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Remarks:

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(54) **Domestic appliance with a water reservoir**

(57) Domestic appliance (1) for textiles, especially home dryer or washing machine, wherein the domestic appliance is equipped with a steam unit (2) for applying water steam, especially hot or superheated steam, to the textiles and wherein a water reservoir (3) is located in or at the domestic appliance (1) for receiving water (4) for the steam unit (2), wherein the domestic appliance (1) has means for displaying (14) the water level (13) in the water reservoir (3).

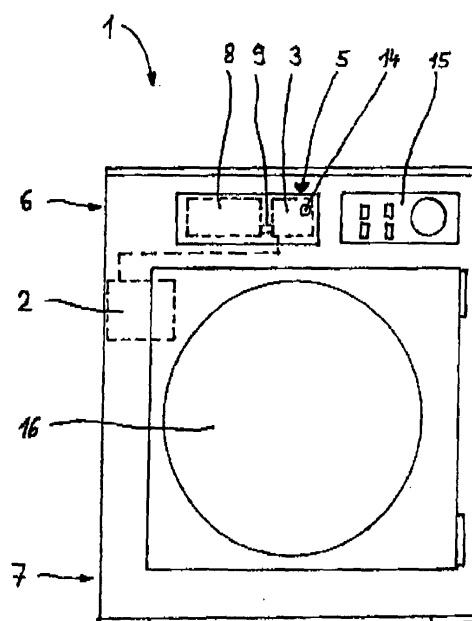


FIG 1

Description

[0001] The invention relates to a domestic appliance, especially to a dryer for textiles or a washing machine.

[0002] Domestic appliances are well known in the state of the art. It is known to wash and to dry textiles by them. Dryers usually use a condensation process or a wet exhausting air process.

[0003] It has been found that the quality of the treatment of textiles can be improved by using steam which is applied to the textiles in the domestic appliance. By doing so unwanted odours can be removed. For this purpose water steam, particularly hot or superheated water steam is fed into the drum which contains the textiles. For this the domestic appliance needs to have a steam unit.

[0004] A problem is that the steam unit needs to be supplied by fresh water which has to be free from lime and other contaminations. Normally, the condense water from the condensation in a dryer can not be used because it contains foreign matters and dirt which is cumulated during the condensation process in the condensate reservoir. If such water would be used dirt and other foreign matters would be brought again into the textile, which is not desirable.

[0005] Therefore, it is an object of the present invention to propose a domestic appliance, especially a home dryer or a washing machine, which has the possibility to treat the textiles with hot steam without any charge of dirt or any other foreign matter or contamination in the supply water, for the steam unit.

[0006] This object is achieved by a domestic appliance according to claim 1. Preferred embodiments are mentioned in the dependent claims.

[0007] According to claim 1 the invention is **characterized in that** the domestic appliance is equipped with a steam unit for applying water steam, especially hot or superheated steam, to the textiles and that a water reservoir is located in or at the domestic appliance for receiving water for the steam unit.

[0008] With this concept it is possible to supply always fresh water without any contamination. Therefore, the steam treatment can be carried out with best quality so that the result of the treatment process is optimized.

[0009] Preferably, the water reservoir is locatable in a reception slot in the domestic appliance.

[0010] The water reservoir can be arranged preferably in an upper region or in the lower region within the domestic appliance.

[0011] According to a preferred embodiment of the invention the domestic appliance is a dryer, especially a dryer of the condensation type which has a condensate reservoir. In this case the water reservoir and the condensate reservoir can be arranged in the dryer at different locations. Alternatively the water reservoir and the condensate reservoir can be arranged adjacently. It is even possible that the water reservoir is arranged within the condensate reservoir, i. e. integrated within the conden-

sate reservoir.

[0012] The water reservoir and the condensate reservoir can be hydraulically connected. In this case it is possible that a filter element is arranged between the water reservoir and the condensate reservoir.

[0013] Furthermore, the water reservoir can have a venting element which is in fluidic connection with the condensate reservoir or with the reception slot for the condensate reservoir.

[0014] The water reservoir can have a filling device. This filling device can be located in the front region of the appliance when the water reservoir is inserted in the domestic appliance. Preferably the filling device is provided with a filter element to clean the water that is filled into the water reservoir.

[0015] Furthermore, the appliance can contain an additional reserve tank that is hydraulically connected with the water reservoir. The reserve tank can be a separate unit or it can be part of the water reservoir.

[0016] The water reservoir can be equipped with a sensor device for detecting the water level in the water reservoir. The domestic appliance can have means for displaying the level in the water reservoir detected by the sensor device. The means for displaying can be integrated in the control panel of the domestic appliance. They can also be integrated in a front region of the water reservoir, i. e. in the water reservoir itself. An alternative embodiment is **characterized in that** the means for displaying are integrated in the bottom region of the domestic appliance.

[0017] Preferably the water level in the water reservoir is displayed by means for displaying which are hydraulically connected to the water reservoir, for example an at least partly transparent device placed in the front region of the water reservoir. The water level in this device can be seen from outside through the transparent part of the device. This water level corresponds to the water level in the water reservoir. The mentioned means for displaying can directly placed in the front panel of the appliance. It is also possible to place them in the frame of a drawer, e.g. a condensate reservoir drawer, or in the frame of a door of the appliance. In this case the means for displaying are covered by the drawer panel when the drawer is closed or by the door when the door is closed, but can be seen when the drawer or the door are open. Additionally it is possible that a window is integrated into the drawer panel or the door in front of the means for displaying to allow checking of the water level even if the drawer or the door is closed. The means for displaying or the at least partly transparent device can be the filling device mentioned above.

[0018] To make sure that the steam production process is only activated if sufficient water is in the water reservoir, a preferred embodiment of the domestic appliance has means for preventing the activation of the steam unit if the sensor device detects a water level in the water reservoir which is below a defined minimum level.

[0019] To maintain an optimum water quality in the wa-

ter reservoir a preferred embodiment is **characterized in that** the water reservoir has a coating with an antibacterial effect.

[0020] For easy handling of the water reservoir and especially for filling and emptying it, the water reservoir can be held in the domestic appliance by quick releasing means. This is also helpful in the production process of the appliance and in case of service, for example when the water reservoir has to be changed or cleaned.

[0021] Furthermore an outlet tube for fluids contained inside the water reservoir can be provided at the water reservoir. With this outlet tube it is possible to empty the water reservoir. Additionally it can be used to clean the water reservoir by directing cleaning fluid through the water reservoir, for example by filling the cleaning fluid into the filling device and by removing it through the outlet tube.

[0022] According to the invention the domestic appliance has an additional hot steam or superheated steam functionality. The water for the steam unit is kept in a separate water reservoir. The water reservoir is usable in a modular manner, i. e. it is possible to retrofit it in existing domestic appliances. It can be mounted very quickly by using quick release means for carrying it.

[0023] Preferably, the water reservoir is located in an upper or lower interspace in the domestic appliance.

[0024] It has preferably a storage and a filter function for clean, not contaminated water, especially distilled water.

[0025] In the drawings different embodiments of the invention are depicted.

FIG 1 shows an example of a home dryer according to the invention in a front elevation,

FIG 2 shows in three-dimensional view a water reservoir, especially suitable for the home dryer shown in FIG 1,

FIG 3 shows a different example of a dryer according to the invention in a front elevation,

FIG 4 shows another example of a water reservoir useable in domestic appliances according to the invention, especially in the home dryer shown in FIG 5,

FIG 5 shows another example of a home dryer according to the invention,

FIG 6 shows yet another example of a home dryer according to the invention, and

FIG 7 shows the filling device for the water reservoir, provided in the dryer shown in FIG 6.

[0026] In FIG 1 a home dryer 1 for drying textiles is shown wherein the drying of the textiles occurs in a well

known manner. The textiles (not depicted) are placed in a drum 16. Here, the dryer 1 is designed as a dryer of the condensation type. I. e. it has a condensate reservoir 8 in which water is collected which is extracted from the wet textiles.

[0027] To improve the quality of the treatment of the textiles a hot or superheated steam process is carried out in the dryer 1. I. e. hot or superheated steam is applied to the textiles in the drum 16 of the dryer. For this a steam unit 2 is arranged within the dryer 1 for the production of hot steam. To produce steam the steam unit 2 needs water. This must be as clean and contamination-free as possible. Therefore a separate water reservoir 3 is arranged in the dryer 1 which can be removed from the dryer 1. Not depicted quick releasing means are supplied to hold the water reservoir 3 in position during use. The dryer 1 has a reception slot 5 in which not only the water reservoir 3 but also the condensate reservoir 8 is arranged. The water reservoir 3 is arranged in the upper region 6 of the dryer. It would also be possible to locate it in another region of the dryer 1, e. g. in the lower region 7.

[0028] In the depicted embodiment of the invention the water reservoir 3 and the condensate reservoir 8 are arranged side by side, i. e. adjacent to another. Here, even a hydraulic connection 9 is supplied so that water from the condensate reservoir 8 can be transferred to the water reservoir 3. To make sure that the water which is forwarded to the water reservoir 3 from the condensate reservoir 8 is sufficiently clean a - not depicted - filter element is positioned in the hydraulic connection 9.

[0029] As can be seen from FIG 2 the water reservoir 3 has a filling device 11 for filling in water 4 into the water reservoir 3. Furthermore, the water reservoir 3 has a venting element 10,

[0030] To survey the water level 13 in the water reservoir 3 a sensor device 12 is arranged in the water reservoir 3. By this element the water level 13 is detected and the detected signal is forwarded e. g. to the control panel 15 of the dryer 1. Here means for displaying 14 can be located to show the user of the dryer 1 when the water level 13 drops below a minimum level.

[0031] In the depicted embodiment the means for displaying 14 are arranged in the front of the water reservoir 3 itself.

[0032] A recessed grip 17 is arranged in the front of the water reservoir 3 to facilitate the handling of the water reservoir 3.

[0033] The water reservoir 3 allows the storage and the supply of clean and decontaminated water 4 for the steam production. Filling and de-filling of the water reservoir 3 is facilitated by the fact that the water reservoir 3 is arranged in the dryer 1 by use of quick release means.

[0034] The venting element 10 makes sure that no water can leak into the dryer 1. Also a reserve tank can be employed (not depicted) so that an alert can be given out to the user if the water level 13 drops below a certain limit. In spite of this the steam production can continue.

The reserve tank can be an additional device or component or it can be integrated within the water reservoir 3. It is possible that a part of the volume of the water reservoir 3 is defined as reserve tank volume. Furthermore the condensate reservoir 8 can be used as reserve tank.

[0035] The opening of the reserve tank can e. g. be done by an actuating element which is controlled by the control unit of the dryer. The transfer of water from the reserve tank to the water reservoir can be controlled electrically and/or hydraulically. For example a vacuum lifting pad can be arranged for this transfer of water.

[0036] Due to the width or diameter of the filling tube 11 it can be made possible in an easy manner to clean the inner of the water reservoir 3. Alternatively it is possible to dismantle the water reservoir 3 for cleaning purposes.

[0037] If the arrangement or allocation of the water reservoir 3 is made by modular containing element (slots etc.) it is possible to use the water reservoir 3 in different applications, e. g. in a washing machine and in a dryer.

[0038] If an antibacterial coating is used in the inner of the water reservoir 3 it can be made sure that not algae will appear. This is especially reasonable if usual tap water is used.

[0039] FIG 3 shows a different example of a home dryer 1 according to the invention. Again the drying of the textiles occurs in a well known manner. The textiles (not depicted) are placed in a drum 16, which is generally a treatment area. The drum 16 is closed by a door 20. Here, the dryer 1 is designed as a dryer of the condensation type. I. e. is has a condensate reservoir 8 in which water is collected which is extracted from the wet textiles.

[0040] To improve the quality of the treatment of the textiles a steam process is carried out in the dryer 1. Steam, i. e. hot or superheated steam, is applied to the textiles in the drum 16 of the dryer 1. For this a modular steam unit 2 is arranged within the dryer 1 for the production of the steam. A water reservoir 3 to supply the steam unit is placed in a side region 18 of the dryer 1, in an upper region 6, close to a side panel 22 of the dryer 1 and between the side panel 22 and the condensate reservoir 8.

[0041] The water reservoir 3 allows the storage and the supply of clean and decontaminated water for the steam production. As shown in FIG 3, it is designed in that way that it becomes very small to use a free space between the condensate reservoir 8 and the side panel 2. Furthermore the design of the water reservoir 3 could be adapted to the form of the drum 16 (not depicted), if the water reservoir 3 uses a space between the drum 16 and the side panel 22.

[0042] The condensate reservoir 8 is arranged as part of a drawer (not depicted) that could be removed from the dryer 1 to empty it. A front panel 21 of this drawer can be seen in FIG 3. This front panel 21 additionally covers at least a part of the water reservoir 3.

[0043] As can be seen from FIG 3 the steam unit 2 is arranged in the left part, i. e. in the side region 18, of the

dryer in a lower region 7, especially between the drum 16 and the side panel 22 of the dryer 1. It is also possible to locate the steam unit 2 in an upper region 6 of the appliance 1.

[0044] FIG 4 shows another example of a water reservoir 3 useable in domestic appliances 1 according to the invention, especially in the home dryer 1 shown in FIG 5. This water reservoir 3 is provided with a filling device 11 to fill water into the water reservoir 3.

[0045] FIG 5 shows another example of a home dryer 1 according to the invention. The side panel is removed, therefore the arrangement of the water reservoir 3 shown in FIG 4 in the dryer 1 can be seen.

[0046] It can be seen in FIG 4 and FIG 5 that the home dryer 1 has means 14 for displaying the water level in the water reservoir 3. These means 14 are integrated in the filling device 11 which is hydraulically connected with the water reservoir 3.

[0047] To implement the means 14 for displaying the filling device 11 is at least at its front made of transparent material. Therefore the water level in the filling device 11, which corresponds to the water level in the water reservoir 3, can be seen through this transparent material. The means 14 for displaying are placed in the front of the water reservoir 3. It is also possible to place them in the frame of a drawer, e.g. a condensate reservoir drawer. In this case the means for displaying are covered by a drawer panel 21 (see FIG 5) when the drawer is closed, but can be seen when the drawer is open. Additionally it is possible that a window is integrated into the drawer panel 21 in front of the means 14 for displaying to allow checking of the water level even if the drawer is closed (not shown in FIG 5, see FIG 3).

[0048] FIG 6 shows yet another example of a home dryer 1 according to the invention. The side panel is removed, therefore the arrangement of the water reservoir 3 in the dryer 1 can be seen. It is arranged behind a steam unit 2 in an lower side region of the dryer 1. In FIG 6 a door 20 of the dryer 1 is open and therefore it is possible to see that a filling device 11 for filling water into the water reservoir 3 is arranged in the door frame of the dryer 1. This filling device 11 is hydraulically connected with the water reservoir 11.

[0049] FIG 7 shows the above mentioned filling device 11 in detail. It can be seen that the filling device 11 comprises a movable filling baffle 23. Furthermore in FIG 7 a filter element 24, for example a sieve, is placed in front of the filling baffle 23. This filter element 24 is designed to be arranged inside the filling baffle 23 to clean the water filled into the water reservoir 3 through the filling baffle 23, for example by removing contaminants like dirt particles.

Reference Numerals

[0050]

1 Dryer

- 2 Steam unit
- 3 Water reservoir
- 4 Water
- 5 Reception slot
- 6 Upper region
- 7 Lower region
- 8 Condensate reservoir
- 9 Hydraulic connection
- 10 Venting element
- 11 Filling device
- 12 Sensor device
- 13 Water level
- 14 Means for displaying
- 15 Control panel
- 16 Drum, treatment area
- 17 Recessed grip
- 18 Side region
- 19 Outlet nozzle
- 20 Door
- 21 Front Panel
- 22 Side panel
- 23 Filling baffle
- 24 Filter element

Claims

- 1. Domestic appliance (1) for textiles, especially home dryer or washing machine, wherein the domestic appliance is equipped with a steam unit (2) for applying water steam, especially hot or superheated steam, to the textiles and wherein a water reservoir (3) is located in or at the domestic appliance (1) for receiving water (4) for the steam unit (2), **characterized in that** the domestic appliance (1) has means for displaying (14) the water level (13) in the water reservoir (3).
- 2. Domestic appliance according to claim 1, wherein the means for displaying (14) are integrated in the front panel, especially the control panel (15), of the domestic appliance (1).
- 3. Domestic appliance according to claim 1, wherein the means for displaying (14) are integrated in a front region of the water reservoir (3).
- 4. Domestic appliance according to claim 1, wherein the means for displaying (14) are integrated in the door region or the bottom region of the domestic appliance (1).
- 5. Domestic appliance according to claim 1, wherein the means for displaying (14) are hydraulically connected to the water reservoir (3).
- 6. Domestic appliance according to claim 5, wherein the means for displaying (14) comprises an at least

partly transparent device placed in the front region of the water reservoir (3).

- 7. Domestic appliance according to claim 5 or 6, wherein the means for displaying (14) are directly placed in the front panel of the appliance.
- 8. Domestic appliance according to claim 5, wherein the means for displaying (14) are placed in the frame of a drawer so that the means for displaying (14) are covered by a drawer panel when the drawer is closed, but can be seen when the drawer is open.
- 9. Domestic appliance according to claim 8, wherein the drawer is a condensate reservoir drawer.
- 10. Domestic appliance according to claim 5, wherein the means for displaying (14) are placed in the frame of a door of the appliance so that the means for displaying (14) are covered by the door when the door is closed, but can be seen when the door is open.
- 11. Domestic appliance according to claim 5, wherein a window is integrated in a drawer panel or in a door in front of means for displaying (14) to allow checking of the water level even if the drawer or the door is closed.
- 12. Domestic appliance according to claim 5 or 6, wherein the means for displaying (14) or the at least partly transparent device is a filling device for filling water into the water reservoir (3).
- 13. Domestic appliance according to claim 1, **characterized in that** the water reservoir (3) is locatable in a reception slot (5) in the domestic appliance (1).
- 14. Domestic appliance according to at least one of claims 1-13, **characterized in that** the water reservoir (3) is arranged in an upper region (6) or in a lower region (7) or in a side region (18) within the domestic appliance (1).
- 15. Domestic appliance according to at least one of claims 1-14, **characterized in that** the water reservoir (3) is held in the domestic appliance by quick releasing means.

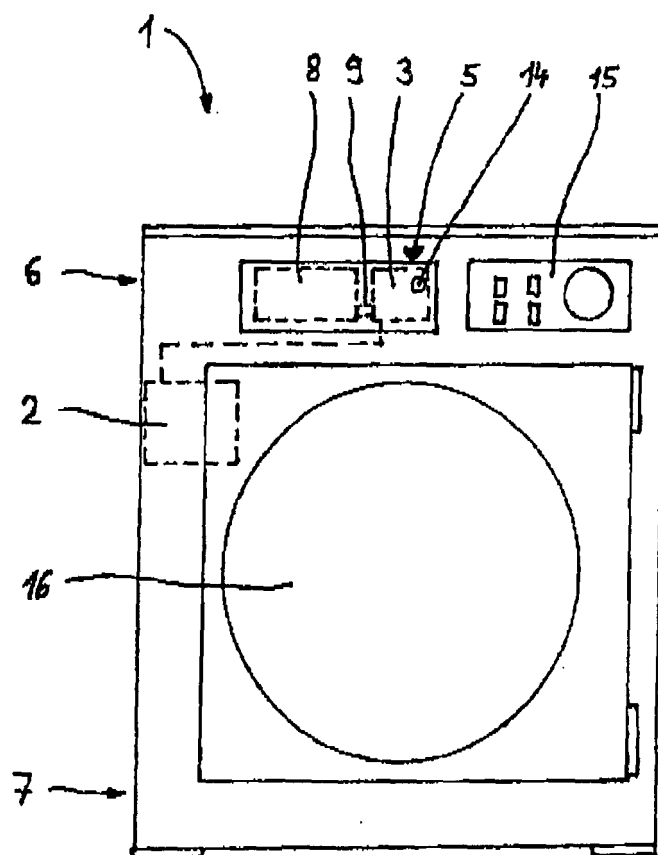


FIG 1

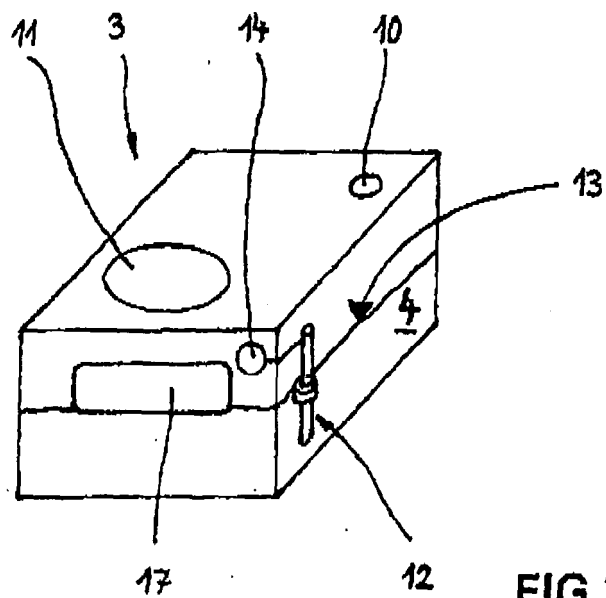


FIG 2

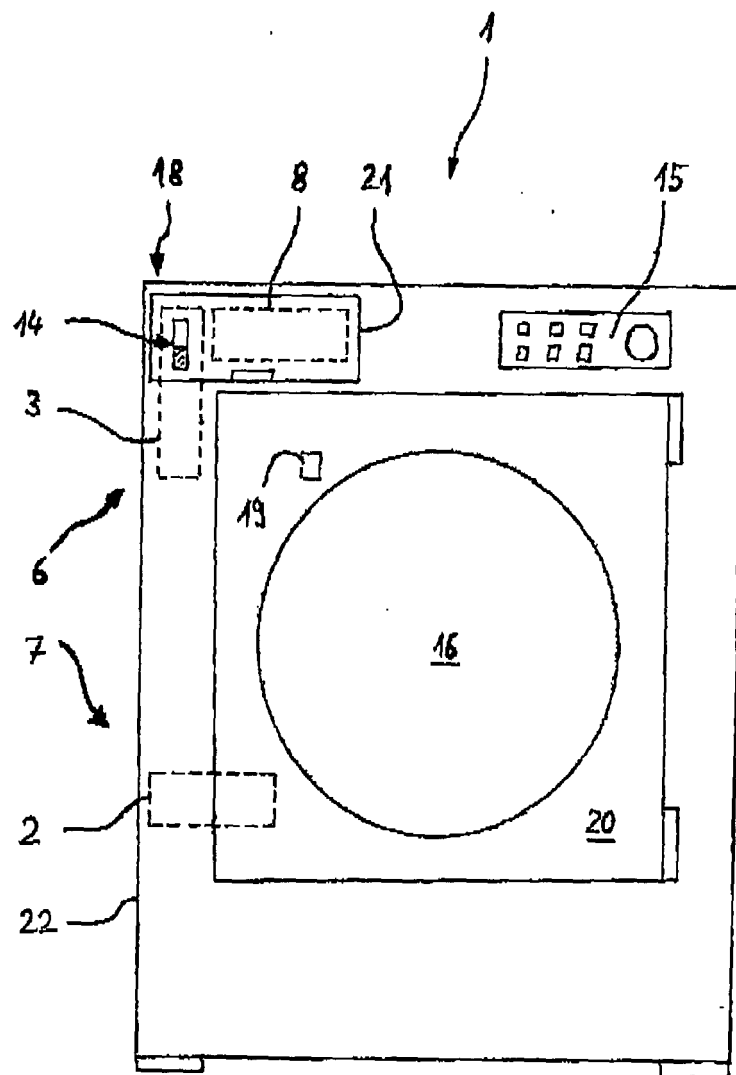


FIG 3

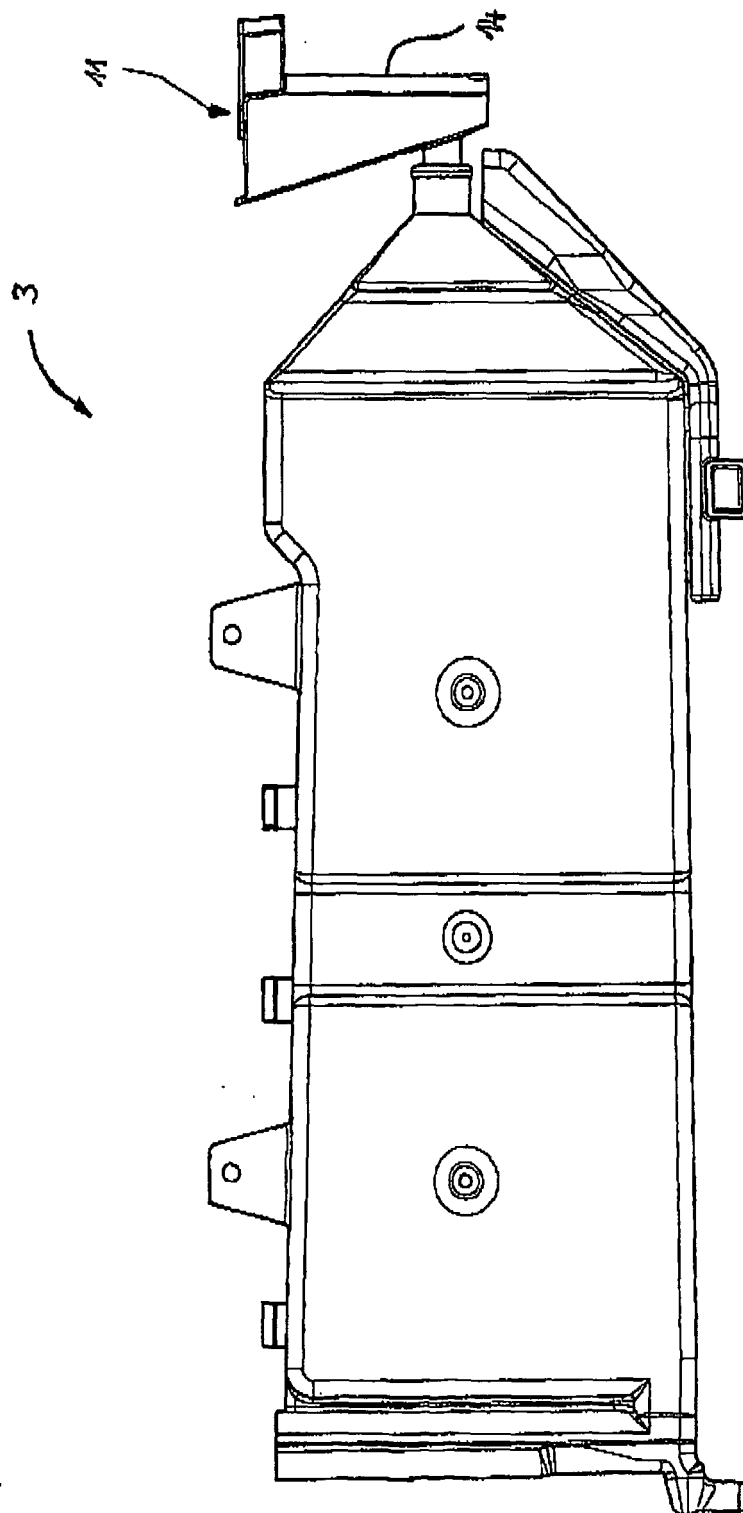


FIG 4

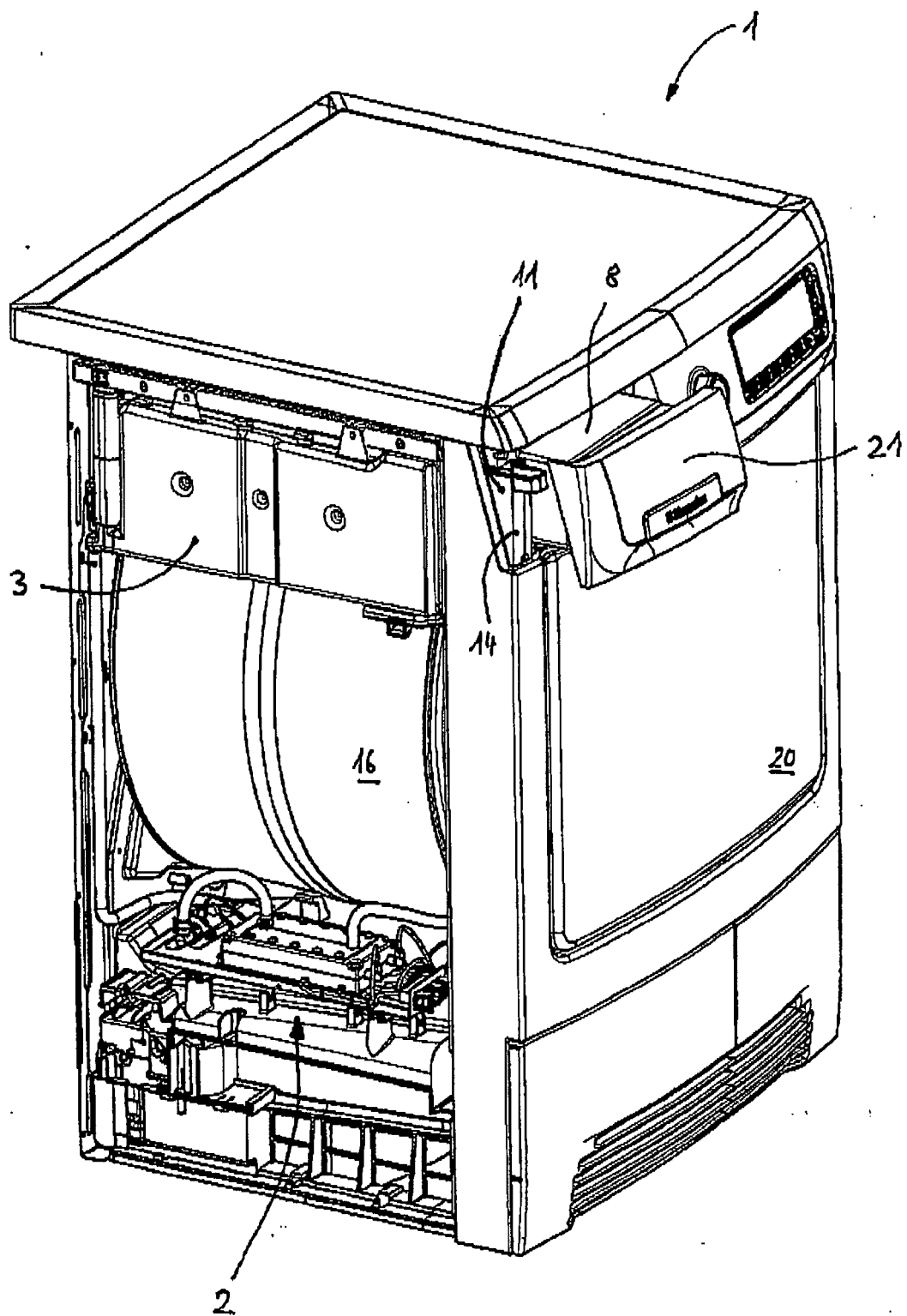


FIG 5

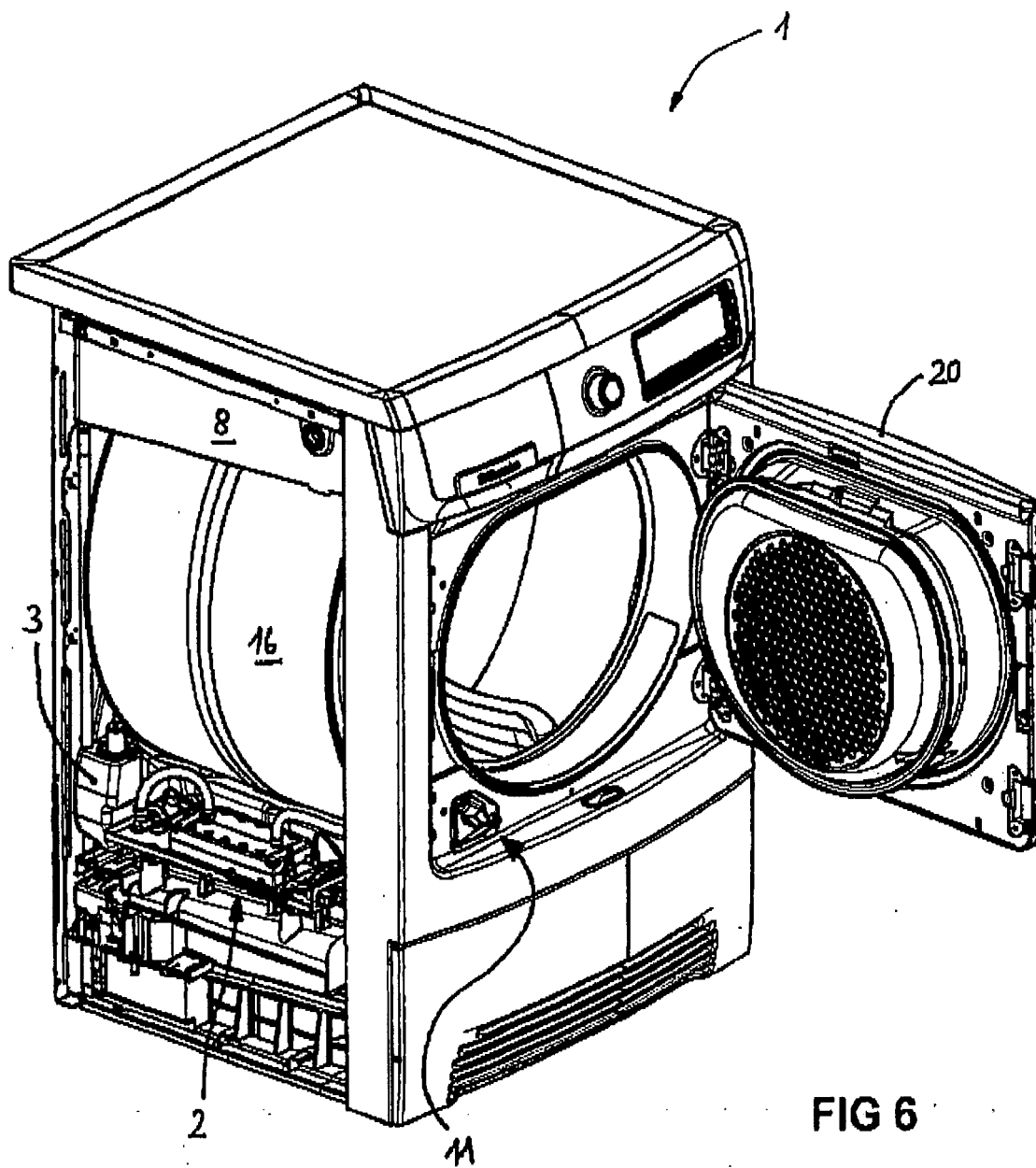


FIG 6

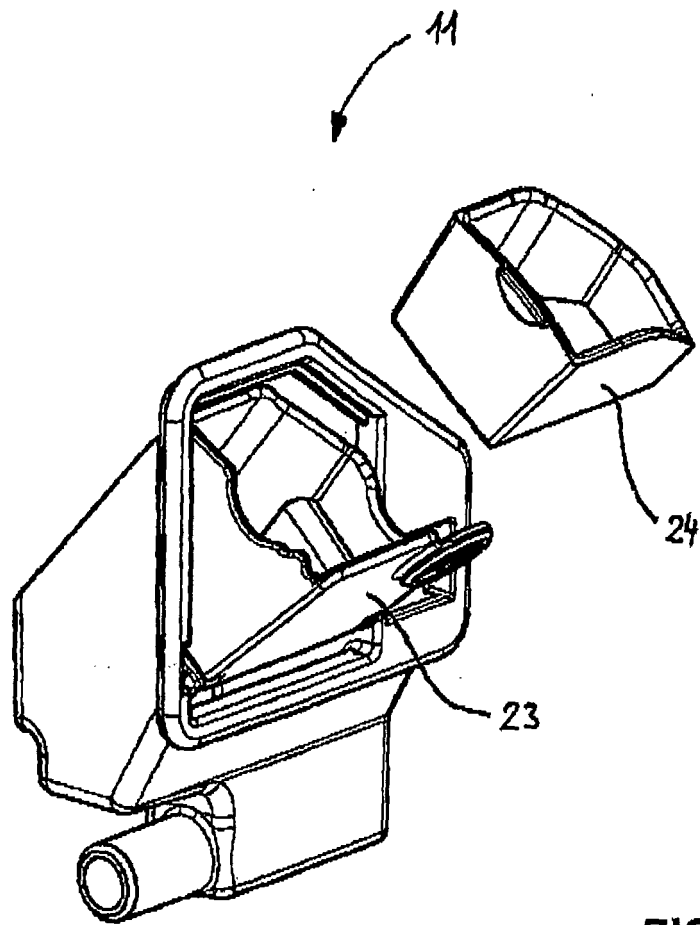


FIG 7



EUROPEAN SEARCH REPORT

Application Number
EP 10 17 9175

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Place of search		Date of completion of the search	Examiner
Munich		9 March 2011	Diaz y Diaz-Caneja
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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