

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 July 2009 (09.07.2009)

PCT

(10) International Publication Number
WO 2009/083576 A1

(51) International Patent Classification:
A47L 15/44 (2006.01)

(21) International Application Number:
PCT/EP2008/068302

(22) International Filing Date:
27 December 2008 (27.12.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
a2007/09223 31 December 2007 (31.12.2007) TR

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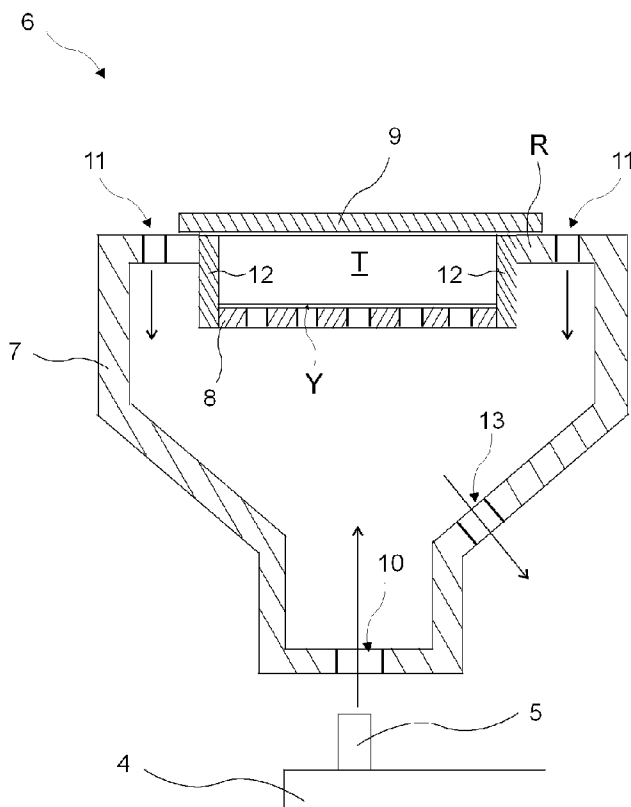
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(54) Title: A DISHWASHER

Figure 3



(57) Abstract: The present invention relates to a dishwasher (1) comprising a detergent dispenser (6) wherein a tablet (T) is emplaced containing cleaning chemical substances for the purpose of washing the dishes.

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Description**A DISHWASHER**

- [0001] The present invention relates to a dishwasher that comprises a detergent dispenser.
- [0002] In dishwashers detergent dispensers are used that are generally mounted on the inside of the door. In these dispensers reservoirs are provided for emplacing the detergent and the rinse agent chemicals. The detergent emplaced in the reservoirs enables the dirt on the dishes to be dissolved and the rinse agent lowers the surface tension of water thus improving drying. The chemical substances used in the cleaning process can only be effective if activated at the right step. For example, the detergent has to be added to water in the main washing step whereas the rinse agent and glass protection agent in the hot rinsing (second rinsing) step. When powder and/or liquid chemicals are used, each chemical is put in its container enabling these containers to be opened in the proper step for using the right chemical at the right time. However, the tablet shaped combined detergents named as "2 in 1" or "3 in 1", containing more than one chemical, dissolving at different temperatures such as detergent, water softener, and rinse agent together pressed in layers dissolve with the mechanical effect of water jets during circulation when directly put in the washing environment. Meanwhile, the rinse agent chemical contained in the tablet that melts at only high temperatures also dissolves and is discharged with the waste water at the end of the main washing step, thus no rinse agent is left to be used in the hot rinsing step.
- [0003] In the state of the art United States of America Patent Document No US2969072, a detergent dispenser used in dishwashers is explained that is pivotally mounted on the basket wherein the items to be washed are emplaced.
- [0004] In the state of the art Great Britain Patent Document No GB 2321590, a detergent dispenser used in dishwashers is explained that is mounted on the connecting tube delivering water to the spray arms.
- [0005] The aim of the present invention is the realization of a dishwasher comprising a detergent dispenser wherein a detergent tablet is emplaced

and enabling the tablet to be dissolved controllably until the end of the washing process.

[0006] A dishwasher realized in order to attain the aim of the present invention is explicated in the claims.

[0007] In the dishwasher of the present invention, a rectangular prism shaped tablet including detergent and rinse agent substances is emplaced in the detergent dispenser for cleaning the dishes and the tablet is dissolved controllably in the detergent dispenser enabling it to be used until the end of the washing. The chemical substances contained in the tablet that have to be used in certain washing steps are prevented from being discharged by dissolving before due time.

[0008] The detergent dispenser used in the dishwasher comprises a reservoir inside which water circulating in the tub enters during washing, forming a detergent-water solution as the water contacts the tablet, and enabling the said solution to be delivered to the washing environment inside the tub, and a tablet holder holding the tablet suspended in the horizontal position from the ceiling of the reservoir and the lower portion of which is inside the reservoir with a bottom wall shaped like a grate or sieve allowing the water entering the reservoir to contact the lower surface of the tablet.

[0009] The detergent dispenser furthermore comprises a lid that is mounted to the ceiling of the reservoir, covering the tablet in the tablet holder, preventing the water circulating in the tub and moving downwards by the effect of gravity from directly reaching the tablet and an inlet hole opening to the lower side of the reservoir, allowing the water circulating in the tub to enter the reservoir from the lower side and move upwards inside the reservoir acting on the lower surface of the tablet suspended from the ceiling of the reservoir.

[0010] The inlet hole under the detergent dispenser opens to the lower side of the reservoir to correspond opposite to the nozzle during the rotational motion of the spray arm. The inlet hole enables the water jet sent upwards from the nozzle to enter the reservoir in every turn or half turn of the spray arm and thus to contact the lower surface of the tablet intermittently and to dissolve the tablet gradually during washing.

- [0011] In an embodiment of the present invention, the detergent dispenser comprises a slot situated on the ceiling of the reservoir, surrounding partially or entirely the lid on the reservoir, enabling the water circulating in the tub to enter the reservoir from the top, washing the inner walls of the reservoir with water.
- [0012] In another embodiment of the present invention, the side walls of the detergent dispenser are shaped frustoconically and the water flowing into the reservoir from the slot washes down the inner surfaces of the inclined side walls, cleaning the detergent residues.
- [0013] In another embodiment of the present invention, the detergent dispenser comprises a barrier extending from the ceiling of the reservoir downwards, surrounding the tablet and preventing the water entering into the reservoir to reach the tablet from the side thereof.
- [0014] A dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:
- [0015] Figure 1 - is the schematic view of a dishwasher.
- [0016] Figure 2 - is the schematic view of a tablet detergent.
- [0017] Figure 3 - is the cross sectional view of a detergent dispenser.
- [0018] Figure 4 - is the perspective view of a detergent dispenser.
- [0019] Figure 5 - is the top view of a detergent dispenser.
- [0020] Figure 6 - is the top view of a detergent dispenser in another embodiment of the present invention.
- [0021] Elements illustrated in the figures are numbered as follows:
1. Dishwasher
 2. Tub
 3. Basket
 4. Spray arm
 5. Nozzle
 6. Detergent dispenser
 7. Reservoir
 8. Tablet holder
 9. Lid
 10. Inlet hole

11. Slot
12. Barrier
13. Exit hole

[0022] The dishwasher (1) comprises a tub (2) wherein the washing process is performed, a door for accessing into the tub (2), more than one basket (3) whereon items to be washed are emplaced, one or more spray arms (4) for delivering water onto the items in the baskets (3), more than one nozzle (5) disposed on the spray arm (4) for spraying water on the items by generating a water jet and a detergent dispenser (6) wherein a tablet (T) is emplaced.

[0023] In the dishwasher (1) the tablet (T) used for cleaning the dishes is comprised of pressed layers containing the chemical substances of detergent, softener and rinsing agent and is preferably shaped as a rectangular prism.

[0024] The dishwasher (1) of the present invention comprises a detergent dispenser (6) having

- a reservoir (7) inside which water circulating in the tub (2) enters during washing, forming a detergent-water solution as the water contacts the tablet (T), whereby the solution is delivered to the washing environment inside the tub (2),
- a tablet holder (8) holding the tablet (T) suspended in the horizontal position from the ceiling (R) of the reservoir (7) and the lower portion inside the reservoir (7) with a lower wall shaped like a grate or sieve allowing the water entering the reservoir (7) to contact the lower surface (Y) of the tablet (T),
- a lid (9) that is installed to the ceiling (R) of the reservoir (7), covering the tablet (T) in the tablet holder (8), preventing the water circulating in the tub (2) and moving downwards by the effect of gravity from directly reaching the tablet (T) and
- an inlet hole (10) arranged on the lower side of the reservoir (7), allowing the water circulating in the tub (2) to enter the reservoir (7) from the lower side and move upwards inside the reservoir (7) thereby acting on the lower surface (Y) of the tablet (T) suspended from the ceiling (R) of the reservoir

(7) (Figure 3).

- [0025] The inlet hole (10) opens to the lower side of the reservoir (7) such as to correspond opposite the nozzle (5) during the rotational motion of the spray arm (4). The inlet hole (10) enables the water jet sent upwards from the nozzle (5) to enter the reservoir (7) in every turn or half turn of the spray arm (4) and thereby to contact the lower surface (Y) of the tablet (T) intermittently and to dissolve the tablet (T) gradually starting from the lower surface (Y) thereof during the course of washing.
- [0026] In the dishwasher (1), the washing program is started after the user emplaces the tablet (T) in the detergent dispenser (6), the spray arms (4) rotate and water is sprayed to the baskets (3) by means of the nozzles (5). The water jet entering into the reservoir (7) through the inlet hole (10) impacts on the lower surface (Y) of the tablet (T) and dissolves the tablet (T). During the rotation of the spray arm (4), the nozzle (5) comes opposite to the inlet hole (10) at every turn or half turn of the spray arm (4) and enables water to be sprayed into the reservoir (7). Thus, the mechanical effect of water is provided inside the reservoir (7) intermittently. The tablet (T) cannot dissolve "rapidly", instead dissolves gradually. Accordingly, the tablet (T) is dissolved controllably until the completion of the washing program.
- [0027] The detergent dispenser (6) is mounted to be suspended at the front side of the upper basket (3) and thus the user is enabled to easily reach the detergent dispenser (6) without bending too much (Figure 1).
- [0028] In an embodiment of the present invention, the detergent dispenser (6) comprises a slot (11) situated on the ceiling (R) of the reservoir (7), surrounding partially or entirely the lid (9), and enabling the water circulating in the tub (2) to enter the reservoir (7) from the top, washing the inner walls of the reservoir (7) with water and dissolving the detergent residues to be added to the solution inside the reservoir (7) (Figures 3, 5 and 6).
- [0029] In another embodiment of the present invention, the detergent dispenser (6) comprises a reservoir (7) having side walls shaped frustoconically that get narrower from the top downwards. Thus, the water flowing into the

reservoir (7) from the slot (11) washes down the inner surfaces of the inclined side walls, cleaning the detergent residues (Figures 3, 4).

[0030] In another embodiment of the present invention, the detergent dispenser (6) comprises a barrier (12) extending from the ceiling (R) of the reservoir (7) downwards, surrounding the tablet (T) and preventing the water entering into the reservoir (7) to reach the tablet (T) from the side thereof. The water entering into the reservoir (7) from the slot (11) does not act on the tablet (T) due to the barrier (12) and the tablet (T) dissolves slowly, lasting until the end of the washing (Figures 3, 4 and 5).

[0031] In another embodiment of the present invention, the barrier (12) is a single piece with the tablet holder (8) and covers the sides of the tablet (T) (Figures 4 and 5).

[0032] In another embodiment of the present invention, the detergent dispenser (6) comprises an exit hole (13) arranged on the side wall of the reservoir (7) for delivering the solution in the reservoir (7) to the washing environment inside the tub (2) (Figures 3 and 4). The amount of water entering into the reservoir (7) and the dissolving rate of the tablet (T) is controlled by adjusting the width of the slot (11) and furthermore the widths of the inlet and exit holes (9, 13).

[0033] In another embodiment of the present invention, the lid (9) is pivotally mounted on the ceiling (R) of the reservoir (7) to be opening and closing by means of a hinge mechanism. When the lid (9) is opened, the upper side of the tablet holder (8) on the ceiling (R) of the reservoir (7) opens and the tablet (T) is emplaced by the user (Figure 6).

[0034] In yet another embodiment of the present invention, the lid (9) is a single piece with the tablet holder (8) and the tablet holder (8) is opened and closed on the ceiling (R) of the reservoir (7) together with the lid (9) (Figure 5).

[0035] The detergent dispenser (6) used in the dishwasher (1) of the present invention, enables the tablet (T) to dissolve controllably and the tablet (T) dissolves slowly until the end of the washing program, being prevented from running out of the chemical substances required at any one stage of the washing program.

Claims

1. A dishwasher (1) that comprises a tub (2) wherein the washing process is performed, a door for accessing into the tub (2), more than one basket (3) whereon items to be washed are emplaced, one or more spray arms (4) for delivering water onto the items in the baskets (3), more than one nozzle (5) disposed on the spray arm (4) for spraying water on the items by generating a water jet and a detergent dispenser (6) wherein a tablet (T), containing chemicals such as detergent, softener and rinse agent in pressed layers, is emplaced, **and characterized by** the detergent dispenser (6) comprising
 - a reservoir (7) inside which water circulating in the tub (2) enters, forming a detergent-water solution as the water contacts the tablet (T), whereby the solution is delivered to the washing environment inside the tub (2),
 - a tablet holder (8) holding the tablet (T) suspended in the horizontal position from the ceiling (R) of the reservoir (7) and the lower portion inside the reservoir (7), with a lower wall shaped like a grate or sieve allowing the water entering into the reservoir (7) to contact the lower surface (Y) of the tablet (T),
 - a lid (9) that is installed to the ceiling (R) of the reservoir (7) covering the tablet (T) in the tablet holder (8), preventing the water circulating in the tub (2) and moving downwards by the effect of gravity from directly reaching the tablet (T) and
 - an inlet hole (10) arranged on the lower side of the reservoir (7), allowing the water circulating in the tub (2) to enter the reservoir (7) from the lower side and move upwards inside the reservoir (7), acting on the lower surface (Y) of the tablet (T) suspended from the ceiling (R) of the reservoir (7).
2. A dishwasher (1) as in Claim 1, **characterized by** the detergent dispenser (6) comprising the inlet hole (10) opening to the lower side of the reservoir (7) such as to correspond opposite to the nozzle (5) during the rotational motion of the spray arm (4), enabling the water jet sent upwards from the nozzle (5) to enter the reservoir (7) in every turn or half turn of the spray arm (4) and thereby to act on the lower surface (Y) of the tablet (T) intermittently.
3. A dishwasher (1) as in Claims 1 or 2, **characterized by** the detergent dispenser (6) comprising a slot (11) situated on the ceiling (R) of the reservoir (7), surrounding partially or entirely the lid (9) on the reservoir (7), enabling the

water circulating in the tub (2) to enter the reservoir (7) from the top, for washing the inner walls of the reservoir (7) with water.

4. A dishwasher (1) as in any one of the Claims 1 to 3, **characterized by** the detergent dispenser (6) comprising the reservoir (7) having side walls shaped frustoconically that get narrower from the top downwards.
5. A dishwasher (1) as in any one of the above Claims, **characterized by** the detergent dispenser (6) comprising a barrier (12) extending from the ceiling (R) of the reservoir (7) downwards, surrounding the tablet (T) and preventing the water entering into the reservoir (7) to reach the tablet (T) from the side thereof.
6. A dishwasher (1) as in Claim 5, **characterized by** the detergent dispenser (6) comprising the barrier (12) that is a single piece with the tablet holder (8) and covers the sides of the tablet (T).
7. A dishwasher (1) as in any one of the above Claims, **characterized by** the detergent dispenser (6) comprising an exit hole (13) arranged on the side wall of the reservoir (7) for delivering the solution in the reservoir (7) to the washing environment inside the tub (2).
8. A dishwasher (1) as in any one of the above Claims, **characterized by** the detergent dispenser (6) comprising the lid (9) pivotally mounted on the ceiling (R) of the reservoir (7) to be opening and closing by means of a hinge mechanism.
9. A dishwasher (1) as in any one of the Claims 1 to 7, **characterized by** the detergent dispenser (6) comprising the lid (9) that is a single piece with the tablet holder (8) and is opened and closed on the ceiling (R) of the reservoir (7) together with the tablet holder (8).
10. A dishwasher (1) as in any one of the above Claims, **characterized by** the detergent dispenser (6) that is mounted to be suspended on the front side of the upper basket (3).

Figure 1

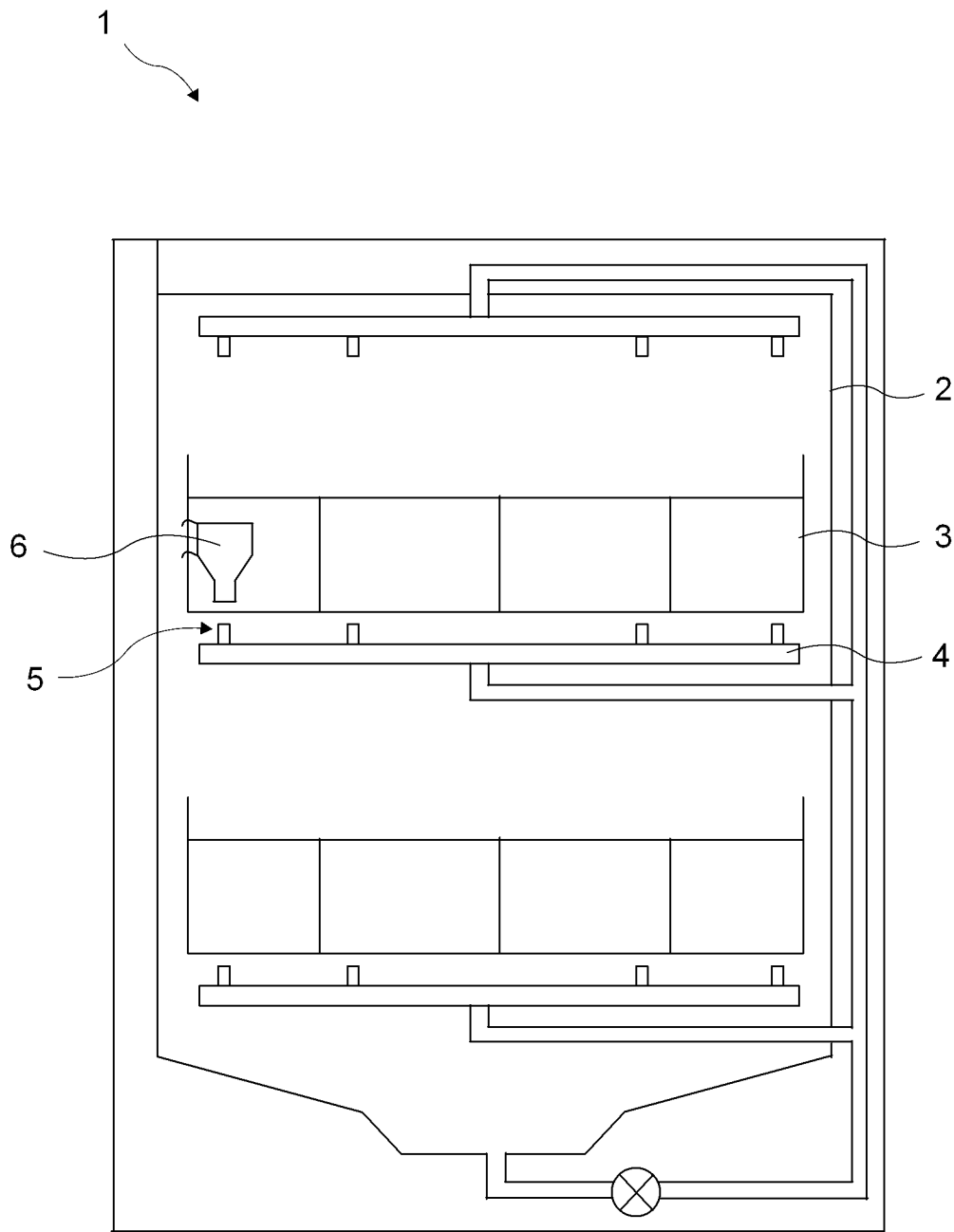


Figure 2

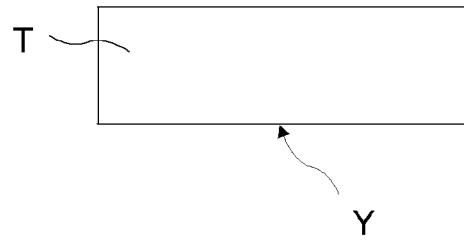


Figure 3

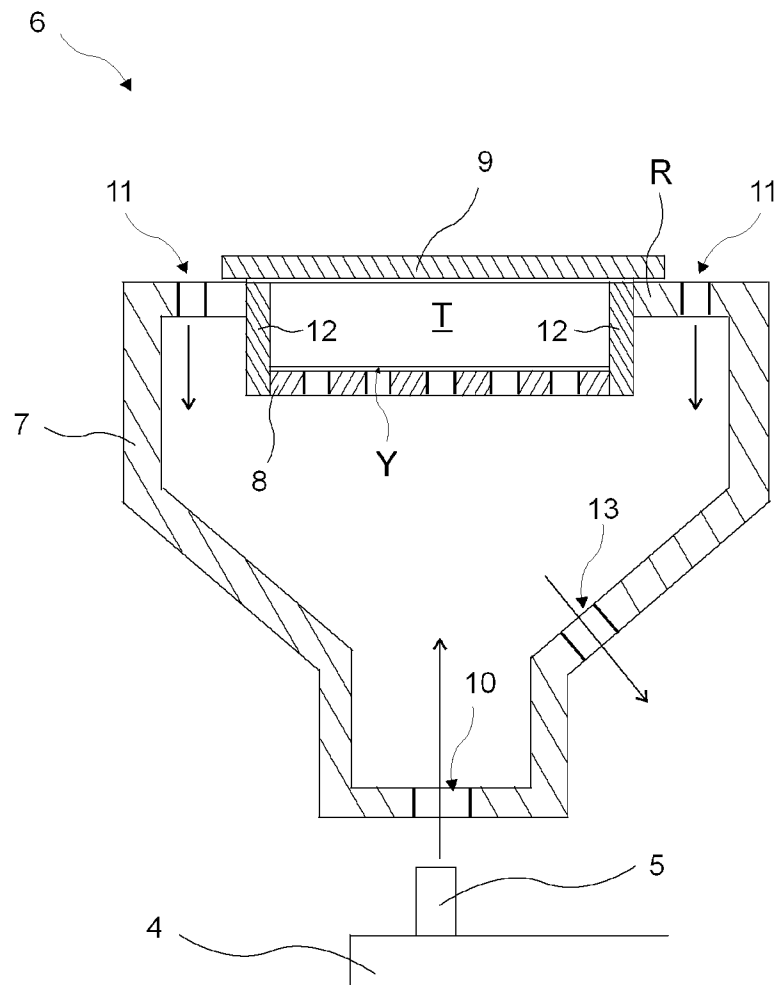


Figure 4

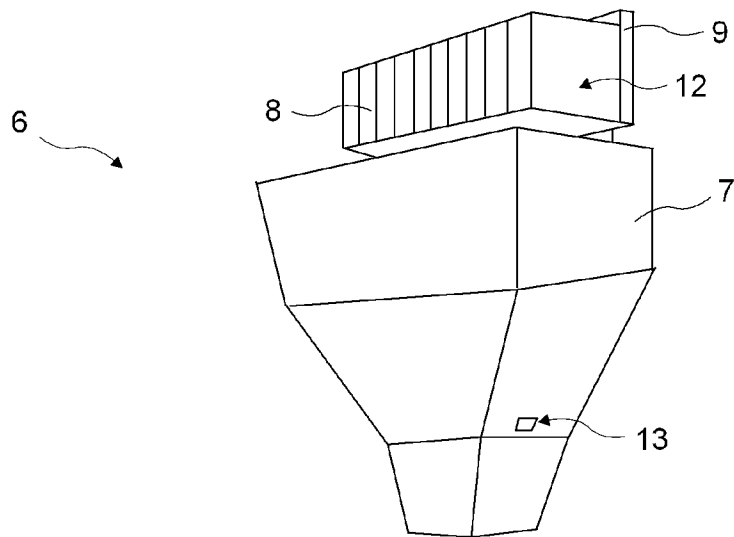


Figure 5

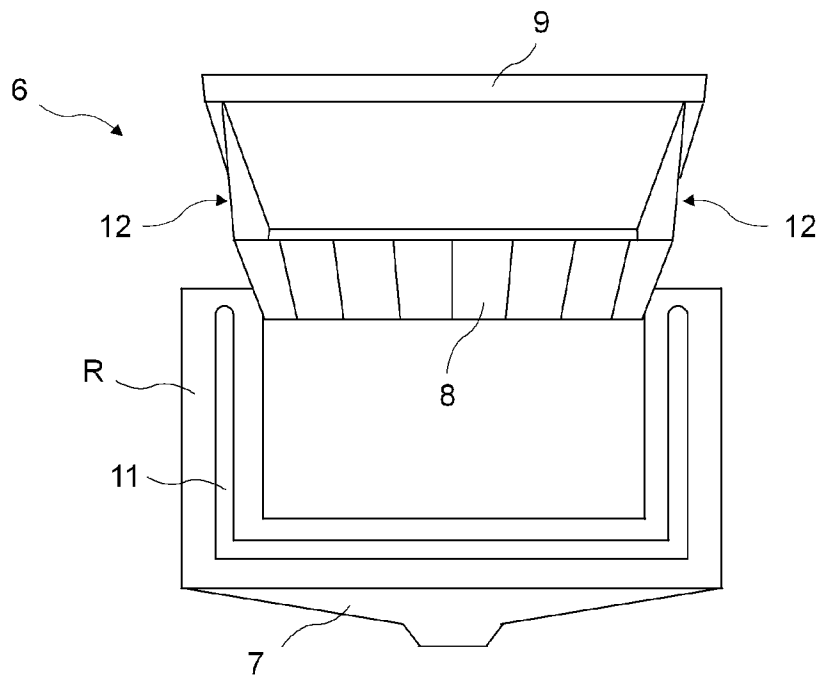
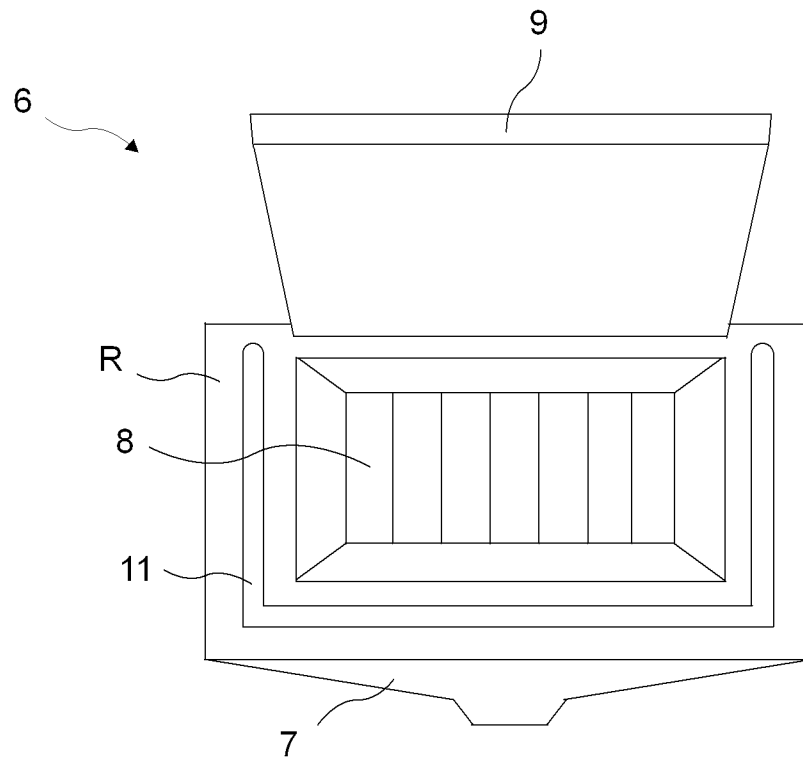


Figure 6



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/068302

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L B01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 321 590 A (ELECTROLUX ZANUSSI ELETTRODOME [IT]) 5 August 1998 (1998-08-05) cited in the application pages 2-4; figures	1
A	US 6 058 946 A (BELLATI RICCARDO PAOLO FEDERIC [IT] ET AL) 9 May 2000 (2000-05-09) claims; figures	1
A	WO 95/07976 A (DIVERSEY CORP [CA]; ROACH KENNETH JAMES [US]; ANDERSON PATRICIA ANNE []) 23 March 1995 (1995-03-23) page 8, line 35 - page 10, line 9; figure 1	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

19 March 2009

Date of mailing of the international search report

02/04/2009

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/068302

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2321590	A	05-08-1998	DE 29800479 U1	09-04-1998
			ES 1039331 U	01-12-1998
			FR 2758708 A1	31-07-1998
			IT PN970006 U1	29-07-1998
US 6058946	A	09-05-2000	AU 733560 B2	17-05-2001
			AU 4282197 A	30-04-1998
			BR 9705152 A	11-01-2000
			CA 2219199 A1	25-04-1998
			DE 69711805 D1	16-05-2002
			DE 69711805 T2	14-11-2002
			ES 2175283 T3	16-11-2002
			ZA 9709552 A	26-04-1999
WO 9507976	A	23-03-1995	AT 163193 T	15-02-1998
			AU 699430 B2	03-12-1998
			AU 7607594 A	03-04-1995
			BR 9407538 A	26-08-1997
			CA 2169543 A1	23-03-1995
			DE 69408540 D1	19-03-1998
			DE 69408540 T2	04-06-1998
			EP 0719325 A1	03-07-1996
			ES 2112558 T3	01-04-1998
			JP 9503799 T	15-04-1997
			NZ 271952 A	24-10-1997
			US 5552079 A	03-09-1996
			ZA 9407064 A	24-04-1995