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(54) **A household appliance with drying function**

(57) Household appliance with drying function (G), developed by the present invention, comprises at least one drum (1); a drying system comprising at least one condenser (2), at least one air blower (3) and at least one heater (4); at least one air canal (5b) wherein part of the air, which moves out condensed from the condenser (2) and is diverted to the heater (4) by means of the air blower (3), returns to the condenser (2) inlet. Lightly humid, saturated and cool air moving out from the condenser (2) is diverted, through said air canal (5b), to the condenser (2) inlet where it mixes with the humid and hot air coming from the drum (1). In this way, it is ensured that the hot and humid air coming from the drum (1) cools and condenses more efficiently in the condenser (2).

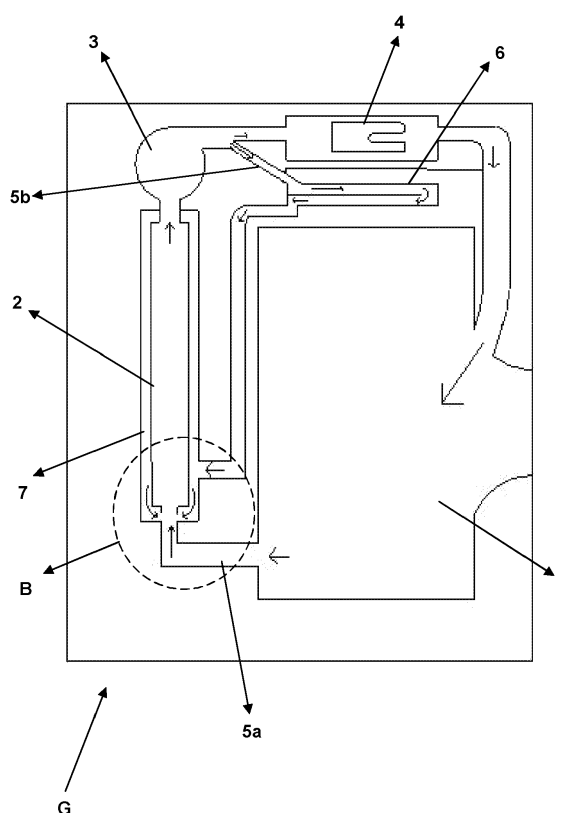


Figure 4

Description

Technical Field

5 [0001] This invention relates to household appliances comprising a drying system with an enhanced drying efficiency.

Prior Art

10 [0002] Drying system in appliances with drying function conventionally comprises a condenser unit, an air blower unit and a heater unit. Hot and humid air, coming from the drum which contains the textile articles to be dried, enters into the condenser. The air which is cooled, condensed and dehumidified in the condenser enters into the air blowing device. Dry air diverted to the heater by this device is heated and returned to the drum by the heater, thereby completing the drying cycle which is continued cyclically. The condenser must adequately condense the hot and humid air coming from the drum in order to ensure efficiency in a known drying cycle.

15 [0003] The drying device, comprising a known drying system, which is disclosed in the patent application No WO2010060810A1 of the prior art is provided with at least one fan for cooling the condenser of the drying system. Extra energy consumption will occur due to this cooling of the condenser by means of a fan.

20 [0004] The drying device disclosed in the patent application No WO2007023510A1 of the prior art comprises a drum containing the textile articles to be dried, a filter for removing such substances as fibres from the air that moves out from the drum, a condenser in which the air is condensed, and a heater. Said device further comprises a cooling unit and a heat exchanger unit positioned in the device in order to ensure a more efficient drying by lowering the heat of the condenser. The cooling unit and the heat exchanger unit operate in collaboration. While the cooling unit cools the condenser, the heat exchanger unit transfers the resulting heat to the air being condensed in the condenser. The cooling unit of said device causes the device to consume more energy and increases cost of production.

Brief Description of the Invention

30 [0005] Household appliance with drying function, developed by the present invention, comprises at least one drum; a drying system comprising at least one condenser, at least one air blower and at least one heater; at least one air canal wherein part of the air, which moves out condensed from the condenser and is diverted to the heater by means of the air blower, returns to the condenser inlet. Lightly humid, saturated and cool air moving out from the condenser is diverted, through said air canal, to the condenser inlet where it mixes with the humid and hot air coming from the drum. In this way, it is ensured that the hot and humid air coming from the drum cools and condenses to some extent before entering into the condenser; therefore, the air entering into the condenser condenses more and drying efficiency is enhanced.

35 [0006] The household appliance of the invention provides, without consuming extra energy, a more efficient drying thanks to the use of lightly humid, saturated, cool air moving out from the condenser.

Objective of the Invention

40 [0007] The aim of this invention is to provide a household appliance comprising an efficient drying system.

[0008] Another aim of this invention is to provide a household appliance wherein lightly humid, saturated and cool air moving out from the condenser is used for enhancing the drying efficiency.

[0009] Another aim of this invention is to provide a cost efficient and reliable household appliance with drying function, which is easy to manufacture, assemble and use.

Brief Description of Drawings

[0010] The household appliance of the invention is illustrated in the annexed drawings wherein

50 Figure 1 is a side sectional view of the household appliance.

Figure 2 is a view of detail "A" of the appliance shown in Figure 1.

55 Figure 3 is a side sectional view of another embodiment of the household appliance.

Figure 4 is a side sectional view of another embodiment of the household appliance.

Figure 5 is a view of detail "B" of the appliance shown in Figure 4.

[0011] The parts in these drawings are individually enumerated and corresponding meanings of the reference numbers are as follows:

Household appliance	(G)
Drum	(1)
Condenser	(2)
Air blower	(3)
Heater	(4)
Air canal	(5a, 5b)
Additional condenser	(6)
Housing	(7)

Disclosure of the Invention

[0012] Figure 1 shows an exemplary household appliance with drying function (G) comprising at least one drum (1). The drying system of this household appliance (G) comprises at least one condenser (2), at least one air blower (3) and at least one heater (4). The humid air in the drum (1) enters into the condenser (2) through at least one air canal (5a). The air, which is condensed and dehumidified in the condenser (2) by giving off heat, is passed through the heater (4) by means of the air blower (3) positioned at the condenser (2) outlet. The air heated by the heater (4) returns to the drum (1) thereby completing the drying cycle which is continued cyclically. The humidity condensed in the condenser (2) is discharged through at least one drainage hole (not shown) provided in the appliance (G).

[0013] Part of the air which is diverted from the air blower (3) to the heater (4) as illustrated in Figure 1 is returned to the condenser (2) inlet through at least one other air canal (5b), shown by Figure 2 in detail, in order to enhance efficiency of the drying function of said household appliance (G). In this way, the hot and humid air coming from the drum (1) to the condenser (2) inlet mixes with the lightly humid, saturated, cold air leaving from the condenser (2) and diverted to the condenser (2) inlet through said air canal (5b); therefore cools further and is dehumidified, and regular drying cycle continues.

[0014] Household appliance (G) of the invention, another exemplary embodiment of which is shown in Figure 3, comprises at least one additional condenser (6) positioned between the air canal (5b) at the outlet of the air blower and the condenser (2). Part of the cool air blown by the air blower (3) is diverted to the heater (4) for continuation of the drying function whereas an amount of air passes through said air canal (5b) located at the outlet of the blower (3) and enters into this additional condenser (6). The air cooled and dehumidified in the condenser (6) is returned again to the condenser (2) and mixes with the hot and humid air coming to the condenser (2) from the drum (1). In this way, more efficient cooling and condensing of the air, coming from the drum (1), in the condenser (2) is ensured.

[0015] In another exemplary embodiment of the invention shown in Figure 4, said appliance (G) comprises at least one housing (7) in which the condenser (2) of the drying system is placed. At least one end of the air canal (5b) located at the outlet of the air blower (3) communicates with this housing (7). In this way, the air that is diverted to the housing (7), in which the condenser (2) is placed, by means of the air blower (3) contacts outer surface of the condenser (2) and cools this surface, ensuring that the hot air passing through the condenser (2) cools and releases more humidity and moves toward the condenser (2) inlet shown by Figure 5 in detail. Hot and humid air coming from the drum (1) through the other air canal (5a) mixes with the lightly humid, saturated, cool air which cools the condenser and the air is further cooled before entering into the condenser (2). Thus, it is ensured that the air entering into the drum (1) is condensed more and drying efficiency is enhanced.

[0016] In the exemplary embodiment of the invention shown in Figure 4 the air that released humidity and is cooled in the additional condenser (6), which is positioned between the condenser (2) and the air canal (5b) at the air blower (3) outlet, is diverted to said housing (7). Thus, the air that is passed through the additional condenser (6) and is diverted to housing (7) by means of the air blower (3) contacts the outer surface of the condenser (2) and cools this surface and moves toward the condenser (2). Hot and humid air coming from the drum (1) through the other air canal (5a) mixes with this air, which comes from the air blower (3) and cools the outer surface of the condenser (2), and condenses more in the condenser (2), enhancing efficiency of drying.

Claims

1. A household appliance (G) with drying function comprising at least one drum (1); and a drying system comprising at least one condenser (2), at least one air blower (3) and at least one heater (4) **characterized by** comprising at least one air canal (5b) wherein part of the air, which moves out condensed from the condenser (2) and is diverted to the heater (4) by means of the air blower (3), returns to the condenser (2) inlet.
2. A household appliance (G) with drying function according to Claim 1 **characterized by** comprising at least one additional condenser (6) positioned between the condenser (2) and the air canal (5b) located at the outlet of air blower (3).
3. A household appliance (G) with drying function according to Claim 1 or Claim 2 **characterized by** comprising at least one housing in which the condenser (2) of drying system is placed and with which at least one end of said air canal (5b) communicates.
4. A household appliance (G) with drying function according to any one of the preceding claims **characterized by** comprising at least one other air canal (5a) through which the air, coming from the drum (1), enters into the condenser (2).
5. A household appliance (G) with drying function according to any one of the preceding claims **characterized by** comprising at least one drainage hole through which the humidity condensed in the condenser (2) is discharged.

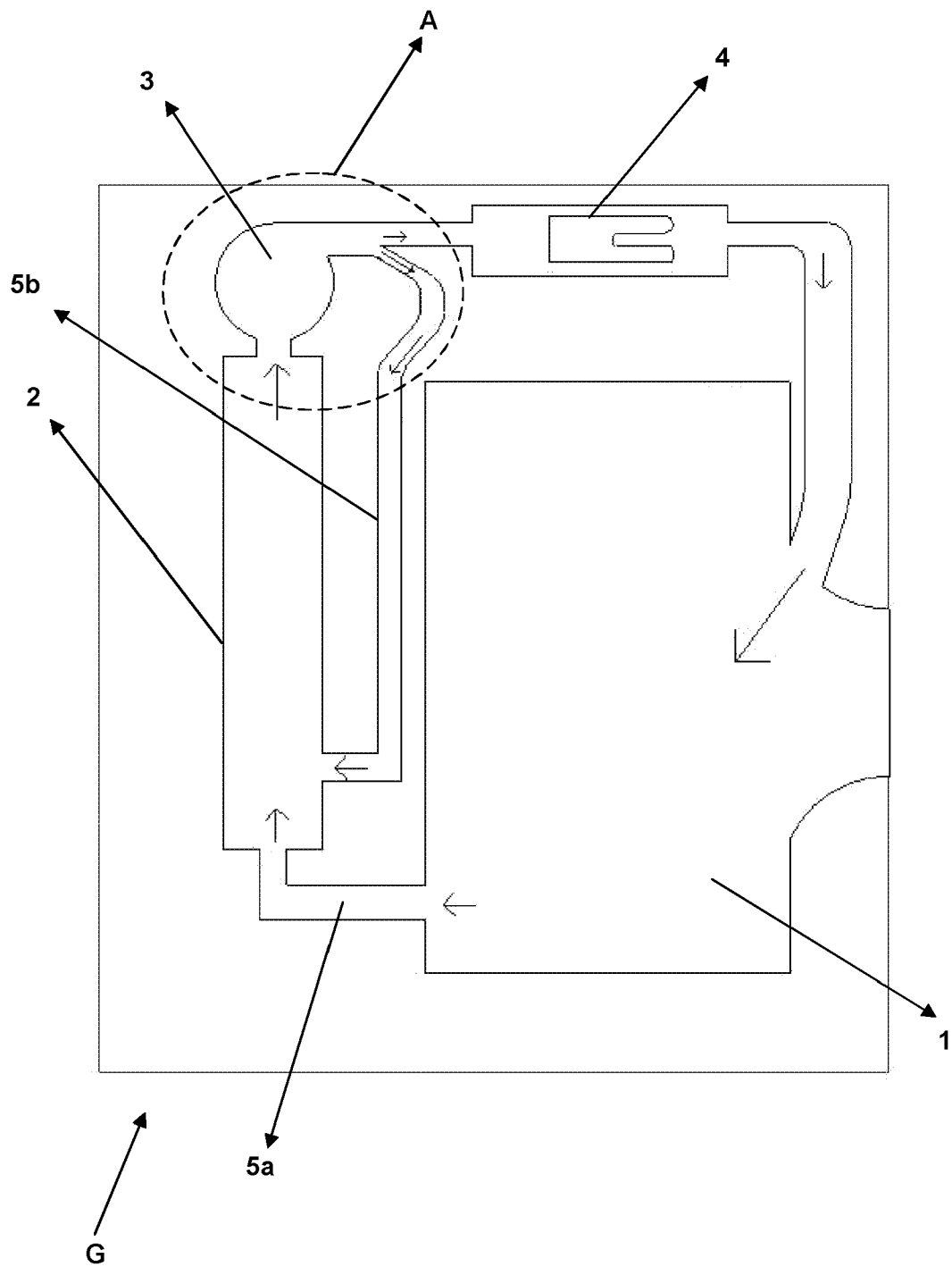


Figure 1

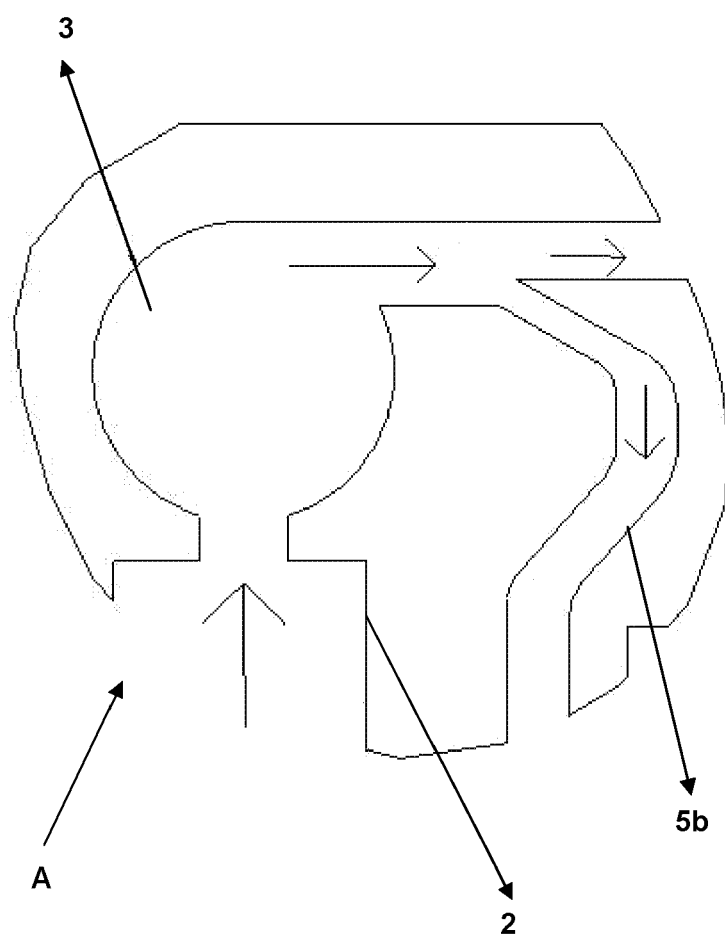


Figure 2

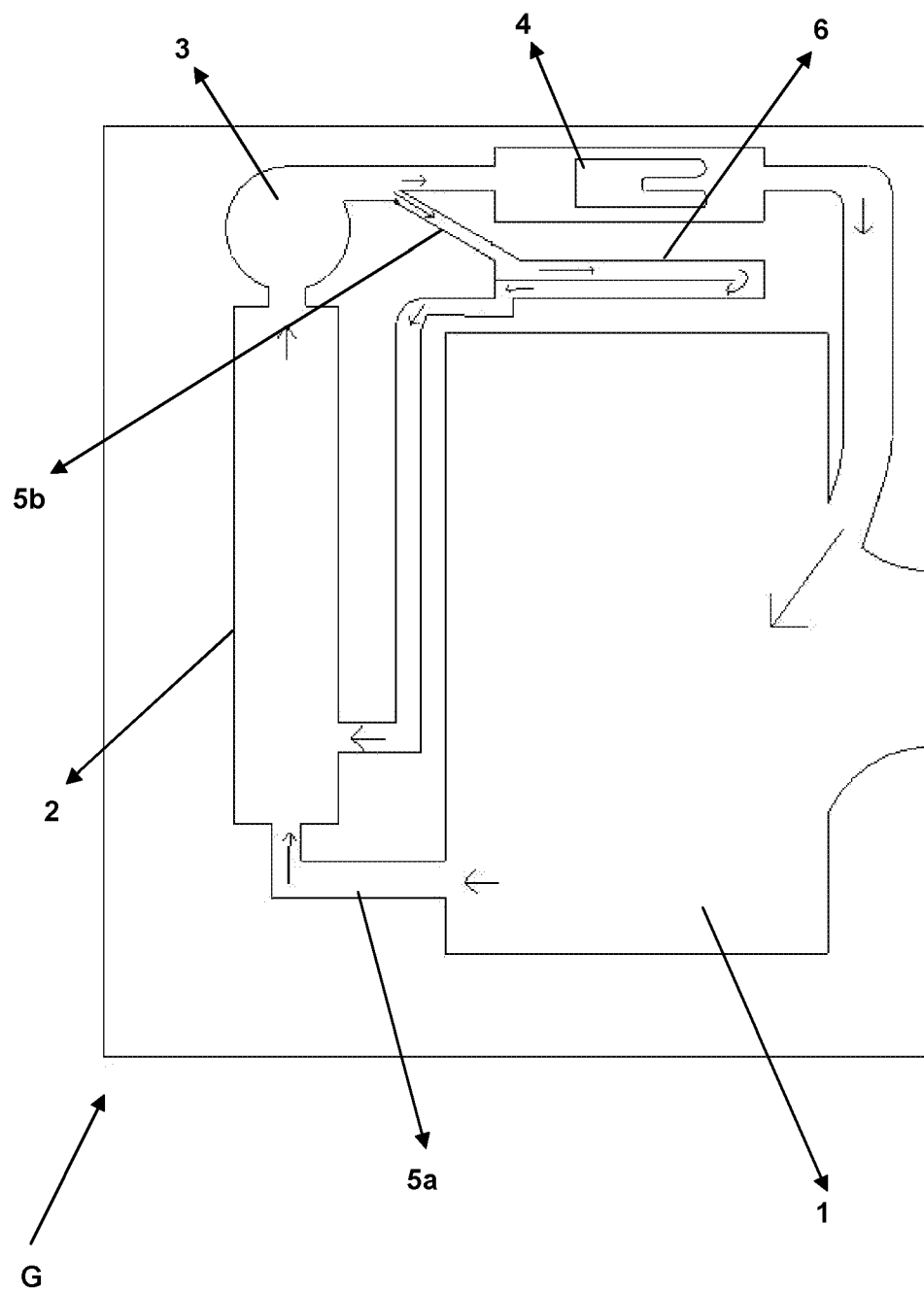


Figure 3

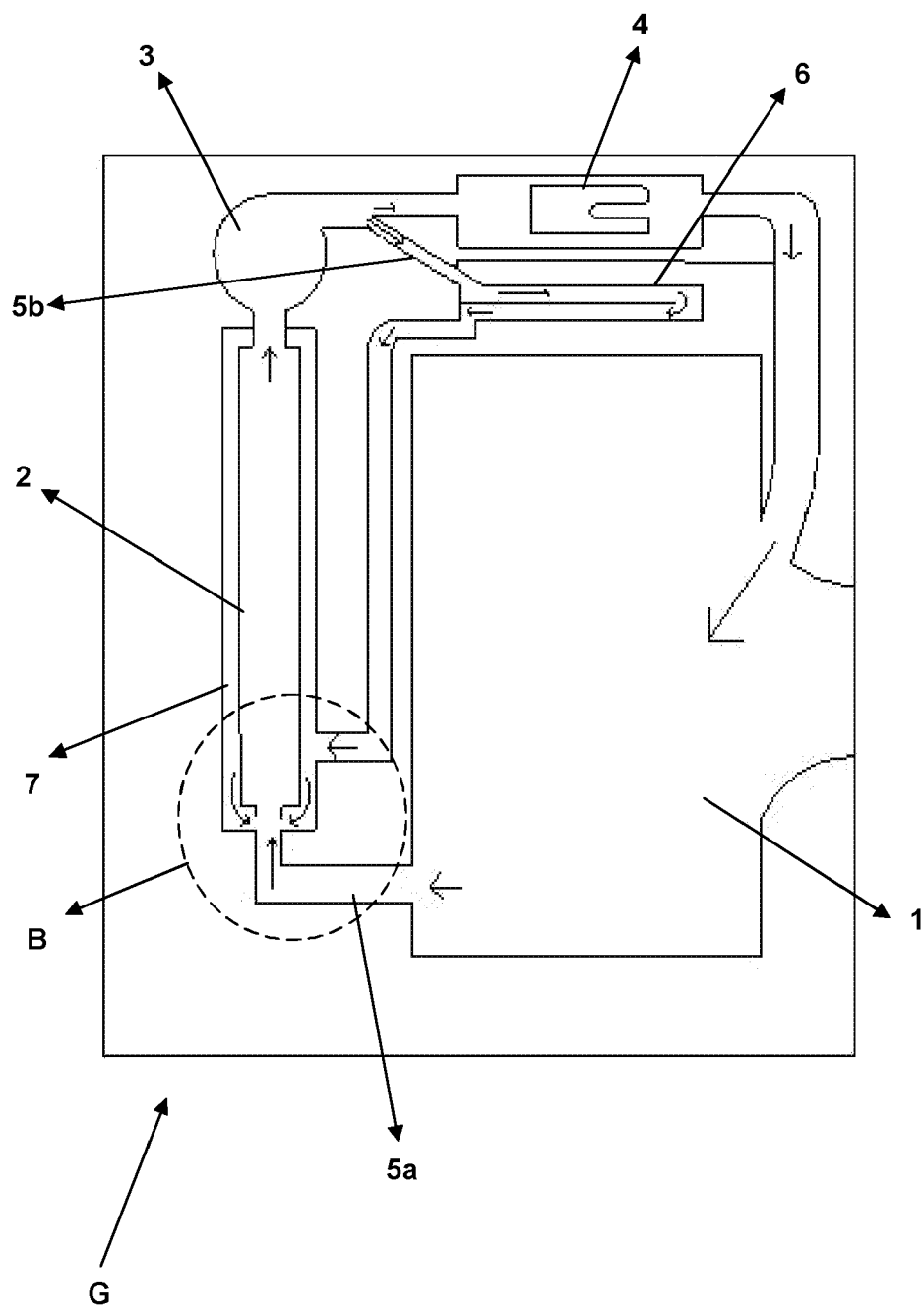


Figure 4

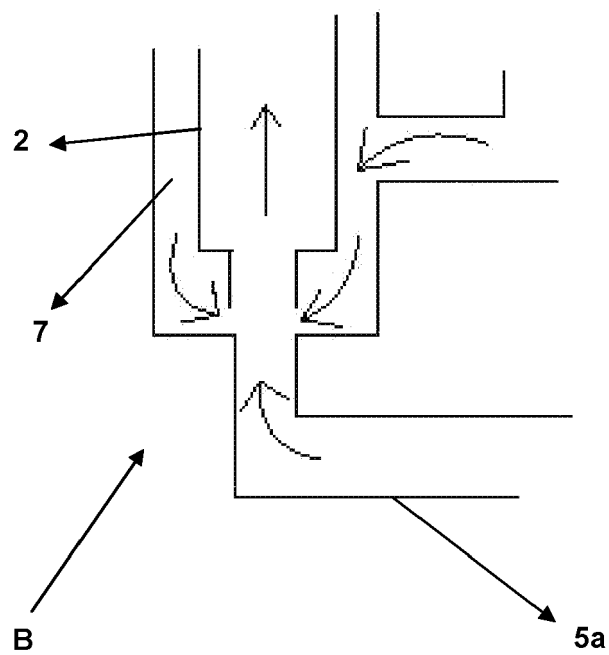


Figure 5



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 5557

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Y	US 2006/179681 A1 (TAMURA TOMOICHIRO [JP] ET AL) 17 August 2006 (2006-08-17) * paragraphs [0060], [0061]; figure 4 *	1,3,4	INV. D06F58/24
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
Place of search		Date of completion of the search	Examiner
Munich		10 November 2011	Westermayer, Wilhelm
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EPO FORM 1503 03.92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 17 5557

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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- WO 2007023510 A1 **[0004]**