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(71) Applicant: **Vestel Beyaz Esya Sanayi ve Ticaret A.S.**
45030 Manisa (TR)

(72) Inventor: **ASIK, Rustem**
45030 Manisa (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 63/2
GOP
06540 Ankara (TR)

(54) WASHER DEVICE

(57) The washer device (M) of the present invention comprises at least one washing chamber (1) wherein the articles to be washed are placed and the washing process is performed; at least one washing liquid inlet (2) through which washing liquid for washing and/or rinsing processes is received; at least one collection chamber (3) which is located under the washing chamber (1) and wherein the washing liquid received from the washing liquid inlet (2) is collected; at least one washing liquid outlet (4) which is connected with the said collection chamber (3) and which discharges the liquid collected in the collection chamber (3) at the end of the washing and/or rinsing process; and at least one steam generator (5) which heats the washing liquid received from the said washing liquid inlet (2) and/or collection chamber (3) and supplies it into the washing chamber (1) through at least one steam inlet (6) connected with the washing chamber (1).

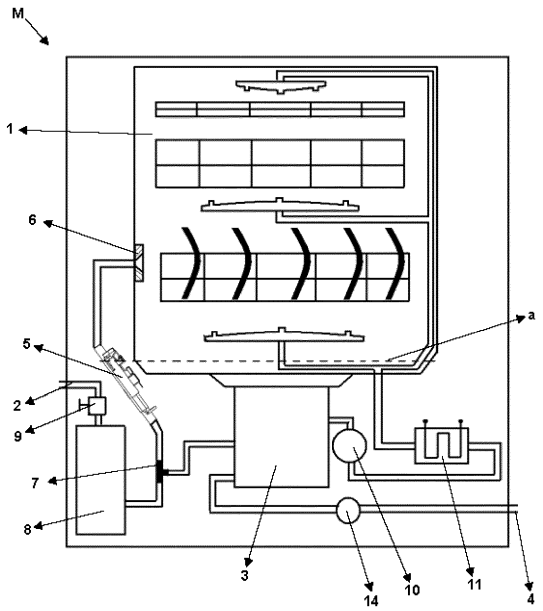

Figure – 1

EP 3 017 746 A1

Description

Field of the Invention

[0001] The present invention relates to washer devices comprising steam generator.

Background Art

[0002] Washer devices especially such as dishwashers and washing machines may employ steam generators that facilitate washing process by softening the dried stains, for example. In the said steam generators, liquid (i.e. mains water) received from a liquid source (i.e. water mains) is heated and converted into steam. The obtained steam is introduced into a washing chamber containing the washed articles, during the washing process or prior to the washing process. Steam with a high temperature softens any stains on the articles included in the washing chamber and ensures a simpler and more effective washing process.

[0003] The washing liquid (i.e. water, a mixture of water and detergent) in the washer devices is circulated throughout a washing process. The washing liquid collected at the bottom of the washing chamber by means of gravity may be supplied to upper sections of the washing chamber through a circulation system. The washing liquid may be heated, when required, during the said circulation process. In this way, the washing liquid is continuously maintained at the desired temperature during the washing process.

[0004] The state-of-art document EP2031116A1 discloses a steam generator suitable for use in washer devices. Said steam generator operates independent from the water control systems of the washer device (i.e. water inlet/outlet systems and/or circulation system of the washer device). However, such independent operation of the steam generator and water control system restricts functionality of the washer device.

Brief Description of the Invention

[0005] The washer device according to the present invention comprises at least one washing chamber wherein the articles to be washed are placed and the washing process is performed; at least one washing liquid inlet through which washing liquid for washing and/or rinsing processes is received; at least one collection chamber which is located under the washing chamber and wherein the washing liquid received from the washing liquid inlet is collected; at least one washing liquid outlet which is connected with the said collection chamber and which discharges the liquid collected in the collection chamber at the end of the washing and/or rinsing process; and at least one steam generator which heats the washing liquid received from the said washing liquid inlet and/or collection chamber and supplies it into the washing chamber through at least one steam inlet connected with the washing chamber.

[0006] In the washer device of the present invention, the steam generator is allowed to operate in conjunction with other components. Thus, the steam generator and/or other components are allowed to operate with different functions so as to meet disparate needs of the users (for example, even if the heating unit of the washer device fails, the washing liquid may be heated).

Object of the Invention

[0007] An object of the present invention is to provide a washer device comprising steam generator.

[0008] Another object of the present invention is to provide a washer device wherein the steam generator is able to operate in conjunction with other components.

[0009] Another object of the present invention is to provide a washer device that ensures that the steam generator included therein is cleaned while being used.

[0010] A further object of the present invention is to provide a washer device that heats the washing liquid without a heating unit or even if the heating unit therein fails.

[0011] A different object of the present invention is to provide a washer device that provides better cleaning of highly soiled articles.

[0012] Still another object of the present invention is to provide a reliable washer device.

Description of the Drawings

[0013] Exemplary embodiments of the washer device according to the present invention are illustrated in the accompanying drawings, in which:

Figure 1 is an exemplary embodiment of the inventive washer device, shown in the form of block.

Figure 2 is another exemplary embodiment of the inventive washer device, shown in the form of block.
Figure 3 is a further exemplary embodiment of the inventive washer device, shown in the form of block.
Figure 4 is a different exemplary embodiment of the inventive washer device, shown in the form of block.
Figure 5 is another exemplary embodiment of the inventive washer device, shown in the form of block.
Figure 6 is a further exemplary embodiment of the inventive washer device, shown in the form of block.

[0014] All the parts illustrated in the drawings are individually assigned a reference numeral and the corresponding terms of these numbers are listed as follows:

Washer device	(M)
Liquid level	(a)
Washing chamber	(1)
Washing liquid inlet	(2)
Collection chamber	(3)
Valve for collection chamber	(3a)
Washing liquid outlet	(4)
Outlet valve	(4a)
Steam generator	(5)
Steam generator valve	(5a)
Steam inlet	(6)
First T connection	(7)
Inlet filter	(8)
Inlet valve	(9)
Circulation pump	(10)
Heating unit	(11)
Steam generator pump	(12)
Second T connection	(13)
Outlet pump	(14)

Description of the Invention

[0015] In the washer devices (i.e. dishwasher or washing machine etc.) that wash the articles placed inside an inner chamber, steam generators are used which supplies steam onto the articles to be washed in order to provide better cleaning of especially dried stains on the articles. Said steam generators operate as a separate unit in the washer device. This results in a restriction in the operation functionalities of the steam generator and thus the washer device. Therefore, with the present invention, there is provided a washer device wherein the steam generator is able to operate in conjunction with other components.

[0016] The washer device (M) according to the present invention, as illustrated in figures 1-6 as a dishwasher, comprises at least one washing chamber (1) wherein the articles to be washed are placed and the washing process is performed; at least one washing liquid inlet (2) through which washing liquid (i.e. water from the mains) for washing and/or rinsing processes is received; at least one collection chamber (3) which is located under the washing chamber (1) and wherein the washing liquid received from the washing liquid inlet (2) is collected; at least one washing liquid outlet (4) which is connected with the said collection chamber (3) and which discharges the liquid collected in the collection chamber (3) at the end of the washing and/or rinsing process; and at least one steam generator (5) which heats the washing liquid received from the said washing liquid inlet (2) and/or collection chamber (3) and supplies it into the washing chamber (1) through at least one steam inlet (6) connected with the washing chamber (1). Said steam generator (5) is preferably positioned in alignment with the bottom of the washer chamber (1). Since the said steam generator (5) heats the washing liquid received from the washing liquid inlet (2) and/or collected in the collection chamber (3) and supplies it into the washing chamber (1), the steam generator (5) may be used for different functions.

[0017] In an illustrative embodiment of the invention as shown in figures 1-3, 5 and 6, the washer device (M) of the present invention comprises at least a first T connection (7) which is connected at one side with the washing liquid inlet (2), and at another side, with the collection chamber (3) and at the other, with the steam generator (5) and which supplies the washing liquid received from the washing liquid inlet (2) into the collection chamber (3) and the steam generator (5). In this embodiment, the washing liquid supplied into the washer device (M) is, at the same time, sent to the collection chamber (3) and the steam generator (5). Here, when the washing liquid received into the washer device (M) reaches to a liquid level (a), and then the washing liquid has filled the collection chamber (3) and reached to the level of the steam generator (5). In this way, the steam generator (5) is operated to boil the water, so it is used to heat the washing liquid in the collection chamber (3) in addition to supplying hot steam into the washing chamber (1). With this embodiment, a

direct connection between the steam generator (5) and the collection chamber (3) is established and accordingly, instead of the washing liquid that is boiled and evaporated in the steam generator (5) and sent to the washing chamber (1), the washing liquid in the collection chamber (3) is re-filled into the steam generator (5) by means of gravity. In this way, the steam generator (5) is able to perform a heating process in a continuous manner.

[0018] In a preferred embodiment of the invention as shown in figure 2, the washer device (M) comprises at least one valve (3a) for collection chamber which is interposed between the said first T connection (7) and the collection chamber (3) and which controls the washing liquid supplied from the first T connection (7) into the collection chamber (3). In this embodiment, when feeding washing liquid into the washer device (M) through a washing liquid inlet (2), for example, the valve (3a) for the collection chamber is switched into a closed position so as to feed the entire washing liquid into the washer chamber (1) via the steam generator (5). Thus, while feeding liquid into the washing chamber (1) through the washing liquid inlet (2) (for example, while feeding water from the mains), the steam generator (5) is cleaned efficiently. After the washing liquid is received, the valve (3a) for the collection chamber is switched into an opened position and thus the washing liquid in the collection chamber (3) is filled into the steam generator (5) by means of gravity.

[0019] Thanks to the abovementioned embodiments, the washing liquid received into the washing chamber (1) may be heated by means of the steam generator (5). With this embodiment, the need of the washer device (M) for an additional heater to heat the washing liquid is eliminated.

[0020] In another preferred embodiment of the invention as shown in figure 3, the washer device (M) comprises at least one steam generator pump (12) which is interposed between the said first T connection (7) and the steam generator (5) and which allows the washing liquid in the collection chamber (3) to pass through the steam generator (5) into the washing chamber (1). With the said steam generator pump (12), the washing liquid in the collection chamber (3) is heated in the steam generator (5) and sent to the washing chamber (1) during the operation of the washer device (M). Here, the washing liquid received from the collection chamber (3) is able to be turned into a hot washing liquid in the steam generator (5) and sent to the washing chamber (1) in case the steam generator pump (12) is operated. Since the washing liquid circulated by means of the steam generator pump (12) will have a higher temperature while being passed through the steam generator (5), if highly soiled articles are placed into an area close to the steam inlet (6), the washing liquid will initially strike on these articles so that such articles may be cleaned more efficiently. In case the steam generator pump (12) is optionally (according to a program) not operated, the steam generator (5) only generates steam and the washing liquid received from the collection chamber (3) is introduced into the washing chamber (1) as a steam. Thus, the washing liquid received into the washing chamber (1) may be heated by means of the steam generator (5). Furthermore, the need of the washer device (M) for an additional heater to heat the washing liquid is eliminated.

[0021] In another preferred embodiment of the invention, the washer device (M) comprises at least one outlet pump (14) that supplies the washing liquid collected in the collection chamber (3) into the washing liquid outlet (4). In this embodiment, the washer device (M) also comprises at least a second T connection (13) which is connected at one side with the outlet pump (14), and at another side, with the washing liquid outlet (4) and at the other, with the steam generator (5); at least one outlet valve (4a) which is interposed between the second T connection (13) and the washing liquid outlet (4) and which controls liquid passage between the second T connection (13) and the washing liquid outlet (4); and at least one steam generator valve (5a) which is interposed between the second T connection (13) and the steam generator (5) and which controls liquid passage between the second T connection (13) and the steam generator (5). In this embodiment, while the washer device (M) receives washing liquid or the washer device (M) is being operated, the outlet valve (4a) is in its closed position and the steam generator valve (5a) is in its opened position. Thus, the outlet pump (14) supplies the washing liquid in the collection chamber (3) into the washing chamber (1) via the steam generator (5). In order to discharge the washing liquid inside the collection chamber (3) from the washer device (M), the outlet valve (4a) is brought into an opened position and the steam generator valve (5a) is brought into a closed position. Alternatively, the washer device (M) comprises at least one three-way valve (not shown) which is connected at one side with the outlet pump (14), and at another side, with the washing liquid outlet (4) and at the other, with the steam generator (5), and which selectively supplies the washing liquid fed by the outlet pump (14) into the steam generator (5) or the washing liquid outlet (4). Since the washing liquid circulated by means of the outlet pump (14) will have a higher temperature while being passed through the steam generator (5), if highly soiled articles are placed into an area close to the steam inlet (6), the washing liquid will initially strike on these articles so that such articles may be cleaned more efficiently. Furthermore, the washing liquid received into the washing chamber (1) may be heated by means of the steam generator (5) and the need of the washer device (M) for an additional heater to heat the washing liquid is eliminated.

[0022] In an illustrative embodiment of the invention, the washer device (M) comprises at least one inlet filter (8) which filters the washing liquid received from the washing liquid inlet (2) before it is sent to the collection chamber (3) and/or steam generator (5). Thanks to the inlet filter (8) which is preferably in the form of a resin container, foreign substances (i.e. scale) contained in the washing liquid received into the washer device (M) are removed.

[0023] In another illustrative embodiment of the invention, the washer device (M) comprises at least one inlet valve (9) connected with the washing liquid inlet (2) for receiving the washing liquid from the washing liquid inlet (2) in a controlled manner.

[0024] In another illustrative embodiment of the invention, the washer device (M) comprises at least one circulation pump (10) that supplies the washing liquid collected in the collection chamber (3) into the washing chamber (1). In this embodiment, the washer device (M) also comprises at least one heating unit (11) which is interposed between the circulation pump (10) and the washing chamber (1) and which heats the washing liquid supplied into the washing chamber (1). Although the washing liquid is heated by the steam generator (5) in the washer device (M) provided with a single steam generator (5) used in figures 1-4, the heating unit (11) may be used in order to extend the lifetime of the steam generator (5), in particular, and to reduce the washing time. In case the said heating unit (11) fails, the washing liquid is heated by the steam generator (5). Particularly, in case at least two steam generators are used, as shown in figures 5 and 6, the heating unit (11) may totally eliminated and the washing liquid may heated by the steam generators (5). Furthermore, with the use of at least two steam generators (5), an intensive steam is generated and the time for heating the water is reduced.

[0025] A method for operation of the washer device (M) according to the present invention comprises the steps of receiving the washing liquid through the washing liquid inlet (2); supplying the washing liquid received from the washing liquid inlet (2) into the washing chamber (1) by means of the steam generator (5) and the collection chamber (3); and finishing the receiving of the washing liquid through the washing liquid inlet (2) when the liquid in the washing chamber (1) has reached to a predetermined liquid level (a). In this embodiment, since the washing liquid received from the washing liquid inlet (2) is passed through the steam generator (5), the steam generator (5) is also cleaned.

[0026] Another method for operation of the washer device (M) according to the present invention comprises the steps of receiving the washing liquid through the washing liquid inlet (2); supplying the washing liquid received from the washing liquid inlet (2) into the washing chamber (1) by means of the steam generator (5); and finishing the receiving of the washing liquid through the washing liquid inlet (2) when the liquid in the washing chamber (1) has reached to a predetermined liquid level (a). In this embodiment, since the washing liquid, in total (or almost in total), is passed through the steam generator (5) and into the washing chamber (1), the washing liquid supplied into the washing chamber (3) is heated in the steam generator (5), when necessary. Here, supply of the washing liquid into washing chamber (1) by means of the steam generator (5) is performed by closing the said valve (3a) for the collection chamber and/or operating the steam generator pump (12).

[0027] A further method for operation of the washer device (M) according to the present invention comprises the step of supplying the washing liquid accumulated in the collection chamber (3) into the washing chamber (1) by being passed through the steam generator (5). In this embodiment, the washing liquid accumulated in the collection chamber (3) is passed through the steam generator (5) using the steam generator pump (12) or outlet pump (14). By passing the washing liquid through the steam generator (5), the washing liquid is heated or converted into steam so as to be supplied into the washing chamber (1).

[0028] In the washer device (M) of the present invention, the steam generator (5) is allowed to operate in conjunction with other components. Thus, the steam generator (5) and/or other components are allowed to operate with different functions so as to meet disparate needs of the users (for example, even if the heating unit of the washer device fails, the washing liquid may be heated).

Claims

1. A washer device (M) comprising at least one washing chamber (1) wherein the articles to be washed are placed and the washing process is performed; at least one washing liquid inlet (2) through which washing liquid for washing and/or rinsing processes is received; at least one collection chamber (3) which is located under the washing chamber (1) and wherein the washing liquid received from the washing liquid inlet (2) is collected; at least one washing liquid outlet (4) which is connected with the said collection chamber (3) and which discharges the liquid collected in the collection chamber (3) at the end of the washing and/or rinsing process, **characterized by** comprising at least one steam generator (5) which heats the washing liquid received from the said washing liquid inlet (2) and/or collection chamber (3) and supplies it into the washing chamber (1) through at least one steam inlet (6) connected with the washing chamber (1).

2. A washer device (M) according to claim 1, **characterized by** comprising at least a first T connection (7) which is connected at one side with the washing liquid inlet (2), and at another side, with the collection chamber (3) and at the other, with the steam generator (5) and which supplies the washing liquid received from the washing liquid inlet (2) into the collection chamber (3) and the steam generator (5).

3. A washer device (M) according to claim 2, **characterized by** comprising at least one valve (3a) for collection chamber which is interposed between the said first T connection (7) and the collection chamber (3) and which controls the supply of the washing liquid from the first T connection (7) into the collection chamber (3).

4. A washer device (M) according to claim 2, **characterized by** comprising at least one steam generator pump (12) which is interposed between the said first T connection (7) and the steam generator (5) and which allows the washing liquid in the collection chamber (3) to pass through the steam generator (5) into the washing chamber (1).

5. A washer device (M) according to claim 1, **characterized by** comprising at least one outlet pump (14) that supplies the washing liquid collected in the collection chamber (3) into the washing liquid outlet (4).

6. A washer device (M) according to claim 5, **characterized by** comprising at least a second T connection (13) which is connected at one side with the outlet pump (14), and at another side, with the washing liquid outlet (4) and at the other, with the steam generator (5); at least one outlet valve (4a) which is interposed between the second T connection (13) and the washing liquid outlet (4) and which controls liquid passage between the second T connection (13) and the washing liquid outlet (4); and at least one steam generator valve (5a) which is interposed between the second T connection (13) and the steam generator (5) and which controls liquid passage between the second T connection (13) and the steam generator (5).

7. A washer device (M) according to claim 5, **characterized by** comprising at least one three-way valve which is connected at one side with the outlet pump (14), and at another side, with the washing liquid outlet (4) and at the other, with the steam generator (5), and which selectively supplies the washing liquid fed by the outlet pump (14) into the steam generator (5) or the washing liquid outlet (4).

8. A washer device (M) according to claim 1, **characterized by** comprising at least one inlet filter (8) which filters the washing liquid received from the washing liquid inlet (2) before it is sent to the collection chamber (3) and/or steam generator (5).

9. A washer device (M) according to claim 8, **characterized in that** the said inlet filter (8) is in the form of a resin container.

10. A washer device (M) according to claim 1, **characterized by** comprising at least one inlet valve (9) connected with the washing liquid inlet (2) for receiving the washing liquid from the washing liquid inlet (2) in a controlled manner.

11. A washer device (M) according to claim 1, **characterized by** comprising at least one circulation pump (10) that supplies the washing liquid collected in the collection chamber (3) into the washing chamber (1).

12. A washer device (M) according to claim 11, **characterized by** comprising at least one heating unit (11) which is interposed between the circulation pump (10) and the washing chamber (1) and which heats the washing liquid supplied into the washing chamber (1).

13. A washer device (M) according to claim 1, **characterized by** comprising at least two steam generators (5).

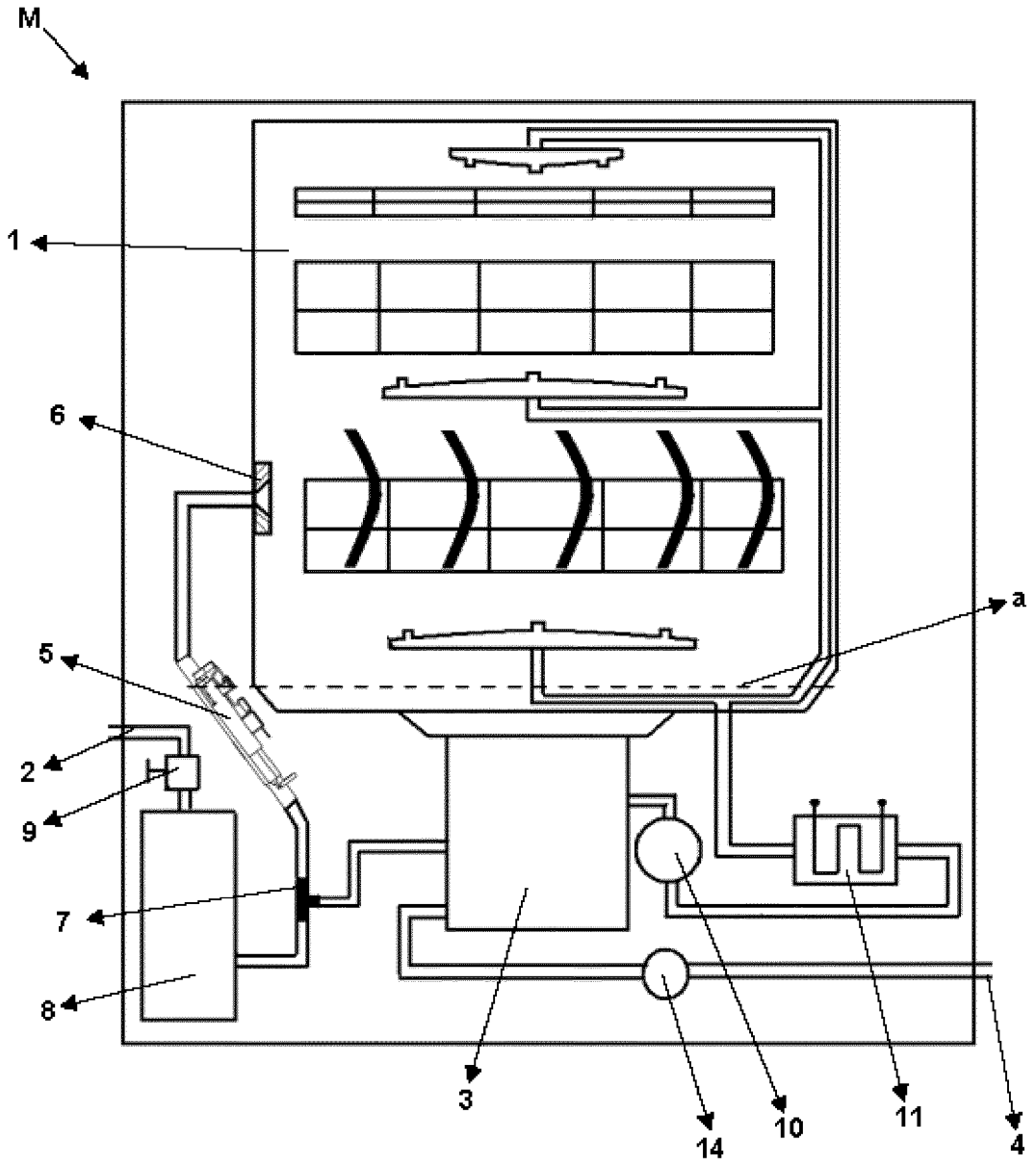

Figure – 1

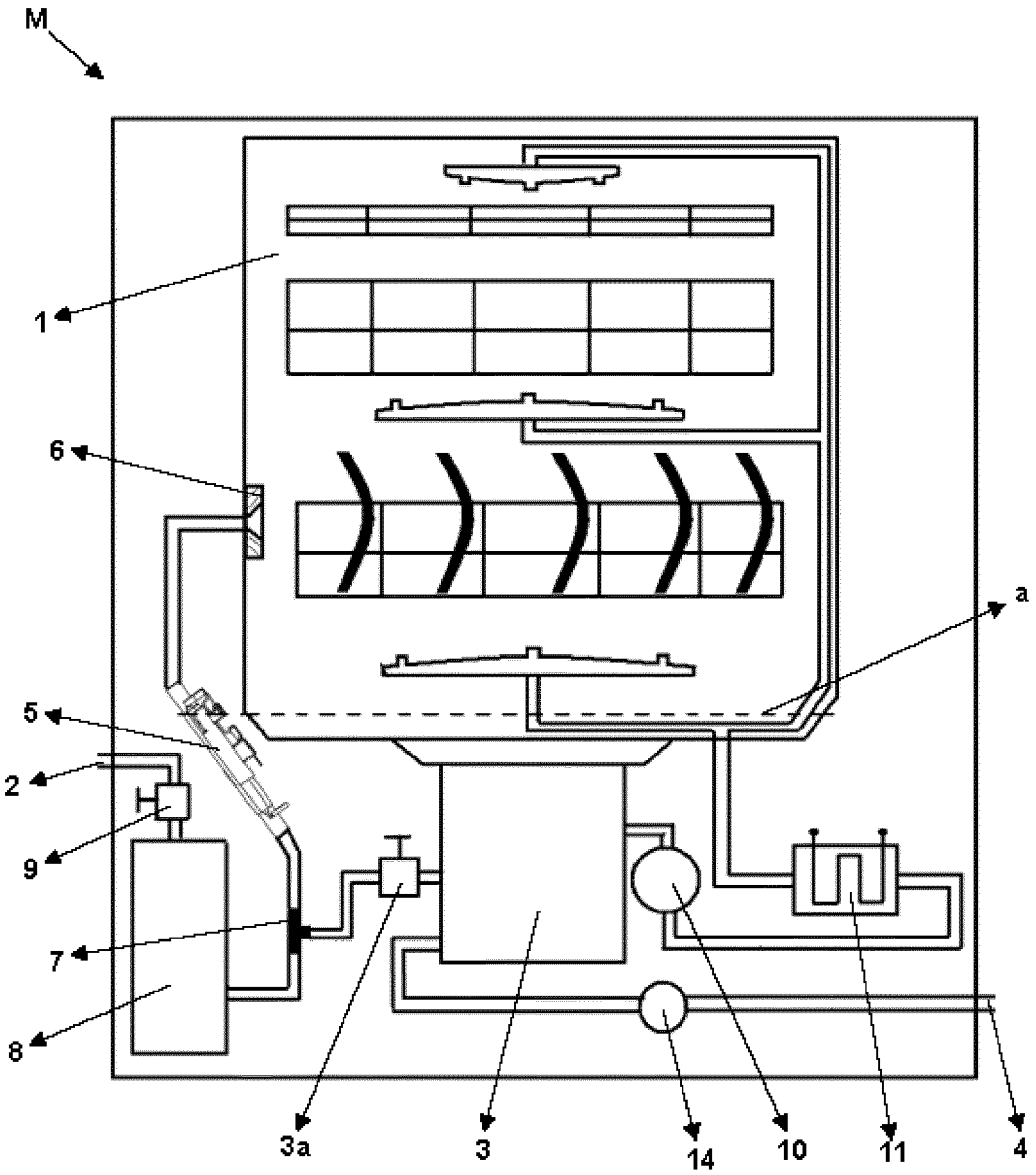

Figure – 2

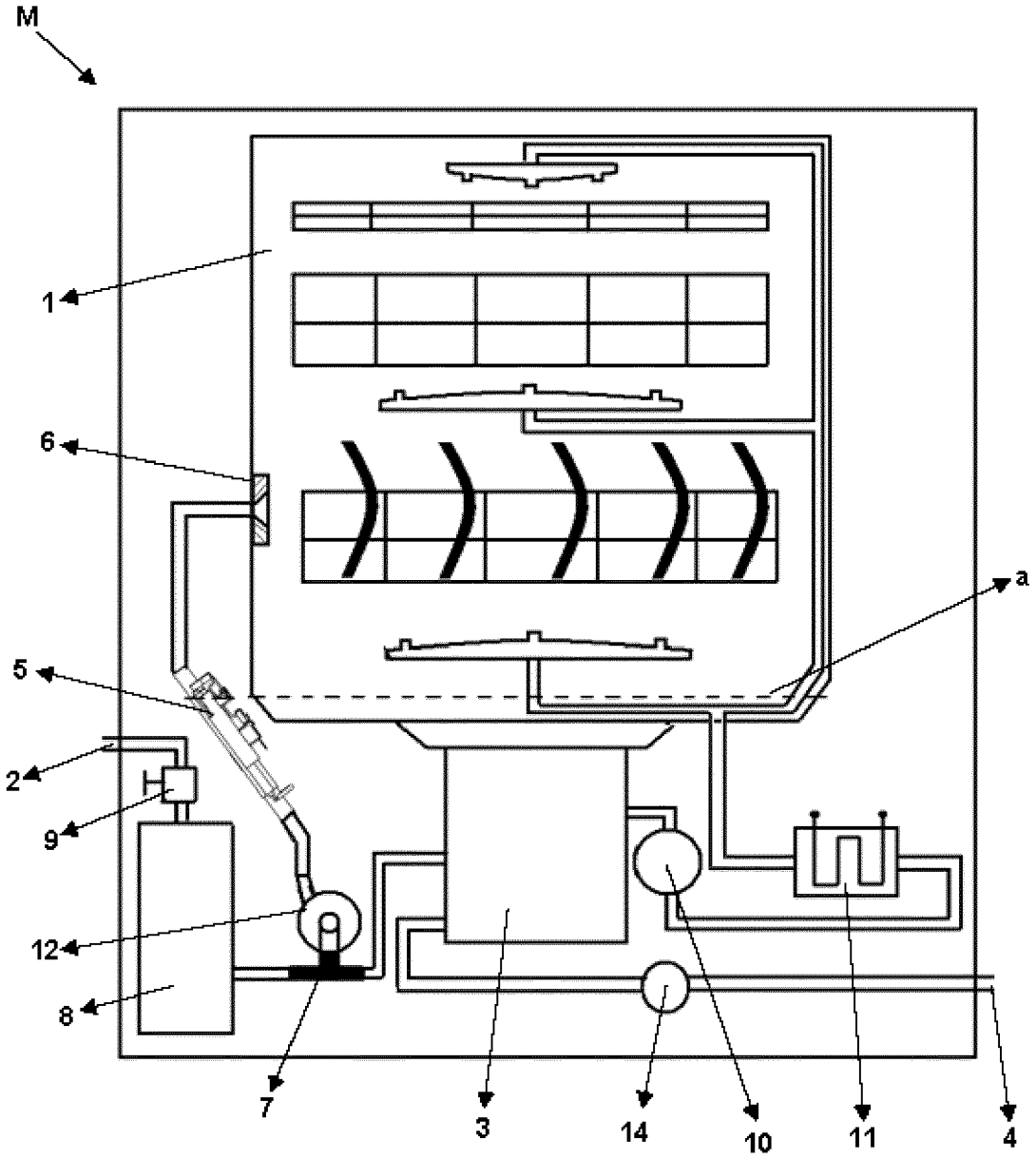

Figure – 3

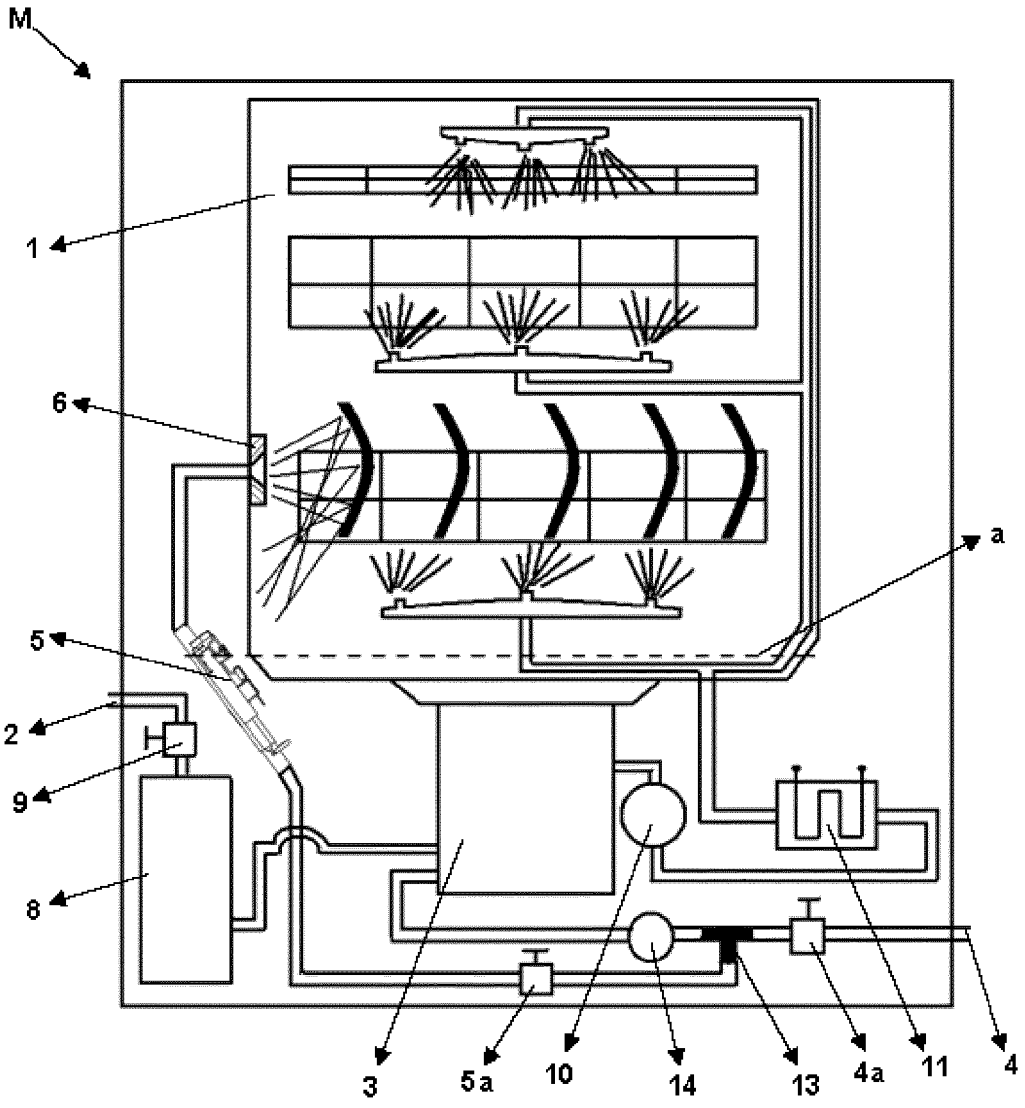

Figure – 4

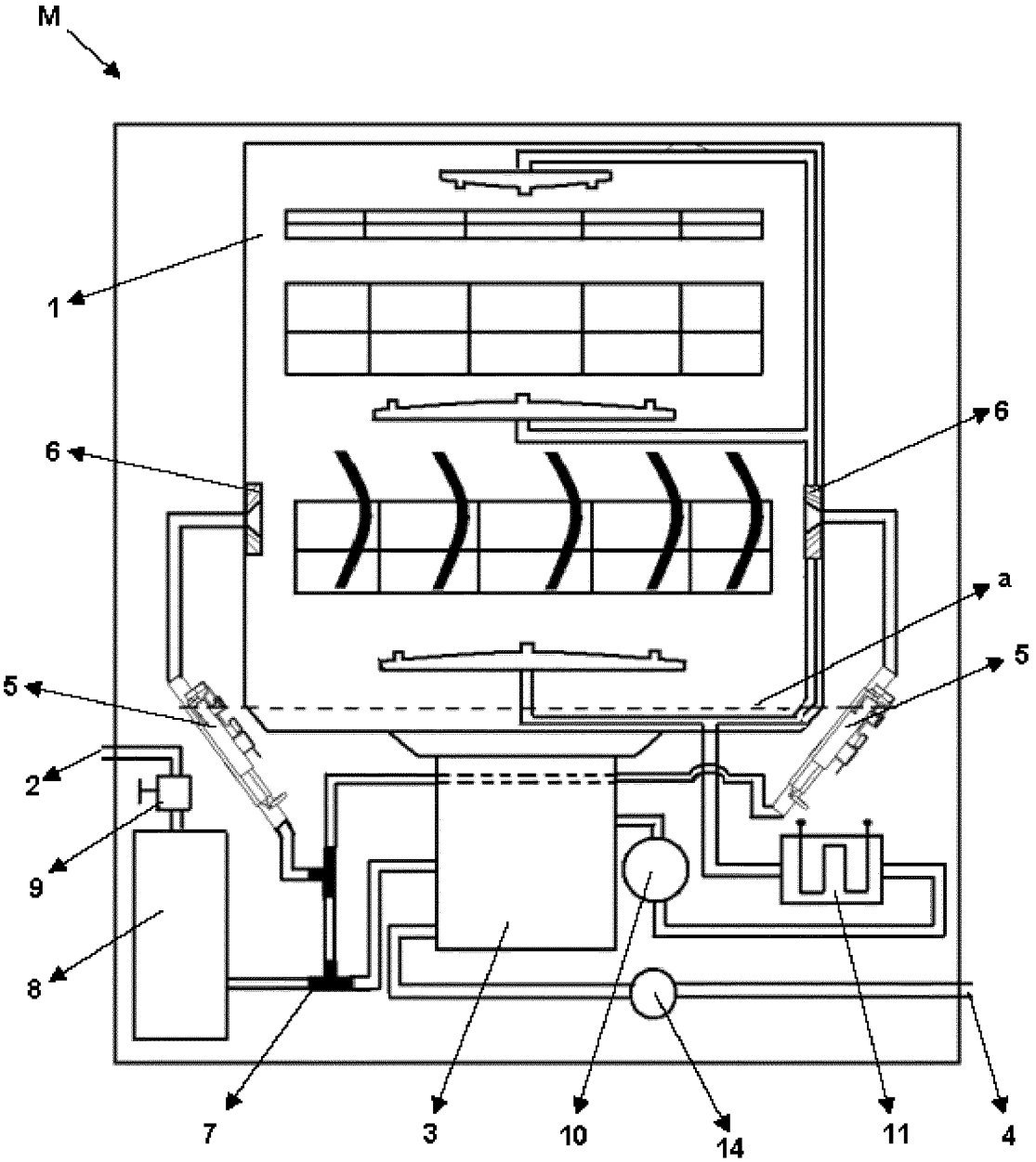

Figure – 5

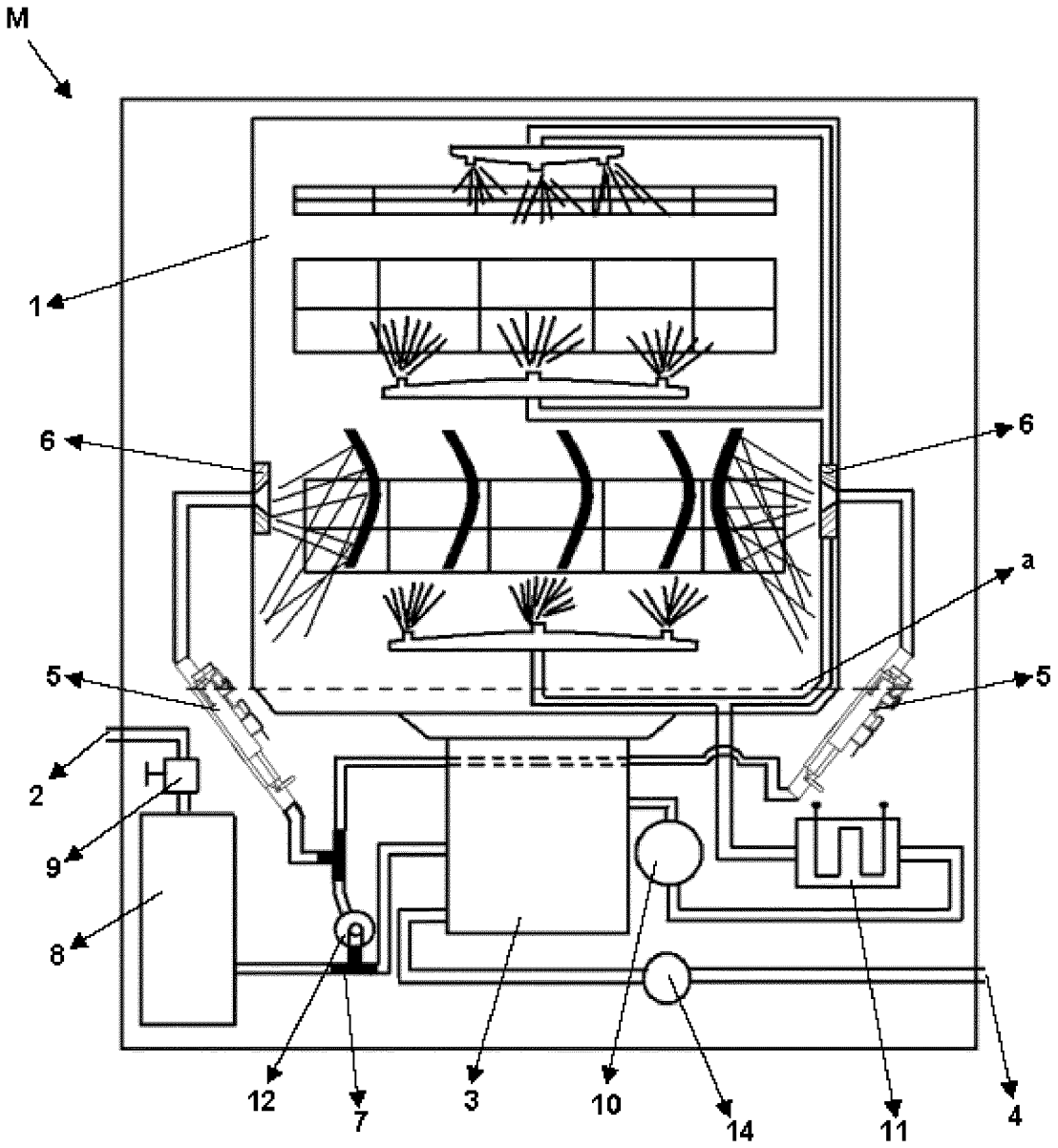

Figure – 6

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EUROPEAN SEARCH REPORT

Application Number
EP 15 19 2536

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 2008/236624 A1 (KIM SEONG HO [KR] ET AL) 2 October 2008 (2008-10-02) * paragraph [0025] - paragraph [0034] * * paragraph [0053] - paragraph [0054]; figure 1 *	1-3,5, 10-13 4	INV. A47L15/42 D06F39/00
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TECHNICAL FIELDS SEARCHED (IPC)

A47L
D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 March 2016	Beckman, Anja

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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O : non-written disclosure
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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