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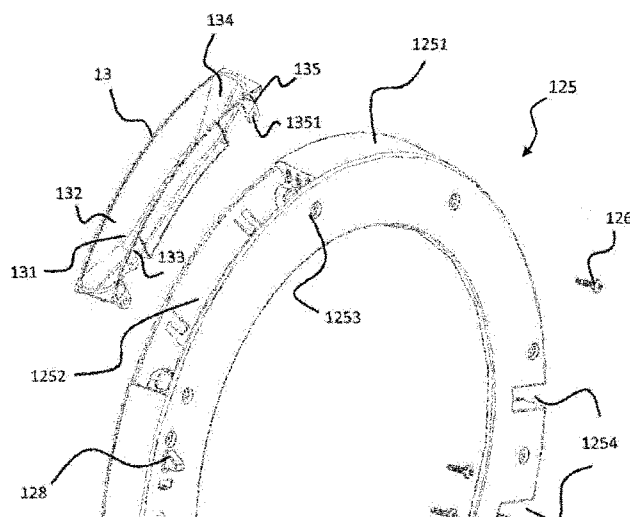
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(54) Title: A WASHING MACHINE COMPRISING A HANDLE



(57) Abstract: The present invention proposes a washing machine (1) with a door (12) for covering a load opening (112), the door (12) comprising, a recessed part (1252) formed on the door (12) configured to receive a handle insert (13) for facilitating the movement of the door (12). As an improvement, the handle insert (13) is made of thermoplastic polyurethane (TPU).

FIG. 3

SPECIFICATION

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A WASHING MACHINE COMPRISING A HANDLE

Technical Field

10 The present invention relates to an insertable door handle for washing machines.

Prior Art

The domestic washing machines comprise a door for accessing inside the machine and
15 loading or retrieving the laundry to be washed. For the user the door is provided with a
conventional handle part for gripping and implementing pulling and pushing movements to
the door in order to close or open. Most commonly, the handle parts are made of the same
material as the door frame, which is hard plastic such as polypropylene (PP). However, such
materials give the user unpleasant experience. In addition, may cause allergies for users
20 who have very sensitive skin. The hard plastic material is also prone to collect dirt. This
creates an unhygienic environment for the user. The hard plastic material is also known to be
difficult to paint. This limits the production options for the manufacturer and prevents the
opportunity offer different alternatives to the end user. Some solutions, such as covering the
handle with soft pads are being used. This solution is costly and inconvenient because over
25 time the pads may come off or break. It also adds another step for production procedure
such as gluing or adhering, costing the manufacturer time and resources.

The document KR101187069B1 discloses a door assembly, which is provided to stably
open and close the knob and the door by mounting the sliding prevention member, and to
30 prevent the sleeve from being caught by forming the knob in the door frame. A door
assembly comprises: a front frame formed with a handle part at one side; a sliding prevention
member installed at the handle part; a rear frame combined at the rear of the front frame;
and a handle cover part clamped between the front and rear frames to cover the edge of the
sliding prevention member. A fixing projection is installed at one side of the sliding prevention
35 member and the handle part, and a groove is formed at the other opposed side, wherein the
fixing projection is inserted.

The invention provides an additional improvement, an additional advantage or an alternative to the prior art.

Brief Description of the Invention

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An object of the invention is to provide an insertable door handle for washing machines, which comprise soft touching property.

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In order to achieve the objects, the invention is a washing machine with a door for covering a load opening, the door comprising a recessed part formed on the door configured to receive a handle insert for facilitating the movement of the door. As an improvement, the handle insert is made of thermoplastic polyurethane (TPU). Thus, the handle insert is softer to touch, has more elasticity and is more durable for the long-term use. The use of such material also provides a secure and firm grip for the user. The thermoplastic polyurethane material is easy to shape in any desired form. This allows to manufacturer to design the handle insert in any shape and form such as grooves for fingers so that the grip is more firm and comfortable for the user. The thermoplastic polyurethane (TPU) material is also biocompatible which eliminates the risk for allergies or other health complications for the user. A handle insert made of thermoplastic polyurethane (TPU) is less prone to collect dirt and dust inside while providing effortless cleaning due to its non-sticky nature. In addition to the advantageous tactile properties, the material also has high abrasion resistance. According to the demand from the user or for production purposes, the material gives option for handle insert to be manufactured in any color or design. Furthermore, instead of additional soft padding or covering, the handle insert is wholly manufactured in softer material. This eliminates unnecessary usage of glue or adhering material and padding, making the solution of the invention environmentally friendly. Besides, the costs and efforts for maintenance of such pad which is mentioned in the prior art are prevented by providing a whole soft material handle insert for the washing machine door.

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In a possible embodiment of the invention, the handle insert further comprise at least one protrusion configured to provide the attachment to the door. In another possible embodiment of the invention, the protrusion comprise at least one hole for receiving a bolt. In a possible embodiment of the invention, the handle insert is mounted on the door by means of at least one bolt. The handle insert is assembled into the recessed part on the rear frame of the door. Through the holes, which are provided on the rear frame and the protrusions, the handle insert is mounted on the door. Thus, more secure and robust attachment of the handle insert is provided. Compared to other connection alternatives such as gluing or snap fitting,

fastening by means of bolts is more resistant to the conditions inside of the washing machines such as high temperatures and spinning torques. Moreover, the thermoplastic polyurethane (TPU) material of the handle insert provides the most compatible results when attached by means of bolts.

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In a possible embodiment of the invention, the recessed part is arranged on a rear frame of the door. The recessed is formed on the edge of the rear frame providing the proper socket for the handle insert to be mounted. The size and shape of the recessed part is in correspondence to the size and shape of the handle insert. Thus, the full integrity of the door is granted. In addition, the installment of the handle insert on the rear frame is more convenient for the production purposes rather than mounting on a different frame of the door.

In a possible embodiment of the invention, the handle insert and the rear frame are the same color or different color. Thus, the same coloring allows economically manufacturing of the washing machine door. In addition, the different coloration of the handle insert stands out against the rear frame so that the user is able to identify the handle for gripping if there is no adequate light around the washing machine.

In a possible embodiment of the invention, the recessed part is provided above a horizontal centerline. Thus, ergonomically advantageous operation of the handle is presented. In a possible embodiment of the invention, the recessed part is provided below a horizontal centerline. Thus, the user access to the door handle is provided in a more convenient manner.

In a possible embodiment of the invention, the handle insert is manufactured in one piece. Thus, the production process is simpler and smoother. On contrary to the prior art, no gluing or adhering process and extra material for padding is required when the handle insert is manufactured as one piece of the thermoplastic polyurethane (TPU) material.

In a possible embodiment of the invention, the handle insert is made of any color and design. Thus, the user is provided with variety of design options.

In this context, the term 'open position' is in particular as the state of the door of the washing machine in which the door is pivoted away from the housing of the washing machine on the vertical axis. In 'the open position', the user is able to load the laundry into or collect the laundry from the drum, which is rotatably disposed in the interior of the housing of the washing machine.

In this context, the term 'closed position' indicates that the door of the washing machine seals the load opening on the housing of the washing machine. During the washing cycle, the door is in closed position.

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In this context, with the indications "top", "bottom", "front", "rear", "horizontal", "vertical", "upward", "downward", "inner", "outer", "inward", "outward" etc. the positions and orientations given for intended use and intended arrangement of the washing machine and for a user then standing in front of the washing machine in a closed position and viewing in the direction of the device are indicated.

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Each possible embodiment disclosed in this text can be combined with the other possible embodiments disclosed in this text if there is no any technical constraint.

15 **Explanation of Figures**

The figures, whose brief explanations are herewith provided, are solely intended for providing a better understanding of the present invention and are as such not intended to define the scope of protection or the context in which said scope is to be interpreted in the absence of the description.

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Fig. 1 is an isometric front view of the washing machine according to the present invention.

Fig. 2 is an exploded view of the door according to the present invention.

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Fig. 3 is an exploded view of the handle insert and the door according to the present invention.

Fig. 4 is an isometric view of the handle insert mounted on the rear frame according to the present invention.

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Fig. 5 is a rear view of the door according to the present invention.

Detailed Description of the Figures

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In this detailed description, the subject matter is explained with references to examples without forming any restrictive effect only in order to make the subject more understandable.

Fig. 1 shows a schematic front view of the washing machine (1). The washing machine (1) comprise a housing (11) with a load opening (112) on a front panel (111) of the housing (11). The load opening (112) is provided to introduce to or retract the laundry from a washing drum (not shown in the figures) which is rotatably disposed inside of the housing (11) of the washing machine (1). A door (12) is pivotably hinged on the front panel (111) for sealing the load opening (112). The door (12) rotates on the vertical axis (Y) between the open and closed position.

Fig. 2 shows the exploded view of the door (12). The door (12) comprises a front frame (121), an inner ring (123), a cover panel (122), a glass bowl (124), a rear frame (125), and a hinge (127). The front frame (121) may also referred as the design ring as it represents the facade of the door (12). The front frame (121) can be painted any color or decorated according to the needs and desires of the user.

The inner ring (123) has a substantially circular shape when viewed from the front while corresponding to the substantially circular shapes of the front frame (121), and the rear frame (125). The inner ring (123) and the rear frame (125) are the main components of the door (12) to carry the weight of the glass bowl (124) which is disposed in between.

The cover panel (122) can be made of plastic material. The cover panel (122) has substantially circular shape corresponding to the shapes of the front frame (121), inner ring (123) and the rear frame (125). The cover panel (122) has a see-through feature in order to provide a sight to the interior of the housing (11) of the washing machine (1). Hence, the cover panel (122) can be embodied from substantially transparent or translucent plastic. The cover panel (122) corresponds to the size of the inner ring (123). In a preferred embodiment, the cover panel (122) is disposed between the inner ring (123) and the front frame (121). The cover panel (122) can be easily removed for repairs or cosmetic changes without affecting the function of the door (12). The cover panel (122) may comprise a logo or a design.

The glass bowl (124) is configured to provide a sight or a view to the interior of the washing machine (1). The glass bowl (124) can have an inclined, tapered or curved shape for guiding the water and the washing fluid towards to the inside of the drum (not shown on the figures) directing it away from the front components of the door (12). The outwardly curved part of the glass bowl (124) is directed to the inner space of the housing (11) in the closed position of the door (12).

The front frame (121), the inner ring (123), the cover panel (122) and the glass bowl (124) are assembled to the rear frame (125) which then assembles to the front panel (111) of the housing (11) by a hinge (127) and corresponding hinge pockets (1254) which are provided on the rear frame (125).

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As seen on fig. 3, the rear frame (125) also comprise at least one port (1253) for the other door (12) parts such as the front frame (121), the inner ring (123), the cover panel (122) and the glass bowl (124) to be connected by means of bolts (126). The periphery of the front frame (121), the inner ring (123), the cover panel (122) and the glass bowl (124) are also provided with corresponding ports (not shown) which match with the ports (1253) disposed on the rear frame (125). The ports (1253) on the rear frame (125) are positioned along the perimeter of the rear frame (125). The bolts (126) are inserted through the ports (1253) disposed on the rear frame (125) into the ports (not shown) which are provided on the front frame (121), the inner ring (123), and the cover panel (122) and the glass bowl (124) so that all of the elements of the door (12) are connected. Other types of connection materials can be used instead of bolts (126) such as screws, and plastic fasteners.

On an edge (1251) of the rear frame (125), a recessed part (1252) is formed configured to receive a handle insert (13) to facilitate gripping and movement of the door (12) between the open and closed position. The length and the depth of the recessed part (1252) corresponds to the size of the handle insert (13).

Also shown on fig. 3, the door (12) and the handle insert (13) are uncombined. The handle insert (13) comprise a first wall (132) and a second wall (133) facing each other, a base (134) is disposed in between to bind the first wall (132) and the second wall (133). As a result, a cavity (131) is formed as a U shape for allowing the fingers of the user to fit in so that he or she can apply force to move the door (12). The width and depth of the first wall (132) and the second wall (133) are the same so that the depth of the cavity (131) is formed between 30-40 mm for providing the optimum gripping performance.

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Thanks to the thermoplastic polyurethane (TPU) material of which the handle insert (13) is made of, the first wall (132) or the second wall (133) can be shaped with grooves for fingers, elevated portions or bumps for providing better grasping or holding. The shape of the grooves (not shown) can also be formed as an M shape or a W shape. For optimum gripping performance, the base (134) of the handle insert (13) has a width between 20-30 mm, which allows adequate space for all sizes and numbers of fingers. The recessed part (1252) is

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elongated on at least a portion of the rear frame (125) for at least 10-15 cm, which is in accordance with the length of the handle insert (13).

Underneath the base (134), on the backside of the cavity (131), at least one protrusion (135) is formed; preferably, two protrusions (135) are formed on both ends of the handle insert (13). At least one hole (1351) is disposed on the protrusion (135) for receiving a bolt (126) in order to connect the handle insert (13) to the rear frame (125) of the door (12). The size of the holes (1351) are in correspondence to the size of the ports (1253) which are disposed on the rear frame (125) for receiving a bolt (126).

Fig. 4 shows the handle insert (13) inserted into the recessed part (1252) and mounted on the rear frame (125) by means of bolts (126). The handle insert (13) is made of thermoplastic polyurethane (TPU) material. Thus, the gripping is provided in a softer and more secure manner. The handle insert (13) is configured as a single piece. The color and design of the handle insert (13) can be same or different to the color and design of the rear frame (125).

Fig.5 indicates the rear frame (125) having a substantially circular shape, which matches to the size of the load opening (112), formed on the housing (11). The rear frame (125) is the part of the door (12) which contacts the load opening (112). The rear frame (125) comprise hinge pockets (1254) configured to receive a hinge (127) which provides the assembly of the door (12) to the front panel (111) of the washing machine (1).

The rear frame (125) further comprise a horizontal center line (14) which is parallelly oriented to the x-axis (X) and a vertical center line (15) which is perpendicular according to the horizontal center line (14) and is also parallel to the y- axis (Y) as shown.

The recessed part (1252) is formed above the horizontal centerline (14). According to the user's or the manufacturer's preference, the recessed part (1252) can be formed below the horizontal centerline (14). The hinge pocket (1254) is located at a 9 o'clock position on one end of the horizontal centerline (14) which is in the opposite end where a locking element (128) is disposed for safely locking the door (12) in the closed position during the washing process. The locking method can be by a thermal lock mechanism wherein the locking element (128) is released when the predetermined temperature is reached.

Reference List

- 5 1 Washing machine
 11 Housing
 111 Front panel
 112 Load opening
- 10 12 Door
 121 Front frame
 122 Cover panel
 123 Inner ring
 124 Glass bowl
- 15 125 Rear frame
 1251 Edge
 1252 Recessed part
 1253 Port
 1254 Hinge pockets
- 20 126 Bolt
 127 Hinge
 128 Locking element
- 13 Handle insert
- 25 131 Cavity
 132 First wall
 133 Second wall
 134 Base
 135 Protrusion
- 30 1351 Hole
- 14 Horizontal centerline
- 15 Vertical centerline
- 35

CLAIMS

- 5 1. A washing machine (1) with a door (12) for covering a load opening (112), the door (12) comprising, a recessed part (1252) formed on the door (12) configured to receive a handle insert (13) for facilitating the movement of the door (12) **characterized in that**, the handle insert (13) is made of thermoplastic polyurethane (TPU).
- 10 2. The washing machine (1) according to the claim 1, wherein the handle insert (13) further comprises at least one protrusion (135) configured to provide the attachment to the door (12).
- 15 3. The washing machine (1) according to the claim 2, wherein the protrusion (135) comprises at least one hole (1351) for receiving a bolt (126).
4. The washing machine (1) according to the claim 1, wherein the handle insert (13) is mounted on the door (12) by means of at least one bolt (126).
- 20 5. The washing machine (1) according to the claim 1, the recessed part (1252) is arranged on a rear frame (125) of the door (12).
6. The washing machine (1) according to claim 5, the handle insert (13) and the rear frame (125) are the same color or different color.
- 25 7. The washing machine (1) according to the claim 1, wherein the recessed part (1252) is provided above a horizontal centerline (14) of the door (12).
- 30 8. The washing machine (1) according to the claim 1, wherein the handle insert (13) is manufactured in one piece.

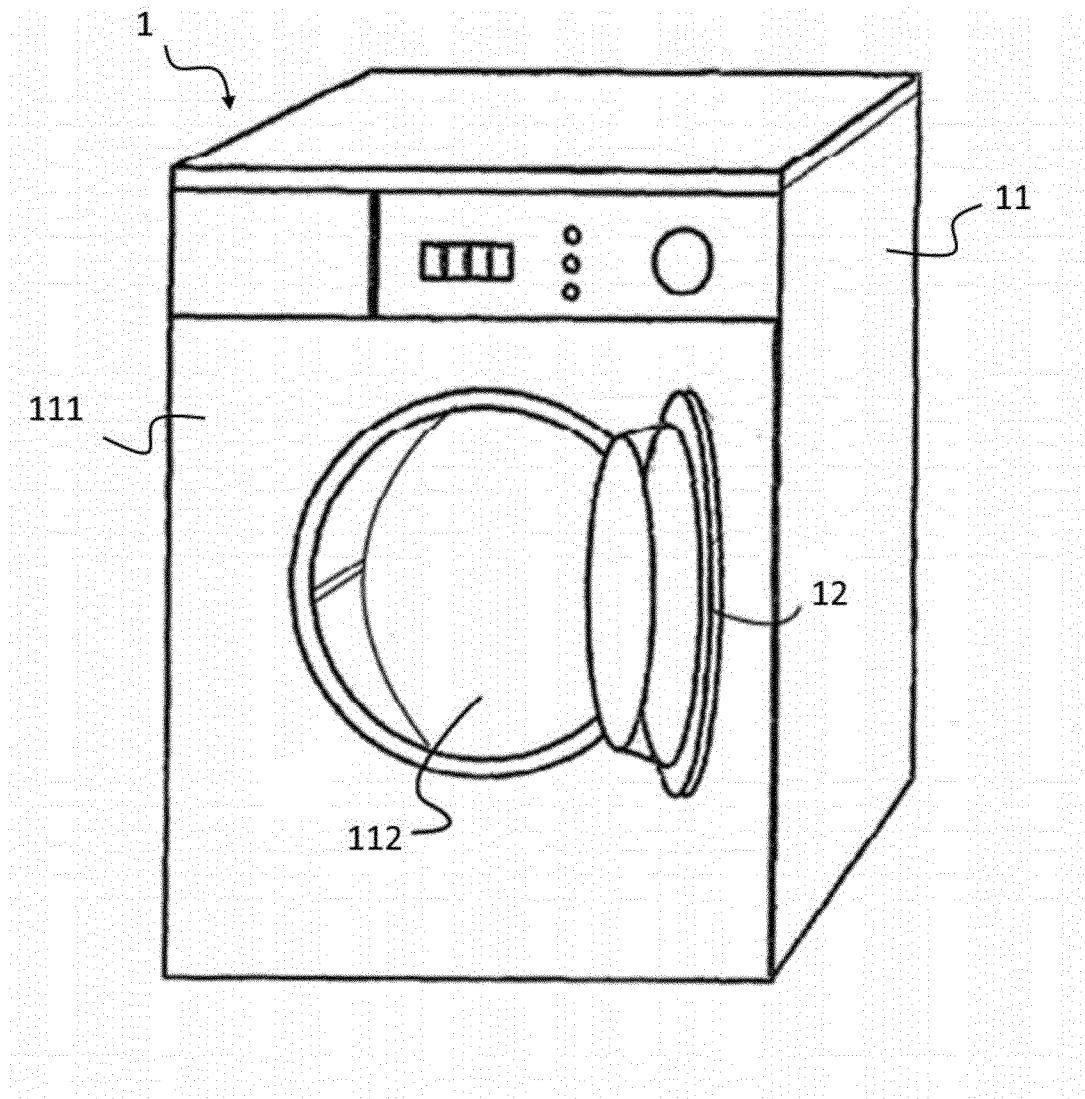


FIG. 1

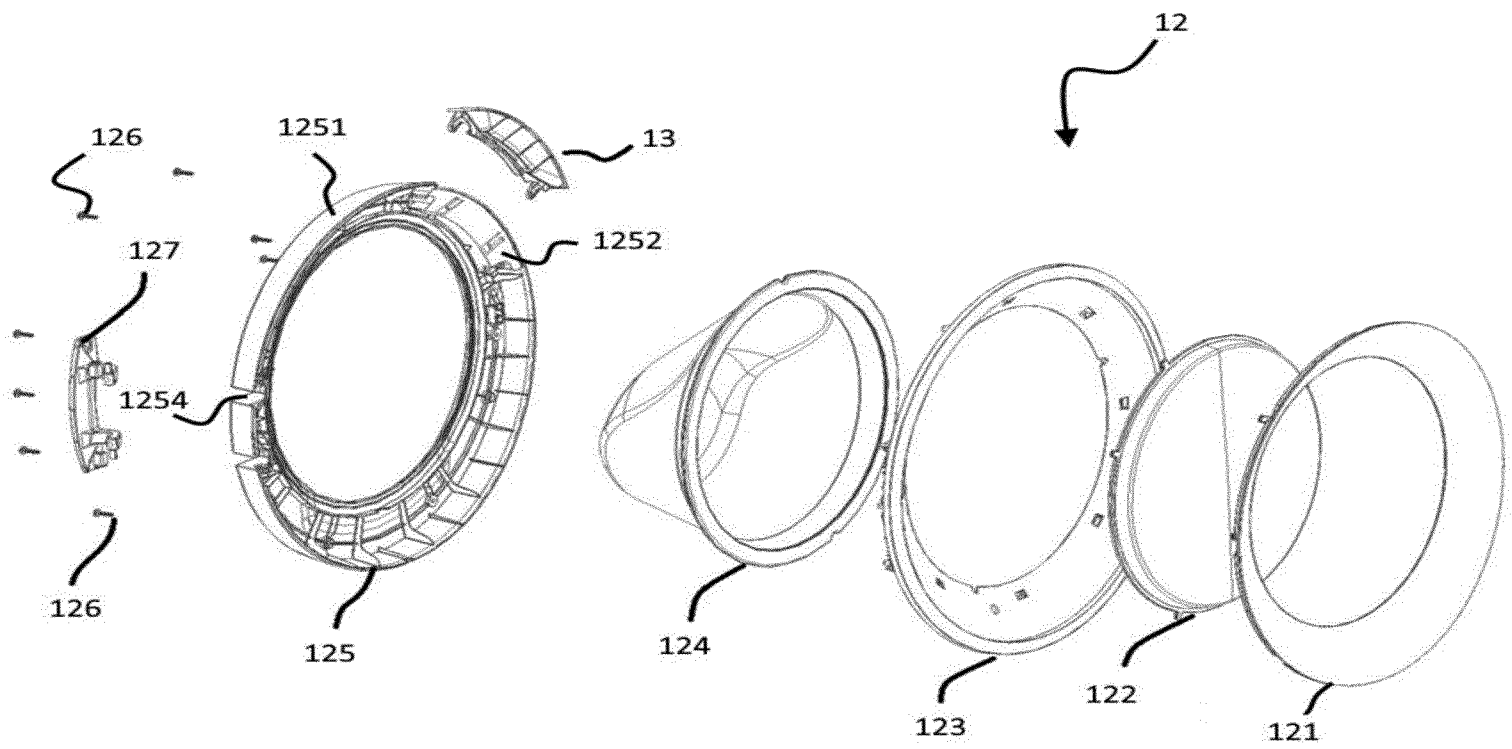


FIG. 2

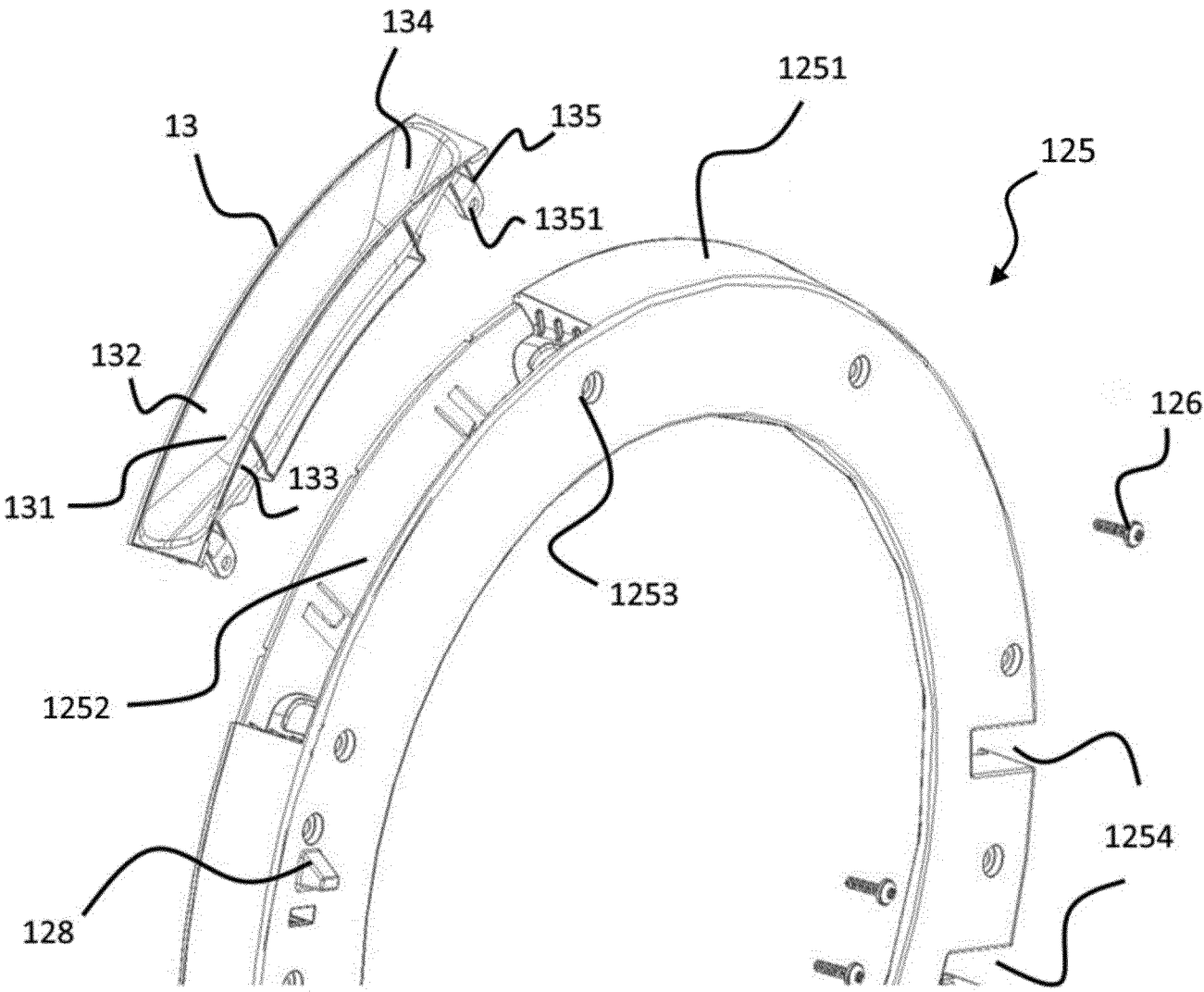


FIG. 3

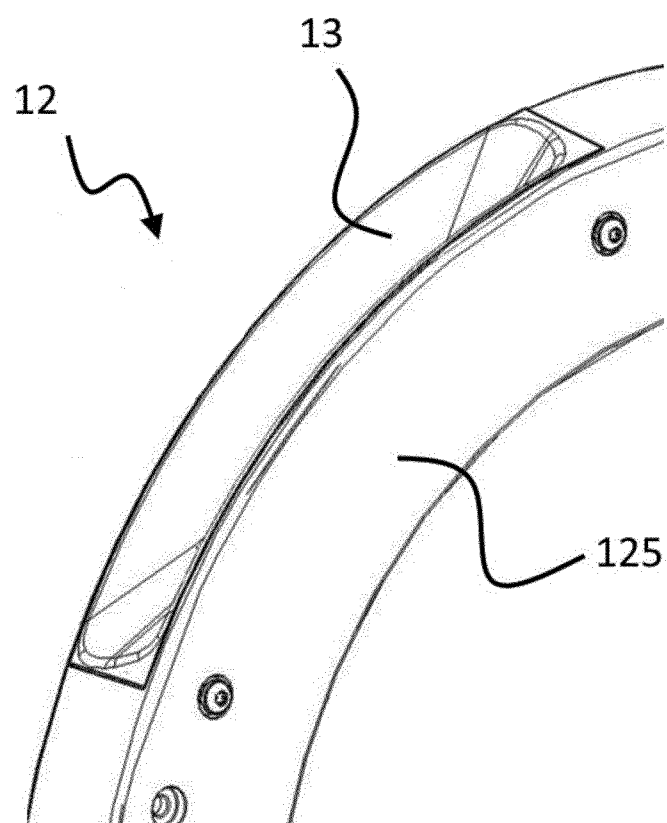


FIG. 4

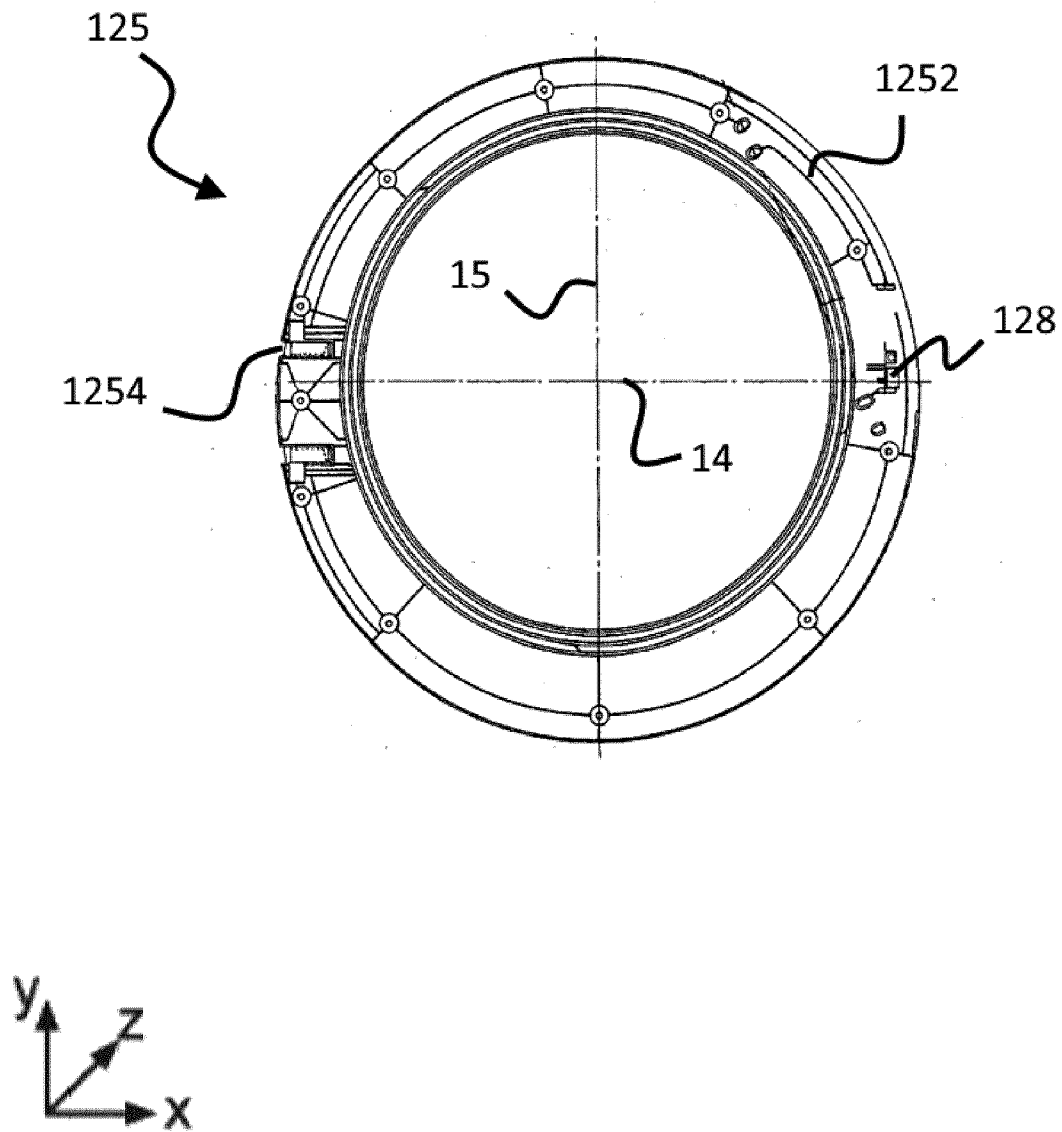


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/067085

A. CLASSIFICATION OF SUBJECT MATTER**INV. D06F39/14****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)

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, WPI Data**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2020/248396 A1 (KWON YONGWOO [KR] ET AL) 6 August 2020 (2020-08-06) paragraph [0031] - paragraph [0033]; figure 1 paragraph [0089] - paragraph [0101]; figures 4-6 paragraph [0108] - paragraph [0109]; figures 7, 8 -----	1-8
A	US 2004/089031 A1 (KIM JONG SEOK [KR] ET AL) 13 May 2004 (2004-05-13) paragraph [0030]; figure 2 paragraph [0033]; figure 4 paragraph [0039] - paragraph [0049]; figures 5, 6 ----- -/--	1-8



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

26 September 2022

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11/10/2022

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2022/067085

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2013/232810 A1 (COXON DAVID JOHN [US] ET AL) 12 September 2013 (2013-09-12) paragraph [0031] - paragraph [0032]; figure 2 paragraph [0048]; figure 5 paragraph [0055] - paragraph [0059]; figures 7, 8 -----	1-8
A	KR 101 147 751 B1 (LG ELECTRONICS INC [KR]) 25 May 2012 (2012-05-25) see annotated machine translation figures 2, 4, 6-8 -----	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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