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(71) Applicant: **Arçelik Anonim Sirketi**
34950 Istanbul (TR)

(72) Inventors:
• **YILDIRIM, SALIH**
34950 ISTANBUL (TR)
• **USTUNER VARDAR, SEVIM**
34950 Istanbul (TR)
• **KARACA, SEMA**
34950 Istanbul (TR)

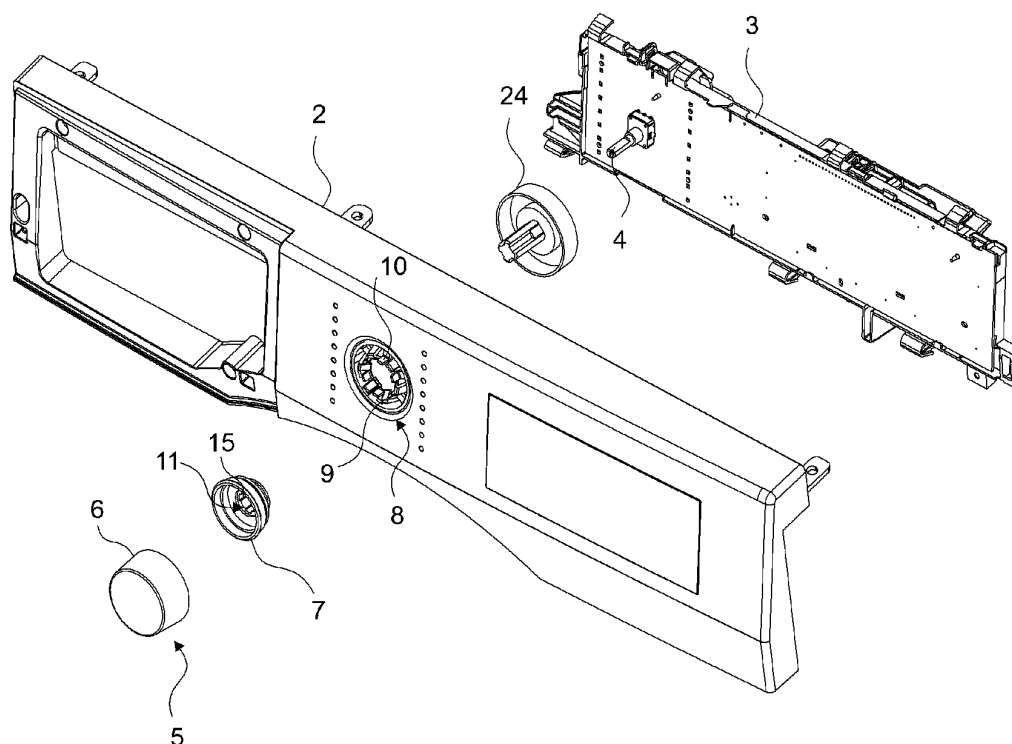
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(54) **A HOUSEHOLD APPLIANCE COMPRISING A KNOB SAFELY MOUNTED ONTO THE PANEL**

(57) The present invention relates to a household appliance (1) comprising a panel (2) enabling the user to monitor and control the functions of the household appliance (1), a control unit (3) disposed behind the panel (2), a shaft (4) that is connected to the control unit (3) and

that enables user preferences to be transmitted to the control unit (3), a knob (5) that actuates the shaft (4), a housing (8) that is disposed on the panel (2) and wherein the knob (5) is placed.

Figure 2



Description

[0001] The present invention relates to a household appliance comprising a knob that is safely mounted onto the panel.

[0002] Household appliances, for example cooking devices, dishwashers and in particular washers/dryers, comprise a panel, a control unit and one or more than one knob that enable the functions thereof to be monitored and controlled by the user. The knobs are directly attached to the shafts that are mechanically fastened to the switches on the control unit behind the panel by means of the housings on the panel or by means of an intermediate piece from the front of the panel. As the knobs are moved, the shafts that are connected to the knobs also move and the functions at predetermined positions depending on the user preferences, for example functions like in which program the laundries should be washed, at which rpm the spin-drying should be performed or at which temperature the wash water should be used, are enabled to be selected.

[0003] In the state of the art, the knobs are mounted on the shaft that is connected to the control unit behind the panel from the front side of the panel for ease of production. In this state of the art embodiment, while the knob is mounted on the panel by means of clawed structures, some tolerances are needed to be taken into consideration in order that the shaft and the knob can be easily borne to each other. Therefore, a gap should be left around the clawed structures. While facilitating the rotation of the knob, these gaps weaken the resistance of the knob against exterior impacts and cause the knob to be operated in a loose manner. In particular this situation causes the user to have an adverse opinion that "the knob is about to fall off".

[0004] In the state of the art European Patent Application No. EP1829071, a household appliance is disclosed, that comprises a knob mounted to the panel.

[0005] In the state of the art British Patent Application No. GB2040396, a control knob is disclosed, that is fixed to the shaft in a safe manner.

[0006] The aim of the present invention is the realization of a household appliance comprising a knob that is easily mounted and safely fixed onto the panel.

[0007] 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 more than one first claw and second claw that are respectively disposed from the wall towards the center, with one applying a force on the knob from inside and the other applying a force on the knob from outside.

[0008] By means of the claws placed into the housing on the panel, the knob is enabled to be mounted to the panel and prevented from being easily detached.

[0009] By means of the present invention, the first claws prevent the knob from being dislodged from the housing by applying a force against the tensile forces acting outwards from the panel. The second claws limit

the movement of the knob by applying a force against the compressive forces acting inwards from the panel. Moreover, since the intermediate piece is squeezed between the first and second claws, the intermediate piece rotates 360 degrees on the said claws. While allowing the knob to be mounted by stretching towards the wall of the housing while the knob is being mounted into the housing, the first claws stretch towards the center of the housing while the knob is tried to be detached, thus preventing the knob from being dislodged from the housing and thus providing an agreement of shape.

[0010] A household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the general front view of the panel of a household appliance.

Figure 2 - is the exploded view of the panel, the control unit, the knob, the intermediate piece and the shaft.

Figure 3 - is the detailed view of the cross-section A in Fig. 1.

Figure 4 - is the view of B cross-section in Figure 1.

[0011] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Panel
3. Control unit
4. Shaft
5. Knob
6. Handle
7. Intermediate piece
8. Housing
9. First claw
10. Second claw
11. Bearing
12. Wall
13. Barrier
14. Recess
15. Guide
16. Protrusion
17. Support
18. Flange
19. Short arm
20. Long arm
21. Bend
22. First arm
23. Second arm
24. Guiding member
25. Abutment

[0012] The household appliance (1), for example the laundry washer/dryer, comprises a panel (2) enabling the user to monitor and control the functions of the household appliance (1), a control unit (3) disposed behind the panel (2), a shaft (4) that is connected to the control unit (3)

and that enables user preferences to be transmitted to the control unit (3), a knob (5) that actuates the shaft (4), an intermediate piece (7) that is disposed between the knob (5) and the shaft (4) and whereon the knob (5) is fixed, a housing (8) that is disposed on the panel (2) and wherein the knob (5) and the intermediate piece (7) are placed, and a first claw and a second claw (9 and 10)

- that are respectively fixed on the wall of the housing (8) so as to surround the housing (8),
- that extends towards the center of the housing (8) in the radial direction,
- with the free ends facing the opposing direction,
- that are successively disposed.

[0013] Figure 1 and Figure 2).

[0014] After the knob (5) and the intermediate piece (7) are mounted to each other, the knob (5) and the intermediate piece (7) are seated into the housing (8). In this situation, when the side wall of the knob (5) bears against the panel (2), the intermediate piece (7) is fixed between the first claw (9) and second claw (10). Thus, while the first claws (9) prevent the intermediate piece (7), hence the knob (5) from being detached from the housing (8) against the tensile forces acting outwards from the panel (2), the forces acting inwards from the panel (2) are met by the second claws (10), thus preventing the knob (5) from being damaged and dislodged from the housing (8).

[0015] The knob (5) comprises a handle (6) that enables the user to hold and actuate the knob (5), at least one wall (12) and at least one barrier (13) that are oppositely disposed on the inner surface of the handle (6), and at least one recess (14) arranged between the wall (12) and the barrier (13). In another embodiment of the present invention, the knob (5) comprises at least one support (17) that is disposed on the inner surface of the handle (6) among the wall (12), the barrier (13) and the recess (14).

[0016] In the preferred embodiment of the present invention, the household appliance (1) comprises a guiding member (24) that is fitted over the shaft (4). The guiding member (24) is mounted freely on the shaft (3) situated on the control unit (3). While the control unit (3) is mounted on the panel (2), the guiding member (24) is fitted over the knob (5) and provides the connection between the knob (5) and the shaft (4).

[0017] The intermediate piece (7) is preferably a cylindrical component and comprises a bearing (11) wherein the shaft (4) or the guiding member (24) mounted on the shaft (4) is supported, a flange (18) surrounding the bearing (11), at least two guides (15) disposed on the inner surface of the bearing (11), extending along the axis of the bearing (11), that prevent the intermediate piece (7) from moving relative to the shaft (4) and to the guiding member (24), and a protrusion (16) that is disposed on the flange (18) and that is seated into the recess (14). The flange (18) has preferably has a stepped structure.

The intermediate piece (7) comprises two abutments (25) that are oppositely disposed on the outer surface of the flange (18), that surround the flange (18) and against one of which the first claw (9) bears and against the other of which the second claw (10) bears when the intermediate piece (7) is seated into the housing (8).

[0018] The first claw (9) is almost L-shaped and comprises a long arm (20) that is fixed to the housing (8) and that extends so as to make an acute angle with the wall of the housing (8), a short arm (19) that is connected to the said long arm (20) so that an acute angle remains therebetween and that extends in a direction opposite to the long arm (20), and a bend (21) that connects the long arm (20) and the short arm (19) (Figure 4).

[0019] The second claw (10) is L-shaped and comprises a first arm (22) that extends from the wall of the housing (8) towards the center in the radial direction and a second arm (23) that extends perpendicularly to the first arm (22) (Figure 3).

[0020] The knob (5) is mounted to the panel (2) in the following manner. First, the intermediate piece (7) is inserted into the knob (5) and is moved until the protrusion (16) reaches the wall (12) at the inner surface of the handle (6). Upon reaching the wall (12), the protrusion (16) stretches and goes over the wall (12) and is seated into the recess (14) so as to bear against the barrier (13). In this case the intermediate piece (7) can no longer move forward in the knob (5) and the intermediate piece (7) is fixed to the knob (5). The supports (17) serve for the function of centering between the knob (5) and the intermediate piece (7). The intermediate piece (7) and the knob (5) connected to each other are inserted into the housing (8) on the panel (2). During this process, the first abutment (25) that is not completely surrounded by the handle (6), that is disposed on the flange (18) of the intermediate piece (7) and that passes through the housing (8) stretches the first claws (9), which partially cover the housing (8), towards the wall of the housing (8) and passes through the housing (8). The short and long arms (19 and 20) of the first claw (9) easily stretch thanks to the acute angle therebetween. As a result of this movement, while the end of the short arm (19) of the first claw (9) bears against the abutment (25) passing through the housing (8), the bend (21), which connects the short and long arms (19 and 20), and the second arms (23) of the second claws (10) bear against the other abutment (25). Thus, the intermediate piece (7) is squeezed between the first claw (9) and the second claw (10) in opposite directions. Then, the guiding member (24) is fitted over the shaft (4) and mounted onto the intermediate piece (7) and the knob (5) seated into the housing (8) from behind the panel (2).

[0021] The panel (2) comprises a circular groove (19) that surrounds the housing (8) all around and a circular protrusion (16) disposed on the said groove (19). In the preferred embodiment of the present invention, the free end (21) of the claw (10) of the intermediate piece (7) bearing against the panel (2) is seated on the said pro-

trusion (16).

Claims

1. A household appliance (1) comprising a panel (2) enabling the user to monitor and control the functions of the household appliance (1), a control unit (3) disposed behind the panel (2), a shaft (4) that is connected to the control unit (3) and that enables user preferences to be transmitted to the control unit (3), a knob (5) that actuates the shaft (4), an intermediate piece (7) that is disposed between the knob (5) and the shaft (4) and whereon the knob (5) is fixed, a housing (8) that is disposed on the panel (2) and wherein the knob (5) and the intermediate piece (7) are placed, **characterized by** a first claw and a second claw (9 and 10)

- that are respectively fixed on the wall of the housing (8) so as to surround the housing (8),
- that extends towards the center of the housing (8) in the radial direction,
- with the free ends facing the opposing direction,
- that are successively disposed.

2. A household appliance (1) as in Claim 1, **characterized by** the knob (5) comprising a handle (6) that enables the user to hold and actuate the knob (5), at least one wall (12) and at least one barrier (13) that are oppositely disposed on the inner surface of the handle (6), and at least one recess (14) arranged between the wall (12) and the barrier (13).

3. A household appliance (1) as in Claim 2, **characterized by** the knob (5) comprising at least one support (17) that is disposed on the inner surface of the handle (6) among the wall (12), the barrier (13) and the recess (14).

4. A household appliance (1) as in Claim 1, **characterized by** the intermediate piece (7) comprising a bearing (11) wherein the shaft (4) is supported, a flange (18) surrounding the bearing (11), at least two guides (15) disposed on the inner surface of the bearing (11), extending along the axis of the bearing (11), that prevent the intermediate piece (7) from moving relative to the shaft (4), and a protrusion (16) that is disposed on the flange (18) and that is seated into the recess (14).

5. A household appliance (1) as in Claim 4, **characterized by** the intermediate piece (7) comprising two abutments (25) that are oppositely disposed on the outer surface of the flange (18), that surround the flange (18) and against one of which the first claw (9) bears and against the other of which the second

claw (10) bears when the intermediate piece (7) is seated into the housing (8).

6. A household appliance (1) as in any one of the above claims, **characterized by** the L-shaped first claw (9) comprising a long arm (20) that is fixed to the housing (8) and that extends so as to make an acute angle with the wall of the housing (8), a short arm (19) that is connected to the said long arm (20) so that an acute angle remains therebetween and that extends in a direction opposite to the long arm (20), and a bend (21) that connects the long arm (20) and the short arm (19).

7. A household appliance (1) as in Claim 1, **characterized by** the L-shaped second claw (10) comprising a first arm (22) that extends from the wall of the housing (8) towards the center in the radial direction and a second arm (23) that extends perpendicularly to the first arm (22).

8. A household appliance (1) as in Claim 1, **characterized by** the intermediate piece (7) that is squeezed between the first claw (9) and the second claw (10) in opposite directions.

9. A household appliance (1) as in Claim 1, **characterized by** a guiding member (24) that is fitted over the shaft (4).

Figure 1

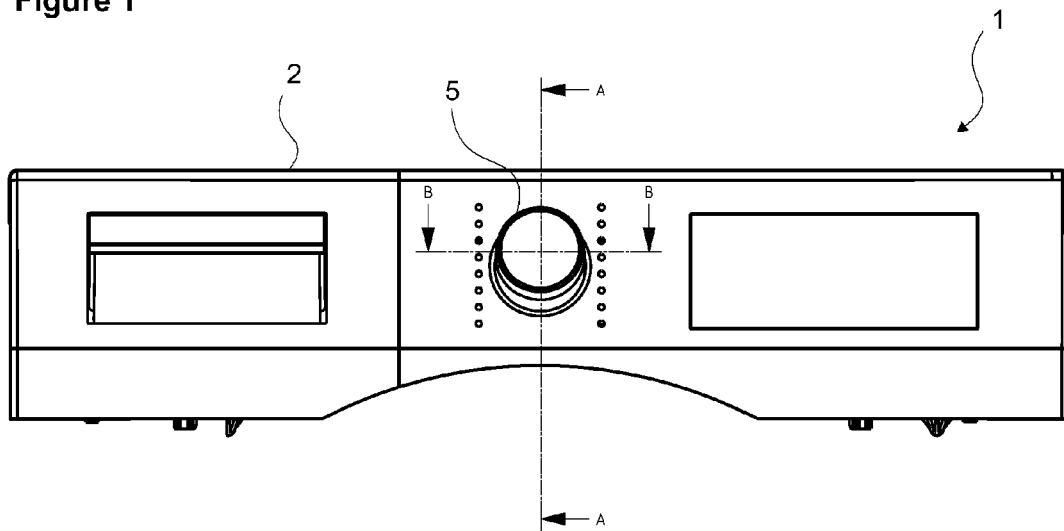


Figure 2

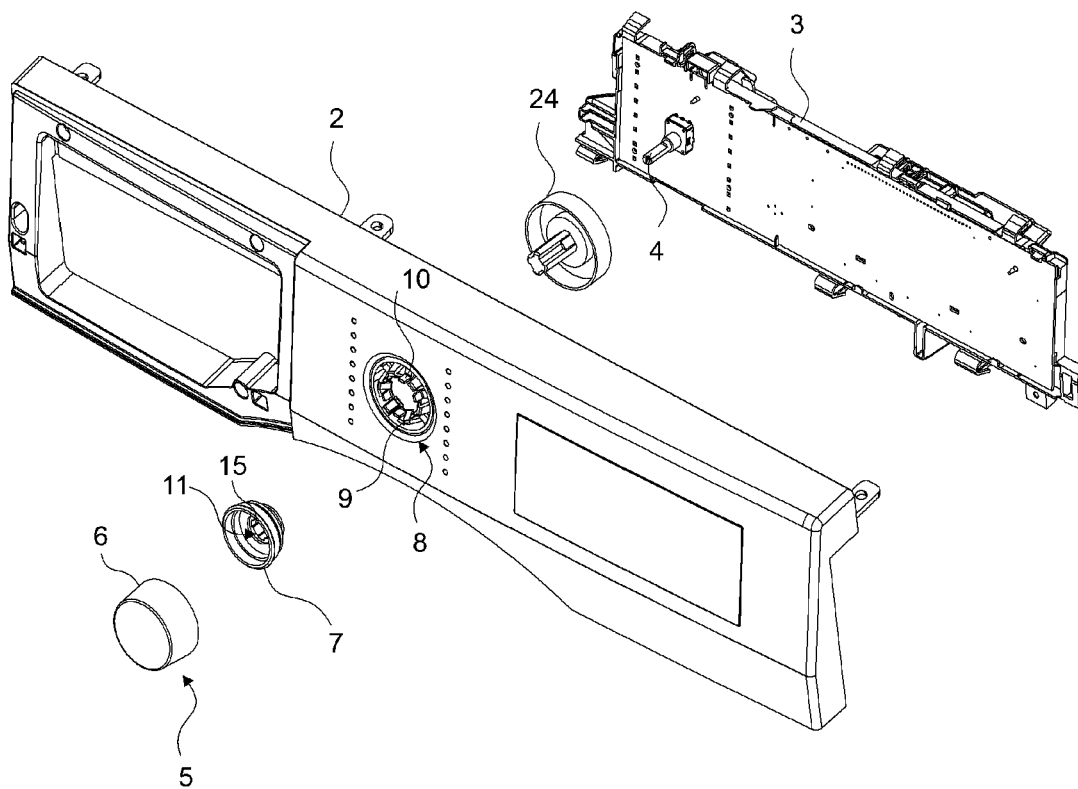


Figure 3

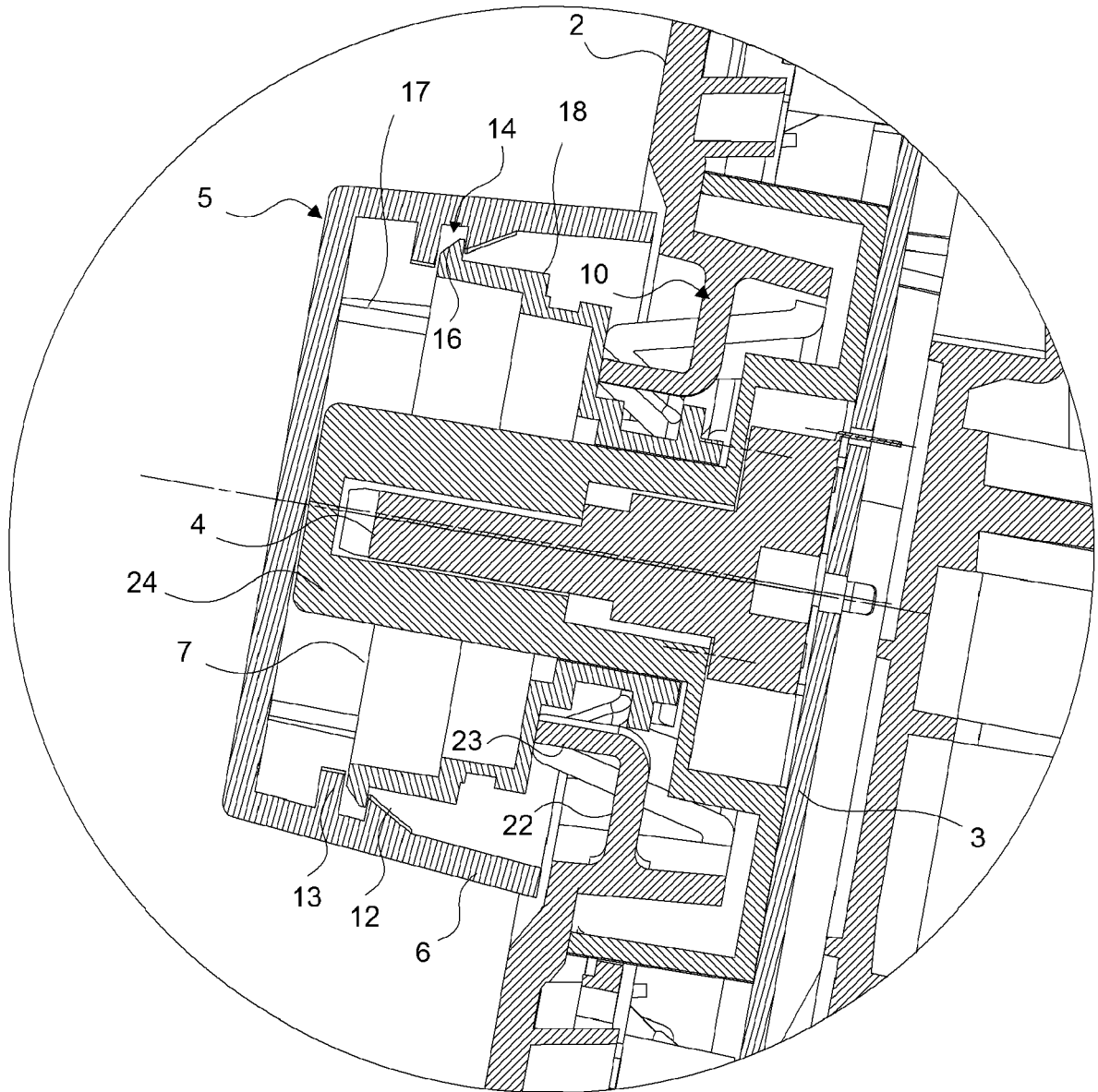
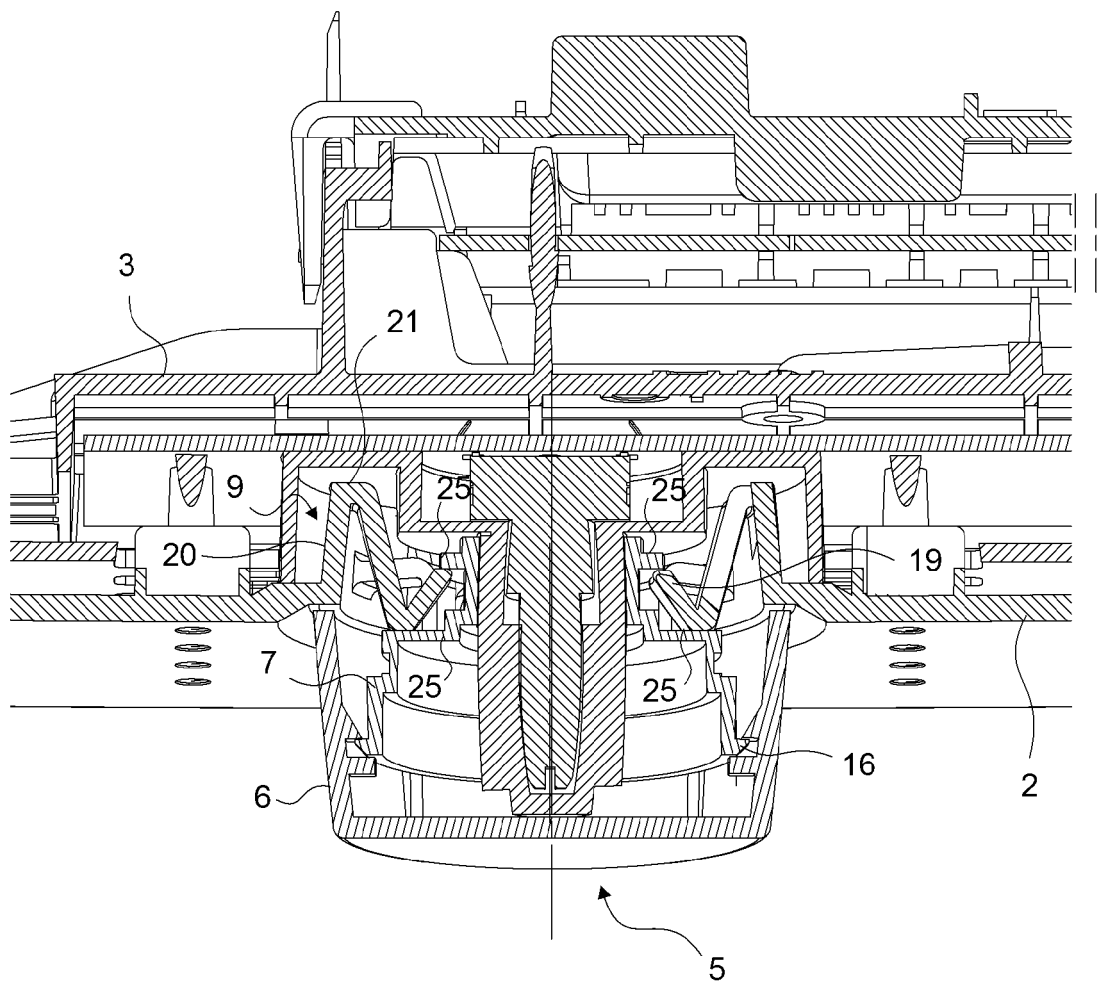


Figure 4





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 EP 16 18 4733

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Place of search Munich		Date of completion of the search 24 November 2016	Examiner Bilard, Stéphane
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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