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(54) HOUSEHOLD APPLIANCE WITH TURN KNOB

HAUSHALTSGERÄT

APPAREIL ÉLECTROMÉNAGER

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EP 2 764 524 B1

Description

[0001] The present invention relates to a household appliance comprising at least one knob which is located on the panel.

[0002] In household appliances, knobs are used, that are generally located on the panel at the front side of the household appliance and that enable the selection of program parameters. With the knob being rotated around itself, the desired program parameter is selected. The circuit board connected to the knob provides the execution of the selected program. While the knob is being rotated, the user has to be informed that the desired program parameter is selected. In order to enable the user to sense that he/she is making the desired selection, knobs with springs are used, that have mechanisms stretching by themselves. These knobs have complicated structures and increase the cost of the household appliance. Moreover, having structures composed of many components, the montage of these knobs may cause difficulties, increasing labor time.

[0003] In the state of the art European Patent No. EP1333458B1, a multistage rotary knob is described, comprising an axle part whereto the spindle transmitting the rotational movement to the electronic control unit is connected and an intermediary panel that is disposed between the spindle and the knob and whereon the stages corresponding to the parameter selected by the knob are situated.

[0004] A household appliance comprising the features of the preamble of claim 1 is disclosed in DE 10 2005 039162 B3.

[0005] The aim of the present invention is the realization of a household appliance comprising a knob, of which the production cost is decreased.

[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 a knob disposed on the panel, providing the user to select various program parameters and a circuit board that detects the selected program parameter. The household appliance furthermore comprises a holder disposed at the inner face of the panel, with the knob being mounted to the front side and the circuit board being mounted to the rear side and wherein the free end of said shaft is passed through the holder to be connected to the circuit board, wherein a bearing is located almost at the center of the holder, through which the shaft is passed. By means of the shaft being integrated with the knob, the shaft is provided to be supported by the knob and no additional component is needed for supporting the shaft. Thus, the production cost of the household appliance is decreased.

[0007] In an embodiment of the present invention, the shaft is produced with the knob as a single piece. Thus, an integrated rigid knob-shaft structure is obtained.

[0008] In another embodiment of the present invention, the shaft and the knob are produced separately and fastened to each other by plastic welding. The shaft and the knob cannot be separated from each other without causing damage.

[0009] In another embodiment of the present invention, more than one stage is present on the knob, positioned so as to correspond to each program parameter predetermined by the producer. With the knob being rotated, the stages pass over the protrusions on the holder, thus enabling the user to sense that he/she selects the desired program parameter.

[0010] In another embodiment of the present invention, the knob comprises a body that is passed through the opening arranged on the panel to remain at the front face of the panel and that is used for selecting program parameters by being rotated, and a skirt that surrounds the body and that extends from the body towards the rear face of the panel. One face of the skirt bears against the rear face of the panel and the other against the front face of the holder.

[0011] In another embodiment of the present invention, the stages are arranged on the skirt.

[0012] In another embodiment of the present invention, the shaft is passed through a bearing disposed almost at the center of the holder and is connected to the circuit board.

[0013] In another embodiment of the present invention, when the shaft is passed through the bearing, the skirt bears against the front face of the holder.

[0014] In another embodiment of the present invention, more than one foot is arranged on the holder, providing the holder to be guided onto the panel. Thus, the position of the holder on the panel is easily determined.

[0015] In another embodiment of the present invention, more than one fixing hole is arranged on the holder, providing the holder to be fastened onto the panel.

[0016] In different embodiments of the present invention, the household appliance is a dishwasher, a washing machine or an oven.

[0017] By means of the present invention, the production cost of the knob is decreased by producing the shaft that transmits the movement of the knob to the circuit board, in an integrated structure.

[0018] The household appliance realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the perspective view of a household appliance.

Figure 2 - is the perspective view of a panel.

Figure 3 - is the perspective view of a panel from a different angle.

Figure 4 - is the perspective view of a panel, a knob, a holder and a circuit board.

Figure 5 - is the perspective view of a panel, a knob, a holder and a circuit board from another angle.

Figure 6 - is the perspective view of a knob and a shaft.

Figure 7 - is the perspective view of a holder.

Figure 8 - is the perspective view of a holder from a different angle.

[0019] The elements illustrated in the figures are numbered as follows:

1. Household appliance
2. Panel
3. Knob
4. Body
5. Circuit board
6. Holder
7. Shaft
8. Bearing
9. Skirt
10. Stage
11. Protrusion
12. Foot
13. Fixing hole
14. Opening

[0020] The household appliance (1) comprises a panel (2), a knob (3) that is disposed on the panel (2) and that provides various program parameters to be selected by being rotated by the user and a circuit board (5) that detects the program parameters selected by the user by means of the knob (3) and that is placed behind the panel (2) in alignment with the knob (3).

[0021] The household appliance (1) furthermore comprises

- a holder (6) that is fastened to the inner face of the panel (2) so as to be between the knob (3) and the circuit board (5) and to one side of which the knob (3) is mounted and to the other side the circuit board (5) and
- a shaft (7) that is integrated with the knob (3), transmitting the movement of the knob (3) to the circuit board (5) and of which the free end is passed through the holder (6) to be connected to the circuit board (5).

[0022] After the holder (6) is fastened to the inner surface of the panel (2), the knob (3) is mounted onto the holder (6) so that the knob (3) remains on the front face of the panel (2) and the circuit board (5) remains on the rear face of the holder (6). The knob (3) is situated at the front side of the holder (6) and the circuit board (5) is situated at the rear side of the holder (6). The shaft (7), connected to the knob (3) so as not to be separated from the knob (3) without causing damage, passes through the holder (6) and extends towards the circuit board (5). With the user rotating the knob (3) for selecting the program parameter, the shaft (7) also rotates together with the knob (3). The shaft (7) transmits the rotational movement of the knob (3) to the circuit board (5) whereto it is connected, thereby providing the circuit board (5) to detect the selected parameter. By means of the integrated structure of the shaft (7) and the knob (3), the movement of the knob (3) is provided to be directly transmitted to the circuit board (5) without requiring any other intermediary component. Thus, the production cost of the knob (3), hence of the household appliance (1), is decreased. Moreover, by minimizing the number of the components used for transmitting the movement of the knob (3) to the circuit board (5), the montage process of the knob (3) is facilitated.

[0023] In an embodiment of the present invention, the shaft (7) is produced with the knob (3) as a single piece. The knob (3) and the shaft (7) are produced in an integrated manner, preferably with the plastic injection method.

[0024] In another embodiment of the present invention, the shaft (7) and the knob (3) are produced separately and the shaft (7) is fastened to the knob (3) with plastic welding.

[0025] In another embodiment of the present invention, the household appliance (1) comprises more than one stage (10) arranged on the knob (3), each corresponding to one program parameter and more than one protrusion (11) arranged on the holder (6), that provides the user to sense that he/she selects the desired program parameter by passing over the stages (10) with the movement of the knob (3). The knob (3) is preferably in circular form and the stages (10) are circumferentially arranged on the knob (3) at certain intervals. Each stage (10) corresponds to a program parameter predetermined by the producer. When the knob (3) is rotated by the user, the relevant stage (10) passes over the protrusion (11), thereby enabling the user to sense that he/she brings the knob (3) to the desired position. The program parameter selected by means of the stages (10) are shown to the user by means of the indicators arranged on the knob (3). The shaft (7) rotating with the rotational movement of the knob (3) triggers the circuit board (5), providing the detection of the selected parameter. Thus, without any additional components, the user is enabled to sense that he/she brings the knob (3) to the desired position by means of the stages (10) and the protrusions (11) arranged on the knob (3) and the holder (6).

[0026] In another embodiment of the present invention, the household appliance (1) comprises an opening (14) arranged on the panel (2), and the knob (3) having a body (4) that is passed through the opening (14) to extend outside the panel (2) and that is moved by being rotated by the user and a skirt (9) that surrounds the body (4) and that extends from the body (4) to the rear face of the panel (2). When the body (4) is passed through the opening (14), the body (4) is surrounded by the walls of the panel (2) facing the opening (14). By means of the skirt (9) extending towards the rear face of the panel (2), the knob (3) is prevented from being dislocated. When the knob (3) is mounted onto the panel (2), the front face of the skirt (9) contacts the inner wall of the panel (2) and the rear face thereof contacts the holder (6).

[0027] In another embodiment of the present invention, the stages (10) are arranged on the skirt (9). When the

body (4) is passed through the opening (14), the skirt (9) faces the front face of the holder (6) and the stages (10) are positioned so as to face the protrusions (11).

[0028] In another embodiment of the present invention, the household appliance (1) comprises a bearing (8) that is located almost at the center of the holder (6), through which the shaft (7) is passed. When the shaft (7) is passed through the bearing (8), the skirt (9) bears against the front face of the holder (6). The shaft (7) is passed through the bearing (8) to be connected to the circuit board (5) that is mounted onto the holder (6). Since the other end of the shaft (7) is integrated with the knob (3), the knob (3), the holder (6) and the circuit board (5) are provided to be grouped. The bearing (8), furthermore, provides the centering of the shaft (7). Thus, the movement generated with the user rotating the knob (3) is transmitted to the circuit board (5) without any problems.

[0029] In another embodiment of the present invention, the household appliance (1) comprises more than one foot (12) that is arranged on the holder (6) and that provides the position of the holder (6) on the panel (2) to be determined. By means of the feet (12), the proper position of the holder (6) on the panel (2) is easily determined.

[0030] In another embodiment of the present invention, the household appliance (1) comprises more than one fixing hole (13) that is arranged on the holder (6) and that provides the holder (6) to be fastened onto the panel (2). After the holder (6) is placed on the panel (2), a fixing element, such as screw, etc. is passed through the fixing hole (13) and the holder (6) is mounted onto the panel (2).

[0031] In various embodiments of the present invention, the household appliance (1) is a dishwasher.

[0032] In various embodiments of the present invention, the household appliance (1) is a washing machine.

[0033] In various embodiments of the present invention, the household appliance (1) is an oven.

[0034] In the household appliance (1) of the present invention, need for an additional component for supporting the shaft (7) is eliminated by means of the integrated structure of the knob (3) and the shaft (7) that transmits the rotational movement of the knob (3) to the circuit board (5). Thus, without requiring any additional components, the user is enabled to sense that he/she brings the knob (3) to the desired position by means of the stages (10) and the protrusions (11) arranged on the knob (3) and the holder (6) respectively. Thus, cost advantage is provided in the production of the household appliance (1).

[0035] 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 panel (2), a knob (3) that is disposed on the panel (2) and that provides various program parameters to be selected by being rotated by the user and a circuit board (5) that detects the program parameters selected by the user by means of the knob (3) and that is placed behind the panel (2) in alignment with the knob (3), wherein a shaft (7) is integrated with the knob (3), transmitting the movement of the knob (3) to the circuit board (5),
characterized by

   - a holder (6) that is fastened to the inner face of the panel (2) so as to be between the knob (3) and the circuit board (5) and to one side of which the knob (3) is mounted and to the other side the circuit board (5) and wherein the free end of said shaft (7) is passed through the holder (6) to be connected to the circuit board (5), wherein a bearing (8) is located almost at the center of the holder (6), through which the shaft (7) is passed.

2. A household appliance (1) as in Claim 1, **characterized by** the shaft (7) produced as a single piece with the knob (3).

3. A household appliance (1) as in Claim 1, **characterized by** the shaft (7) produced separately from the knob (3) and fastened to the knob (3) with plastic welding.

4. A household appliance (1) as in anyone of the above claims,
characterized by more than one stage (10) arranged on the knob (3), each corresponding to one program parameter and more than one protrusion (11) arranged on the holder (6), that provides the user to sense that he/she selects the desired program parameter by passing over the stages (10) with the movement of the knob (3).

5. A household appliance (1) as in anyone of the above claims,
characterized by an opening (14) arranged on the panel (2), and by the knob (3) having a body (4) that is passed through the opening (14) to extend outside the panel (2) and that is moved by being rotated by the user and a skirt (9) that surrounds the body (4) and that extends from the body (4) to the rear face of the panel (2).

6. A household appliance (1) as in Claim 5 when referring back to claim 4, **characterized by** the stage (10) arranged on the skirt (9).

7. A household appliance (1) as in anyone of the above claims, **characterized by** the skirt (9) that bears against the front face of the holder (6) when the shaft (7) is passed through the bearing (8).

8. A household appliance (1) as in anyone of the above claims, **characterized by** more than one foot (12) that is arranged on the holder (6) and that provides the position of the holder (6) on the panel (2) to be determined.

9. A household appliance (1) as in anyone of the above claims,
characterized by more than one fixing hole (13) that is arranged on the holder (6) and that provides the holder (6) to be fastened on the panel (2).

10. A household appliance (1) as in anyone of the above claims which is a dishwasher.

11. A household appliance (1) as in anyone of the Claims 1 to 10, which is a washing machine.

12. A household appliance (1) as in anyone of the Claims 1 to 10, which is an oven.

Patentansprüche

1. Haushaltsgerät (1), umfassend eine Blende (2), einen Knopf (3), der an der Blende (2) angeordnet ist und das Auswählen verschiedener Programmparameter ermöglicht, indem er von dem Benutzer gedreht wird, und eine Leiterplatte (5), die die vom Benutzer mithilfe des Knopfs (3) ausgewählten Programmparameter erkennt und hinter der Blende (2) unter Ausrichtung an dem Knopf (3) angeordnet ist, wobei ein Schaft (7) in den Knopf (3) integriert ist, der die Bewegung des Knopfs (3) an die Leiterplatte (5) überträgt,
gekennzeichnet durch

   - ein Halter (6) an der Innenfläche der Blende (2) befestigt ist, derart, dass er zwischen dem Knopf (3) und der Leiterplatte (5) ist und an seiner einen Seite der Knopf (3) angebracht ist und an seiner anderen Seite die Leiterplatte (5), und wobei das freie Ende des Schafts (7) durch den Halter (6) verläuft, um mit der Leiterplatte (5) verbunden zu sein, wobei ein Lager (8) nahezu in der Mitte des Halters (6) angeordnet ist, **durch** das der Schaft (7) verläuft.

2. Haushaltsgerät (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schaft (7) einstückig mit dem Knopf (3) hergestellt ist.

3. Haushaltsgerät (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schaft (7) gesondert vom Knopf (3) hergestellt ist und durch Kunststoffschweißen am Knopf (3) befestigt ist.

4. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** mehrere Stufen (10), die am Knopf (3) angeordnet sind und jeweils einem Programmparameter entsprechen, und mehrere Vorsprünge (11), die am Halter (6) angeordnet sind und es ermöglichen, dass der Benutzer spürt, dass er den gewünschten Programmparameter auswählt, indem sie mit der Bewegung des Knopfs (3) über die Stufen (10) treten.

5. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine Öffnung (14), die an der Blende (2) angeordnet ist, und **dadurch**, dass der Knopf (3) einen Körper (4), der **durch** die Öffnung (14) tritt, um sich aus der Blende (2) heraus zu erstrecken, und bewegt wird, indem er von dem Benutzer gedreht wird, und eine Einfassung (9) aufweist, die den Körper (4) umgibt und sich von dem Körper (4) zur Rückseitenfläche der Blende (2) erstreckt.

6. Haushaltsgerät (1) nach Anspruch 5 bei Rückbezug auf Anspruch 4, **dadurch gekennzeichnet, dass** die Stufe (10) an der Einfassung (9) angeordnet ist.

7. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Einfassung (9) an der Stirnfläche des Halters (6) anliegt, wenn der Schaft (7) durch das Lager (8) geführt wird.

8. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** mehrere Füße (12), die am Halter (6) angeordnet sind und es ermöglichen, dass die Position des Halters (6) an der Blende (2) bestimmt wird.

9. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** mehrere Fixierungsbohrungen (13), die am Halter (6) angeordnet sind und es ermöglichen, dass der Halter (6) an der Blende (2) befestigt ist.

10. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche, das ein Geschirrspüler ist.

11. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche 1 bis 10, das eine Waschmaschine ist.

12. Haushaltsgerät (1) nach einem der vorangehenden Ansprüche 1 bis 10, das ein Ofen ist.

Revendications

1. Un électroménager (1) comprenant un panneau (2), un bouton rotatif (3) qui est disposé sur le panneau (2) et qui permet la sélection des différents paramètres de programme en étant tourné par l'utilisateur et une carte de circuit (5) qui détecte les paramètres de programme sélectionnés par l'utilisateur par l'intermédiaire du bouton rotatif (3) et qui est placée derrière le panneau (2) en alignement avec le bouton rotatif (3), où un arbre (7) est intégré au bouton rotatif (3), donc transmettant le mouvement du bouton rotatif (3) à la carte de circuit (5),
caractérisé par

   - un support (6) qui est fixé à la surface intérieur du panneau (2) de manière à rester entre le bouton rotatif (3) et la carte de circuit (5), à l'un côté duquel le bouton rotatif (3) est monté et à l'autre côté duquel la carte de circuit (5) est monté et où l'extrémité libre de ladite arbre (7) est passée à travers le support (6) à être reliée à la carte de circuit (5), où un palier (8) est situé presque au center du support (6), à travers lequel l'arbre (7) passe.

2. Un électroménager (1) selon la Revendication 1, caractérisé en par l'arbre (7) qui est produit en une seule pièce avec le bouton rotatif (3).

3. Un électroménager (1) selon la Revendication 1, caractérisé en par l'arbre (7) qui est produit séparément du bouton rotatif (3) et fixé au bouton rotatif (3) par la soudure plastique.

4. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** plus d'une étape (10) qui est disposée sur le bouton rotatif (3), chacune correspondante à un paramètre de programme et plus d'une protubérance (11) qui est arrangée sur le support (6) et qui assure que l'utilisateur sent que il/elle sélectionne le paramètre de programme désiré en passant au-dessus des étapes (10) par le mouvement du bouton rotatif (3).

5. Un électroménager (1) selon l'une quelconque des revendications précédents, **caractérisé par** une ouverture (14) qui est arrangée sur le panneau (2), et par le bouton rotatif (3) présentant un corps (4) qui est passé à travers l'ouverture (14) de manière à s'étendre hors du panneau (2) et qui est déplacé en étant tourné par l'utilisateur et un rebord (9) qui entoure le corps (4) et qui s'étend à partir du corps (4) vers la surface arrière du panneau (2).

6. Un électroménager (1) selon la Revendication 5, en référence à la Revendication 4, **caractérisé par** l'étape (10) qui est arrangée sur le rebord (9).

7. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** le rebord (9) qui s'appuie sur la surface avant du support (6) lorsque l'arbre (7) est passé à travers le palier (8).

8. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** plus d'un pied (12) qui est disposé sur le support (6) et qui permet la détermination de la position du support (6) sur le panneau (2).

9. Un électroménager (1) selon l'une quelconque des revendications précédentes, **caractérisé par** plus d'un trou de fixation (13) qui est disposé sur le support (6) et qui permet la fixation du support (6) sur le panneau (2).

10. Un électroménager (1) selon l'une quelconque des revendications précédentes, qui est un lave-vaisselle.

11. Un électroménager (1) selon l'une quelconque des revendications de 1 à 10, qui est une lave-linge.

12. Un électroménager (1) selon l'une quelconque des revendications de 1 à 10, qui est un four.

Figure 1

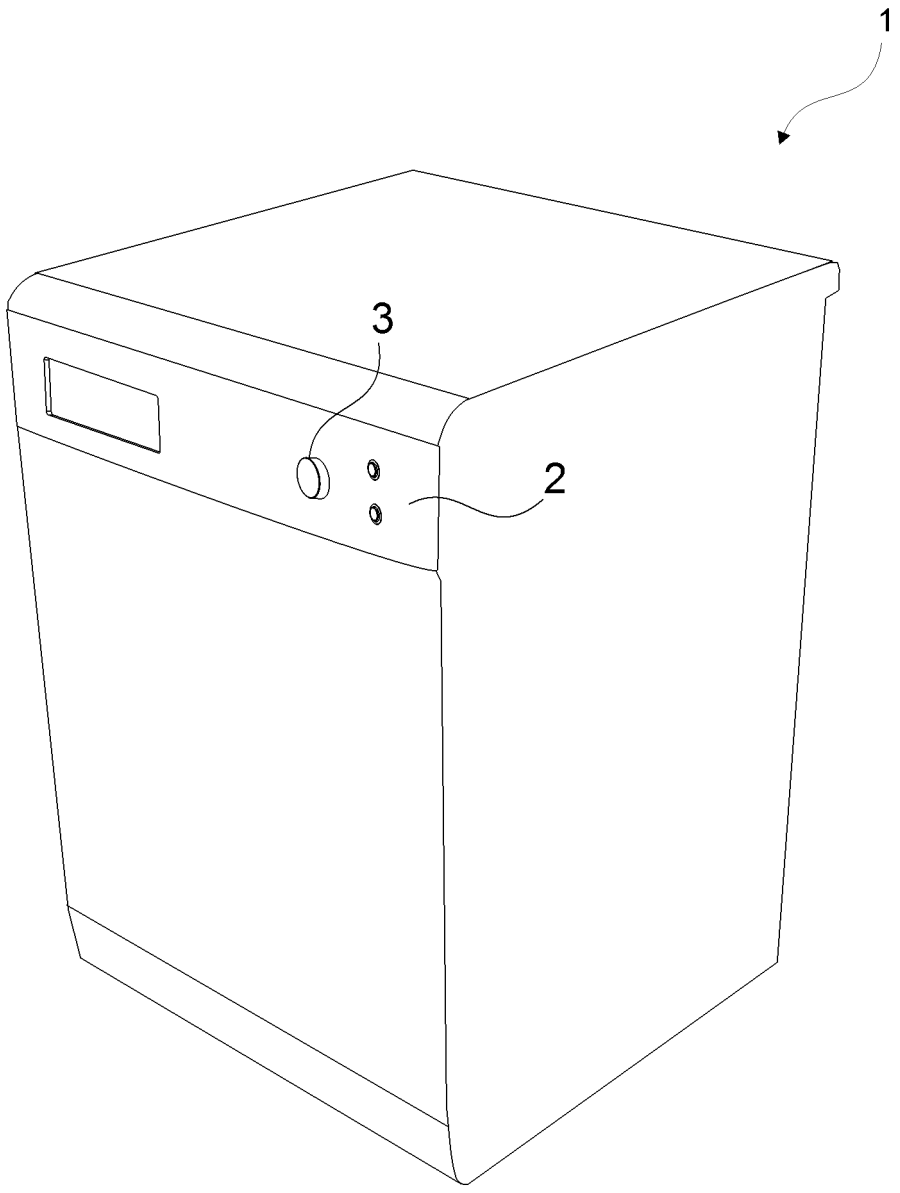


Figure 2

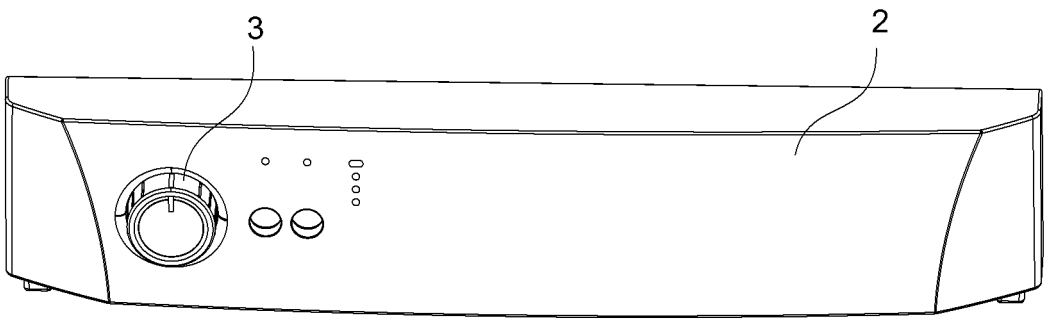


Figure 3

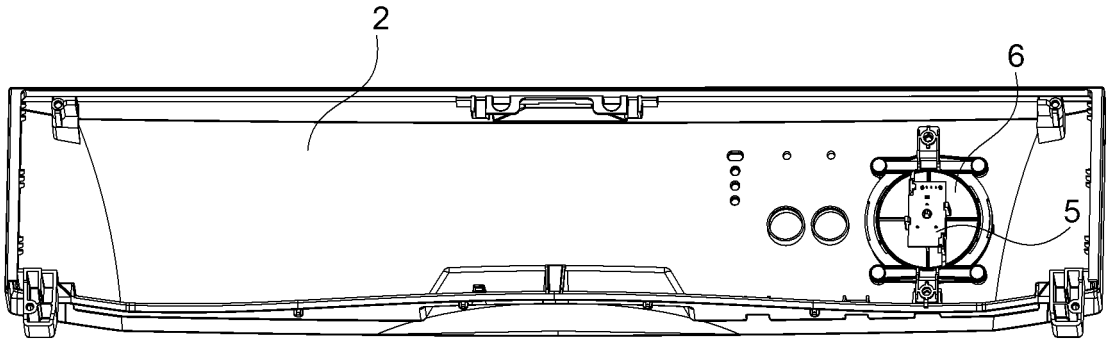


Figure 4

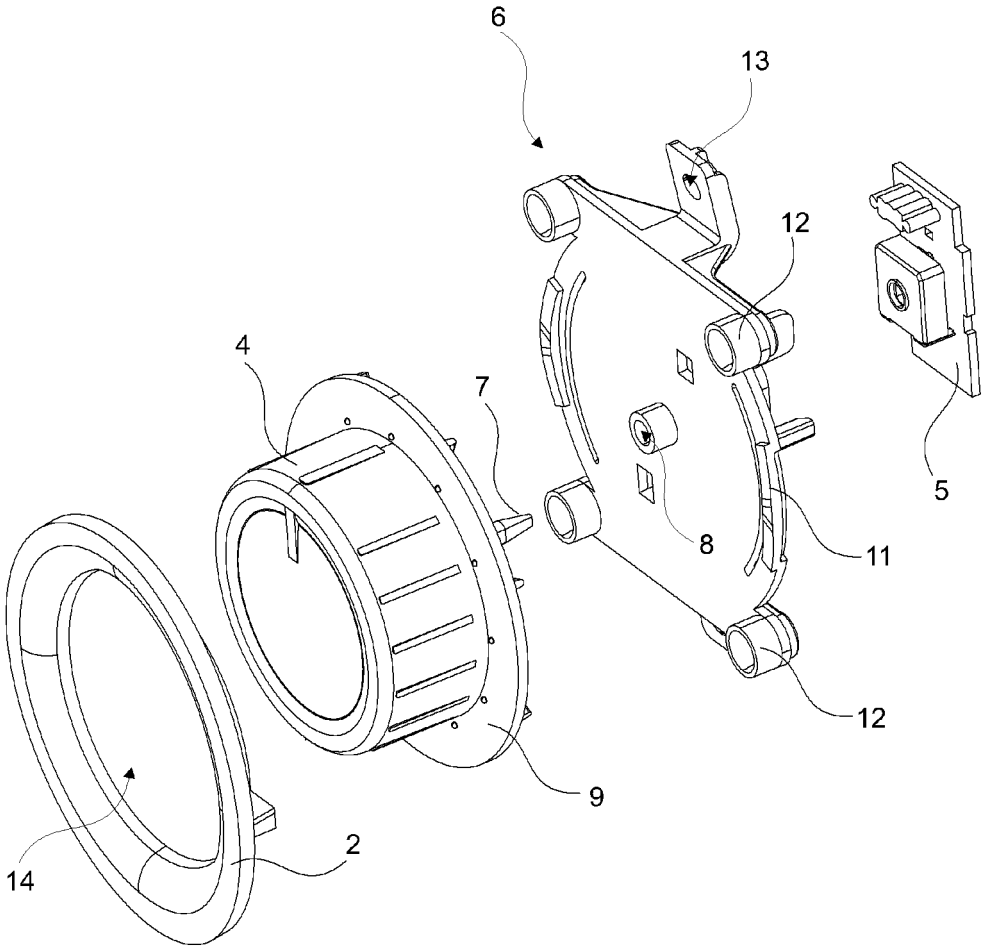


Figure 5

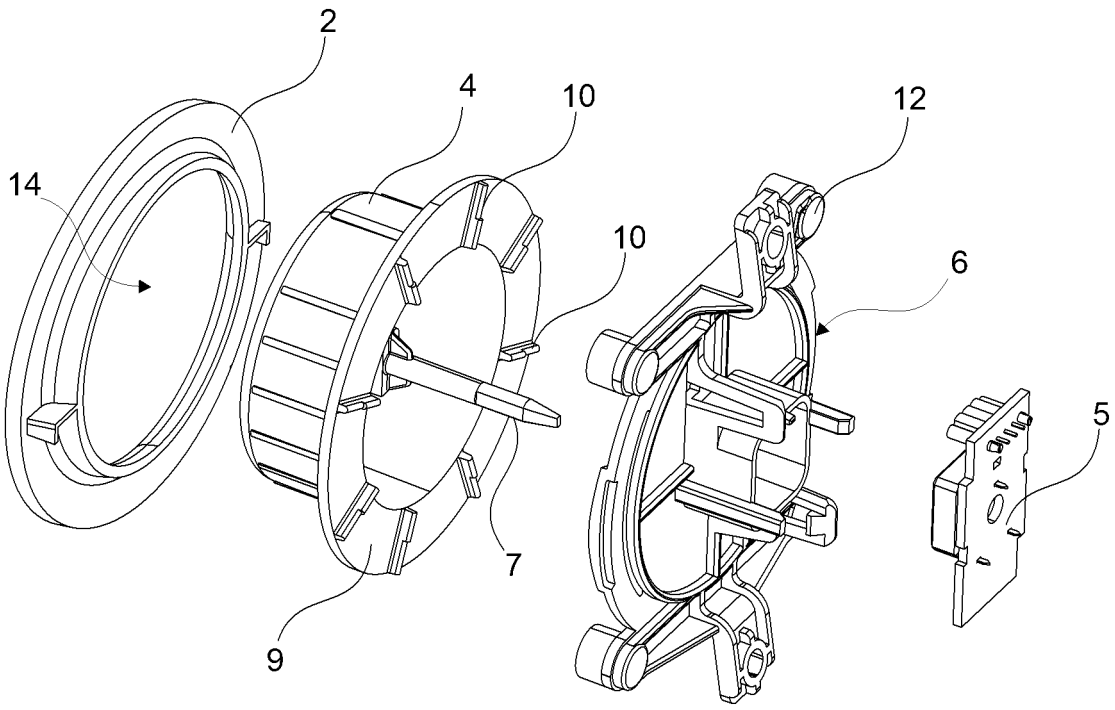


Figure 6

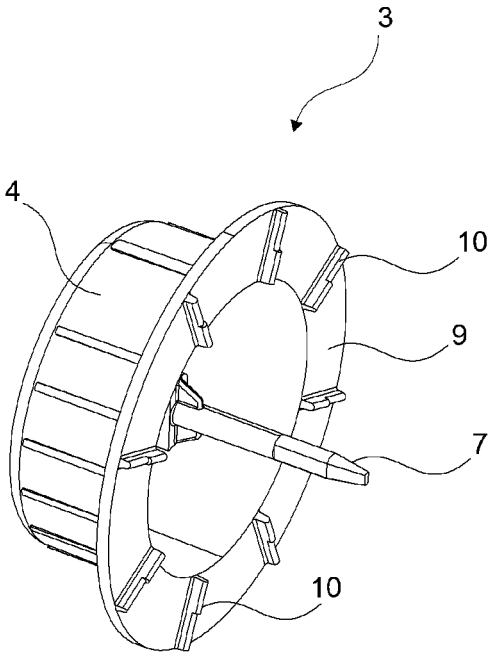


Figure 7

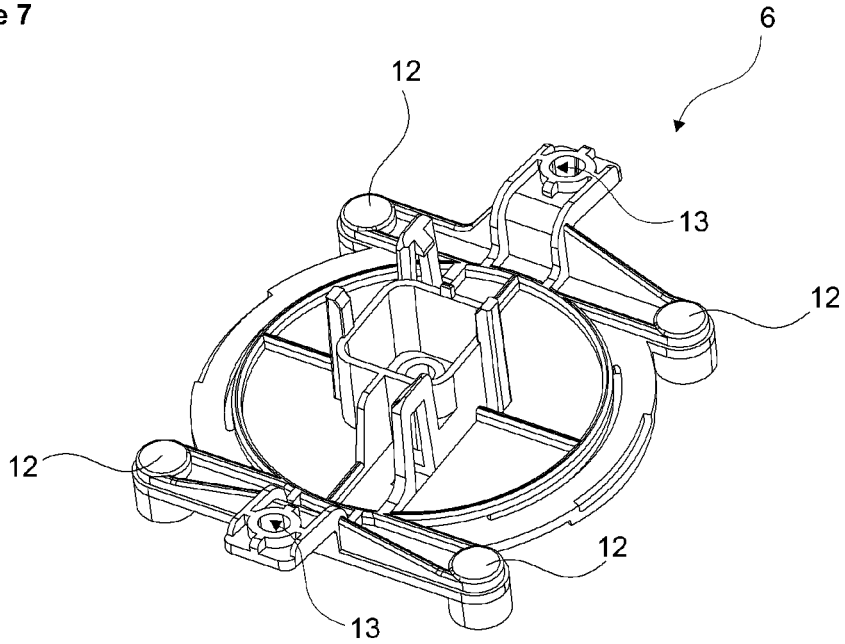
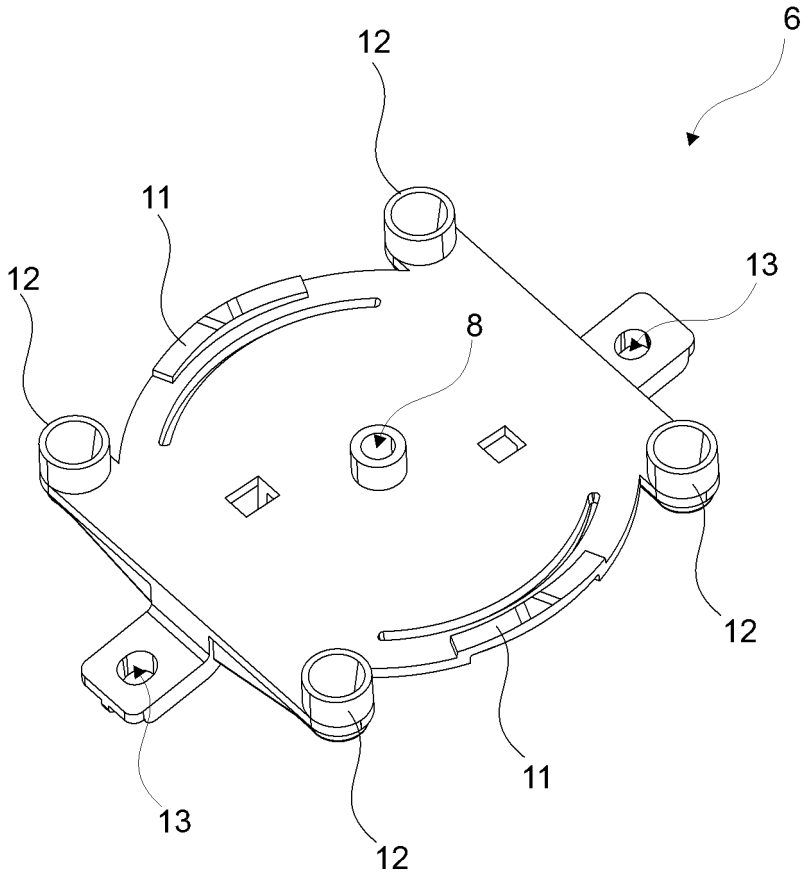


Figure 8



REFERENCES CITED IN THE DESCRIPTION

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- DE 102005039162 B3 **[0004]**