



(51) International Patent Classification:

A47L 15/44 (2006.01) D06F 33/02 (2006.01)
D06F 39/02 (2006.01)

(21) International Application Number:

PCT/EP2013/075538

(22) International Filing Date:

4 December 2013 (04.12.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

A 2012/14885 18 December 2012 (18.12.2012) 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, BN, BR, BW, BY,

BZ, CA, CH, CL, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

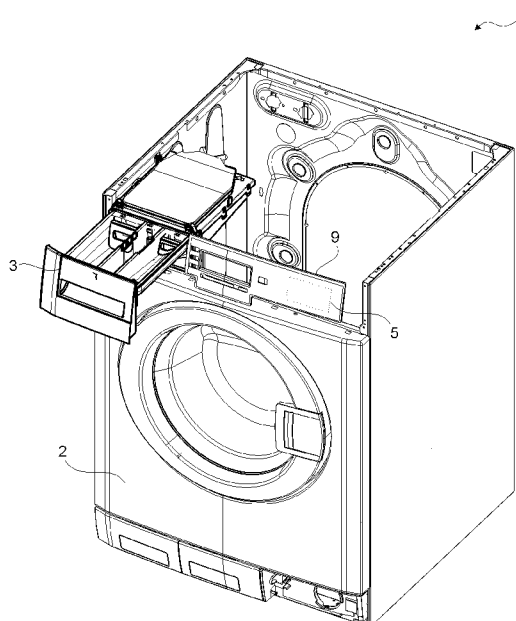
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE,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

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: A HOUSEHOLD APPLIANCE COMPRISING WIRELESS COMMUNICATION UNIT

Figure 1



(57) Abstract: The present invention relates to a household appliance (1) comprising a body (2), at least one auxiliary element (3) mounted on the body (2) so as to move with respect to the body (2), a housing (4) disposed on the auxiliary element (3) and a circuit board (5) that controls the operation thereof and facilitating the installation of a wireless communication unit (6).

Description**A HOUSEHOLD APPLIANCE COMPRISING WIRELESS COMMUNICATION
UNIT**

- [0001] The present invention relates to a household appliance comprising a wireless communication unit.
- [0002] Applications such as smart home, smart grid become widespread and are developed from day to day together with the expansion in utilization areas of wireless communication technologies and reduction in costs. In smart home applications, electrical household appliances, lighting elements, air-conditioning systems and other consumer electronic products can be controlled by a public network inside the house. Therefore, in household appliances like the washing machine, drying machine, dishwasher, refrigerator, wireless communication units that provide connection to the network are used. By means of the wireless communication unit, the respective household appliance can be connected to the smart home medium and/or can be remotely controlled by the user. In addition, since the wireless communication feature cannot be used effectively by all users, it creates an unnecessary cost for the users who do not utilize this feature. In situations wherein the wireless communication unit is delivered optionally and separate from the main product, service personnel has to be called for installation of the wireless communication unit and this causes losses in labor and cost. Furthermore, since a large part of the household appliance is produced from sheet metal, the signals of the wireless communication unit inside the body decrease under the cage effect and an effective communication cannot be provided.
- [0003] In the state of the art Chinese Utility Model No. CN201588102, a washing machine is described, that comprises a wireless signal receiver disposed at the rear side of the control panel.
- [0004] In the state of the art International Patent Application No. WO2011080146, a household appliance comprising an electronic component disposed behind the kick-plate is described. In an embodiment of the invention, the electronic component is defined as a wireless signal receiver.
- [0005] The aim of the present invention is the realization of a household

appliance, the wireless communication unit of which can be attached/detached easily.

[0006] The household appliance realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises an auxiliary element disposed movably on its body and a wireless communication unit disposed inside a housing situated on the auxiliary element. The wireless communication unit, when placed into the housing, can directly communicate with the circuit board that controls the operation of the household appliance. The wireless communication unit can be supplied separately from the household appliance and is installed only by being placed into the housing.

[0007] In an embodiment of the present invention, the wireless communication unit is detachably installed into the housing. When a problem relating to the wireless communication unit is encountered, the wireless communication unit can be easily detached from the household appliance and attached again similarly after the problem is eliminated.

[0008] The auxiliary element has an open position and a closed position. If the auxiliary element is desired to be used, the user brings the auxiliary element to the open position and after the work is done, changes the auxiliary element back to the closed position. In the closed position the auxiliary element is almost coplanar with the body.

[0009] In this embodiment, the auxiliary element is brought to the open position in order to access the housing. When the auxiliary element is in the open position, the wireless communication unit is attached into the housing or detached from the housing. When the auxiliary element is in the closed position, the housing cannot be seen from outside. This not only improves the esthetic appearance but also increases the strength of the wireless communication unit against interventions that may originate from the outside.

[0010] In an embodiment of the present invention, a transmitting socket connected to the wireless communication unit and a receiving socket connected to the circuit board are used for the wireless communication unit and the circuit board to communicate with each other. When the

auxiliary element is brought to the closed position, the movable transmitting socket provides contact with the stationary receiving socket and provides the connection between the wireless communication unit and the circuit board. Consequently, it is not required to make any electrical connections during the assembly process and the assembly process is facilitated.

- [0011] In an embodiment of the present invention, the household appliance comprises a body produced from sheet metal and a panel, produced from plastic material, disposed at the upper and/or lower part of the body. In this embodiment, the auxiliary element is situated on the panel. Thus, a layer produced from plastic material, instead of metal material, is situated at the front side of the wireless communication unit and signal transmission is facilitated.
- [0012] In an embodiment of the present invention, the auxiliary element is in form of a drawer that is attached/detached by being slid into a casing situated on the body.
- [0013] In an embodiment of the present invention, the household appliance is a laundry washing and/or drying machine.
- [0014] In a version of this embodiment, the auxiliary element is a detergent dispenser. The auxiliary element comprises a storage tank wherein the cleaning agents are placed. In this embodiment, there is a gap between the side wall of the storage tank and the side wall of the casing and the receiving socket and the transmitting socket are positioned so as to align with this gap. Thus, the sockets are prevented from contacting with liquids.
- [0015] In a version of this embodiment, at least one protection member is situated around the receiving socket and/or the transmitting socket, that prevents liquid from splattering onto the sockets. The protection member functions as a barrier in front of the socket.
- [0016] By means of the present invention, the wireless communication units supplied separately from the household appliances are provided to be easily installed to the household appliances. The user can accomplish the installation process without calling maintenance personnel and this provides decrease in maintenance costs. Thanks to the position of the

wireless communication unit, factors that may adversely affect wireless signal transmission are eliminated and also the electrical connections are prevented from contacting with liquid.

[0017] The household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0018] Figure 1 – is the perspective view of the household appliance while the auxiliary element is in the open position.

[0019] Figure 2 – is the partial view of the household appliance while the auxiliary element is in the open position.

[0020] Figure 3 – is the perspective view of the casing and the auxiliary element while the auxiliary element is in the open position.

[0021] Figure 4 – is the perspective view of the auxiliary element.

[0022] Figure 5 – is the partial view of the casing.

[0023] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Body
3. Auxiliary element
4. Housing
5. Circuit board
6. Wireless communication unit
7. Transmitting socket
8. Receiving socket
9. Panel
10. Casing
11. Storage tank
12. Protection member

[0024] The household appliance (1) comprises a body (2), at least one auxiliary element (3) mounted on the body (2) so as to move with respect to the body (2), a housing (4) arranged on the auxiliary element (3) and a circuit board (5) that controls the operation thereof. The circuit board (5) is disposed within the volume inside the body (2) and controls the operation of the related components depending on the conditions the household appliance (1) is desired to be operated. The auxiliary element (3) is

disposed at a position on the body (2) that is accessible from the outside and can be moved by the user when required (Figure 1, Figure 2).

[0025] The household appliance (1) of the present invention comprises a wireless communication unit (6) that is disposed inside the housing (4) so as to communicate with the circuit board (5) and that enables the household appliance (1) to be remotely and wirelessly controlled. The wireless communication unit (6) enables the household appliance (1) to be controlled from a common platform with the other household appliances present in the environment and/or to be remotely controlled by the user. The installation process is completed by placing the wireless communication unit (6) into the housing (4) since the infrastructure required for communication of the wireless communication unit (6) with the circuit board (5) is prepared in advance by the producer. Consequently, the process of installing the wireless communication unit (6) to the household appliance (1) is realized without opening the interior of the body (2). When required, the wireless communication unit (6) can be bought separately from the household appliance (1) and easily installed by the user. The cost of the household appliance (1) and hence the sale price are prevented from increasing for the users who do not need the wireless communication unit (6). Furthermore, the users that desire to use the wireless communication unit (6) are enabled to easily perform the installation without calling maintenance personnel.

[0026] In an embodiment of the present invention, the wireless communication unit (6) is detachably installed into the housing (4). Thus, the wireless communication unit (6) can be easily taken out of the body (2) when not in use.

[0027] The auxiliary element (3) has an open position (P1) wherein at least some portion thereof is outside the body (2) and a closed position (P2) wherein it is almost coplanar with the body (2).

[0028] In an embodiment of the present invention, when the auxiliary element (3) is in the open position (P1), the wireless communication unit (6) can be placed therein. In this embodiment, the housing (4) is not visible when the auxiliary element (3) is in the closed position (P2). When the wireless

communication unit (6) is desired to be installed, the auxiliary element (3) is changed to the open position (P1). In the meantime, the household appliance (1) is not operating. After the wireless communication unit (6) is placed inside the housing (4), the auxiliary element (3) is changed to the closed position (P2) again and the installation is completed. Thus, the installation of the wireless communication unit (6) to the household appliance (1) is realized without detaching any part from the household appliance (1).

[0029] In an embodiment of the present invention, the household appliance (1) comprises at least one transmitting socket (7) disposed on and/or in the vicinity of the wireless communication unit (6) and at least one receiving socket (8) that is disposed on the body (2) and that delivers the signals received from the transmitting socket (7) to the circuit board (5) by communicating with the transmitting socket (7) when the auxiliary element (3) is in the closed position (P2). The receiving socket (8) stays stationary on the body (2) while the transmitting socket (7) moves together with the auxiliary element (3). The receiving socket (8) is connected to the circuit board (5) from one end. The wireless communication unit (6) contacts with the transmitting socket (7) when installed into the housing (4). When the auxiliary element (3) is changed to the closed position (P2), the transmitting socket (7) joins with the receiving socket (8) and communication is provided between the wireless communication unit (6) and the circuit board (5). By means of this structure, the installation of the wireless communication unit (6) according to the principle of plug-and-play can be accomplished easily (Figure 3, Figure 4, Figure 5).

[0030] In an embodiment of the present invention, the household appliance (1) comprises the body (2) produced from sheet metal, at least one panel (9) produced from plastic material, disposed at the upper and/or lower side of the body (2) and the auxiliary element (3) disposed on the panel (9). In this embodiment, the wireless communication unit (6), being disposed inside the plastic panel (9) on the body (2), is away from the cage effect that may occur due to the sheet metal used in the body (2) and thus wireless signal power is prevented from decreasing (Figure 1).

- [0031] In an embodiment of the present invention, the household appliance (1) comprises the drawer-shaped auxiliary element (3) and a casing (10) arranged on the body (2) wherein the auxiliary element (3) is slidably placed. The casing (10) extends from the surface of the body (2) towards the inner volume of the body (2). In this embodiment, the housing (4) is situated at the lower surface of the auxiliary element (3) (Figure 3).
- [0032] In an embodiment of the present invention, the household appliance (1) is a laundry washing and/or drying machine.
- [0033] In a version of this embodiment, the auxiliary element (3) is a detergent dispenser having a storage tank (11) wherein cleaning agents are placed. In this embodiment, the transmitting socket (7) and the receiving socket (8) are positioned so as to remain between the side wall of the storage tank (11) and the side wall of the casing (10). Consequently, the sockets (7, 8) are prevented from contacting with the liquid contained in the storage tank (11) and electrical safety is improved (Figure 3, Figure 4).
- [0034] In a version of this embodiment, the household appliance (1) comprises at least one protection member (12) that is disposed around the transmitting socket (7) and/or the receiving socket (8) and that prevents the liquid contained in the auxiliary element (3) from contacting with the transmitting socket (7) and/or the receiving socket (8). Liquid is prevented from splattering onto the sockets (7, 8) by means of the protection member (12) that functions as a barrier in front of the sockets (7, 8) (Figure 3, Figure 4, Figure 5).
- [0035] In another embodiment of the present invention, the auxiliary element (3) is a water collection chamber.
- [0036] By means of the present invention, the wireless communication unit (6) can be easily installed to the household appliance (1). The wireless communication unit (6) becomes usable as soon as the installation is performed since communication between the wireless communication unit (6) and the circuit board (5) is provided by means of the sockets (7, 8). Furthermore, the wireless communication unit (6) in the household appliance (1) is supplied to the user optionally and the cost of the product is prevented from increasing unnecessarily for the users who do not desire

to use this feature.

[0037] It is to be understood that the present invention is not limited to the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A household appliance (1) **comprising** a body (2), at least one auxiliary element (3) mounted on the body (2) so as to move with respect to the body (2), a housing (4) disposed on the auxiliary element (3) and a circuit board (5) that controls the operation thereof, **characterized in that** a wireless communication unit (6) is disposed inside the housing (4) so as to communicate with the circuit board (5) and enables the household appliance (1) to be remotely and wirelessly controlled.
2. The household appliance (1) as in Claim 1, **characterized in that** the wireless communication unit (6) is detachably installed into the housing (4).
3. The household appliance (1) as in Claim 1 or 2, **characterized in that** the auxiliary element (3) has an open position (P1) wherein at least some portion thereof is outside the body (2) and a closed position (P2) wherein it is almost coplanar with the body (2).
4. The household appliance (1) as in Claim 3, **characterized in that** the housing (4) wherein the wireless communication unit (6) can be disposed when the auxiliary element (3) is in the open position (P1) and is not visible when the auxiliary element (3) is in the closed position (P2).
5. The household appliance (1) as in Claim 3 or 4, **characterized in that** at least one transmitting socket (7) is disposed on and/or in the vicinity of the wireless communication unit (6) and at least one receiving socket (8) is disposed on the body (2) and delivers the signals received from the transmitting socket (7) to the circuit board (5) by communicating with the transmitting socket (7) when the auxiliary element (3) is in the closed position (P2).
6. The household appliance (1) as in any one of the above claims, **characterized in that** the body (2) is produced from sheet metal, at least one panel (9) is produced from plastic material, disposed at the upper and/or lower side of the body (2) and the auxiliary element (3) is disposed on the panel (9).
7. The household appliance (1) as in any one of the above claims, **characterized in that** the auxiliary element is drawer-shaped (3) and a casing (10) is arranged on the body (2) wherein the auxiliary element (3) is slidingly placed.
8. The household appliance (1) as in any one of the above claims, which is a laundry washing and/or drying machine.

9. The household appliance (1) as in Claim 7 or 8, **characterized in that** the auxiliary element (3) is a detergent dispenser, having a storage tank (11) wherein cleaning agents are placed, and **in that** the transmitting socket (7) and the receiving socket (8) are positioned so as to remain between the side wall of the storage tank (11) and the side wall of the casing (10).
10. The household appliance (1) as in Claim 9, **characterized in that** at least one protection member (12) is disposed around the transmitting socket (7) and/or the receiving socket (8) and prevents the liquid contained in the auxiliary element (3) from contacting with the transmitting socket (7) and/or the receiving socket (8).
11. The household appliance (1) as in any one of the Claims 7 to 10, **characterized in that** the auxiliary element (3) is a water collection chamber.

Figure 1

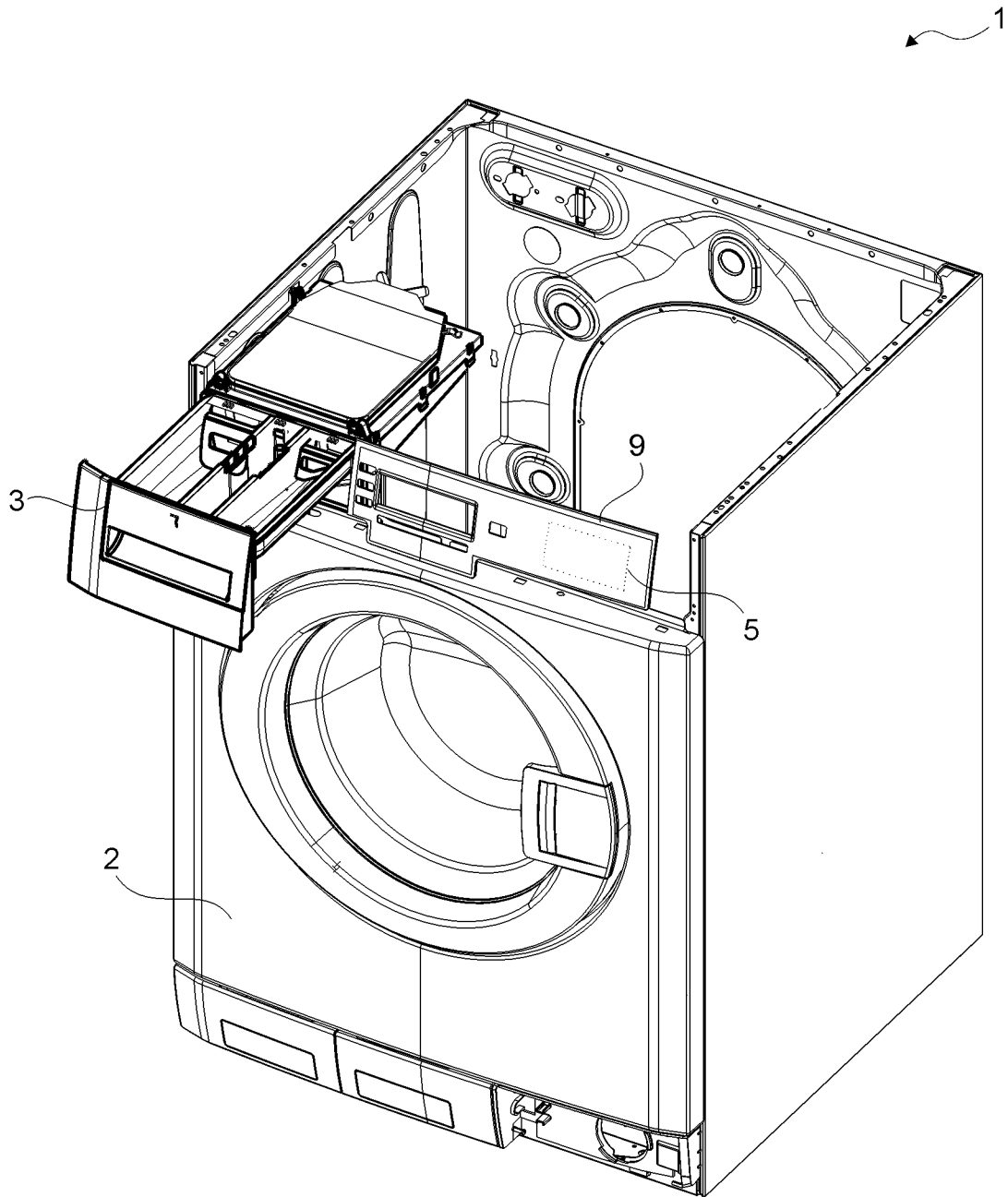
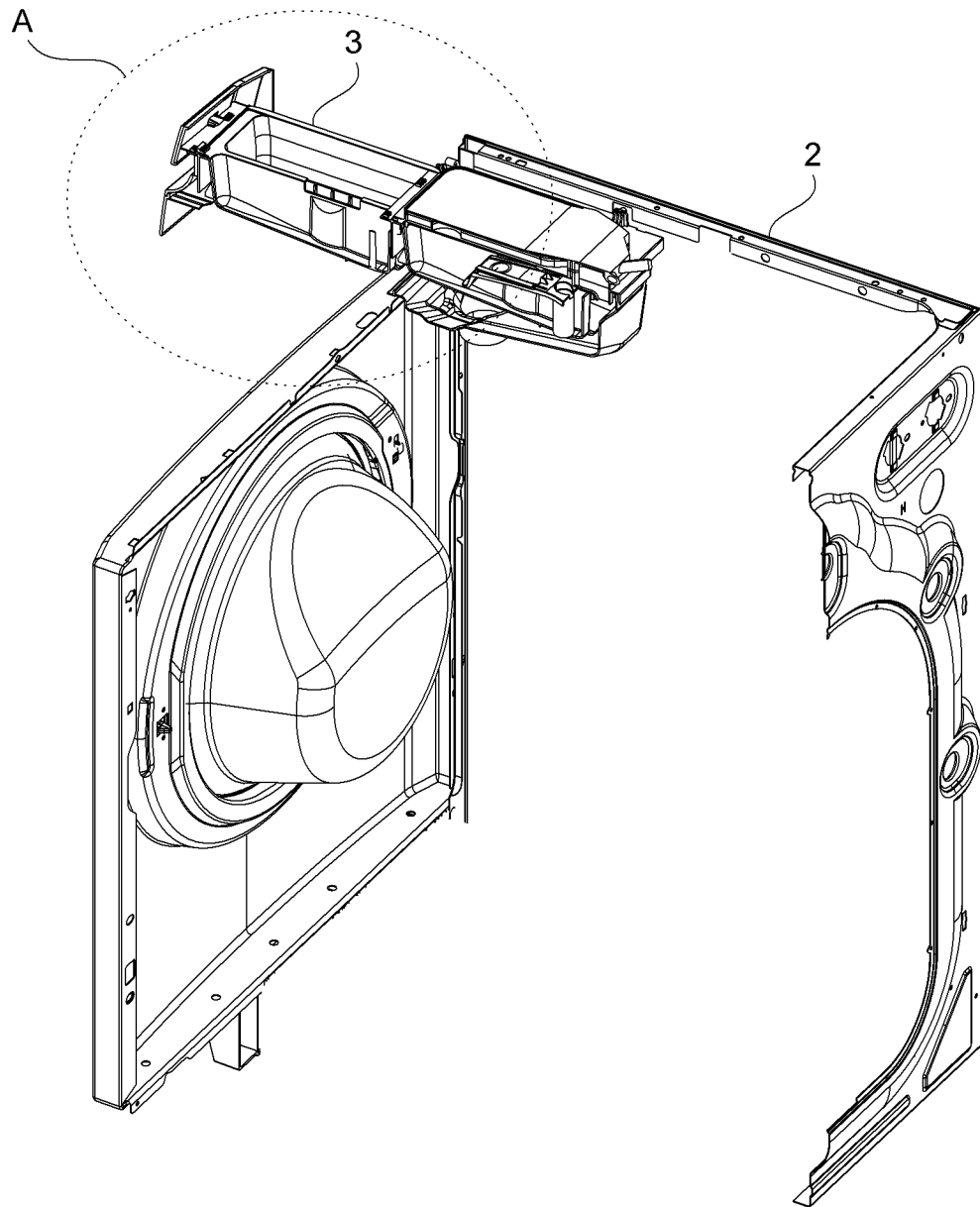


Figure 2



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Figure 3

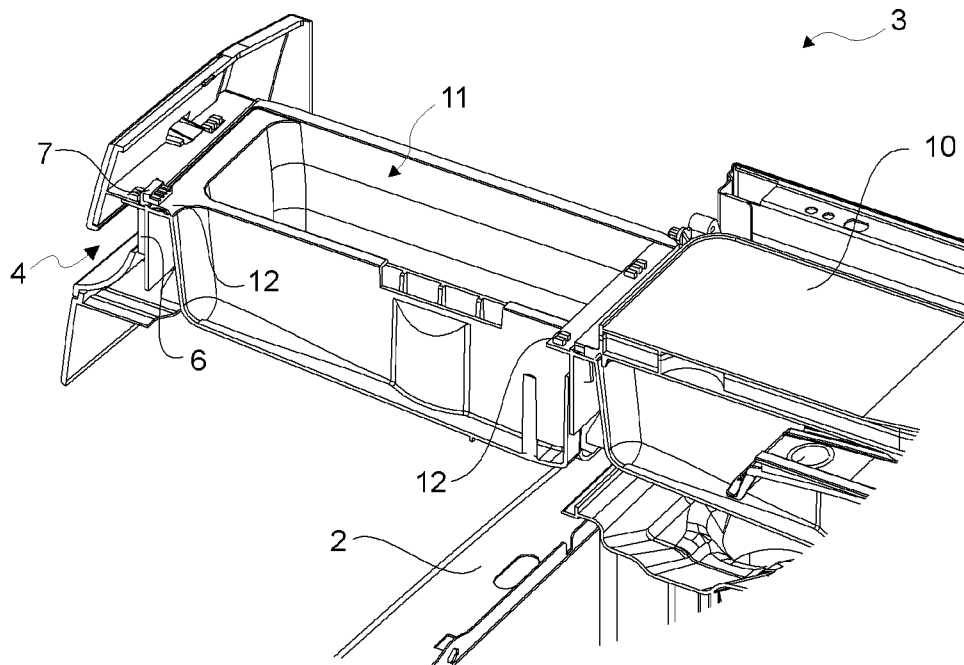


Figure 4

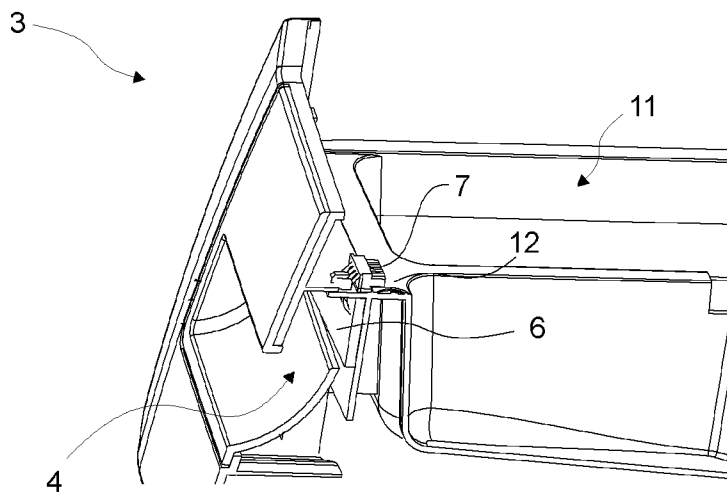
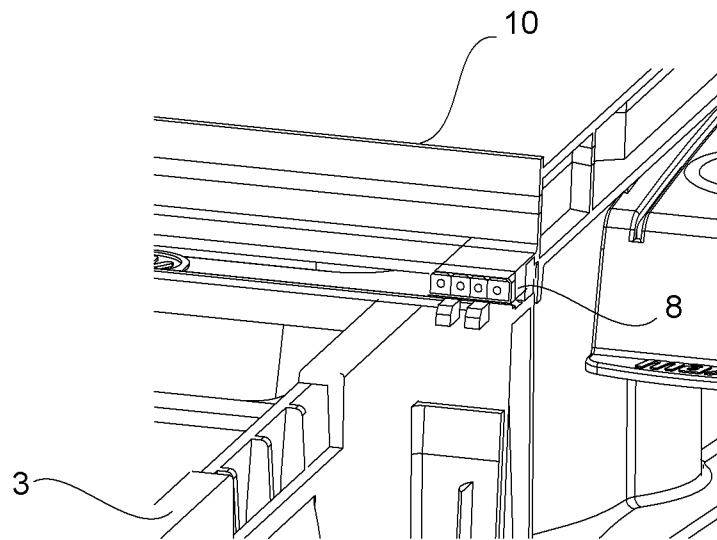


Figure 5



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/075538

A. CLASSIFICATION OF SUBJECT MATTER INV. A47L15/44 D06F39/02 D06F33/02 ADD.		
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 D06F		
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 practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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☒ 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 23 May 2014		Date of mailing of the international search report 02/06/2014
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/075538

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PCT/EP2013/075538

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