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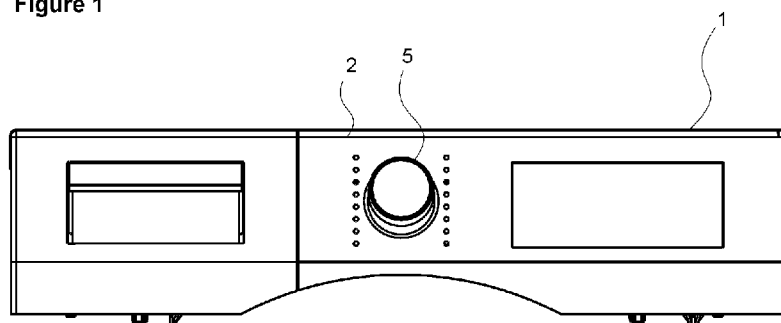
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(54) Title: A HOUSEHOLD APPLIANCE COMPRISING A KNOB SAFELY MOUNTED ONTO THE PANEL

Figure 1



(57) Abstract: 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 (6) that is disposed on the panel (2) and wherein the knob (5) is placed, and an insert (8) and a handle (7) that are fixed to each other so that the panel (2) remains therebetween.



Description**A HOUSEHOLD APPLIANCE COMPRISING A KNOB SAFELY MOUNTED ONTO THE PANEL**

- [0001] The present invention relates to a household appliance comprising a knob that is safely mounted to 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 insert 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 so 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. According to the international standards, the knob should pass the impact test, therefore, it should be ensured that the knob does not dislodge due to the impact imparted.
- [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 a shaft that is borne by both an insert and a handle and that is mechanically connected to a control unit. Since the shaft fixes/locks the insert and the handle to each other, the insert and the handle cannot be separated without dislodging the shaft.
- [0008] A first bearing and a second bearing that are configured so as to allow the shaft to pass therethrough are provided, and the shaft is configured so as not to rotate in both bearings independently of the bearings.
- [0009] The insert and the handle are attached to each other so that the panel remains therebetween, as locking claws and locking protrusions engage with each other. When the insert and the handle are fixed to each other, the first bearing and the second bearing are positioned to be end to end and allow the shaft to pass therethrough. After passing through the bearings, the shaft prevents the insert and the handle from moving relative to each other.
- [0010] In the present invention, the shaft provides that the components interlock in an undetachable manner. The knob cannot be detached from the household appliance unless the shaft is dislodged from inside the knob.
- [0011] By means of the present invention, the dislodging of the knob under a load is prevented and both the perceptive quality is improved and the safety risk is eliminated.
- [0012] A household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures where
- [0013] Figure 1 - is the general front view of the panel of a household appliance.
- [0014] Figure 2 – is the exploded cross-sectional view of the panel, the control unit, the shaft, the knob, the insert and the handle.
- [0015] Figure 3 – is the front view of the insert and the handle when attached to each other.

- [0016] Figure 4 – is the view of the cross-section A– A in Figure 3.
- [0017] Figure 5 – is the perspective view of the handle.
- [0018] Figure 6 – is the perspective view of the insert.
- [0019] Figure 7 – is the cross-sectional view of the insert and the handle that are fixed on the panel.
- [0020] Figure 8 – is the cross-sectional view of the insert, the handle and the shaft that are fixed on the panel.
- [0021] Figure 9 – is the front view of the handle when seated onto the insert.
- [0022] Figure 10 – is the front view of the insert and the handle when attached to each other.
- [0023] The elements illustrated in the figures are numbered as follows:
1. Household appliance
 2. Panel
 3. Control unit
 4. Shaft
 5. Knob
 6. Housing
 7. Handle
 8. Insert
 9. First bearing
 10. Second bearing
 11. Locking claw
 12. Locking protrusion
 13. Base
 14. Arm
 15. Protrusion
 16. First inclined surface
 17. Second inclined surface
 18. Recess
 19. Barrier
 20. Stopper
 21. Skirt
 22. Decorative element

[0024] The household appliance (1) 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); a handle (7) that is disposed on the knob (5); a housing (6) that is disposed on the panel (2) and wherein the knob (5) is placed,

- an insert (8) and a handle (7) that are attached to each other so that the panel (2) remains therebetween;
- a first bearing (9) that is disposed on the insert (8), that is shorter than the shaft (4) and wherein the shaft (4) is borne, and
- a second bearing (10) that is disposed on the handle (7), that is positioned in the same axis as the first bearing (9) by abutting the first bearing (9) when the insert (8) and the handle (7) are attached to each other, and wherein the part of the shaft (4) remaining outside the first bearing (9) is borne

[0025] (Figure 1, Figure 2).

[0026] The knob (5) is mounted to the household appliance (1) in the following manner. First, the insert (8) is inserted into the housing (6) from behind the panel (2) and then, the handle (7) is pushed from the front of the panel (2) towards the part of the insert (8) projecting out of the housing (6) and the insert (8) and the handle (7) are mounted to each other so that the panel (2) remains therebetween. After the assembly, the insert (8) and the handle (7) are attached to each other by being rotated around the bearing axis. In this case, the first bearing (9) and the second bearing (10) complement each other (Figure 3 and Figure 4). The shaft (4) is borne by being passed through the first bearing (9) and the second bearing (10). The second bearing (10) both bears the free end of the shaft (4) and surrounds the end thereof. By means of the shaft, the knob (5) cannot be dislodged from the panel without displacing the shaft (4) and the assembly of the knob (5) to the household appliance (1) is completed.

[0027] The household appliance (1) comprises one or more than one locking claw (11) that is disposed on the insert (8) and that passes through the housing

(6) when the insert (8) is fitted into the housing (6), and one or more than locking protrusion (12) that is disposed on the face of the handle (7) facing the panel (2) and with which the locking claws (11) engage. When the handle (7) and the insert (8) engage with each other so that the panel (2) remains therebetween, the handle (7) and the insert (8) are rotated around the bearing axis. By means of the this rotational movement, the locking claws (11) on the insert (8) engage with the locking protrusion (12) on the handle (7) and thus the insert (8) and the handle (7) are attached to each other so that the panel (2) remains therebetween.

[0028] The shaft (4) is not a full cylinder but in the form of a circle of which the cross-section is delimited by the diameter or the chord. The first bearing (9) and the second bearing (10) have forms corresponding to the form of the shaft (4). When the locking claws (11) are fully seated onto the locking protrusion (12) by rotating the insert (8) and the handle (7), the first bearing (9) and the second bearing (10) complement each other so as to allow the shaft (4) to pass through both bearings (9, 10). In this case, when the shaft (4) is passed through the first and second bearings (9, 10) to be borne, the first bearing (9) and the second bearing (10) prevent the shaft (4) from rotating therein, thus the shaft (4) does not allow the insert (8) and the handle (7) to rotate relative to each other, hence does not allow the insert (8) and the handle (7) to move in opposite directions so as to be separated from each other.

[0029] The household appliance (1) comprises a base (13) on the insert (8), that has a hole through which the shaft (4) passes, and at least two locking claws (11) that extend from the edge of the base (13) perpendicularly to the base (13) and that surround the first bearing (9), the length of the locking claws (11) being greater than the length of the first bearing (9). The first bearing (9) is located on a platform parallel to the base (13) while the first bearing (9) and the hole are coaxial.

[0030] The household appliance (1) furthermore comprises an arm (14) that is disposed on the locking claw (11), that is almost L-shaped and that bears against the locking protrusion (12) when the insert (8) and the handle (7) are attached to each other, and a protrusion (15) that is disposed at the

end of the arm (14). In this embodiment of the present invention, the household appliance (1) comprises a first inclined surface (16) and a recess (18) that are disposed on the locking claw (11) and that extend between the base (13) and the arm (14) (Figure 6).

[0031] The household appliance (1) furthermore comprises a skirt (21) that is disposed on the handle (7) and that surrounds the second bearing (10) located at the center of the handle (7). The household appliance (1) comprises a barrier (19) that is disposed on the locking protrusion (12) and that enters the recess (18) on the locking claw (11); a second inclined surface (17) that overlaps with the first inclined surface (16) on the locking claw (11), and a stopper (20) that goes over the protrusion (15) on the arm (14) and bears against the arm (14) (Figure 5).

[0032] In the preferred embodiment of the present invention, the first inclined surface (16) and the second inclined surface (17) are inclined at the same angle. Thus, the first and second inclined surfaces (16 and 17) are seated onto each other in a flush manner. In this case, the insert (8) and the handle (7) cannot separate from each other without making a linear movement.

[0033] In detail, the knob (5) is mounted to the household appliance (1) in the following manner. First, the insert (8) is inserted into the housing (6) from behind the panel (2). The insert (8) is moved inside the housing (6) until the base (13) bears against the rear wall of the panel (2) and the insert (8) is fixed onto the panel (2) such that the insert (8) can move only radially. In this case, the base (13) remains behind the panel (2) and the locking claws (11) are partially at the front side of the panel (2). Then, the handle (7) is placed onto the insert (8) from the front of the panel (2). The locking claws (11) pass over the locking protrusions (12) and thus the handle (7) is seated onto the insert (8). In this case, the first bearing (9) and the second bearing (10) abut to each other; however, both bearings (9, 10) does not fully overlap although the said components are coaxial. The chord of the first bearing (9) and the chord of the second bearing (10) are positioned so as to create an angle therebetween, thus preventing the shaft (4) from passing to the second bearing (10) from the first bearing (9) (Figure 9).

Since the first bearing (9) and the second bearing (10) do not overlap in this position, if the shaft (4) is inserted, the shaft (4) cannot be fully inserted into the first and second bearings (9 and 10) and be borne. In order to fix the handle (7) onto the insert (8), the insert (8) and the handle (7) are rotated around the horizontal axis, thus enabling the locking claw (11) to be fully seated onto the locking protrusion (12). When the handle (7) is rotated, the locking protrusion (12) moves until the barrier (19) bears against the recess (18) on the locking claw (11). When the barrier (19) bears against the recess (18), the first inclined surface (16) and the second inclined surface (17) bear against each other and the protrusion (15) goes over the stopper (20) and bears against the stopper (20). The locking claw (11) and the locking protrusion (12) prevent the insert (8) and the handle (7) from moving perpendicularly to the panel (2). When the insert (8) and the handle (7) are fixed to each other, the first bearing (9) and the second bearing (10) are aligned in an axial and end-to-end manner so as to allow the shaft (4) to pass therethrough. In this case, the first bearing (9) and the second bearing (10) complement each other (Figure 10). The shaft (4) is borne by being smoothly passed through the first bearing (9) and the second bearing (10) and the assembly of the knob (5) onto the household appliance (1) is completed. The knob (5) is mounted on the part of the insert (8) that passes through the housing (6) to the front side of the panel (2) and the assembly of the knob (5) on the insert (8), hence on the panel (2) of the household appliance (1) is completed. By the shaft (4) being borne by both the first bearing (9) on the insert (8) and the second bearing (10) on the handle (7), the strength of the knob (5) against outer forces is improved (Figure 7 and Figure 8).

[0034] By being passed through the first and second bearings (9, 10) respectively disposed on the insert (8) and the handle (7), the shaft (4) prevents the insert (8) and the handle (7) from rotating. Thus, the insert (8) and the handle (7) are prevented from rotating in opposite directions and being separated from each other. The shaft (4) borne by the first and second bearings (9 and 10) enables the insert (8) and the handle (7) to be locked to each other in an undetachable manner. The knob (5) cannot be

detached from the panel (2) unless the shaft (4) is dislodged from the bearings (9 and 10).

[0035] In an embodiment of the present invention, the household appliance (1) comprises a decorative element (22) mounted on the knob (5). The decorative element (22) can be produced as a single piece with the knob (5) or can be produced separately. In the case being produced separately, the decorative element (22) is mounted on the knob (5) by using various mechanical methods.

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); a handle (7) that is disposed on the knob (5); a housing (6) that is disposed on the panel (2) and wherein the knob (5) is placed, **characterized by**
 - an insert (8) and a handle (7) that are attached to each other so that the panel (2) remains therebetween;
 - a first bearing (9) that is disposed on the insert (8), that is shorter than the shaft (4) and wherein the shaft (4) is borne, and
 - a second bearing (10) that is disposed on the handle (7), that is positioned in the same axis as the first bearing (9) by abutting the first bearing (9) when the insert (8) and the handle (7) are attached to each other, and wherein the part of the shaft (4) remaining outside the first bearing (9) is borne.
2. A household appliance (1) as in Claim 1, **characterized by** the second bearing (10) that bears and surrounds the free end of the shaft (4).
3. A household appliance (1) as in Claim 1, **characterized by** one or more than one locking claw (11) that is disposed on the insert (8) and that passes through the housing (6) when the insert (8) is fitted into the housing (6), and one or more than locking protrusion (12) that is disposed on the face of the handle (7) facing the panel (2) and with which the locking claws (11) engage.
4. A household appliance (1) as in Claim 1, **characterized by** the shaft (4) in the form of a circle of which the cross-section is delimited by the diameter or the chord.
5. A household appliance (1) as in Claim 3, **characterized by** a base (13) on the insert (8), that has a hole through which the shaft (4) passes, and at least two locking claws (11) that extend from the edge of the base (13) perpendicularly to the base (13) and that surround the first bearing (9), the length of the locking claws (11) being greater than the length of the first bearing (9).
6. A household appliance (1) as in Claim 3 or Claim 5, **characterized by** an arm (14) that is disposed on the locking claw (11) and that bears against the

locking protrusion (12) when the insert (8) and the handle (7) are attached to each other, and a protrusion (15) that is disposed at the end of the arm (14).

7. A household appliance (1) as in Claim 6, **characterized by** a first inclined surface (16) and a recess (18) that are disposed on the locking claw (11) and that extend between the base (13) and the arm (14).
8. A household appliance (1) as in Claim 3, **characterized by** a skirt (21) that is disposed on the handle (7) and that surrounds the second bearing (10) located at the center of the handle (7) and has locking protrusion (12) on its inner surface.
9. A household appliance (1) as in Claim 7, **characterized by** a barrier (19) that is disposed on the locking protrusion (12) and that enters the recess (18) on the locking claw (11); a second inclined surface (17) that overlaps with the first inclined surface (16) on the locking claw (11), and a stopper (20) that goes over the protrusion (15) on the arm (14) and bears against the arm (14).

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Figure 1

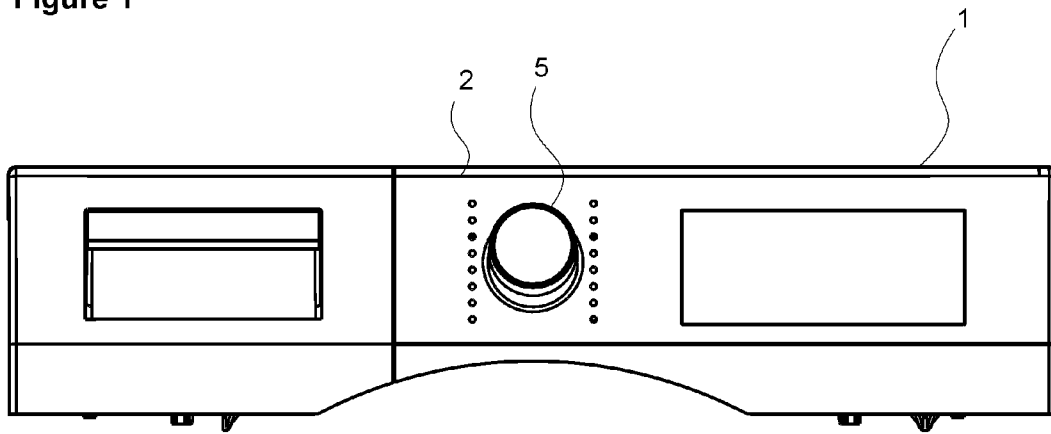


Figure 2

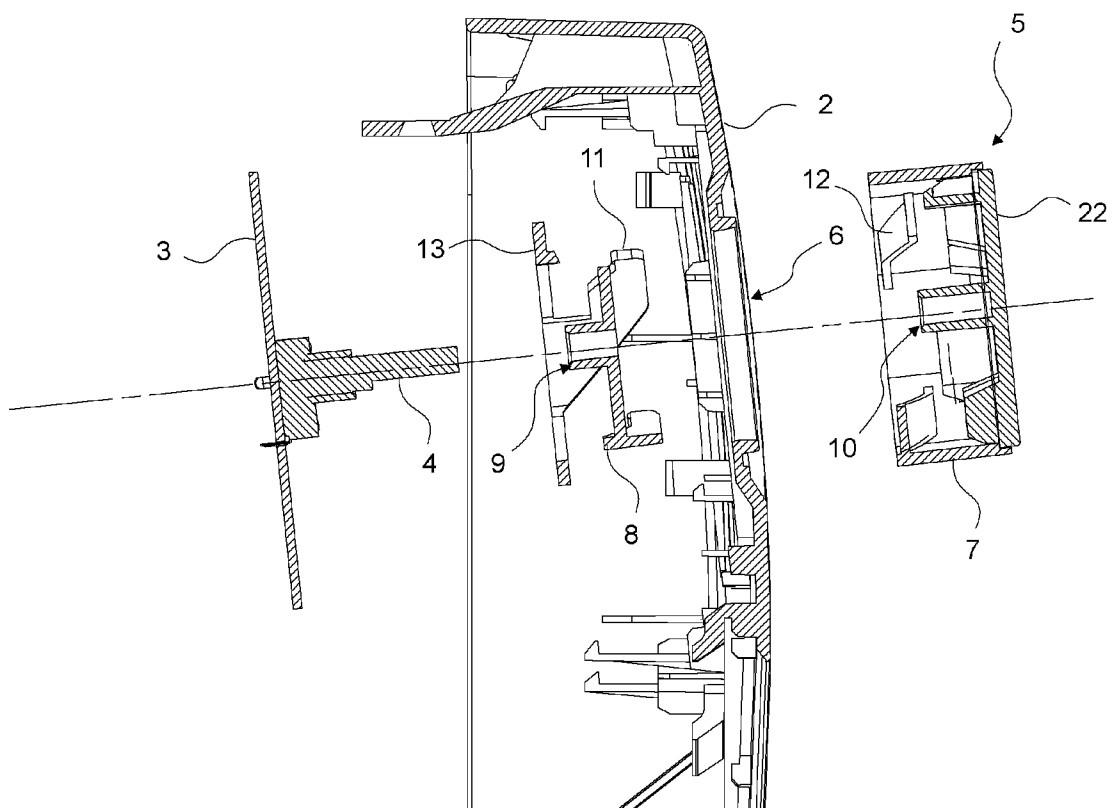


Figure 3

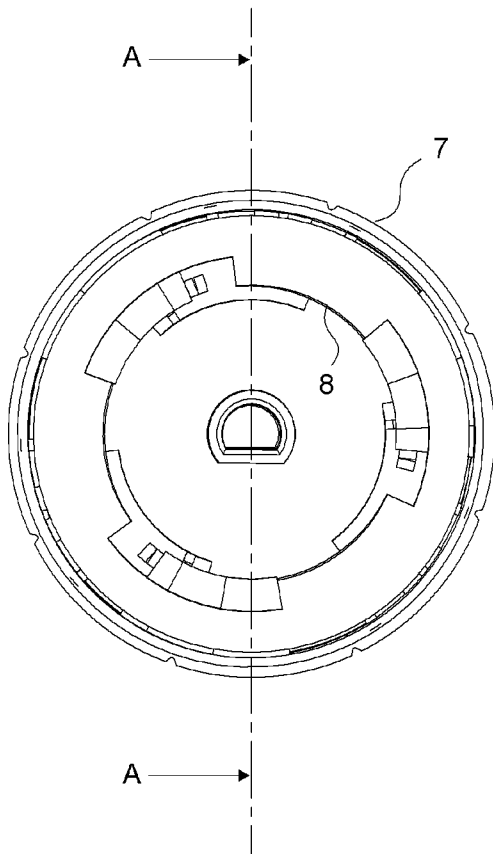


Figure 4

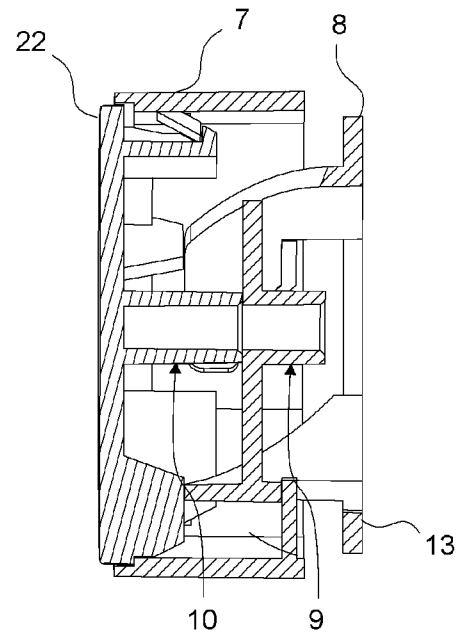


Figure 5

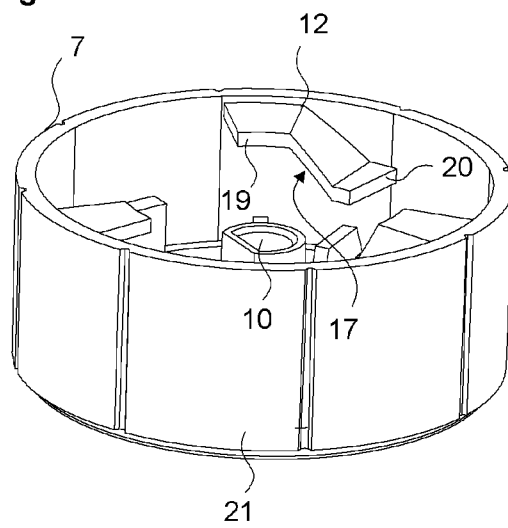


Figure 6

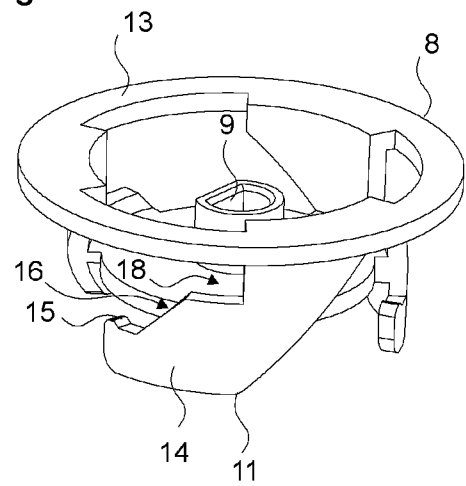


Figure 7

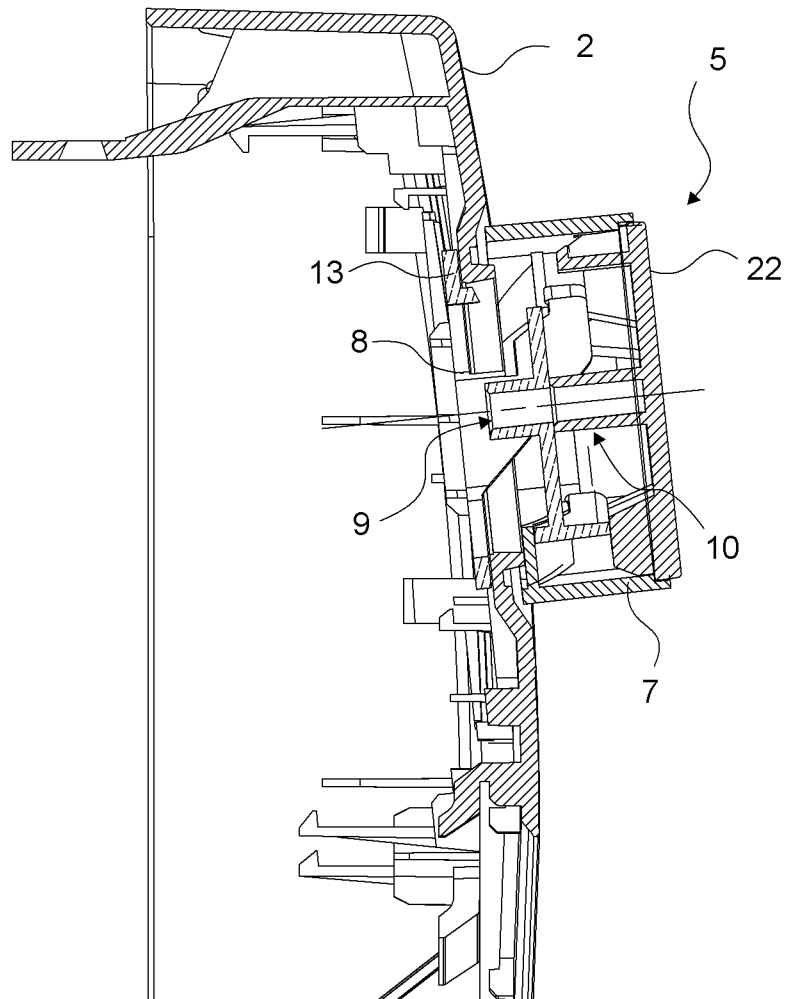


Figure 8

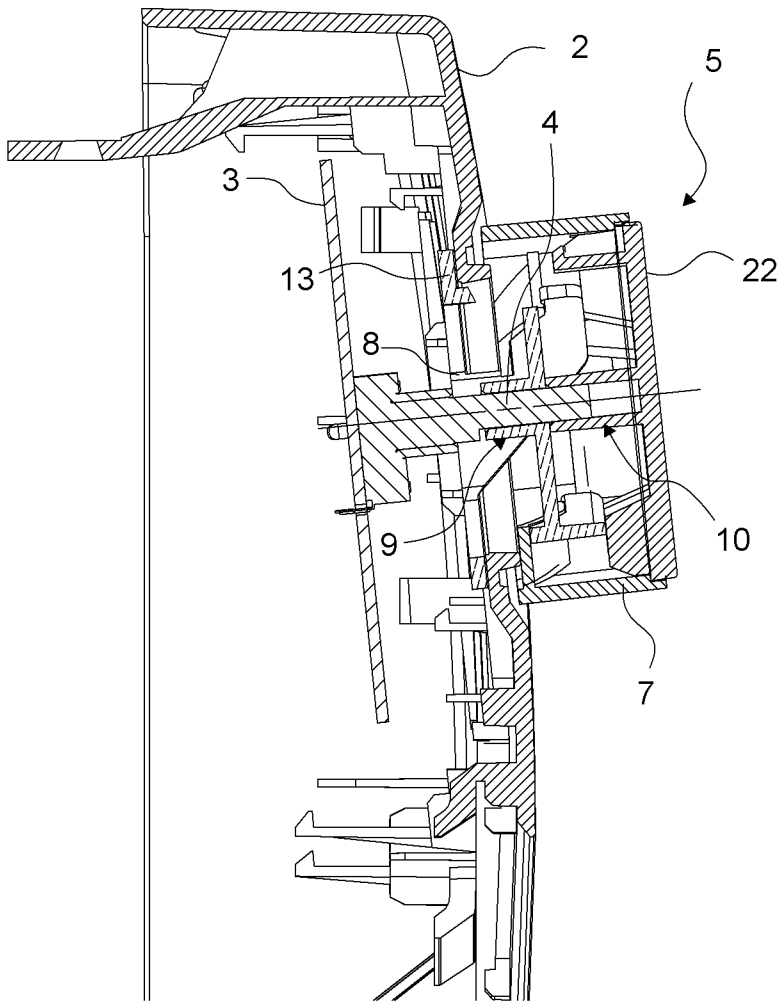


Figure 9

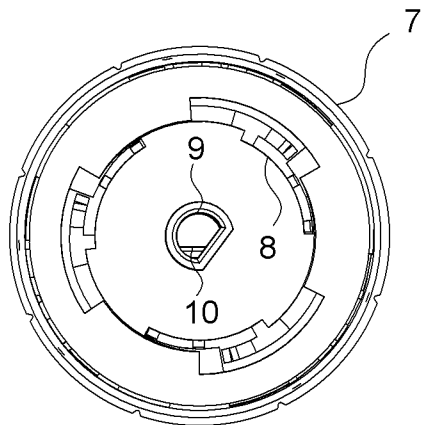


Figure 10

