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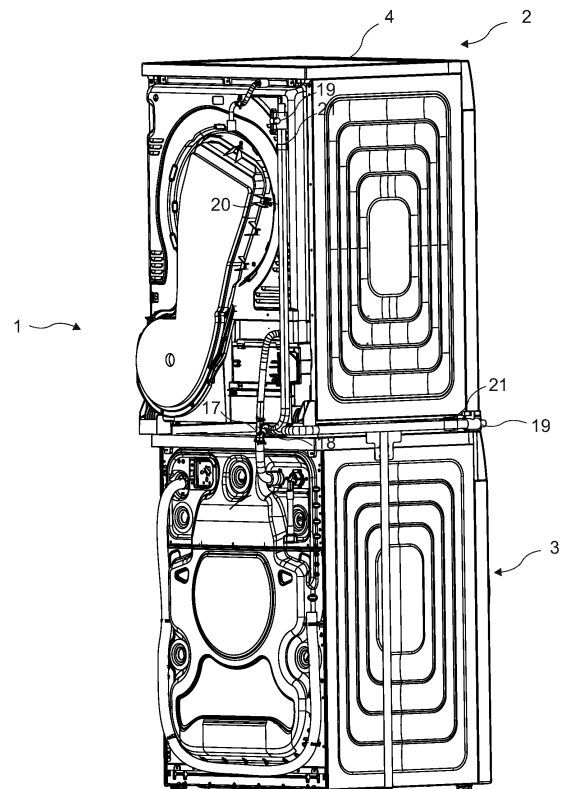
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(54) **A LAUNDRY WASHING/DRYING SYSTEM**

(57) The present invention relates to a laundry washing/drying system (1) comprising a first household appliance (2) having a body (4), a drum (5) which is disposed in the body (4) and wherein the laundry to be dried is placed, a condenser (6) which provides the dehumidification of the drying air, a tank (7) which receives and collects the condensate formed in the condenser (6) and a tank outlet (13) which is provided on the tank (7) and which enables the condensate collected in the tank (7) to be discharged; a second household appliance (3) having a tub (9) wherein the washing process is performed, at least one water inlet (10) through which the washing water is taken to be transferred to the tub (9), at least one valve (11) which is provided on the water inlet (10), a control unit (12) which controls the valve (11) so as to adjust the amount of water to be taken into the tub (5); and at least one discharge line (14) which is suitable to be connected to the tank outlet (13) at one end and to the water inlet (10) at the other end and which enables the condensate collected in the tank (7) to be delivered from the tank outlet (13) to the water inlet (10).

Figure 1



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Description

[0001] The present invention relates to a laundry washing/drying system comprising a first household appliance and a second household appliance which are connected to each other in fluid communication. Preferably, the first household appliance is a laundry dryer and the second household appliance is a washing machine.

[0002] Laundry dryers have a drum provided in the body. After the laundry to be dried is placed in the drum, the drying air is delivered into the drum. The hot and humid drying air drawn from the drum by a fan is directed to the condensation channel. The drying air is passed over a condenser provided in the condensation channel, thus cooling and dehumidifying the drying air. Water condensed from the moist air in the condenser is delivered to the tank by means of a pump and collected in the tank. A discharge outlet is provided on the tank, which allows the condensate collected in the tank to be discharged. Depending on the user's preferences, the condensate can be discharged directly by connecting the discharge outlet to the drain by means of a hose, or the discharge outlet can be deactivated such that the user is required to empty the tank at certain intervals. In the state of the art, the condensate generated in the laundry dryer is delivered to the washing machine as washing water through a discharge line and with the effect of gravity. However, the effect of gravity ensures that the condensate is slowly delivered through the discharge line to a water inlet in the washing machine. The slow delivery of the condensate containing small amounts of lint, etc. causes clogging in the water inlet and serious problems in washing performance. Therefore, there is a need for a laundry washing/drying system wherein the clogging problem occurring in the water inlet when the condensate is delivered to the washing machine by the effect of gravity is solved in a cost-efficient manner without using any pumps, etc.

[0003] The state of the art European Patent Application No. EP2511413 discloses a laundry dryer which is placed on the washing machine and disclosed that the condensate generated in the laundry dryer is temporarily stored with the effect of gravity in a tank which is disposed in the washing machine.

[0004] The aim of the present invention is the realization of a laundry washing/drying system wherein the liquid flow rate from the first household appliance to the second household appliance is increased.

[0005] The laundry washing/drying system realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a first household appliance having a body, a drum which is disposed in the body and wherein the laundry to be dried is placed, a condenser which provides the dehumidification of the drying air, a tank which receives and collects the condensate formed in the condenser and a tank outlet which is provided on the tank and which enables the condensate collected in the tank to be dis-

charged; a second household appliance having a tub wherein the washing process is performed, at least one water inlet through which the washing water is taken to be transferred to the tub, at least one valve which is provided on the water inlet, a control unit which controls the valve so as to adjust the amount of water to be taken into the tub; at least one discharge line which enables the condensate collected in the tank to be delivered from the tank outlet to the water inlet; and a connection member which is provided on the discharge line and which has at least one inlet port and at least one outlet port; and the connection member has a cross-sectional area smaller than the cross-sectional area of the delivery line so as to increase the flow rate of the water to be delivered to the water inlet. Thus, the flow rate of the water delivered to the water inlet is increased such that particles such as fluff, fiber, etc. accumulating at the water inlet are swept and delivered into the tub. Therefore, energy loss and decrease in washing performance caused by the clogging in the water inlet are prevented.

[0006] In an embodiment of the present invention, at least one second outlet port is provided on the connection member, and a second discharge line is connected to the second outlet port from one end and, from the other end, to at least one valve disposed on the body so as to interrupt the liquid flow out. The valve is preferred to be placed on the upper part of the rear wall or on the side wall of the first household appliance. The second discharge line is preferably manufactured from a flexible material. Thus, ease of use is provided to the user by offering an alternative solution to detaching and attaching the tank by the user in order to discharge the condensate collected in the tank and the discharge line in case the second household appliance has not been operated for a long time.

[0007] In another embodiment of the present invention, the valve is configured to be opened and closed by the user so as to enable the water flow from the discharge line to the outside of the body to be interrupted. On the valve, a latch is provided, which enables the second discharge line to be separated from the valve when rotated around its own axis. Thus, in case the second household appliance is not operated and therefore the condensate is not delivered to the tub through the discharge line, the condensate collected from the tank to the second outlet can be easily discharged by the user through the second discharge line and the second outlet port.

[0008] In another embodiment of the present invention, on the body, at least one holder is provided, which enables the second discharge line to be fixed on the body so as to allow the user to detach and attach the same from and to the body. The holder preferably has a snap-fitting structure. Thus, the second discharge line can be robustly fixed onto the body.

[0009] In an embodiment of the present invention, the discharge line has at least partially spiral form. By means of the spiral form, the condensate delivered from the discharge line to the water inlet creates a vortex, thus re-

ducing the negative pressure which prevents the water from flowing. Thus, the condensate is discharged much faster from the discharge line to the water inlet. Consequently, a cost-advantageous embodiment is realized wherein particles such as lint etc. accumulated in the water inlet or the discharge line is swept more effectively.

[0010] In another embodiment of the present invention, there is at least one discharge out which is provided on the tank, which has an opening allowing the discharge of the water and which enables the condensate to be directly discharged to the drain when the discharge line is not used; and a barrier which is positioned in the opening and which covers the lower half of the opening. The opening on the discharge outlet is preferably circular and the barrier is almost semicircular. In the case where the condensate is delivered from the discharge line to the second household appliance and the second household appliance is not operated for a while such that the discharge line and then the tank are almost completely filled with condensate, a larger volume of condensate equal to the volume from the lower side of the discharge outlet to the upper side thereof where the barrier extends is accumulated in the tank. Thus, the need for the user to frequently detach and attach the tank to empty the condensate is eliminated.

[0011] In another embodiment of the present invention, the discharge outlet extends at angle with respect to the horizontal axis. Thus, the opening is positioned at a higher level by extending the discharge outlet by a certain distance in the horizontal in an angled manner. Consequently, large amount of condensate is stored in the tank.

[0012] By means of the present invention, a laundry washing/drying system is realized, wherein the clogging problem of the delivery members caused by the particles in the condensate delivered from the first household appliance to the second household appliance is solved in a cost-efficient and environmental manner.

[0013] The laundry dryer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the perspective view of the laundry washing/drying system related to an embodiment of the present invention.

Figure 2 - is the sideways schematic view of the laundry washing/drying system related to another embodiment of the present invention.

Figure 3 - is the rear view showing the tank, the discharge outlet and the tank outlet related to another embodiment of the present invention.

Figure 4 - is the view of the discharge outlet and the barrier provided on the discharge outlet related to another embodiment of the present invention.

Figure 5 - is the view showing the discharge outlet

of the tank upper lid related to another embodiment of the present invention.

Figure 6 - is the perspective view of the spiral discharge line of the laundry washing/drying system related to another embodiment of the present invention.

[0014] The elements illustrated in the figures are numbered as follows:

1- Laundry washing/drying system

2- First household appliance

3- Second household appliance

4- Body

5- Drum

6- Condenser

7- Tank

8- Discharge outlet

9- Tub

10- Water inlet

11- Valve

12- Control unit

13- Tank outlet

14- Discharge line

15- Inlet port

16- Outlet port

17- Connection member

18- Second outlet port

19- Valve

20- Second discharge line

21- Holder

22- Barrier

23- Opening

[0015] The laundry washing/drying system (1) com-

prises a first household appliance (2) having a body (4), a drum (5) which is disposed in the body (4) and wherein the laundry to be dried is placed, a condenser (6) which provides the dehumidification of the drying air, a tank (7) which receives and collects the condensate formed in the condenser (6) and a tank outlet (13) which is provided on the tank (7) and which enables the condensate collected in the tank (7) to be discharged; a second household appliance (3) having a tub (9) wherein the washing process is performed, at least one water inlet (10) through which the washing water is taken to be transferred to the tub (9), at least one valve (11) which is provided on the water inlet (10), a control unit (12) which controls the valve (11) so as to adjust the amount of water to be taken into the tub (5); and at least one discharge line (14) which is suitable to be connected to the tank outlet (13) at one end and to the water inlet (10) at the other end and which enables the condensate collected in the tank (7) to be delivered from the tank outlet (13) to the water inlet (10). It is generally preferred to use the first household appliance (2) as a laundry dryer and the second household appliance (3) as a washing machine. In the case where the first household appliance (2) is used as a laundry dryer and the second household appliance (3) is used as a washing machine and the laundry dryer is placed onto the washing machine, the condensate generated and collected in the laundry dryer is directed to the water inlet (10) in the washing machine by means of a discharge line (14). The condensate is taken as washing water through the water inlet (10) into the tub (9). Thus, environmentally-friendly household appliances are realized by saving significant amounts of water.

[0016] The laundry washing/drying system (1) of the present invention comprises at least one connection member (17) which is provided on the discharge line (14), which has at least one inlet port (15) and at least one outlet port (16), and which has a cross-sectional area smaller than the cross-sectional area of the discharge line (14) so as to accelerate the water flow between the inlet port (15) and the outlet port (16). The inlet port (15) and the outlet port (16) enable the water flowing in the discharge line (14) to pass through the connection member (17). The cross-sectional area of the connection member (17) is configured to be narrower than the cross-sectional area of the discharge line (14) so as to increase the flow rate of the condensate, which increase with the effect of gravity from the tank outlet (13) to the inlet port (15). Thus, the connecting member (17) acts as a nozzle and enables the condensate to be fed to the water inlet (10) under greater pressure. Thus, by preventing the part of the discharge line (14) remaining between the connection member (17) and the water inlet (10), the water inlet (10) and the valve (11) on the water inlet (10) from getting clogged with fluff, etc., the risk of any possible decrease in the performance of the laundry washing/drying system (1) or the risk of complete failure of the laundry washing/drying system is prevented in a cost-effective manner.

[0017] In an embodiment of the present invention, there are at least one second outlet port (18) which is provided on the connection member (17), at least one valve (19) which is provided on the body (4) and a second discharge line (20), one end of which is connected to the second outlet port (18) and the other end to the valve (19). In case the valve (11) provided at the water inlet (10) does not allow water to be taken into the tub (9) through the discharge line (14) and the first household appliance (2) is operated, the condensate fills into the discharge line (14) such that the water level in the discharge line (14) reaches the tank (7) and the tank (7) is filled with the condensate. By means of the second outlet port (18) provided on the connection member (17), the condensate in the discharge line (14) passes through the second outlet port (18) and fills into the second discharge line (20), one end of which is connected to the second outlet port (18). The other end of the second discharge line (20) is connected to the valve (19) provided on the body (4). Thus, the valve (19) acts as a plug and prevents the condensate from overflowing from the second discharge line (20). In the case where the valve (19) is disposed on the upper part of the rear wall of the first household appliance (2), from the second outlet port (18) to the height of the valve (19), the condensate rises equally in the discharge line (14) and the second discharge line (20) due to Bernoulli's principle. Thus, when the second household appliance (3) is not in operation, more condensate is accumulated by means of the second discharge line (20). Moreover, when the valve (19) is disposed on the side wall towards the front of the body (4), the user can easily reach the valve (19) from the front of the second household appliance (3). By removing the second discharge line (20) from the valve (19), the condensate collected in the discharge line (14), the second discharge line (20) and tank (7) is enabled to be used by the user for different purposes.

[0018] In another embodiment of the present invention, there is a valve (19) which enables the flow of the condensate to be controlled by the user. There is a latch on the valve (19) which can be rotated around its own axis. By turning the latch, the user cuts the connection between the second discharge line (20) and the valve (19), and removes the second discharge line (20) from the valve (19). Thus, the condensate collected in the second discharge line (20) is enabled to be easily used by the user. Furthermore, when the valve (19) is disposed on the front of the first household appliance (2), the user is enabled to discharge the condensate in an ergonomic manner.

[0019] In another embodiment of the present invention, there is at least one holder (21) which is disposed on the body (4) and which enables the second discharge line (20) to be fixed on the body (4) so as to be detached and attached by the user. When the user removes the second discharge line (20) from the valve (19), the holder (21) supports the weight of the second discharge line (20) by at least partially holding the second discharge line (20). Thus, the second discharge line (20), which contains the

condensate, is prevented from falling to the ground due to its weight and the condensate is prevented from spilling out. Moreover, by means of the holder (21) having a flexible and lockable structure, the user can pull the second discharge line (20) from the body (4) without difficulty.

[0020] In another embodiment of the present invention, there is the discharge line (14) of which at least a portion is in spiral form. Thus, a vortex is created in the condensate, and the water is enabled to be fed to the water inlet (10) more quickly.

[0021] In another embodiment of the invention, there are at least one discharge outlet (8) which is provided on the tank (7) and which has an opening (23) enabling the condensate to be discharged out of the tank (7), and a barrier (22) which is provided on the discharge outlet (8) and which partially closes the opening (23). In case the condensate is not delivered to the second household appliance (3), instead of being closed completely, the opening (23) is left slightly open to ensure that atmospheric pressure is applied to the air space in the tank (7). Thus, the condensate collected in the tank (7) is fed more quickly to the connection member (17) and from there to the water inlet (10). By means of the barrier (22), a higher amount of condensate is stored in the tank (7) without spilling through the opening (23).

[0022] In another embodiment of the present invention, the discharge outlet (8) extends at angle with respect to the horizontal axis. Thus, the condensate collection capacity of the tank (7) is improved. Consequently, in the case where the second household appliance (3) is not used for a long time but the first household appliance (2) is used more than once, the volume of the tank (7) is increased (approximately 0.5 lt.). Thus, various tank volume requirements are met, eliminating the problem of condensate spilling onto the ground.

[0023] By means of the present invention, in a cost efficient manner, the flow rate of the condensate delivered from the first home appliance (2) to the second home appliance (3) without using any pump is increased and the cleaning process of particles such as lint, fiber, etc. accumulated in the discharge line (14) for transferring the condensate and the water inlet (10) where the condensate is fed to the second household appliance (3). Moreover, by increasing the volume of the tank (7) with cost-effective and simple solutions, in the case where the second household appliance (3) has not been used for a long time but the first household appliance (2) has been used more than once, the technical problem of condensate overflowing from the tank (7) is eliminated.

Claims

1. A laundry washing/drying system (1) **comprising** a first household appliance (2) having a body (4), a drum (5) which is disposed in the body (4) and wherein the laundry to be dried is placed, a condenser (6) which provides the dehumidification of the drying air,

a tank (7) which collects the condensate formed in the condenser (6) and a tank outlet (13) which is provided on the tank (7) and which enables the condensate collected in the tank (7) to be discharged; a second household appliance (3) having a tub (9) wherein the washing process is performed, at least one water inlet (10) through which the washing water is taken to be transferred to the tub (9), at least one valve (11) which is provided on the water inlet (10), a control unit (12) which controls the valve (11) so as to adjust the amount of water to be taken into the tub (5); and at least one discharge line (14) which is suitable to be connected to the tank outlet (13) at one end and to the water inlet (10) at the other end and which enables the condensate collected in the tank (7) to be delivered from the tank outlet (13) to the water inlet (10), **characterized by** at least one connection member (17) which is provided on the discharge line (14), which has at least one inlet port (15) and at least one outlet port (16), and which has a cross-sectional area smaller than the cross-sectional area of the discharge line (14) so as to accelerate the water flow between the inlet port (15) and the outlet port (16).

2. A laundry washing/drying system (1) as in Claim 1, **characterized by** at least one second outlet port (18) which is provided on the connection member (17), at least one valve (19) which is provided on the body (4), and a second discharge line (20), one end of which is connected to the second outlet port (18) and the other end to the valve (19).
3. A laundry washing/drying system (1) as in Claim 2, **characterized by** a valve (19) which enables the flow of the condensate to be controlled by the user.
4. A laundry washing/drying system (1) as in Claim 2 or 3, **characterized by** at least one holder (21) which is disposed on the body (4) and which enables the second discharge line (20) to be fixed on the body (4) so as to be detached and attached by the user.
5. A laundry washing/drying system (1) as in any one of the above claims, **characterized by** the discharge line (14) of which at least a portion is in spiral form.
6. A laundry washing/drying system (1) as in any one of the above claims, **characterized by** at least one discharge outlet (8) which is provided on the tank (7) and which has an opening (23) enabling the condensate to be discharged out of the tank (7), and a barrier (22) which is provided on the discharge outlet (8) and which partially closes the opening (23).
7. A laundry washing/drying system (1) as in Claim 6, **characterized by** the discharge outlet (8) which extends at angle with respect to the horizontal axis.

Figure 1

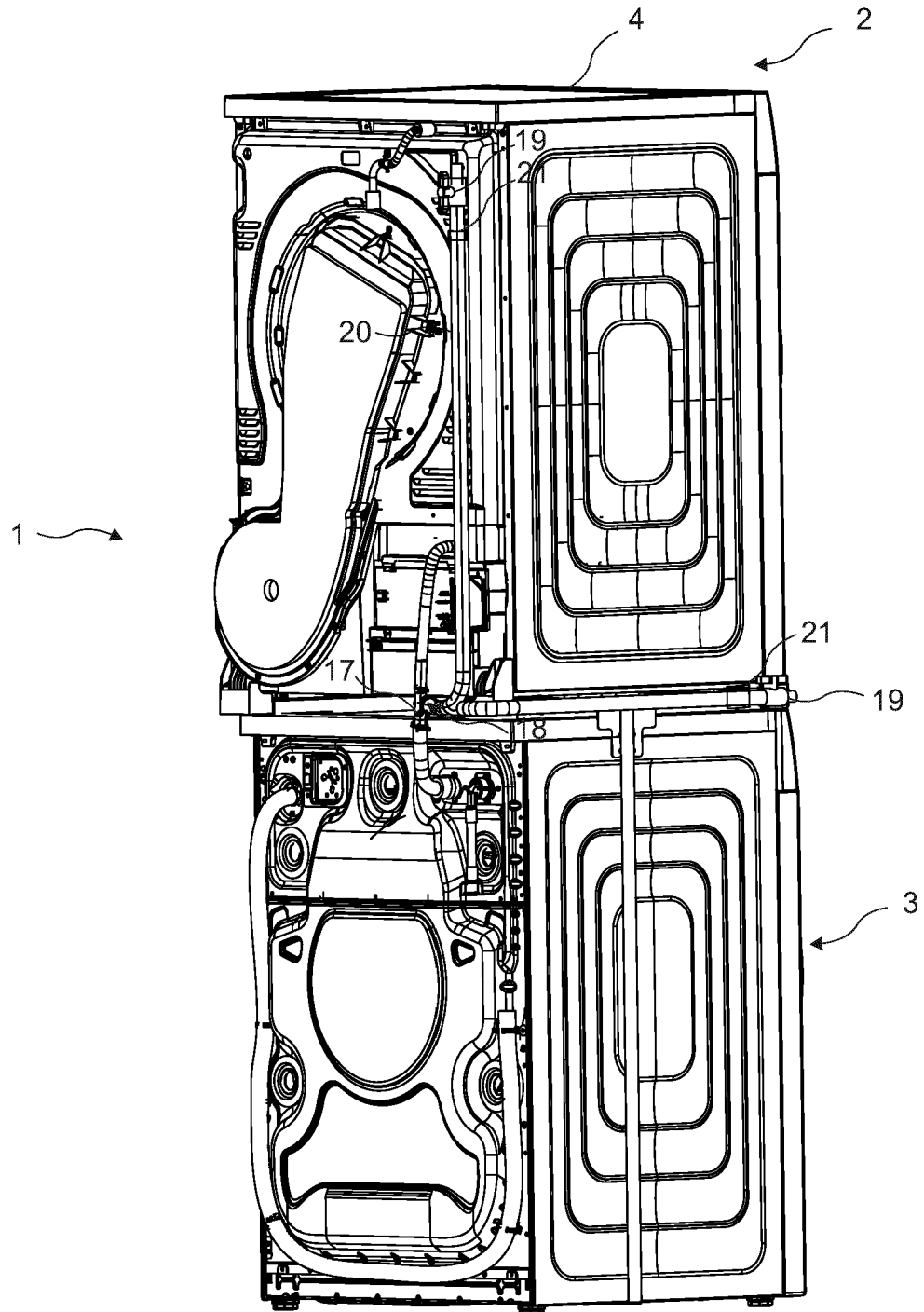


Figure 2

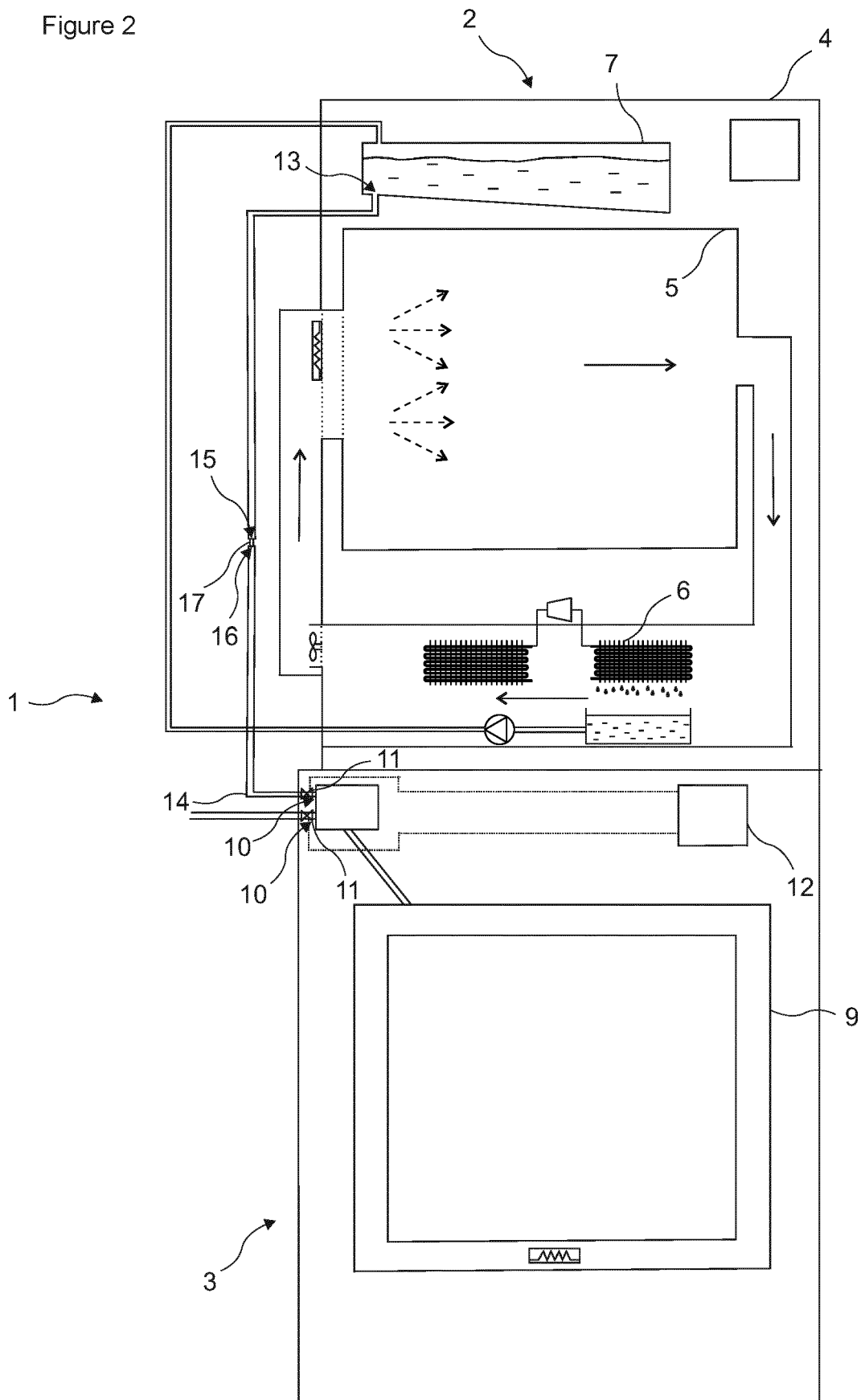


Figure 3

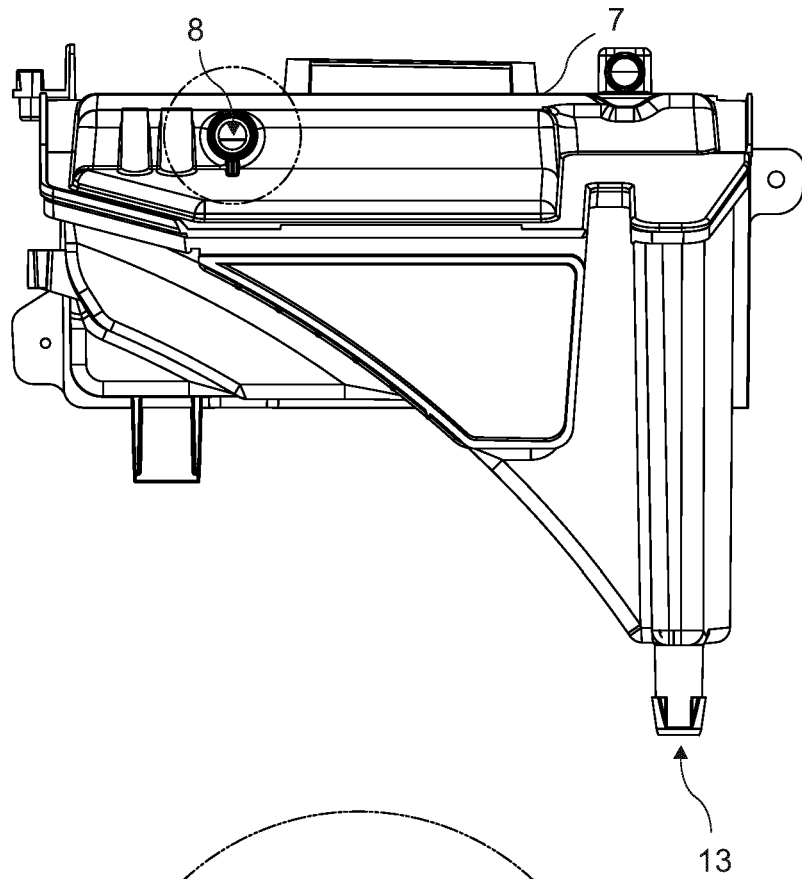


Figure 4

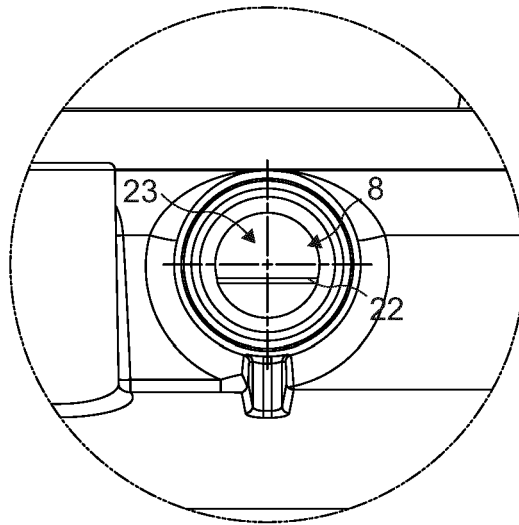


Figure 5

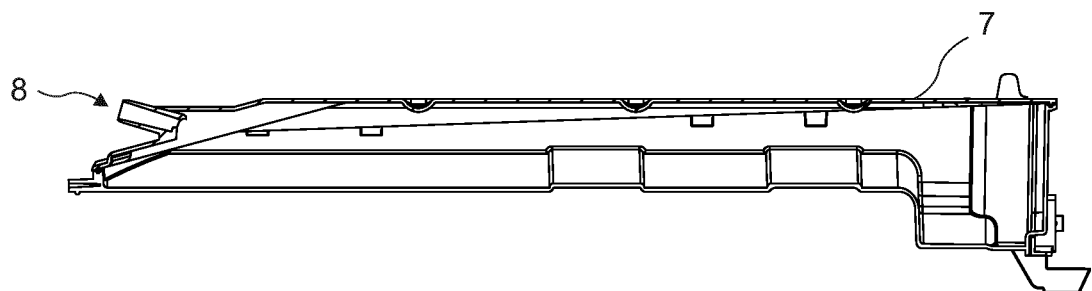
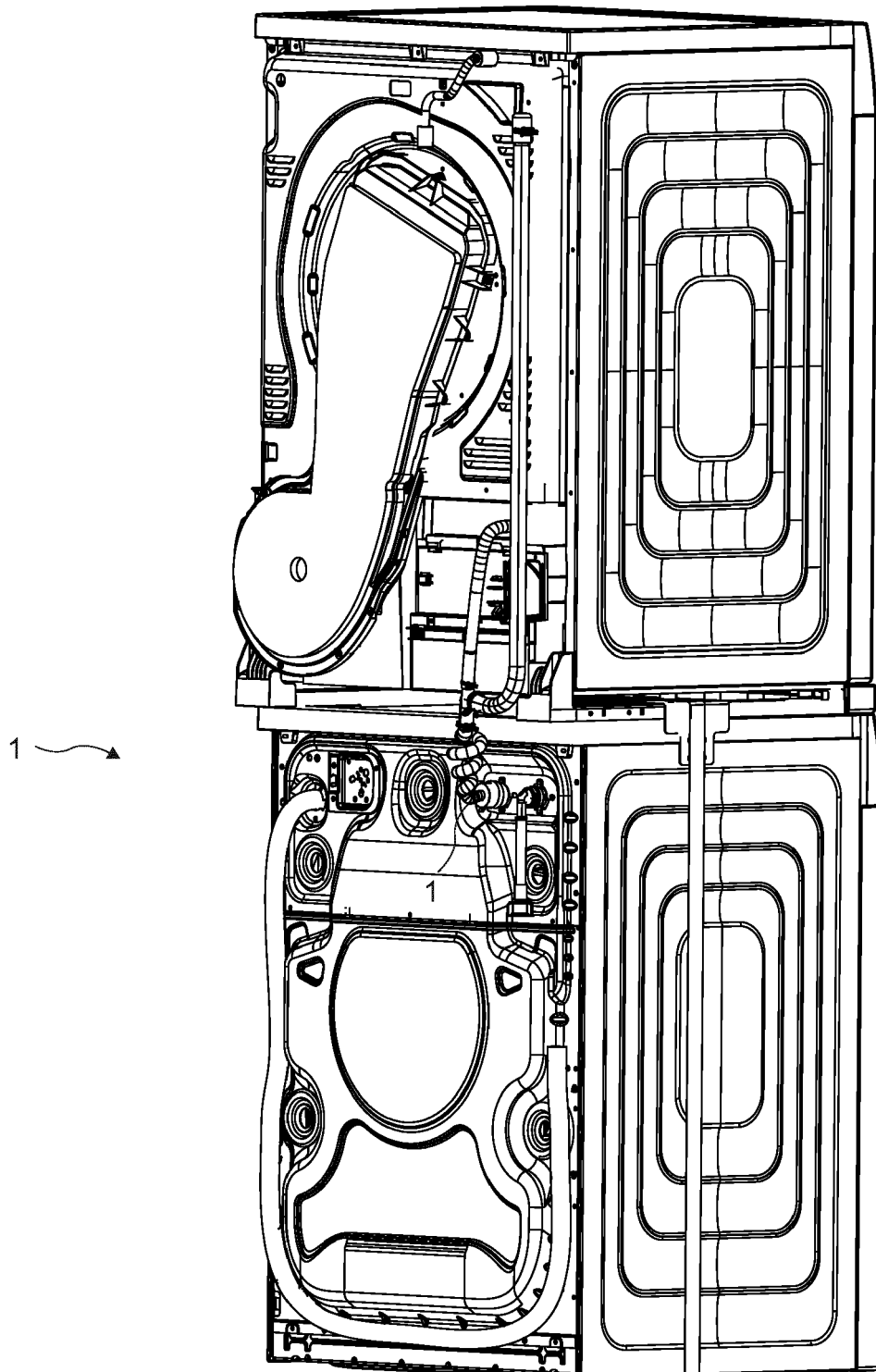


Figure 6





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Place of search Munich		Date of completion of the search 10 April 2024	Examiner Sabatucci, Arianna
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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
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