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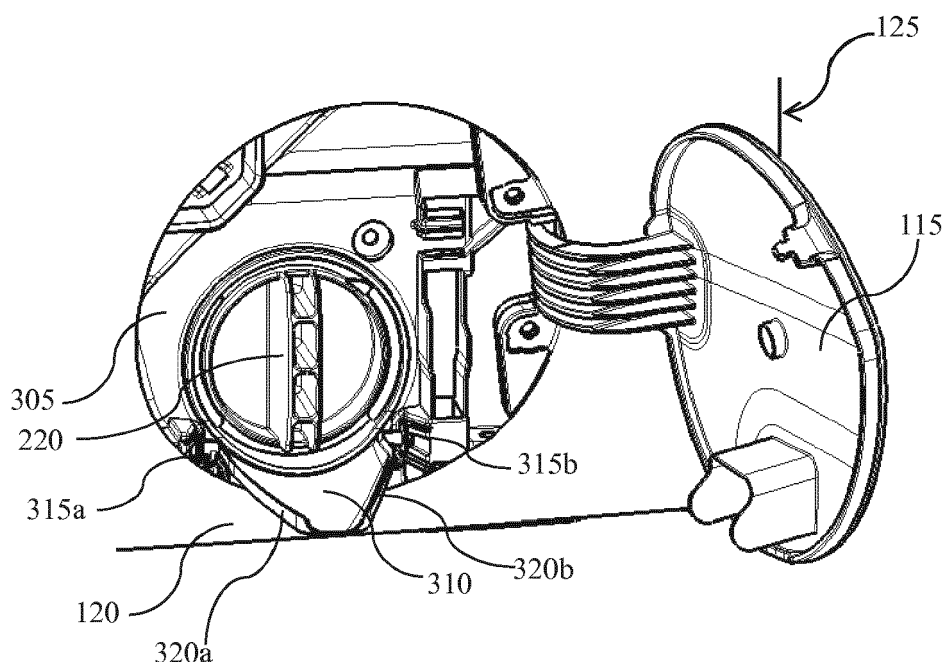
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(54) **HOUSEHOLD ELECTRICAL APPLIANCE FOR THE TREATMENT OF CLOTHES, WITH AN IMPROVED DRAINAGE UNIT**

(57) Household electrical appliance (105) for the treatment of clothes, particularly a laundry washer and laundry washer-dryer, comprising a drainage unit for washing/rinsing liquid that includes a chamber (207) adapted to contain or conduct the liquid accessible from outside the household electrical appliance through an

access opening (215) that can be closed by a cap (220). The household electrical appliance comprises a liquid conveyor element (310) associated with said access opening for controlling the leakage of liquid from the drainage unit.



**Figura 3B**

## Description

**[0001]** The solution presented in this document refers to the sector of household electrical appliances in general and, more specifically, to household electrical appliances for the treatment of clothes, particularly a laundry washer and laundry washer-dryer, having a water drainage (and possibly recirculation) unit with an inspectable outlet filter.

**[0002]** Usually, a household electrical appliance for the treatment of clothes, such as the laundry washer or washer-dryer in question, is divided into different sections, namely: a section for loading the washing/rinsing water, a section for washing garments (comprising a washing tub and movable drum housed inside the tub) and a section for draining off the washing/rinsing water. The drain section is managed by a drain pump that sends the water exiting the tub toward the drain system.

**[0003]** Upstream of the drain pump there is normally a filtering unit that comprises a pump body defining within it a chamber (or chambers) in which to house the filtering element through an opening, a filter (diaphragm) designed to allow the passage of water and trap any objects contained in the flow of water to be drained and a cap, usually screwed on, that closes the opening of the pump body and through which the filter can be accessed.

**[0004]** The drain filter is usually located at the bottom of the household electrical appliance and placed in communication with the cabinet, which constitutes the outer casing of the household electrical appliance, through an interface. Access to the filter, to inspect and clean it, or generally access to the cap that allows the chamber (or chambers) defined by the filtering unit to be closed, is gained by opening an outer flap hinged on the cabinet.

**[0005]** A problem with known solutions is that, when accessing the filter, water leaks out, some of it re-entering the household electrical appliance and some leaking onto the floor, and is difficult for the user to collect.

**[0006]** One of the aims of the solution described in this document is to facilitate the inspection of the chamber (or chambers) defined by the unit that usually comprises the pump impeller and the filter, and consequent cleaning of the drain filter of the household electrical appliance, and in particular to prevent uncontrolled leakage of water during these operations.

**[0007]** According to the solution presented in this document, a household electrical appliance is provided for the treatment of clothes, particularly a laundry washer and laundry washer-dryer, comprising a drainage unit for washing/rinsing liquid that includes a chamber adapted to contain or conduct the liquid accessible from outside the household electrical appliance through an access opening that can be closed by a cap. The household electrical appliance comprises a liquid conveyor element associated with said access opening for controlling the leakage of liquid from the drainage unit.

**[0008]** In an embodiment, said liquid conveyor element is mechanically coupled in a rotatable way to the house-

hold electrical appliance in correspondence of said access opening, and is positioned in an open position in which the liquid conveyor element is adapted to act as a gutter for the liquid leaking from the drainage unit.

**[0009]** In an embodiment, the household electrical appliance comprises a casing and said access opening is an opening in said casing.

**[0010]** Advantageously, said liquid conveyor element is mechanically coupled to said casing in correspondence of said opening, or to an interface element between said casing and a wall of an external cabinet of the household electrical appliance.

**[0011]** For the mechanical coupling between the liquid conveyor element and the casing or the interface element, first coupling means are provided on the casing or on the interface element, and second coupling means are provided on the liquid conveyor element.

**[0012]** Preferably, one of the first coupling means and the second coupling means comprises at least one pin, and the other of the first coupling means and the second coupling means comprises at least one respective seat adapted to rotatably accommodate said pin.

**[0013]** Preferably, said one of the first coupling means and the second coupling means comprising at least one pin is provided with a centering element adapted to cooperate with said seat for the correct positioning of the liquid conveyor element in the assembling phase.

**[0014]** Advantageously, said first and second coupling means comprise end-of-stroke means for determining a first end-of-stroke of the liquid conveyor element in said open position and a second end-of-stroke of the liquid conveyor element in a closed position.

**[0015]** Said chamber adapted to contain or conduct the liquid can include a filtering element accessible from outside the household electrical appliance through an access opening.

**[0016]** The filtering element can be removably contained in said casing, and said access opening can be an opening in said casing.

**[0017]** The solution proposed here has the advantage of making it possible for the user to control the direction of liquid flow, encouraging it to flow correctly outwards and preventing it from flowing back/falling into the cabinet of the household electrical appliance.

**[0018]** These and further features and advantages of the solution presented here will emerge from the following detailed description of one of its embodiments, given purely by way of a non-limiting example. For a clearer understanding, the description should be read with reference to the accompanying drawings, in which:

**Figures 1A, 1B and 1C** show a laundry washer implementing an embodiment of the solution proposed herein, with the access flap to the drain filter closed (**Figure 1A**) and open (**Figures 1B and 1C**);

**Figure 2** shows in axial section the filtering unit of the laundry washer;

**Figures 3A and 3B** show, enlarged, the detail of the

access area to the filtering unit shown in **Figures 1B** and **1C**;

**Figure 4** shows, in plan view, front view and side view, a rotatable gutter of the filtering unit;

**Figure 5** shows, enlarged, a detail of the rotatable gutter in **Figure 4**;

**Figure 6** shows the coupling between the rotatable gutter and an interface that places the filtering unit in communication with the external cabinet of the laundry washer, and

**Figures 7** and **8** show details of the areas of coupling between the rotatable gutter and the interface.

**[0019]** With reference to the drawings, **Figures 1A, 1B** and **1C** show a household electrical appliance for the treatment of clothes, particularly a laundry washer (or laundry washer-dryer).

**[0020]** The household electrical appliance, shown as a whole by reference numeral **105**, comprises in a known way a section for filling with the washing/rinsing liquid, a section for washing the garments (comprising a washing tub and a drum for garments to be washed housed inside the drum, both not visible in the Figures and known per se) and a section for draining the washing/rinsing water. The section for draining the washing/rinsing water comprises a water draining/recirculation unit with a filtering unit.

**[0021]** The filtering unit, partially visible in **Figures 1B** and **1C** where it is identified by reference numeral **110**, is usually located at the bottom of the household electrical appliance **105** and is accessible, for simple inspection or cleaning (by the user or maintenance engineer), by opening an external flap **115** hinged, so as to be openable and reclosable, on a front wall **120** of a cabinet **125** that constitutes the external casing of the household electrical appliance **105**. The filtering unit **110** is placed in communication with the front wall **120** of the cabinet **125** by means of an interface **305** partially visible in **Figures 3A** and **3B** and in its entirety in **Figure 6**.

**[0022]** The section for draining the washing/rinsing water is managed by a drain pump that sends the water exiting the tub toward the drainage system. The filtering unit **110** is located upstream of the drain pump and, as shown in **Figure 2**, comprises a pump body **205** defining within it a chamber **207** (or several chambers), adapted to contain or convey the liquid and in which can be housed a filtering element **210** that can be inserted/extracted through an opening **215** in the pump body **205**, which enables access to the filtering element **210**. A cap **220**, usually screwed on, closes the opening **215** of the pump body **205**. The filtering element **210** comprises for example a filter (for example a diaphragm) designed to allow the passage of water and trap any objects contained in the flow of water to be drained.

**[0023]** As shown in **Figures 3A** and **3B**, a rotatable gutter **310** is positioned externally in relation to the filtering unit **210** and pivots on the interface **305** in correspondence of two appropriate seats **315a** and **315b**. When in

the closed position, as in **Figure 3A**, the gutter **310** partially or totally conceals the access cap **220** to the filtering element **210** and unambiguously defines the correct positioning; through a rotation of at least one prescribed angle in relation to the plane of the front wall **120** of the cabinet **125**, for example a rotation of approximately 90° or more, the gutter **310** assumes an open and inclined position outward from the machine, as shown in **Figure 3B**. With the gutter **310** in the open position it is possible to access the cap **220**, affording access to the filtering element **210**, and to perform inspection, cleaning and ordinary and extraordinary maintenance operations.

**[0024]** Advantageously, the gutter **310** has a converging geometry tapering from the end provided with the pins **405a** and **405b** toward the front part of the gutter **310** itself, is concave towards the top and has raised external lateral edges **320a** and **320b**.

**[0025]** On opening the cap **220**, the liquid (water for washing or rinsing or mixed with detergent) that may be contained in the drainage system, and particularly in the filtering unit **110**, flows outwards through a gap **225** (see **Figure 2**) between the cap **220** and the pump body **205**; the quantity of liquid that leaks out is regulated and controlled by the extent of rotation (unscrewing) of the cap **220**. Thanks to the provision of the gutter **310**, which advantageously has a converging, concave geometry with raised outer edges, and to its position when open (inclined downwards), it is possible to control the direction of the flow of water, encouraging it to flow correctly outwards and preventing it from flowing back/falling into the cabinet **125**.

**[0026]** In the example of an embodiment described here, shown in **Figures 4** and **5**, the gutter **310** is provided with two lateral pins **405a** and **405b**, each of which is engaged in one of the two respective seats **315a** and **315b** of the interface **305**. Pins **405a** and **405b** are characterized by:

- two raised surfaces, for example two discs **410a** and **410b**, one on each pin **405a** and **405b**, which during the assembly phase come into contact with the interface **305** and determine the correct centering of the gutter **310**;
- two cams **415a** and **415b**, one on each pin **405a** and **405b**, which serve to:
  - define an end-of-stroke means for the gutter **310** in the two main operating positions (open and closed);
  - prevent the unintended rotation of the gutter **310** (due to the effect of the force of gravity or vibrations, for example);
  - give the user the sensation of having opened/closed the gutter in the correct way by means of a sound/tactile "click-clack" sensation.

**[0027]** The seats **315a** and **315b** for the two pins **405a** and **405b** made in the interface **305** are advantageously

modeled so as to allow the gutter **310** to be mounted with one movement in a single direction, for example in a horizontal direction, as illustrated in **Figure 6**.

**[0028]** As shown in **Figures 7** and **8**, in each of the two seats **315a** and **315b** made in the interface **305** there are two different areas: a first area **705** dedicated to the fixing of the gutter **310**, by coupling with one of the two disks **410a** and **410b** on one of the two pins **405a** and **405b** of the gutter **310**, and a second area **710** responsible for controlling the rotation of the gutter **310**, by coupling with one of the two cams **415a** and **415b**. Both of these two areas **705** and **710** are resilient and flexible.

**[0029]** The area **705** for fixing the gutter **310** is characterized by a cantilevered geometry **715** that flexes during the fitting/removal of the gutter **310** to facilitate the passage of the pins.

**[0030]** The part **720** of the area **710** designed to cooperate by contact with the cams **415a** and **415b** is engaged at either end and free to flex in the middle. Depending on the direction of rotation of the gutter **310** and the consequent flexing of the area **710**, the end-of-stroke of the gutter **310** is defined in the two positions (open and closed) and the gutter is locked in the correct operating position. As stated above, the two operating positions of the gutter **310** can easily be identified by the user thanks to the sound/tactile "click-clack" effect given by the rotation of the cams **415a** and **415b**.

**[0031]** The two areas **705** and **710** - namely the two functions of fixing the gutter **310** and controlling the rotation of the gutter **310** - can be made either as separate areas, as in the embodiment shown, or, alternatively, be incorporated into one geometry.

**[0032]** As stated above, thanks to the provision of the gutter **310**, which advantageously has a converging geometry and raised outer edges, and to its position when open (inclined downwards), it is possible to control the direction of flow of the water, encouraging it to flow correctly outwards and preventing it from flowing back/falling into the cabinet **125**.

**[0033]** Thanks to the fact that the gutter **310** is not connected to the cap **220** for accessing the filtering element, but rather to the interface **305**, the action by the user on the cap **220** is facilitated (as there are no mechanisms incorporated within the cap).

**[0034]** The solution proposed is easy and intuitive to use.

**[0035]** The gutter **310** can be easily fitted/removed.

**[0036]** Thanks to the cams, the possibility of incorrect positioning is much reduced.

**[0037]** Naturally, variations can be made to the embodiment described.

**[0038]** For example, the seats for the two pins of the gutter can be made in the pump body **205** instead of in the interface **305**.

**[0039]** Another possibility consists in swapping the position of the pins and the seats, making the pins in the interface **305** (or in the pump body **205**) and the seats in the gutter **310**.

## Claims

1. Household electrical appliance (**105**) for the treatment of clothes, particularly laundry washer and laundry washer-dryer, comprising a drainage unit for washing/rinsing liquid that includes a chamber (**207**) adapted to contain or conduct the liquid accessible from outside the household electrical appliance through an access opening (**215**) closable by a cap (**220**), **characterized by** comprising a liquid conveyor element (**310**) associated with said access opening for controlling the leakage of liquid from the drainage unit.
2. Household electrical appliance according to claim 1, wherein said liquid conveyor element is mechanically coupled in a rotatable way to the household electrical appliance in correspondence of said access opening and is positioned in an open position, in which the liquid conveyor element is adapted to act as a gutter for the liquid leaking from the drainage unit.
3. Household electrical appliance according to claim 2, comprising a casing (**205**) in which said access opening is an opening of said casing.
4. Household electrical appliance according to claim 3, wherein said liquid conveyor element is mechanically coupled to said casing in correspondence of said opening, or to an interface element (**305**) between said casing and a wall (**120**) of an external cabinet (**125**) of the household electrical appliance.
5. Household electrical appliance according to claim 4, wherein, for the mechanical coupling between the liquid conveyor element and the casing or the interface element, first coupling means (**315a, 315b**) are provided on the casing or on the interface element, and second coupling means (**405a-b, 410a-b, 415a-b**) are provided on the liquid conveyor element.
6. Household electrical appliance according to claim 5, wherein one of the first coupling means and the second coupling means comprises at least one pin (**405a-b**), and the other of the first coupling means and the second coupling means comprises at least one respective seat (**315a-b**) adapted to rotatably accommodate said pin.
7. Household electrical appliance according to claim 6, wherein said one of the first coupling means and the second coupling means comprising at least one pin is provided with a centering element (**410a-b**) adapted to cooperate with said seat for the correct positioning of the liquid conveyor element in the assembling phase.

8. Household electrical appliance according to any one of claims from 5 to 7, wherein said first and second coupling means comprise end-of-stroke means **(415a-b,710,720)** for determining a first end-of-stroke of the liquid conveyor element in said open position and a second end-of-stroke of the liquid conveyor element in a closed position. 5
9. Household electrical appliance according to any one of claims 1 to 8, wherein said chamber adapted to contain or conduct the liquid includes a filtering element **(210)** accessible from outside the household electrical appliance through an access opening **(215)**. 10
10. Household electrical appliance according to claim 9, comprising a casing **(205)** in which the filtering element is removably contained, and wherein said access opening is an opening of said casing. 15
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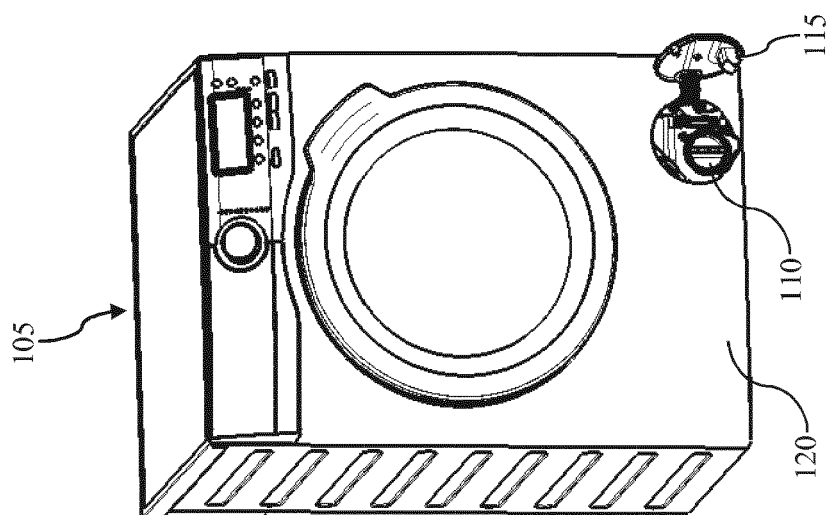


Figure 1C

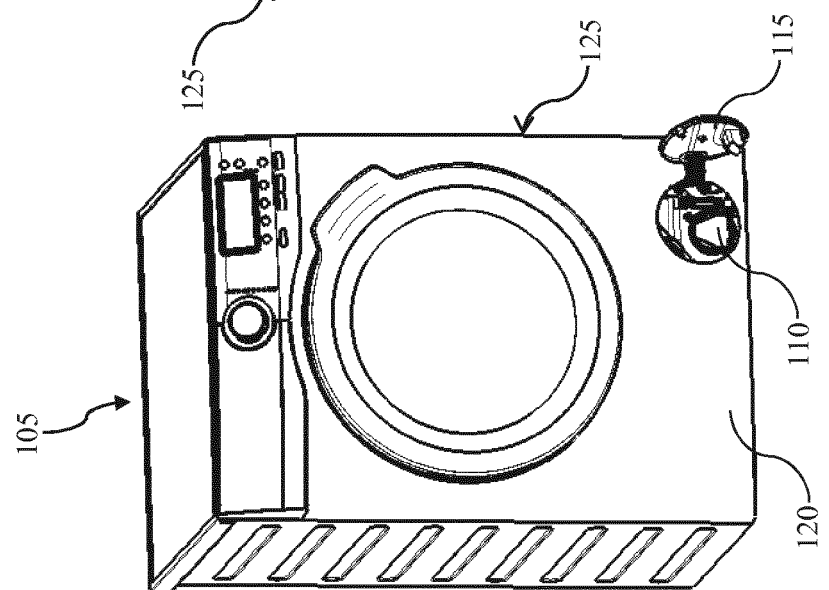


Figure 1B

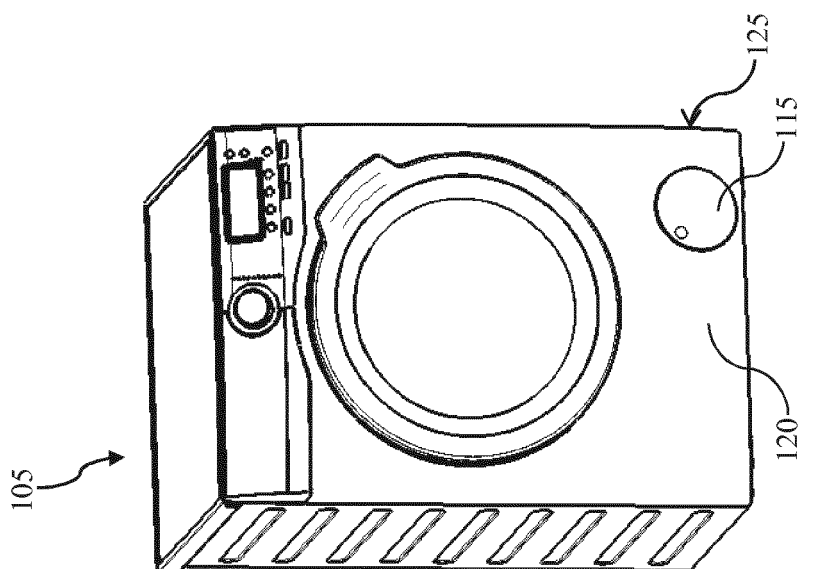


Figure 1A

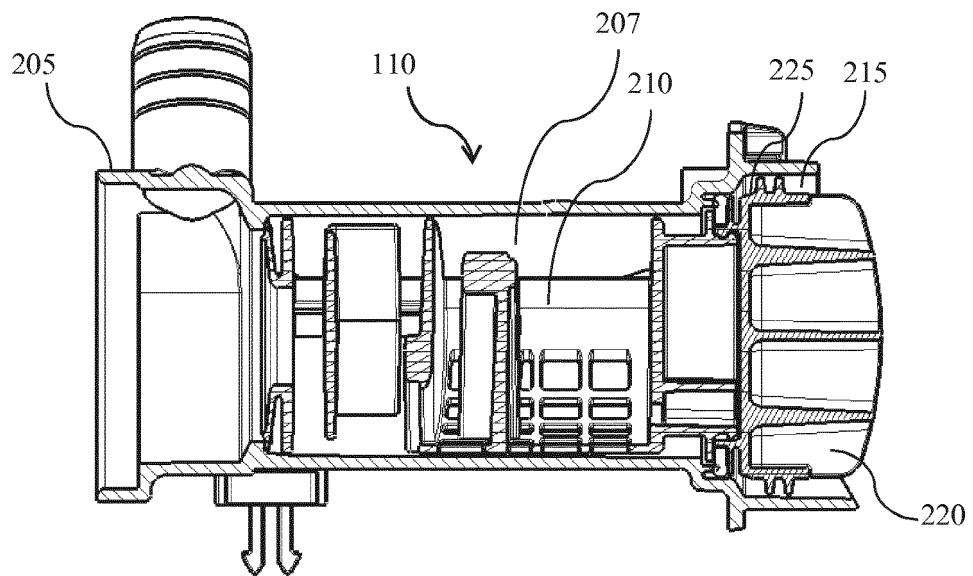


Figura 2

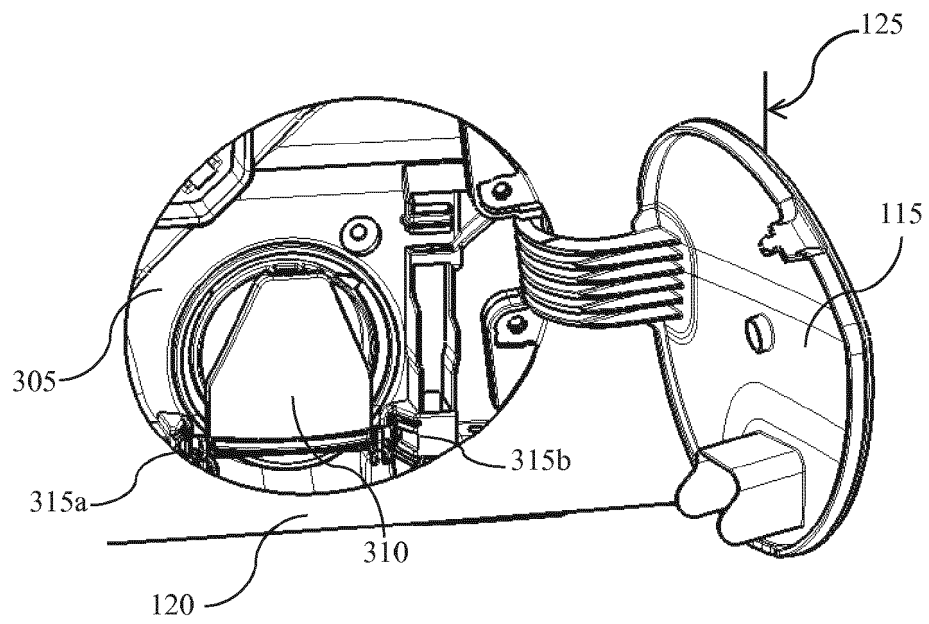


Figura 3A

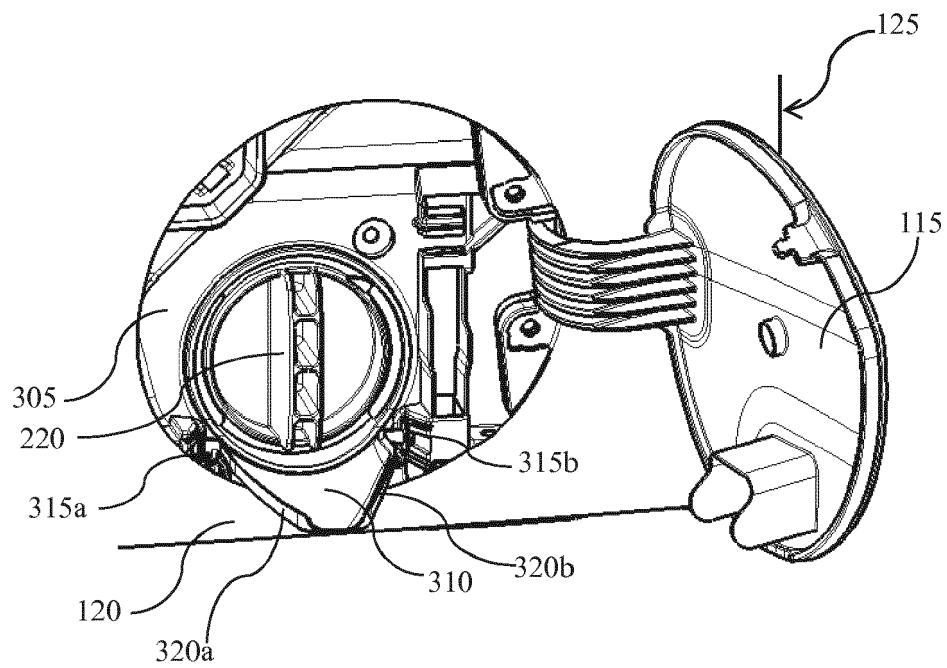


Figura 3B

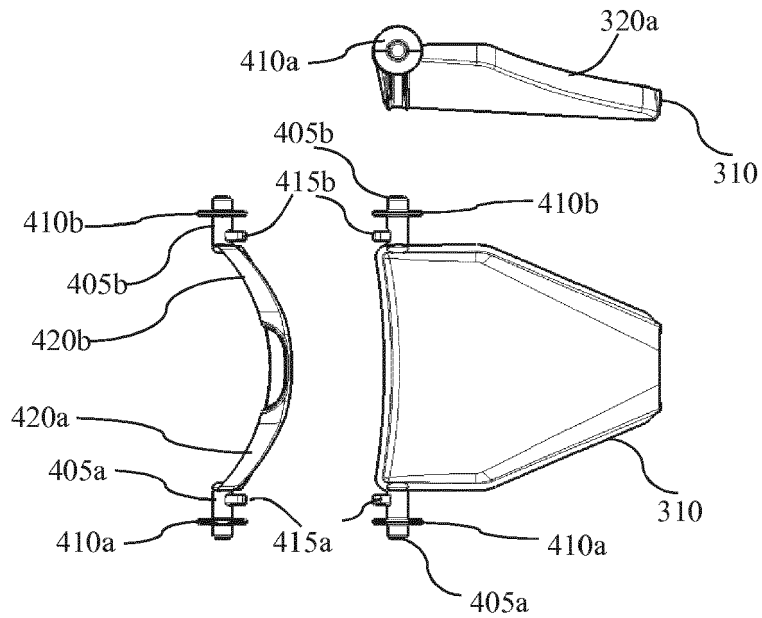


Figura 4

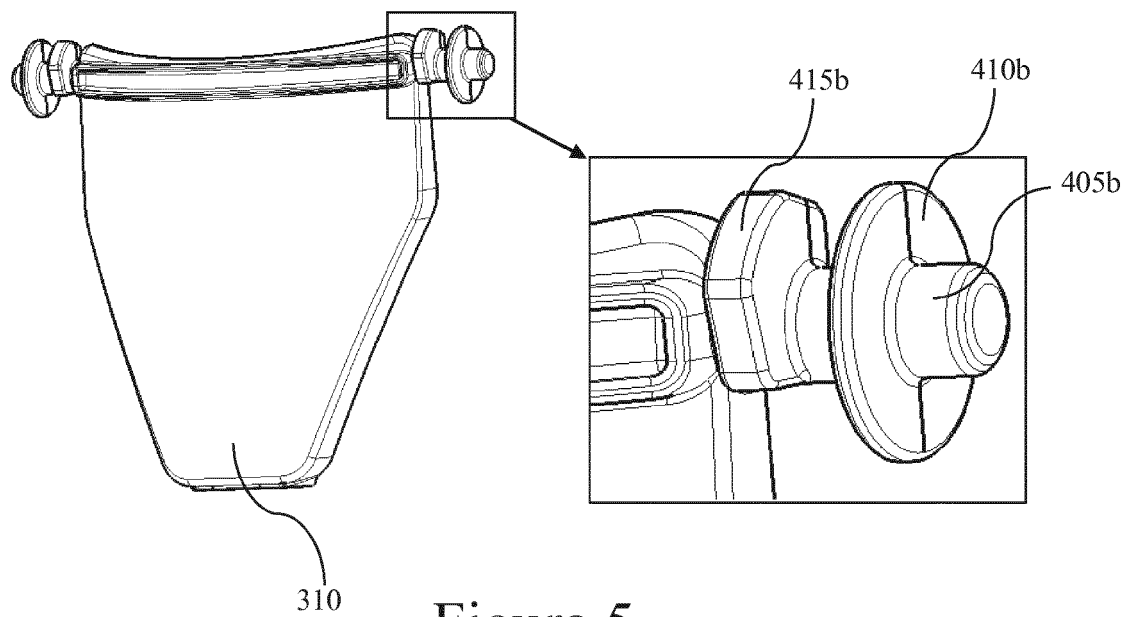


Figura 5

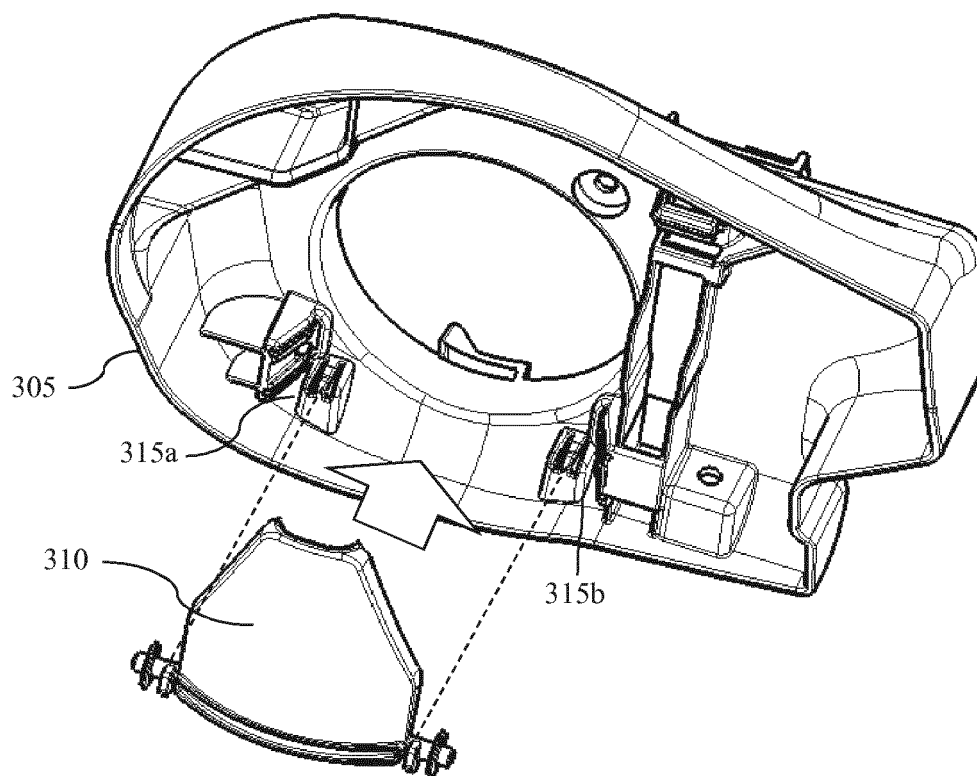


Figura 6

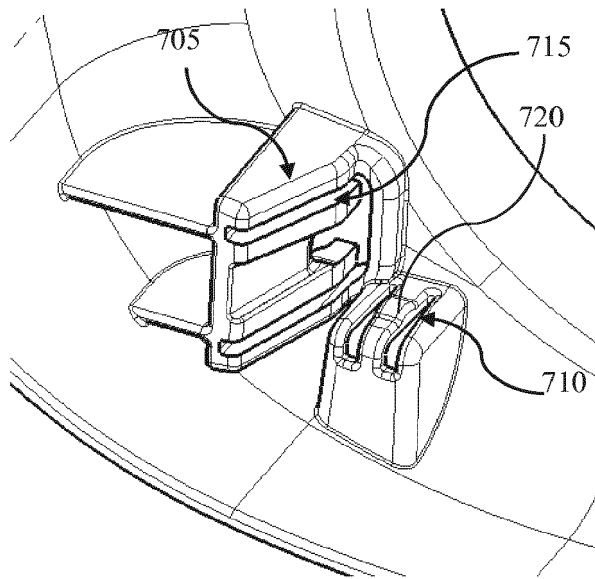


Figura 7

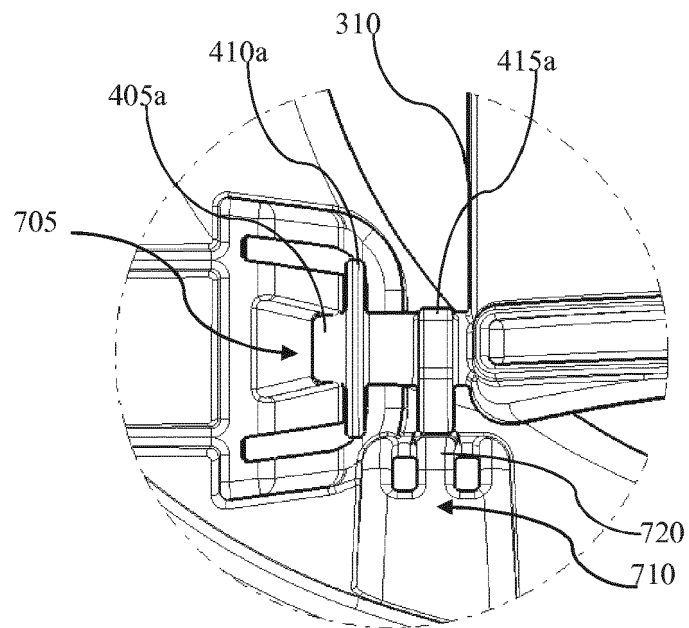


Figura 8



## EUROPEAN SEARCH REPORT

Application Number  
EP 17 17 0227

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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                                                      |                                                                                                                                                                                                                                                                              |                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Category                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                        | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC)                 |
| X                                                                                                                                                                                                                                                      | EP 2 317 000 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 4 May 2011 (2011-05-04)<br>* paragraphs [0006], [0008] *<br>* paragraphs [0022] - [0029] *<br>* figures 1-4 *   | 1-10                                                                                                                                                                                                                                                                         | INV.<br>D06F39/12<br><br>ADD.<br>D06F39/10<br>D06F39/08 |
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| Place of search<br><b>Munich</b>                                                                                                                                                                                                                       |                                                                                                                                                                      | Date of completion of the search<br><b>12 July 2017</b>                                                                                                                                                                                                                      | Examiner<br><b>Weidner, Maximilian</b>                  |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                                                      | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                         |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 17 17 0227

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