



(11) **EP 3 074 564 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
06.09.2017 Bulletin 2017/36

(51) Int Cl.:
D06F 39/00^(2006.01) D06F 58/20^(2006.01)

(21) Application number: **13801515.1**

(86) International application number:
PCT/EP2013/075091

(22) Date of filing: **29.11.2013**

(87) International publication number:
WO 2015/078515 (04.06.2015 Gazette 2015/22)

(54) **STEAM LAUNDRY DRYER AND METHOD FOR OPERATING THE SAME**
DAMPFWÄSCHETROCKNER UND VERFAHREN ZUM BETRIEB DAVON
SÈCHE-LINGE À VAPEUR ET SON PROCÉDÉ DE FONCTIONNEMENT

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

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(43) Date of publication of application:
05.10.2016 Bulletin 2016/40

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EP-A1- 1 862 581 EP-A1- 2 325 381
WO-A1-2012/086345 WO-A2-2008/013426
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Description

[0001] The present invention relates to a steam laundry dryer and a method for operating the same. The present invention particularly relates to a water tank which feeds a steam generator and a method of replenishing the water tank.

[0002] After termination of a washing course, the clothes are dried either by hanging them on a clothesline or alternatively by placing them into a laundry dryer which dehumidifies the clothes by treating them with heat. In both cases the clothes generally develop wrinkles and creases as they are eventually dried. The formation of wrinkles depend on several factors, including the material of the cloth and the physical conditions governing the drying process, such as heat and water as well as any strain acting on the clothes. It is common practice to utilize heat and steam to remove the wrinkles and the creases from the clothes. Therefore, irons are generally provided with steam injection facilities to smooth out the wrinkles and the creases. The customer will usually need to do some ironing work to smooth out the wrinkles and creases developed during the drying.

[0003] To reduce the workload on the customers, laundry dryers have been provided with steam injection facilities to remove the wrinkles and the creases by applying steam to the clothes. Nevertheless, the steam application is not particularly limited to removal of wrinkles and creases. In general, steam has a sanitizing effect. For instance, steam can effectively remove odors. Therefore, in a laundry dryer, steam can be reasonably applied at any stage of the drying process to achieve the aforementioned effects.

[0004] The international patent application n. WO 2008/013426 describes a laundry dryer having a steam generator selectively supplying steam to the drum and a water supply source having an accommodating part for storing water supplied to the steam generator and a water supply means for supplying the water within the accommodating part to the steam generator.

[0005] A conventional steam laundry dryer (1') comprises a drum (2') for receiving clothes, a motor (3') for rotating the drum (2'), a water/steam separator (4') having a steam injection port (4a'), a water outlet port (4b') and a water/steam inlet port (4c'), the steam injection port (4a') being arranged to open into the drum (2'), a steam generator (5') having a discharge port (6') for supplying pressurized water/steam to the water/steam inlet port (4c') and an intake port (7') for receiving water, the discharge port (6') being fluidly connected to the water/steam inlet port (4c') via a first conduit (8'), a water tank (9') having a feed port (10') for feeding water into the steam generator (5') and a replenishment port (11') for filling the water tank (9') with water, the feed port (10') being fluidly connected to said intake port (7') via a second conduit (12') and the replenishment port (11') being fluidly connected to the water tank (9') via a third conduit (13') and a controller (14') for operating the motor (3')

and the steam generator (5') (Fig. 1).

[0006] When the water tank (9') is replenished, the water column within the first conduit (8') and the water column within third conduit (13') both rise up to a level H2' as both the discharge port (6') and the intake port (7') are in fluid communication with the atmosphere via the water tank (9'). The above conventional steam laundry dryer (1') is controlled such that with the commencement of the first minute, the motor (3') is activated so as to aerate and shuffle the clothes inside the drum (2'). During the first minute the steam generator (5') is, however, not activated. With the commencement of the second minute the steam generator (5') is also activated. When the steam generator (5') is activated, the water column above the discharge port (6') is pushed into the water/steam separator (4'). The water/steam separator (4') prevents the inflowing water from being conveyed into the drum (2') and drains it into a reservoir (20') via the water outlet port (4b') and a conduit (21'). Hence, the initially generated steam is injected into the drum (2') not until before all of the water standing above the steam generator (5'), i.e., the water above level H1' has been drained off by means of the water/steam separator (4'). Thereby, the clothes in the drum (2') are prevented from becoming excessively wet.

[0007] However, a drawback of the above conventional steam laundry dryer (1') is that a manufacturing and an assembly of the water/phase separator (4') and the conduit (21') increase the overall costs. Another drawback of this conventional steam laundry dryer (1') is that the steam supply into the drum (3') is delayed because of the water standing above the level H1'. Therefore, a total duration of the operation cycle must be prolonged to compensate for the delay and to supply the requisite amount of steam into the drum (2').

[0008] An objective of the present invention is to provide a steam laundry dryer and a method of operating a steam laundry dryer which overcomes the aforementioned drawbacks of the prior art and which has a simplified construction that enables the clothes to be effectively and reliably treated with steam.

[0009] This objective has been achieved by the steam laundry dryer according to the present invention as defined in claim 1, and the method of operating a steam laundry dryer according to the present invention as defined in claim 12. Further achievements have been attained by the subject-matters respectively defined in the dependent claims.

[0010] In the steam laundry dryer according to the present invention, the water tank has a discharge opening for draining excess water from the water tank. The discharge opening of the water tank and the discharge port of the steam generator are arranged at a same level H1. In the steam laundry dryer according to the present invention, the controller is adapted to drain the excess water which stands above the level H1 via the discharge opening by controlling an opening/closing means prior to activating the steam generator.

[0011] In an embodiment, as the steam laundry dryer is put into operation and with the commencement of the first minute, the motor is activated so as to aerate and shuffle the clothes inside the drum. During the first minute the excess water which stands above the level H1 is gradually drained via the discharge opening by opening the opening/closing means. After elapse of a predetermined duration, the excess water is completely drained off, subsequently the opening/closing means is closed and the steam generator is activated. The steam delivered by the steam generator is supplied to the steam injection port which directs the pressurized stream onto the clothes inside the drum.

[0012] In another embodiment, the steam laundry dryer has a water reservoir for collecting excess water which is drained from the water tank via the discharge opening. In this embodiment, the steam laundry dryer is provided with a pump for draining off the water reservoir.

[0013] In another embodiment, the opening/closing means is configured by the pump or a solenoid valve. In this embodiment, the solenoid valve is arranged along a conduit which fluidly connects the discharge opening with the water reservoir. The pump or the solenoid valve is activated at a predetermined point in time of the cycle for a predetermined duration to drain off the excess water column standing above the steam generator.

[0014] By the present invention the necessity to use a water/phase separator has been obviated. Instead a single steam injection port can be utilized. Thereby, the assembly of the steam laundry dryer has been simplified. By virtue of the discharge opening provided in the water tank any excess water can be drained off. Thereby, the steam generator is enabled to supply steam into the drum from a beginning of its activation. By the present invention, the steam supply performance has been expedited and the duration of the drying cycle has been further reduced.

[0015] Additional advantages of the steam laundry dryer according to the present invention and the method of operating the steam laundry dryer according to the present invention will become apparent with the detailed description of the embodiments with reference to the accompanying drawings in which:

Figure 1 - is a schematic view of a conventional steam laundry dryer;

Figure 2 - is a schematic view of a laundry dryer according to an embodiment of the present invention.

[0016] The reference signs appearing on the drawings relate to the following technical features.

1. Steam laundry dryer
2. Drum
3. Motor
4. Steam injection port
- 4'. Water/steam separator

- 4a'. Steam injection port
- 4b'. Water outlet port
- 4c'. Water/steam inlet port
5. Steam generator
5. Discharge port
7. Intake port
8. First conduit
9. Water tank
10. Feed port
10. Replenishment port
12. Second conduit
13. Third conduit
14. Controller
15. Discharge opening
15. Bottom
17. Lime container
18. Bottom
19. Discharge outlet
20. Water reservoir
20. Fourth conduit
22. Solenoid valve

[0017] The steam laundry dryer (1) comprises: a drum (2) for receiving clothes; a motor (3) for rotating the drum (2), a steam injection port (4) which opens into the drum (2), a steam generator (5) which has a discharge port (6) for supplying pressurized steam to the steam injection port (4), and an intake port (7) for receiving water, wherein the discharge port (6) is fluidly connected to the steam injection port (4) via a first conduit (8), a water tank (9) which has a feed port (10) for feeding water into the steam generator (5), and a replenishment port (11) for filling the water tank (9) with water, wherein the feed port (10) is fluidly connected to said intake port (7) via a second conduit (12), and wherein the replenishment port (11) is fluidly connected to the water tank (9) via a third conduit (13) and a controller (14) for operating the motor (3) and the steam generator (5) (Fig. 2).

[0018] In the steam laundry dryer (1) according to the present invention, the water tank (9) has a discharge opening (15) for draining excess water from the water tank (9) (Fig. 2). The discharge opening (15) of the water tank (9) and the discharge port (6) of the steam generator (5) are arranged at a same first level H1 (Fig. 2). The controller (14) is adapted to drain the excess water which stands above the first level H1 via the discharge opening (15) by controlling an opening/closing means prior to activating the steam generator (5) (Fig. 2).

[0019] As the water tank (9) is replenished, the water columns within the first conduit (8) and the third conduit (13) rise up since both the discharge port (6) and the intake port (7) are in fluid communication with the atmosphere via the water tank (9). According to the present invention the steam generator (5) is not immediately activated after the steam laundry dryer (1) is put into operation. In particular, at a predetermined point of time during the operation, the excess water standing above the first level H1 is gradually drained via the discharge opening

(15) by controlling the opening/closing means. The opening/closing means is kept open for the predetermined time, and subsequently closed. As the excess water has been drained off, the steam laundry dryer (1) is now ready to generate and supply steam. The steam injection port (4) is supplied with pressurized steam by the steam generator (5) from the beginning of its activation. Thereby, the need for a water/steam separator (4') on a downstream side of the steam generator (5) is obviated. In conjunction therewith, the conduit (21') and any other components for fixing the same become completely superfluous. Thereby, the manufacturing process and the assembly process of the steam laundry dryer (1) has been substantially simplified.

[0020] According to the invention, the steam injection port (4) is arranged at a second level H2 such that the clothes in the drum (2) can be subjected to steam from the above. The replenishment port (11) is arranged at a third level H3. The third level H3 is chosen so as not to exceed the second level H2. Thereby, the water column rising in the first conduit (8) during the replenishment is prevented from spilling over the steam injection port (4) which is open to the atmosphere. The third level H3 and the second level H2 are set to be higher than the first level H1 (Fig. 2).

[0021] In another embodiment, the third level H3 equals the second level H2 (Fig. 2). Thereby, the replenishment port (11) is arranged at a highest level which allows, for example, a customer to easily replenish the water tank (9). However, the present invention is not limited to this configuration. In an alternative embodiment (not shown), the second level H2 is higher than third level H3.

[0022] In another embodiment, a bottom (16) of the water tank (9) is arranged at a fourth level H4. In this embodiment, the intake port (7) of the steam generator (5) is arranged at a fifth level H5. The fourth level H4 is higher than the fifth level H5 and lower than the first level H1 (Fig. 2). Thereby, the water can be efficiently fed into the steam generator (5).

[0023] In another embodiment, the steam laundry dryer (1) further comprises a lime container (17) for collecting lime. In this embodiment, the second conduit (12) is configured to fluidly connect the feed port (10) to the intake port (7) via the lime container (17). A bottom (18) of the lime container (17) is arranged at a sixth level H6 which is lower than a fifth level H5 where the the intake port (7) is positioned (Fig. 2). Thereby, the lime which is formed in the steam generator (5) can accumulate in the lime container (17).

[0024] In another embodiment, the lime container (17) has an openable/closable discharge outlet (19) for draining the water inside the lime container (17).

[0025] In another embodiment, the openable/closable discharge outlet (19) is configured as a cap (not shown). Thereby, the lime container (17) can be manually drained off before maintenance so as to completely evacuate the water tank (9), the steam generator (5), and the first to

third conduits (8; 12; 13).

[0026] In another embodiment, the steam laundry dryer (1) has a water reservoir (20) for collecting excess water drained from the water tank (9) via the discharge opening (15). The discharge opening (15) is fluidly connected to the water reservoir (20) via a fourth conduit (21). A pump (not shown) is provided to drain off the water reservoir (20). The opening/closing means is configured by either the same pump or by a solenoid valve (22) which is arranged along the fourth conduit (21) (Fig. 2).

[0027] In another embodiment, the controller (14) is further adapted to operate the pump so as to drain the water reservoir (20).

[0028] In another embodiment, the replenishment port (11) is configured to allow manual filling of the water tank (9) with water (Fig. 2).

[0029] The control method for operating the steam laundry dryer (1) according to the present invention comprises: a step of draining excess water which stands above the first level H1 via the discharge opening (15); and a step of generating and supplying pressurized steam to the steam injection port (4) after termination of the draining step.

[0030] In another embodiment, the control method further comprises: a step of rotating the drum (2) so as to aerate and shuffle the clothes. The rotation step and the draining step are initiated concurrently. The clothes are not subjected to steam during the initial aeration. Therefore, the draining step can be performed as the clothes are initially aerated.

[0031] In another embodiment, the rotation step is initiated a predetermined duration before initiating the steam generating/supplying step. This duration is chosen such that the draining step can be completed prior to activation of the steam generator (5). As the steam generating/supplying step is initiated, the steam injection port (4) immediately receives a pure burst of steam. In the present invention, the steam application is not delayed as in the conventional technique where the excess water above the level H1' is initially drained via the water/steam separator (4') by the action of the steam generator (5'). Moreover, an unnecessary prolongation of the drying cycle is prevented.

[0032] The program according to the present invention comprises computer-readable codes for causing a steam laundry dryer (1) to execute the above-described method steps.

[0033] By the present invention, the overall configuration of the steam laundry dryer (1) has been simplified as the use of a water/steam separator (4') is obviated. The steam laundry dryer (1) of the present invention can be more easily manufactured and assembled. By the present invention, the steam generation and steam supply performance has been further improved.

Claims

1. A steam laundry dryer (1) comprising a drum (2) for receiving clothes, a motor (3) for rotating the drum (2), a steam injection port (4) which opens into the drum (2), a steam generator (5) which has a discharge port (6) for supplying pressurized steam to the steam injection port (4) and an intake port (7) for receiving water, wherein the discharge port (6) is fluidly connected to the steam injection port (4) via a first conduit (8), a water tank (9) which has a feed port (10) for feeding water into the steam generator (5), and a replenishment port (11) for filling the water tank (9) with water, wherein the feed port (10) is fluidly connected to said intake port (7) via a second conduit (12), and wherein the replenishment port (11) is fluidly connected to the water tank (9) via a third conduit (13), a controller (14) for operating the motor (3) and the steam generator (5), **characterized in that**
 - the water tank (9) has a discharge opening (15) for draining excess water from the water tank (9), wherein the discharge opening (15) of the water tank (9) and the discharge port (6) of the steam generator (5) are arranged at a same first level H1;
 - the steam injection port (4) is arranged at a second level H2; and the replenishment port (11) is arranged at a third level H3, wherein the third level H3 is not higher than the second level H2, and wherein the third level H3 and the second level H2 are higher than the first level H1 and
 - the controller (14) is adapted to drain the excess water which stands above the first level H1 via the discharge opening (15) by controlling an opening/closing means prior to activating the steam generator (5).
2. The steam laundry dryer (1) according to claim 1, **characterized in that** the third level H3 equals the second level H2.
3. The steam laundry dryer (1) according to claim 1, **characterized in that** the second level H2 is higher than third level H3.
4. The steam laundry dryer (1) according to any one of claims 1 to 3, **characterized in that** a bottom (16) of the water tank (9) is arranged at a fourth level H4; and the intake port (7) of the steam generator (5) is arranged at a fifth level H5, wherein the fourth level H4 is higher than fifth level H5 and lower than the first level H1.
5. The steam laundry dryer (1) according to any one of claims 1 to 4, **characterized in that** a lime container (17) for collecting lime, wherein the second conduit (12) is configured to fluidly connect the feed port (10) to the intake port (7) via the lime container (17), wherein a bottom (18) of the lime container (17) is arranged at sixth level H6 which is lower than the intake port (7) at a fourth level H5.
6. The steam laundry dryer (1) according to claim 5, **characterized in that** the lime container (17) has an openable/closable discharge outlet (19) for draining the water inside the lime container (17).
7. The steam laundry dryer (1) according to claim 6, **characterized in that** the openable/closable discharge outlet (19) is configured as a cap.
8. The steam laundry dryer (1) according to any one of claims 1 to 7, **characterized in that** a water reservoir (20) for collecting excess water drained from the water tank (9) via the discharge opening (15), wherein the discharge opening (15) is fluidly connected to the water reservoir (20) via a fourth conduit (21), a pump for draining off the water reservoir (20), wherein the opening/closing means is configured by said pump or a solenoid valve (22) arranged along the fourth conduit (21).
9. The steam laundry dryer (1) according to claim 8, **characterized in that** the controller (14) is further adapted to operate the pump so as to drain the water reservoir (20).
10. The steam laundry dryer (1) according to any one of claims 1 to 9, **characterized in that** the replenishment port (11) is configured to allow manual filling of the water tank (9) with water.
11. A control method for operating a steam laundry dryer (1) comprising a drum (2) for receiving clothes, a motor (3) for rotating the drum (2), a steam injection port (4) which opens into the drum (2), a steam generator (5) which has a discharge port (6) for supplying pressurized steam to the steam injection port (4), and an intake port (7) for receiving water, the discharge port (6) being fluidly connected to the steam injection port (4) via a first conduit (8), a water tank (9) which has a feed port (10) for feeding water into the steam generator (5), a replenishment port (11) for filling the water tank (9) with water, and an openable/closable discharge opening (15) for draining water from the water tank (9), the feed port (10) being fluidly connected to said intake port (7) via a second conduit (12), the replenishment port (11) being fluidly connected to the water tank (9) via a third conduit (13), the discharge opening (15) of the water tank (9) and the discharge port (6) of the steam generator (5) being arranged at a same first level H1, the steam injection port (4) being arranged at a second level

H2 and the replenishment port (11) being arranged at a third level H3 not higher than the second level H2, and the third level H3 and the second level H2 being higher than the first level H1, the control method being **characterized by** comprising the steps of:

- draining excess water which stands above the first level H1 via the discharge opening (15) and
- generating and supplying pressurized steam to the steam injection port (4) after termination of the draining step.

12. The control method according to claim 11, **characterized by** further comprising a step of rotating the drum (2) so as to aerate the clothes, wherein the rotation step and the draining step are initiated concurrently.
13. The control method according to claim 12, **characterized in that** the rotation step is initiated a predetermined duration before initiating the steam generating/supplying step.
14. A program comprising computer-readable codes for causing a steam laundry dryer (1) to execute the method steps defined in any one of claims 11 to 13.

Patentansprüche

1. Ein Dampfwäschetrockner (1) bestehend aus einer Trommel (2) für Aufnahme von Kleidungen, einem Motor (3) für Rotation der Trommel (2), einem Dampfeinspritzanschluss (4), der in die Trommel öffnet (2), einem Dampfgenerator (5), der einen Entladungsanschluss (6) besitzt für Versorgung von unter Druck stehendem Dampf zum Dampfeinspritzblock (4) und einem Einlasskanal (7) für Aufnahme von Wasser, wobei der Entladungsanschluss (6) flüssig verbunden ist mit Dampfeinspritzanschluss (4) durch eine erste Rohrleitung (8), einem Wassertank (9), der eine Nachlaufbohrung (10) besitzt für Wasserzufuhr in den Dampfgenerator (5), und einem Nachfüllenanschluss (11) für das Füllen des Wassertanks (9) mit Wasser, wo die Nachlaufbohrung (10) flüssig verbunden ist zum besagten Einlasskanal (7) durch eine zweite Rohrleitung (12), und wobei der Nachfüllenanschluss (11) flüssig verbunden ist zum Wassertank (9) durch eine dritte Rohrleitung (13), einem Regler (14) für Bearbeitung des Motors (3) und einem Dampfgenerator (5), **dadurch gekennzeichnet, daß**
- der Wassertank (9) eine Entladungsöffnung (15) hat für den Abfluss von übermäßigem Wasser vom Wassertank (9), wobei die Entladungsöffnung (15) des Wassertanks (9) und der Ent-

ladungsanschluss (6) des Dampfgenerators (5) in einem demselben ersten Niveau H1 eingeordnet sind;

- der Dampfeinspritzanschluss (4) ist an einem zweiten Niveau H2 eingeordnet; und der Nachfüllenanschluss (11) ist an einem dritten Niveau H3 eingeordnet, wobei das dritte Niveau H3 nicht höher ist als das zweite Niveau H2, und wobei das dritte Niveau H3 und das zweite Niveau H2 höher als das erste Niveau H1 sind und

- der Regler (14) ist angepasst für den Abfluss des übermäßigen Wassers, das über dem ersten Niveau H1 steht durch die Entladungsöffnung (15) bei Kontrolle einer Öffnung/Schließung bedeutet vor der Aktivierung des Dampfgenerators (5).

2. Der Dampfwäschetrockner (1) nach dem Anspruch 1, **dadurch gekennzeichnet, daß** das dritte Niveau H3 gleich zum zweiten Niveau H2 ist.
3. Der Dampfwäschetrockner (1) nach dem Anspruch 1, **dadurch gekennzeichnet, daß** das zweite Niveau H2 größer als das dritte Niveau H3 ist.
4. Der Dampfwäschetrockner (1) nach den vorhergehenden Ansprüchen 1 bis 3, **dadurch gekennzeichnet, daß** ein Grund (16) des Wassertanks (9) an einem vierten Niveau H4 eingeordnet ist; und der Einlasskanal (7) des Dampfgenerators (5) ist an einem fünften Niveau H5 eingeordnet, wobei das vierte Niveau H4 höher als das fünfte Niveau H5 und niedriger als das erste Niveau H1 ist.
5. Der Dampfwäschetrockner (1) nach den vorhergehenden Ansprüchen 1 bis 4, **dadurch gekennzeichnet, daß** sich ein Kalkbehälter (17) befindet für Versammlung von Kalk, wobei die zweite Rohrleitung (12) konfiguriert ist für flüssige Verbindung der Nachlaufbohrung (10) zum Einlasskanal (7) durch den Kalkbehälter (17), wobei ein Grund (18) des Kalkbehälters (17) eingeordnet ist am sechsten Niveau H6, das niedriger ist als Einlasskanal (7) an einem vierten Niveau H5.
6. Der Dampfwäschetrockner (1) nach Anspruch 5, **dadurch gekennzeichnet, daß** der Kalkbehälter (17) einen aufklappbaren/verschließbaren Entladungsauslaß (19) hat für den Abfluß des Wassers im Kalkbehälter (17).
7. Der Dampfwäschetrockner (1) nach Anspruch 6, **dadurch gekennzeichnet, daß** der aufklappbare/verschließbare Entladungsauslaß (19) konfiguriert ist als ein Deckel.
8. Der Dampfwäschetrockner (1) nach den vorhergehenden Ansprüchen 1 bis 7,

dadurch gekennzeichnet, daß

ein Wasserspeicher (20) für Versammlung von übermäßiges Wasser abgeleitet vom Wassertank (9) durch Entladungsöffnung (15), wobei die Entladungsöffnung (15) flüssig verbunden ist zum Wasserspeicher (20) durch eine vierte Rohrleitung (21), eine Pumpe für den Abfluß des Wasserspeichers (20), wobei die Öffnung/ Verschließung bedeutet, daß sie konfiguriert ist von besagter Pumpe oder einem Magnetventil (22), das entlang vierter Rohrleitung (21) eingeordnet ist.

9. Der Dampfwäschetrockner (1) nach dem Anspruch 8, **dadurch gekennzeichnet, daß** der Regler (14) weiter angepaßt ist, um die Pumpe zu betätigen, so daß der Wasserspeicher (20) abgeflossen wird.

10. Der Dampfwäschetrockner (1) nach den vorhergehenden Ansprüchen 1 bis 9, **dadurch gekennzeichnet, daß** der Nachfüllanschluss (11) konfiguriert ist, um manuelle Einfüllung des Wassertanks (9) mit Wasser zu erlauben.

11. Eine Kontrollmethode für die Bearbeitung eines Dampfwäschetrockners (1) bestehend aus einer Trommel (2) für Aufnahme von Kleidungen, einem Motor (3) für Rotation der Trommel (2), einem Dampfeinspritzanschluss (4), der in die Trommel öffnet (2), einem Dampfgenerator (5), der einen Entladungsanschluss (6) besitzt für Versorgung von unter Druck stehendem Dampf zum Dampfeinspritzblock (4) und einem Einlasskanal (7) für Aufnahme von Wasser, wobei der Entladungsanschluss (6) flüssig verbunden ist mit Dampfeinspritzanschluss (4) durch eine erste Rohrleitung (8), einem Wassertank (9), der eine Nachlaufbohrung (10) besitzt für Wasserzufuhr in den Dampfgenerator (5), einem Nachfüllanschluss (11) für das Füllen des Wassertanks (9) mit Wasser, und eine aufklappbare/verschließbare Entladungsöffnung (15) für den Abfluß des Wassers vom Wassertank (9), die Nachlaufbohrung (10) ist flüssig verbunden zum besagten Einlasskanal (7) durch eine zweite Rohrleitung (12), der Nachfüllanschluss (11) ist flüssig verbunden zum Wassertank (9) durch eine dritte Rohrleitung (13), die Entladungsöffnung (15) des Wassertanks (9) und der Entladungsanschluss (6) des Dampfgenerators (5) ist eingeordnet an einem demselben ersten Niveau H1, der Dampfeinspritzanschluss (4) ist eingeordnet an einem zweiten Niveau H2 und der Nachfüllanschluss (11) ist eingeordnet an einem dritten Niveau H3 nicht höher als das zweite Niveau H2, und das dritte Niveau H3 und das zweite Niveau H2 sind höher als das erste Niveau H1, die Kontrollmethode ist **dadurch gekennzeichnet, daß** bestehend aus folgenden Schritten:

- Abfluß des übermäßigen Wassers, das über

dem ersten Niveau H1 steht durch die Entladungsöffnung (15) und

- Erzeugung und Versorgung von unter Druck stehendem Dampf zum Dampfeinspritzblock (4) nach dem Beenden des Abflussschritts.

12. Die Kontrollmethode nach dem Anspruch 11, **dadurch gekennzeichnet, daß** weiter aus einem Schritt der Rotation der Trommel (2) besteht, so die Kleidungen belüftet werden, wobei der Rotationschritt und der Abflussschritt gleichzeitig begonnen werden.

13. Die Kontrollmethode nach dem Anspruch 12, **dadurch gekennzeichnet, daß** der Rotationschritt eine vorbestimmte Dauer begonnen wird vor dem Anfang des dampferzeugenden/ versorgenden Schritts.

14. Ein Programm bestehend aus computerlesbare Kode für die Ursache eines Dampfwäschetrockners (1), um die Methodenschritten, die in vorhergehenden Ansprüchen 11 bis 13 definiert sind, durchzuführen.

Revendications

1. Un sèche-linge à vapeur (1) comprenant un tambour (2) pour recevoir des vêtements, un moteur (3) pour faire tourner le tambour (2), un orifice d'injection de vapeur (4) qui débouche dans le tambour (2), un générateur de vapeur (5) qui présente un orifice de décharge (6) pour fournir de la vapeur sous pression à l'orifice d'injection de vapeur (4) et un orifice d'admission (7) pour recevoir l'eau, où l'orifice de décharge (6) est reliée de manière fluide à l'orifice d'injection de vapeur (4) par l'intermédiaire d'un premier conduit (8), un réservoir d'eau (9) qui présente un orifice d'alimentation (10) pour alimenter de l'eau dans le générateur de vapeur (5), et un orifice de remplissage (11) pour remplir le réservoir d'eau (9) avec de l'eau, où l'orifice d'alimentation (10) est reliée de manière fluide au dit orifice d'admission (7) par l'intermédiaire d'un second conduit (12), et où l'orifice de remplissage (11) est reliée de manière fluide au réservoir d'eau (9) par l'intermédiaire d'un troisième conduit (13), un contrôleur (14) pour actionner le moteur (3) et le générateur de vapeur (5), **caractérisé en ce que**

- le réservoir d'eau (9) présente une ouverture de décharge (15) pour évacuer l'excès d'eau du réservoir d'eau (9), où l'ouverture de décharge (15) du réservoir d'eau (9) et l'orifice d'évacuation (6) du générateur de vapeur (5) sont disposés à un même premier niveau H1;

- l'orifice d'injection de vapeur (4) est disposé à

- un second niveau H2; et l'orifice de remplissage (11) est disposée à un troisième niveau H3, où le troisième niveau H3 n'est pas supérieur au second niveau H2, et où le troisième niveau H3 et le second niveau H2 sont supérieurs au premier niveau H1 et
- le contrôleur (14) est adapté pour drainer l'excès d'eau qui se trouve au-dessus du premier niveau H1 par l'intermédiaire de l'ouverture de décharge (15) en commandant un moyen d'ouverture / fermeture avant l'activation du générateur de vapeur (5).
2. Sèche-linge à vapeur (1) selon la revendication 1, **caractérisé en ce que** le troisième niveau H3 est égal au deuxième niveau H2.
 3. Sèche-linge à vapeur (1) selon la revendication 1, **caractérisé en ce que** le deuxième niveau H2 est supérieur au troisième niveau H3.
 4. Sèche-linge à vapeur (1) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** un fond (16) du réservoir d'eau (9) est agencé à un quatrième niveau H4; et l'orifice d'admission (7) du générateur de vapeur (5) est agencé à un cinquième niveau H5, dans lequel le quatrième niveau H4 est supérieur au cinquième niveau H5 et inférieur au premier niveau H1.
 5. Sèche-linge à vapeur (1) selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** un récipient de chaux (17) pour collecter de la chaux, dans lequel le second conduit (12) est configuré pour connecter de manière fluide l'orifice d'alimentation (10) à l'orifice d'admission (7) par l'intermédiaire du récipient de chaux (17), dans lequel un fond (18) du récipient de chaux (17) est disposé au sixième niveau H6 qui est inférieur à l'orifice d'admission (7) à un quatrième niveau H5.
 6. Sèche-linge à vapeur (1) selon la revendication 5, **caractérisé en ce que** le récipient de chaux (17) présente une sortie de décharge (19) ouvrable/fermable pour drainer l'eau à l'intérieur du récipient de chaux (17).
 7. Sèche-linge à vapeur (1) selon la revendication 6, **caractérisé en ce que** la sortie de décharge ouvrable/fermable (19) est configurée comme un capuchon.
 8. Sèche-linge à vapeur (1) selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** un réservoir d'eau (20) pour collecter l'eau excédentaire drainée depuis le réservoir d'eau (9) par l'ouverture de décharge (15), dans lequel l'ouverture de décharge (15) étant reliée de manière fluide au réservoir d'eau (20) par l'intermédiaire d'un quatrième conduit (21), une pompe pour drainer le réservoir d'eau (20), dans lequel le moyen d'ouverture/fermeture est configuré par ladite pompe ou une électrovanne (22) agencée le long du quatrième conduit (21).
 9. Sèche-linge à vapeur (1) selon la revendication 8, **caractérisé en ce que** le contrôleur (14) est en outre adapté pour faire fonctionner la pompe de manière à drainer le réservoir d'eau (20).
 10. Sèche-linge à vapeur (1) selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** l'orifice de remplissage (11) est configuré pour permettre le remplissage manuel du réservoir d'eau (9) avec de l'eau.
 11. Procédé de commande pour faire fonctionner un sèche-linge à vapeur (1) comprenant un tambour (2) pour recevoir des vêtements, un moteur (3) pour faire tourner le tambour (2), un orifice d'injection de vapeur (4) qui débouche dans le tambour (2), un générateur de vapeur (5) qui présente un orifice de décharge (6) pour fournir de la vapeur sous pression à l'orifice d'injection de vapeur (4) et un orifice d'admission (7) pour recevoir de l'eau, l'orifice de décharge (6) étant relié de manière fluide au orifice d'alimentation en vapeur (4) par l'intermédiaire d'un premier conduit (8), un réservoir d'eau (9) qui présente un orifice d'alimentation (10) pour alimenter l'eau dans le générateur de vapeur (5), un orifice de remplissage (11) pour remplir le réservoir d'eau (9) avec de l'eau, et une ouverture de décharge ouvrable/fermable (15) pour drainer l'eau du réservoir d'eau (9), l'orifice d'alimentation (10) étant relié de manière fluide audit orifice d'admission (7) par l'intermédiaire d'un second conduit (12), l'orifice de remplissage (11) étant relié de manière fluide au réservoir d'eau (9) par l'intermédiaire d'un troisième conduit (13), l'ouverture de décharge (15) du réservoir d'eau (9) et l'orifice de décharge (6) du générateur de vapeur (5) étant agencés au même premier niveau H1, l'orifice d'injection de vapeur (4) étant agencé à un deuxième niveau H2 et l'ouverture de remplissage (11) étant agencée à un troisième niveau H3 non supérieur au deuxième niveau H2, et le troisième niveau H3 et le deuxième niveau H2 étant supérieur au premier niveau H1, le procédé de commande étant **caractérisé en ce qu'il** comprend les étapes consistant à:
 - drainer l'excès d'eau qui se situe au-dessus du premier niveau H1 par l'ouverture de décharge (15) et
 - générer et fournir de la vapeur sous pression à l'orifice d'injection de vapeur (4) après la fin de

l'étape de drainage.

12. Procédé de commande selon la revendication 11, **caractérisé en ce qu'il** comprend en outre une étape de rotation du tambour (2) de manière à aérer les vêtements, dans laquelle étape de rotation et l'étape de drainage sont déclenchées simultanément. 5
13. Procédé de commande selon la revendication 12, **caractérisé en ce que** l'étape de rotation est initiée en durée prédéterminée avant de initier l'étape de génération/fourniture de vapeur. 10
14. Un programme comprenant des codes lisibles par ordinateur pour amener un sèche-linge à vapeur (1) à exécuter les étapes de procédé définies dans l'une quelconque des revendications 11 à 13. 15

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Fig. 1

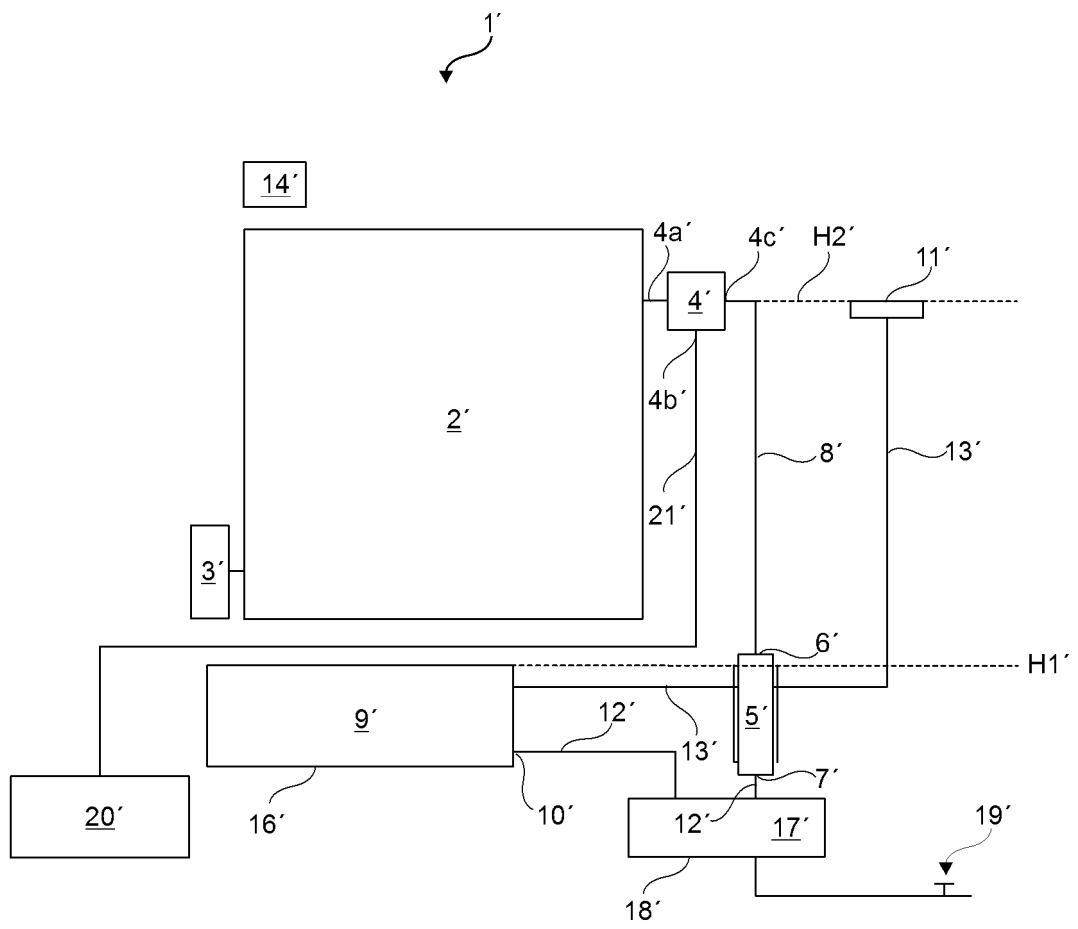
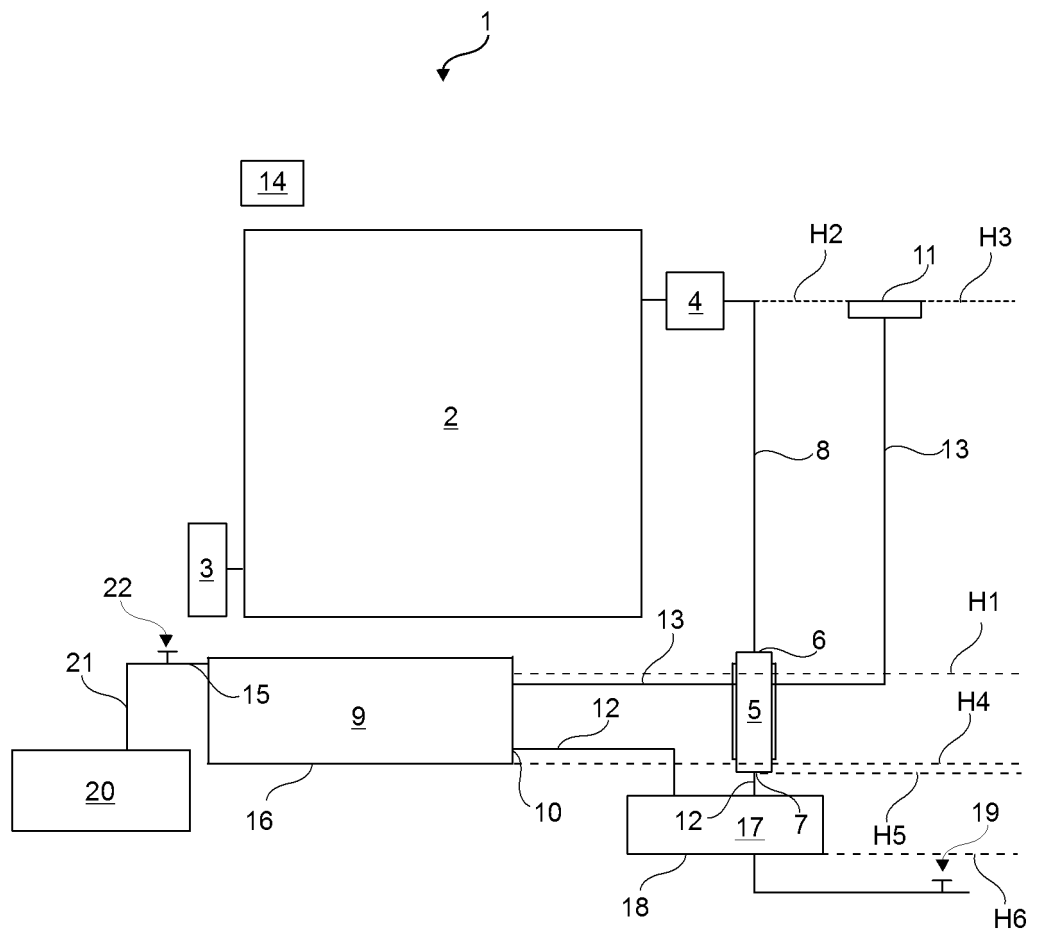


Fig. 2



REFERENCES CITED IN THE DESCRIPTION

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