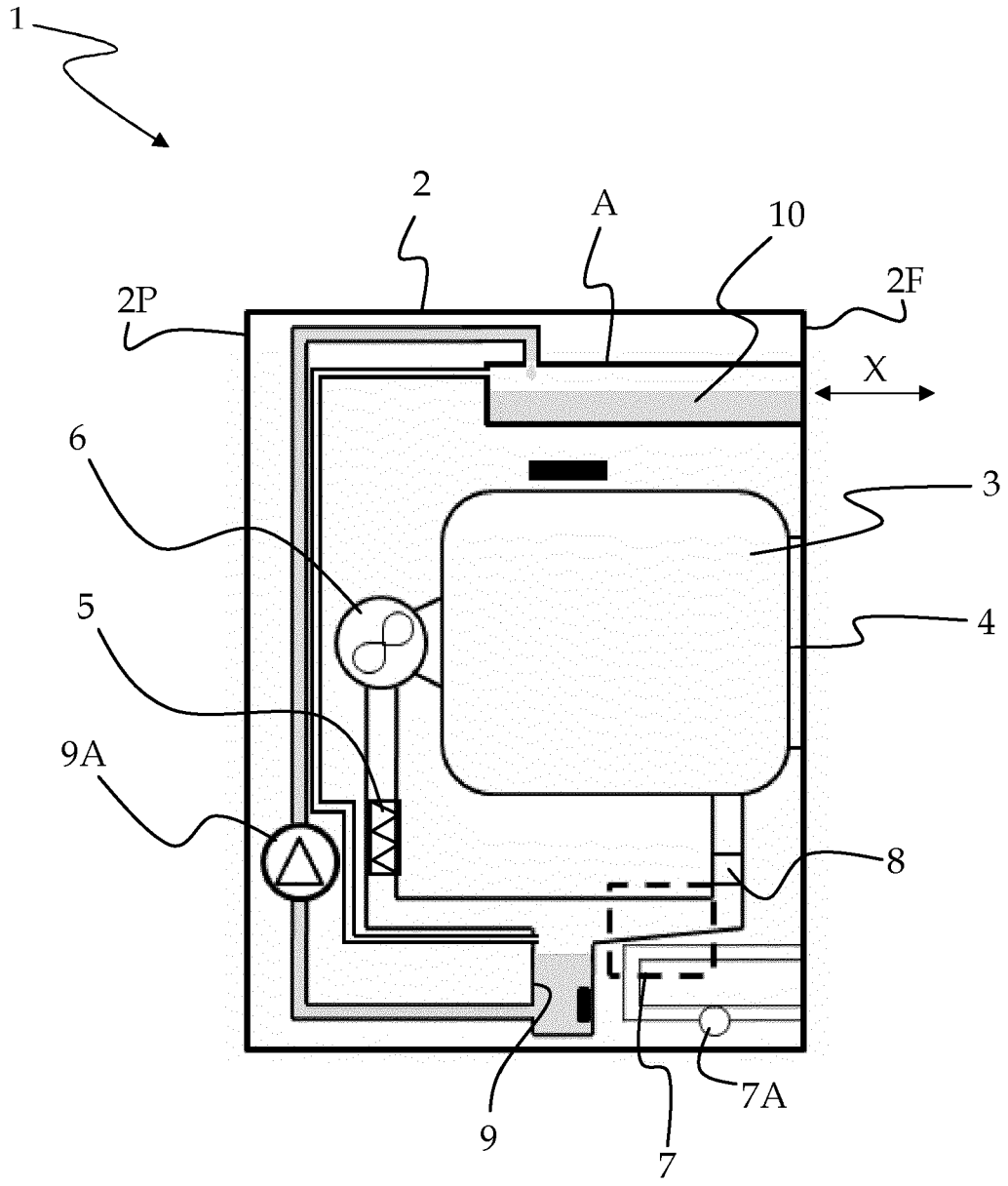

Fig. 1

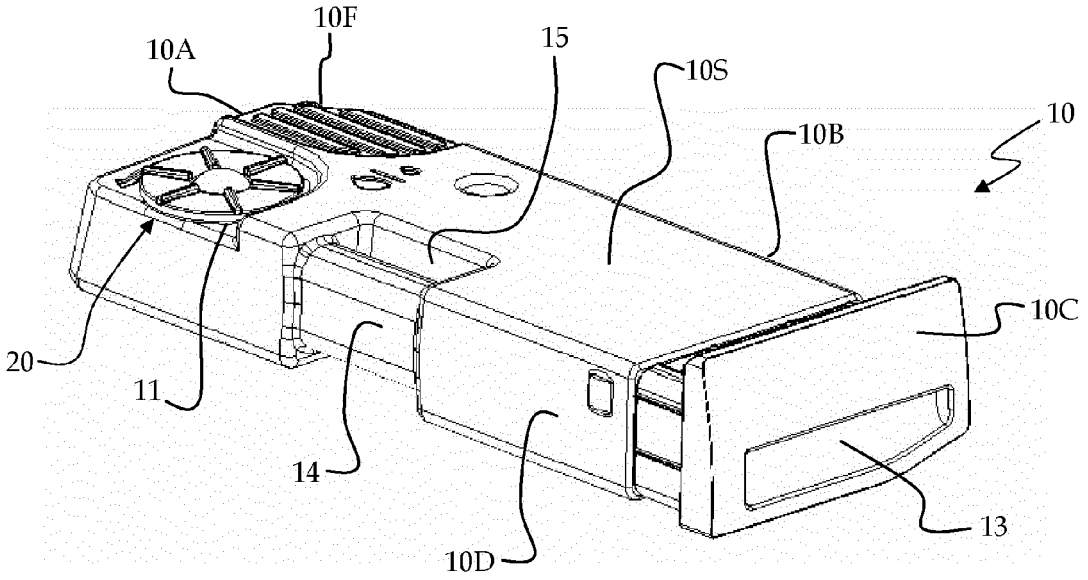
10F
10A
15
10S
10
10B
10C
20
11
14
13
10D

Fig. 2a

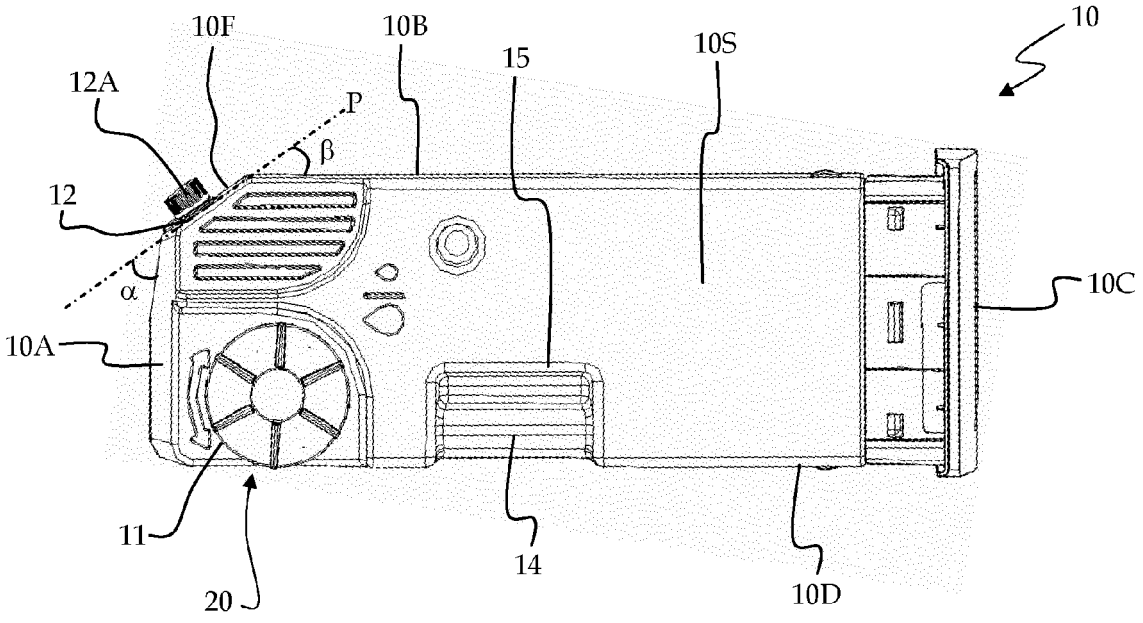
10F
10B
15
10S
10
12A
P
β
12
α
10C
10A
11
20
14
10D

Fig. 2b