(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 196 573 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.06.2010 Bulletin 2010/24

(51) Int Cl.:
D06F 29/00 *(2006.01)*

(21) Application number: **08171494.1**

(22) Date of filing: **12.12.2008**

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

(71) Applicant: **Electrolux Home Products Corporation N.V.**
1930 Zaventem (BE)

(72) Inventors:
- **Da Riol, Daniele**
  I-33084 Cordenons (PN) (IT)
- **Bisaro, Michele**
  I-33097 Spilinbergo (PN) (IT)
- **Pasut, Fabio**
  I-33170 Pordenone (IT)

(74) Representative: **Maccalli, Marco et al**
Maccalli & Pezzoli S.r.l.,
Via Settembrini, 40
20124 Milano (IT)

(54) Household appliance with surface for steam treating laundry

(57) A household appliance **(100)** comprises a cabinet **(105)** provided with a worktop **(110)** defining a surface **(130)** adapted to lying thereon clothes to be treated. A steam generation unit **(230,330)** is provided, operable to generate steam, and a steam delivery system **(245,250;245,450;500,570,575,580)** is fluidly connected to the steam generation unit and adapted to deliver steam to said surface.

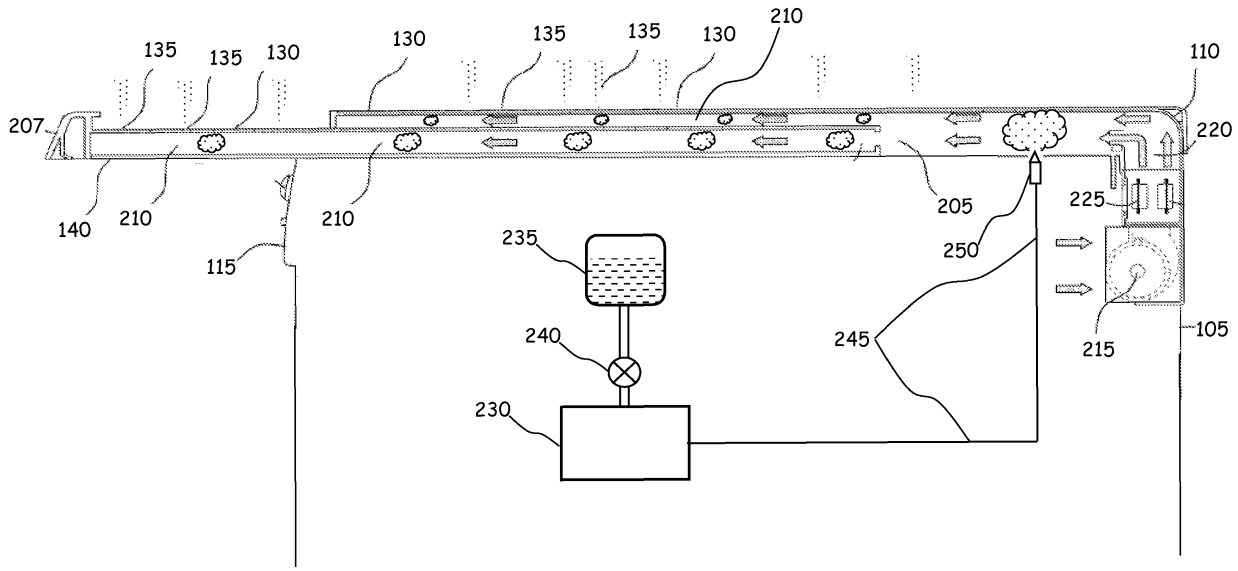

FIG. 2

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Description

[0001] The present invention relates in general to the field of household appliances, and in particular to a household appliance for washing and/or drying clothes.

[0002] Garments made of delicate textile materials, such as cashmere, are not adapted to undergo regular drying treatments in a tumble dryer, owing to the mechanical stresses, mainly in the form of impacts, which the textile fibres would be subject to. For properly taking care of these delicate textiles, more gentle drying treatments are required, such as line drying or flat drying, which on the other hand are rather time-consuming processes, especially in wintertime.

[0003] Solutions effective in eliminating the above mentioned drawbacks are disclosed in the European patent applications No. EP 1845185 and No. EP 1854916, both in the name of the present applicant, which provide for household appliances that comprise an outer casing with a worktop defining a drying surface, featuring a plurality of apertures, each one of which is fluidly connected with conveying means adapted to deliver a flow of air towards and through said apertures for the purpose of drying garments that are laid upon the drying surface.

[0004] According to embodiments thereof, the present invention proposes an improvement to the solutions set forth in the cited European patent applications.

[0005] According to an aspect of the present invention, there is provided a household appliance comprising a cabinet provided with a worktop defining a surface adapted to support thereon clothes to be treated. A steam generation unit is provided, operable to generate steam, and a steam delivery system is fluidly connected to the steam generation unit and adapted to deliver steam to said surface.

[0006] In embodiments of the present invention, said surface may have a plurality of apertures. Said steam delivery system may be fluidly connected to and adapted to deliver steam through at least some apertures of said plurality of apertures.

[0007] An air passage may be provided underneath the surface, and said steam delivery system may be are arranged to deliver steam into said air passage.

[0008] The steam delivery system may comprises at least one steam delivery nozzle.

[0009] In embodiments of the present invention, the said steam delivery system may comprise a plurality of steam delivery nozzles, each one arranged to deliver steam directly to a respective one of said apertures.

[0010] In further embodiments of the present invention, the steam delivery system may comprises a handheld steam delivery tool fluidly connectable or connected to a steam delivery outlet provided on the appliance cabinet and adapted to deliver steam generated by the steam generation unit.

[0011] The steam generation unit may be a steam generation unit provided in said cabinet for generating steam to be supplied to a clothes loading drum of the household appliance.

[0012] The apertures in the worktop surface may be in fluid communication with an air conveying system adapted to deliver a flow of air through said apertures, so as to gently drying garments or clothes laid on the worktop surface.

[0013] The air conveying system may comprises at least one heater operable to heat the flow of air to be delivered through said apertures.

[0014] Thanks to the proposed solution, clothes and garments can be laid on the worktop of the household appliance and be subjected to a steam flux, so as for example to prepare them for subsequent ironing, or simply to refresh them.

[0015] These and other features and advantages of the present invention will be made apparent by the following detailed description of exemplary and non-limitative embodiments thereof, to be read in conjunction with the attached drawings, wherein:

Figure 1 is a perspective view of a household appliance wherein a solution according to an embodiment of the present invention can be advantageously implemented;

Figure 2 is a partial side cross-sectional view of the household appliance of **Figure 1,** showing an embodiment of the present invention;

Figure 3 is a partial side cross-sectional view of the household appliance of **Figure 1**, showing another embodiment of the present invention;

Figure 4 shows another embodiment of the present invention, and

Figure 5 shows still another embodiment of the present invention.

[0016] In **Figure 1**, there is shown a household appliance **100**, in particular a household appliance for washing (*e.g.,* a domestic washing machine) and/or drying clothes (*e.g.* a domestic dryer or washer/dryer), wherein a solution according to an embodiment of the present invention is advantageously implemented.

[0017] The household appliance **100** comprises an outer casing or cabinet **105** with a worktop **110** and a front panel **115** carrying operational input and setting controls, a drum (not visible in **Figure 1**) rotatably supported inside the cabinet **105** and adapted to be loaded with the items to be washed and/or dried, an opening in a front wall **120** of the cabinet **105** for loading and unloading the items into and from the drum, and a door **125** for closing said opening.

[0018] The worktop **110** of the household appliance **100** comprises a drying surface **130** having a plurality of apertures **135**, each one of which is fluidly connected to conveying means adapted to direct a flow of air through said apertures **135**, for gently drying garments that are placed on the drying surface **130**. Garments to be dried can be placed on the drying surface **130**, and air is caused to flow through the apertures or perforations **135** so as

to hit the garments placed thereon, thereby gently drying it.

[0019] In the exemplary embodiment shown, the drying surface **130** comprises two surfaces, one being the surface of the worktop **110** itself, and the other being the surface of a drawer-like element **140** which is slidable in an accommodation or housing **205**, visible in **Figure 2**, provided in the worktop **110** and having appropriate slide guiding means; the drawer-like element **140** can slide between a first position, in which the drawer-like element **140**, and thus its drying surface, is contained, *i.e.* inserted within the accommodation **205** in the worktop **110** (just a handgrip portion **207** provided on the front of the drawer-like element **140** protruding from the worktop **110** for enabling the extraction of the drawer-like element **140**), and a second position (the one depicted in **Figure 1**) in which the drawer-like element **140**, and thus its drying surface, is extracted and extended horizontally out of the accommodation **205** in the worktop **110**. This arrangement provides a quite large drying surface for lying even relative large garments in stretched condition; in alternative embodiments of the invention, the drying surface may consist of the surface of the drawer-like element **140** only, the surface of the worktop **110** not being provided with apertures, or the drawer-like element **140** may be absent, the drying surface being in such a case formed only by the top surface of the worktop **110**. On the other hand, the drying surface of the drawer-like element **140** enables garments to be dried even when the surface of the worktop **110** is not directly accessible, due to obstacles immediately above the worktop.

[0020] As visible in **Figure 2**, both the worktop **110** and the drawer-like element **140** are internally hollow so as to integrally form an air passage **210** for conveying the flow of drying air under and along the drying surface **130**. The accommodation **205** further defines a drying-medium conveying channel adapted to fluidly connect the air passage **210** with air circulating means **215**.

[0021] The air circulating means **215** may for instance comprise at least one blower arranged inside the appliance cabinet **105** and adapted to take in air from either the interior or the exterior of the cabinet **105** to convey it into the air passage **210**. The blower may be housed within a proper accommodation provided to this purpose inside the cabinet of the appliance, in order to take in the ambient air from the interior of the cabinet (which is normally not air-tight and thus is in fluid communication with the external ambient, from which air can enter into the cabinet). A communication duct **220** is provided in the worktop **110** and/or the cabinet **105** to connect the air circulating means **215** to the air passage **210**. Other arrangements are however possible, as described in EP 1845185, which is incorporated herein by reference; in particular, and merely by way of example, the conveying means may be located outside the casing **105**, for example, the air circulating means **210** and the communication duct **220** may be associated to the upper backward portion of the casing **105** in proximity to and below the worktop **110** projecting from the casing, or the air circulating means **210** and the communication duct **220** may arranged above the worktop **110** in fluidly connection with the accommodation **205**. In embodiments of the present invention, the air conveyed to the drying surface may be process air used to dry the items inside the dryer drum, or air used to cool a condenser present in the appliance to remove moisture from the process air used to dry the items in the drum.

[0022] Heating means **225** may also be provided, for instance comprising one or more electric heating elements arranged downstream the air circulating means **215** and upstream the air passage **210**. The heating means **225** may be housed inside the communication duct **220**.

[0023] According to an embodiment of the present invention, the household appliance **100** is equipped with a steam generation unit **230**, for example housed within the cabinet **105**. The steam generation unit **230** is fluidly connected to a water tank **235**, for example through a valve and/or pump **240**, and receives from the tank **235** the water to be converted into steam. The steam generation unit **230** may be of conventional construction, comprising for example an electric boiler. A steam delivery conduit **245** delivers the generated steam from the steam generation unit **230** to a steam delivery nozzle **250** arranged to deliver steam into the drying-medium conveying channel defined by the accommodation **205**, and thus to the drying surface **130.**

[0024] The activation of the air circulating means **215**, of the heating means **225** and of the steam generation unit **230** is for example controllable, preferably in an independent manner, by means of specific controls provided on the appliance control panel **115**, or directly integrated on the worktop **110**, or integrated in the handgrip portion **207** of the drawer-like element **140**.

[0025] In operation, the garments to be dried are laid upon the drying surface **130**, if necessary after extracting the drawer-like element **140** from the worktop **110** (depending on the garments size and/or number). Upon switching on the air circulating means **215** and the heating means **225**, hot air starts flowing through the apertures **135** in the drying surface **130** so as to hit the garments laid thereupon and dry them. Upon switching on also the steam generation unit **230**, steam is also injected into the drying-medium conveying channel **205**, and flows through the apertures **135**. In case the garments are not to be dried, but simply refreshed, the steam generation unit **230** may be activated while the air circulating means **215** and the heating means **225** may be left off or be activated.

[0026] The steam generation unit **230** may be a special unit specifically provided in the household appliance **100**; this may be for example the case of a washing machine, which normally are not equipped with a steam generation unit for other purposes. In alternative embodiments of the present invention, where the household appliance is already equipped with a steam generation unit, like for

example in the case of some types of dryers or washer/dryers, the steam generation unit already provided in the household appliance **100** for different purposes may be exploited for delivering steam to the drying surface **130**. For example, as depicted in **Figure 3**, a steam generation unit **330** already provided in the dryer or washer/dryer **100** for supplying steam into a drum **360** where items to be drier are loaded may be used. In this case, valves **365** and **370** may preferably be provided for in the steam delivery duct **245** and in a duct **375** delivering steam to the drum, such valves being controllable through the controls of the appliance, so as to enable selective delivery of steam either to the drum, or to the drying surface **130**, or to both; in this way, it may for example be possible to deliver steam to the drying surface even when the drier is not operating to dry clothes in the drum.

[0027] When the steam generation unit **230** operates in conjunction with the air circulating means **215**, the flow of air generated by the latter transports the steam and forces it through the apertures **135**.

[0028] To achieve a more effective delivery of steam through the apertures **135** in the drying surface **130**, especially in the case where the air circulating means **215** are not operating, an arrangement similar to that depicted in **Figure 4** may be adopted, wherein a plurality of steam nozzles **450** is provided, each one associated with and arranged below a respective one of the apertures **135** in the drying surface **130**. This arrangement may be simpler to implement in a household appliance of the type described in the previously cited European patent application No. EP 1845185, not having the drawer-like element **140** in the worktop **110** (otherwise the steam delivery conduits supplying the nozzles **450** may interfere with the movement of the drawer-like element).

[0029] In another embodiment of the invention, the steam generation unit in the household appliance, for example the steam generator **330** already provided in a dryer or washer/dryer for delivering steam to the items in the drum, may be exploited to deliver steam to garments and clothes laid upon the drying surface **130** of the worktop **110** by using a hand-held tool, like the tool **500** shown in **Figure 5**, that through a hose **570** is connectable or connected to a steam delivery outlet **575** provided for example on the front panel of the cabinet **105**, and at which a steam delivery conduit **580** (preferably with a controllable valve **585** inserted therein) coming from the steam generation unit **330** ends. The valves allow steam to be delivered in a selective way to either the tool **500** or to the drying surface, or to both of them.

[0030] The present invention has been here described in some exemplary embodiments thereof. Several modifications to the described embodiments, as well as other embodiments of the invention are possible, without departing from the protection scope defined in the appended claims.

[0031] For example, the present invention may be implemented in any one of the different embodiments of household appliance described in the cited European patent applications No. EP 1845185 and No. EP 1854916, which are incorporated herein by reference.

[0032] Also, it should be clear that the solution shown in **Figure 5** may be implemented in an appliance which is not provided with the drying surface on the worktop.

Claims

1. A household appliance (**100**) comprising a cabinet (**105**) provided with a worktop (**110**) defining a surface (**130**) adapted to support thereon clothes to be treated,
characterized by comprising
a steam generation unit (**230,330**) operable to generate steam, and a steam delivery system (**245,250; 245,450;500,570,575,580**) fluidly connected to the steam generation unit and adapted to deliver steam to said surface.

2. The household appliance of claim 1, wherein said surface has a plurality of apertures (**135**).

3. The household appliance of claim 2, wherein said steam delivery system is fluidly connected to and adapted to deliver steam through at least some apertures of said plurality of apertures.

4. The household appliance of claim 3, comprising an air passage (**205,210**) underneath the surface, and wherein said steam delivery system is arranged to deliver steam into said air passage.

5. The household appliance of claim 4, wherein said steam delivery system comprises at least one steam delivery nozzle (**250**).

6. The household appliance of claim 3, 4 or 5, wherein said steam delivery system comprises a plurality of steam delivery nozzles (**450**), each one arranged to deliver steam directly to a respective one of said apertures.

7. The household appliance of any one of the preceding claims, wherein said steam delivery system comprises a handheld steam delivery tool (**500**) fluidly connectable or connected to a steam delivery outlet (**575**) provided on said cabinet and adapted to deliver steam generated by the steam generation unit.

8. The household appliance of any one of the preceding claims, wherein said steam generation unit is a steam generation unit provided in said cabinet for generating steam to be supplied to a clothes loading drum of the household appliance.

9. The household appliance of any of claims 2 to 8 as depending on claim 2, wherein said apertures are in

fluid communication with an air conveying system (**205,210,215**) adapted to deliver a flow of air through said apertures.

10. The household appliance of claim 9, wherein said air conveying system comprises at least one heater (**225**) operable to heat the flow of air to be delivered through said apertures.

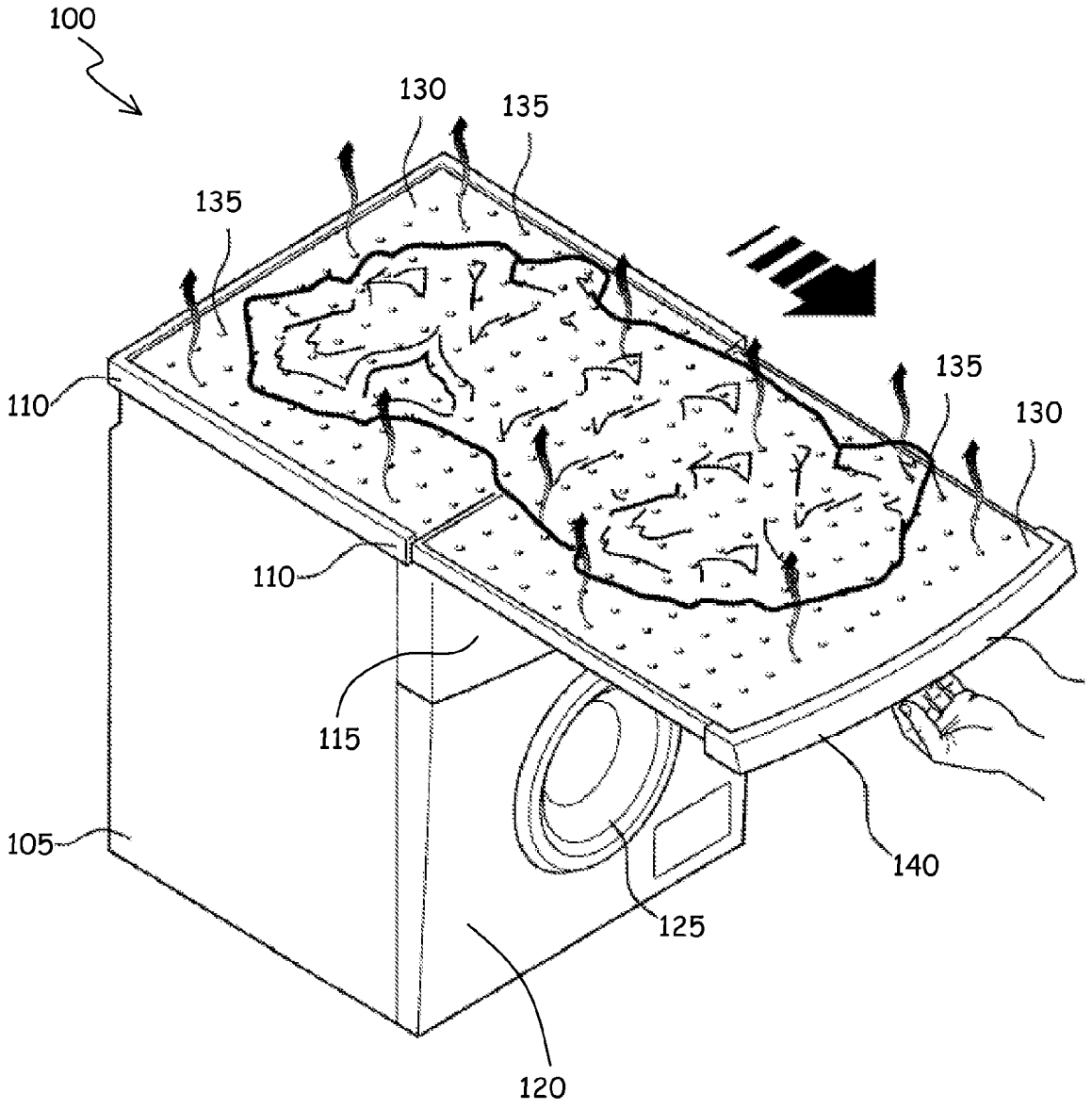

FIG. 1

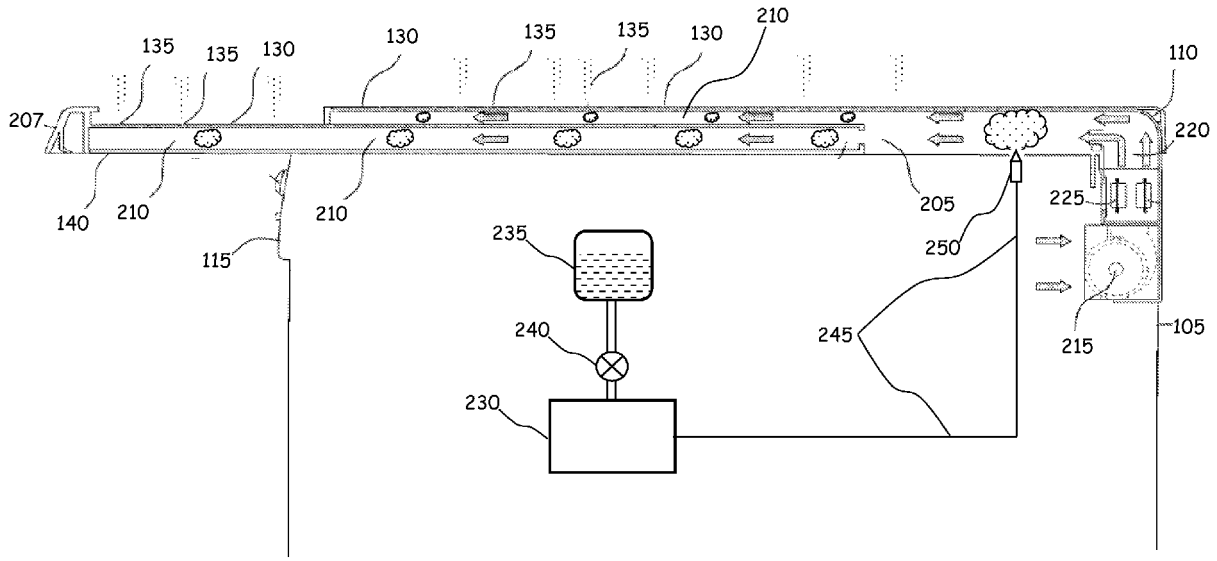
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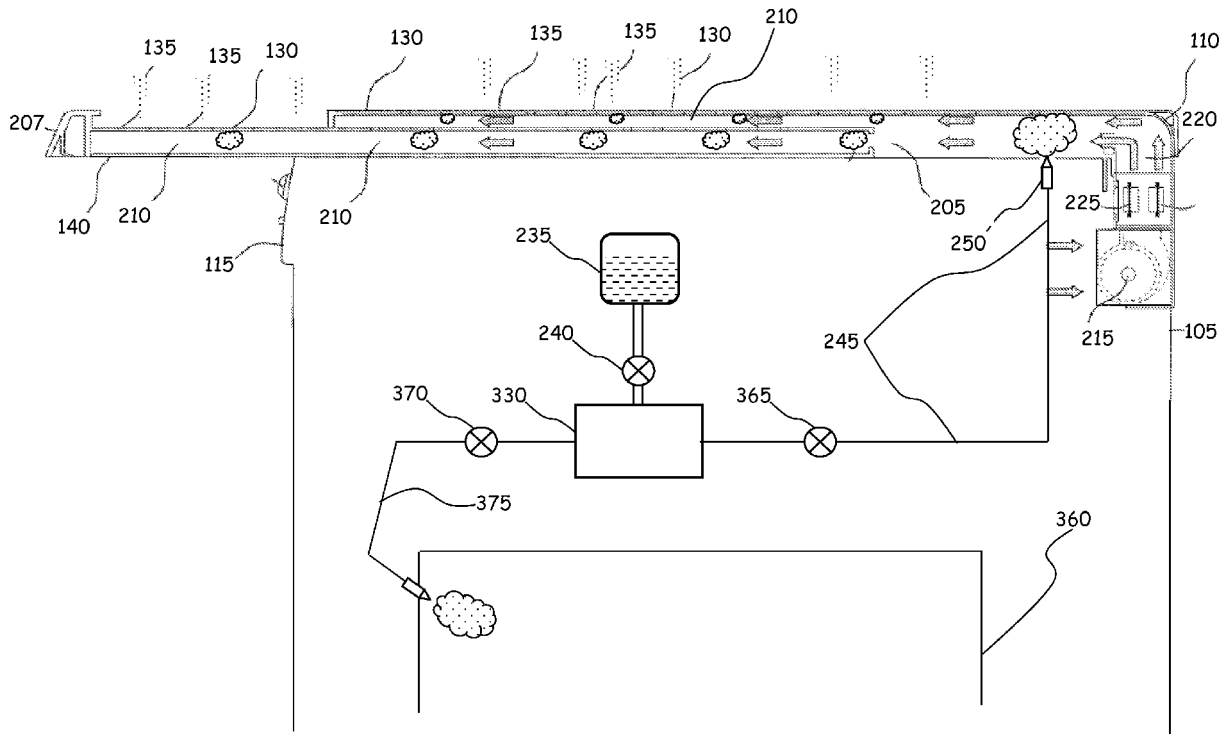
FIG. 2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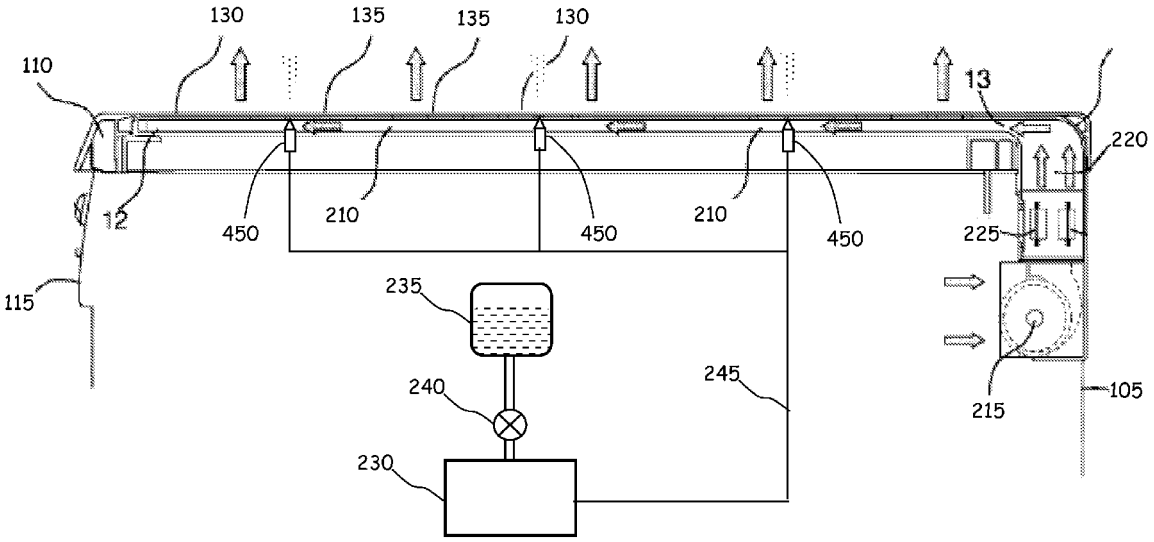
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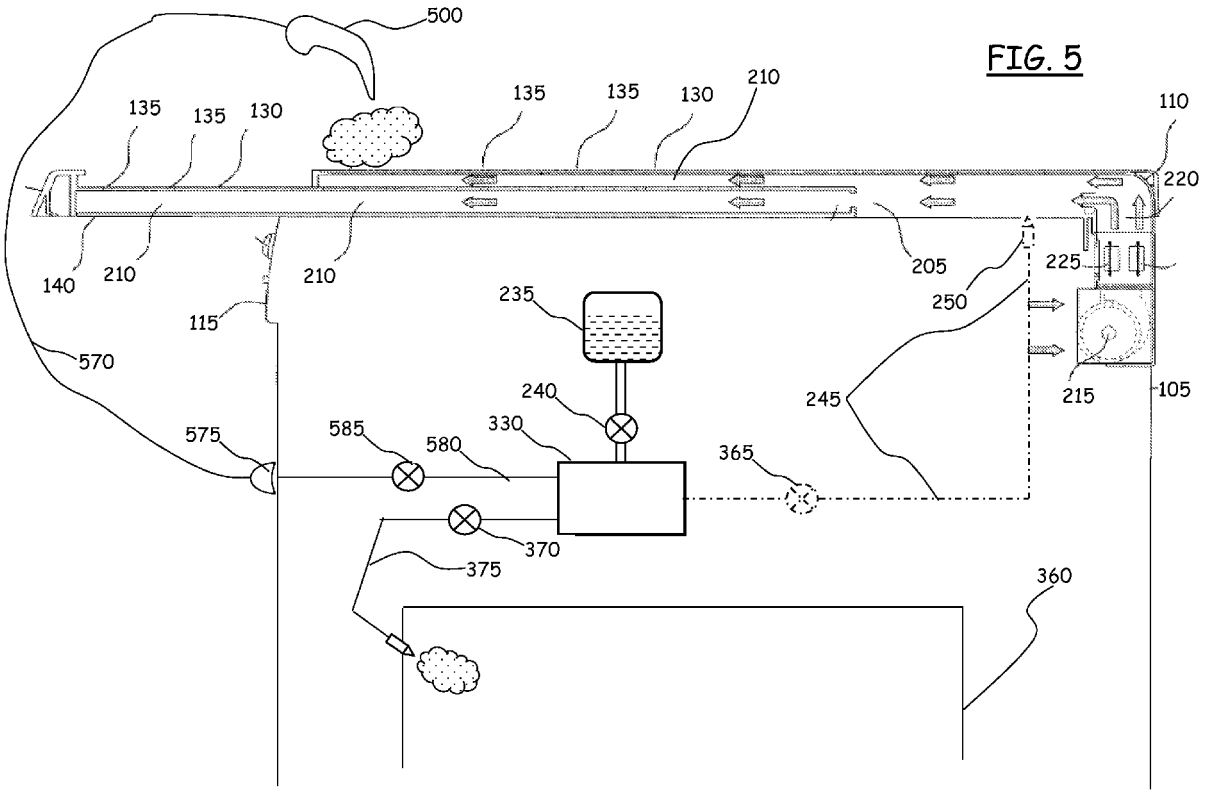
FIG. 4

FIG. 5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EUROPEAN SEARCH REPORT

Application Number
EP 08 17 1494

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	US 2008/053163 A1 (PARK SANG H [KR] ET AL) 6 March 2008 (2008-03-06) * paragraph [0071] * * figures 6,7; example 2 *	1-10	
A	EP 1 925 703 A (CANDY SPA [IT]) 28 May 2008 (2008-05-28) * the whole document *	1-10	
A	US 2007/151302 A1 (KENDALL JAMES W [US] ET AL) 5 July 2007 (2007-07-05) * figures 10,11 *	7	

TECHNICAL FIELDS SEARCHED (IPC)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 April 2009	Hannam, Martin

CATEGORY OF CITED DOCUMENTS

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16-04-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- EP 1854916 A **[0003] [0031]**