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Remarks:
A request for correction of the description has been filed pursuant to Rule 139 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).

(54) **Detergent dispenser comprising mobile detergent bed**

(57) The present invention is a detergent dispenser (1) that keeps the detergent (3) within its body before transferring thereof into the dishwasher (A) during the washing process, and enables the detergent (C) to be melted with the water sprayed while the dishwasher (A) is working and to be flowed into the dishwasher (A). The detergent dispenser (1) according to the present invention comprises detergent bed (3) that can move upwards and downwards (+y, -y), switches to open position while the machine (A) is working, and keeps the detergent (C) within its body during the washing process, and detergent flow channels (3.1) that enable the water sprayed within the machine (A) to enter into the detergent bed (3) when said detergent bed (3) is opened, and melt the detergent (C) and enable the detergent (C) to be flowed into the machine (A).

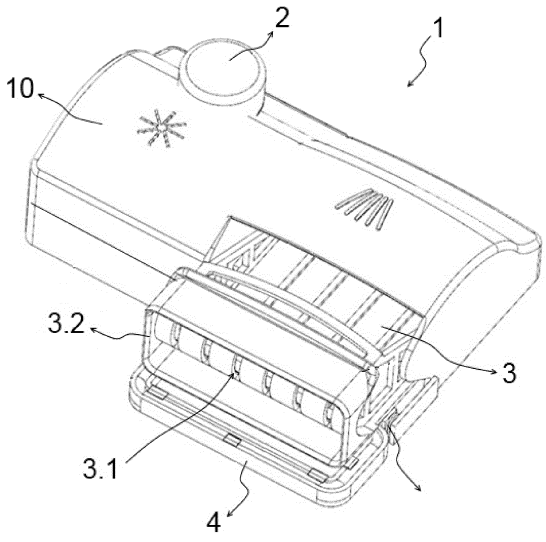


**Figure 2**

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## Description

### TECHNICAL FIELD

**[0001]** The present invention is related to improvements made in the detergent dispenser of dishwashers.

**[0002]** The present invention is especially related to detergent dispenser embodiment that keeps the tablet detergent in the mobile detergent bed therein before transferring thereof into the machine directly during the washing period, melts the detergent with the water sprayed while the machine is working, and enables the detergent to be discharged into the machine through the openings at the lower section of the machine body.

### STATE OF ART

**[0003]** In the state of art, there are several embodiments of the detergent dispensers mounted at the back of front door of dishwashers. Detergent dispensers known also as detergent drawer comprise mechanisms that keep the detergent washing the dishes therein and transfer thereof into the machine during the washing process.

**[0004]** There are two different applications in the present detergent dispensers in terms of triggering and opening the cover and transferring the detergent into the machine. Said applications are circular cover opening system and sliding cover opening system.

**[0005]** A three-dimensional view of the detergent dispenser (20) comprising circular cover opening system in the prior art is given in Figure 11. In the circular cover opening system, detergent tablet is placed into fixed drawer in the receptacle and the cover (21) is closed. When the system switches to detergent receiving mode, the cover (21) is opened in a semi-circular manner through the hinges on the body and then, detergent falls into the machine. A side sectional view of detergent dispenser (20) comprising circular cover opening system on a dishwasher (A) is given in Figure 12.

**[0006]** The detergent cover (21) opening towards the inside of the machine hits to the upper rack of the machine and prevents the detergent from flowing into the machine.

**[0007]** A three-dimensional view of the detergent dispenser (30) comprising sliding cover opening system in the prior art is given in Figure 13. In sliding cover opening system, detergent tablet (C) is placed into the fixed detergent drawer provided in the beveled detergent receptacle (32). When the system switches to detergent receiving mode, the cover (31) is opened laterally or upwards by means of sliding motion and the detergent is transferred into the machine (A). A side sectional view of detergent dispenser (30) comprising sliding cover opening system on the front door (B) of a dishwasher is given in Figure 14.

**[0008]** As described above, detergent tablet is placed into the fixed detergent drawer in the detergent dispenser in the present applications and falls into the machine directly when the cover of the detergent dispenser is opened with the command of the machine during the washing process. In the present applications, the receptacle where the detergent is placed is fixed and the detergent falls into the machine thanks to the bevel in the detergent receptacle. Detergent tablet does not fall into the same place every time; it may sometimes fall into a pot or glass. The washing performance and efficiency of the machine decrease because detergent tablet falling into an unsuitable place is not mixed with the pressure water provided by spray arm or does not diffuse in the machine.

**[0009]** A spot has been created for the tablet falling from the detergent dispenser in the front rack of the dishwasher in some of the detergent dispenser models. The tablet falls into the same place every time. The tablet does not have the risk of falling into the pot or an unsuitable place; however, said embodiment has decreased the volume of upper rack.

**[0010]** In conclusion, improvements are made in the detergent dispenser of dishwashers; therefore, new embodiments that will eliminate the abovementioned disadvantages and will offer solutions for the present systems are needed.

### OBJECTS OF THE PRESENT INVENTION

**[0011]** The present invention is related to detergent dispenser meeting the abovementioned requirements, eliminating all of the disadvantages and offering some additional advantages.

**[0012]** The primary object of the present invention is to keep the detergent in a mobile detergent bed during the washing process and to flow the detergent melted with the water sprayed in the machine, into the machine.

**[0013]** Another object of the present invention is to eliminate the problem of decrease in the washing performance arising from the fact that detergent tablet falls into unsuitable places within the machine.

**[0014]** It is aimed to prevent the volume decrease in the upper rack thanks to a cover embodiment moving downwards rather than moving into the machine.

**[0015]** In order to achieve all the objects that mentioned above and will be understood from the detailed description below, the present invention is a detergent dispenser which is positioned within the dishwasher and comprises a detergent bed in which the detergent is positioned, and a cover that closes the detergent bed and provides sealing, characterized in comprising the following in order to provide the motion of said detergent bed on vertical axis;

- a latch serves as a trigger for the motion of detergent bed,
- a latch lug configured on said latch,
- a fixing lug provided on the lower surface of detergent bed, interlocking with said latch lug and fixing the detergent bed within the detergent dispenser,

- a spring protrusion provided on the lower surface of the detergent bed,
- a motion spring which is positioned within the detergent dispenser and set up with the pressure applied by said spring protrusion when the fixing lug is connected with latch lug, and switches to free position when fixing lug is released from latch lug and enables the detergent bed to move outside the detergent dispenser

**[0016]** The structural and characteristic features and all the advantages of the present invention will be more clearly understood thanks to the figures given below and the detailed description written with reference to those figures; therefore, the evaluation needs to be done by taking said figures and the detailed description into consideration.

## BRIEF DESCRIPTION OF THE FIGURES

**[0017]** In order to understand the embodiment of the present invention and the additional members together with the advantages thereof, it is required to be evaluated with the figures described below.

**Figure 1** ; A three-dimensional view of detergent dispenser according to the present invention. In said view, the detergent receptacle is closed.

**Figure 2** ; A three-dimensional view of detergent dispenser according to the present invention. In said view, detergent bed or drawer is opened.

**Figure 3** ; The view of detergent dispenser according to the present invention as being mounted to the front door of the dishwasher. In said view, the detergent receptacle is closed.

**Figure 4** ; The view of detergent dispenser according to the present invention as being mounted to the front door of the dishwasher. In said view, the detergent receptacle is opened.

**Figure 5** ; The side profile cross-sectional view of the detergent dispenser according to the present invention when the lower cover thereof is closed.

**Figure 6** ; The side profile cross-sectional view of the detergent dispenser according to the present invention when the lower cover thereof is opened.

**Figure 7** ; The view of collapsible lower cover in a side section received from the bottom of detergent dispenser according to the present invention.

**Figure 8** ; The view of detergent flow channels on the lower cover and detergent bed in a three-dimensional section of detergent dispenser according to the present invention.

**Figure 9** ; A representative view of detergent tablet in open detergent bed in a three-dimensional view of detergent dispenser according to the present invention.

**Figure 10** ; The side profile cross-sectional view of detergent dispenser according to the present invention as being mounted to the front door of the dishwasher in a preferred embodiment thereof.

**Figure 11** ; A three-dimensional view of the detergent dispenser comprising circular cover opening system in the prior art.

**Figure 12** ; A side cross-sectional view of detergent dispenser comprising circular cover opening system on a dishwasher in the prior art.

**Figure 13** ; A three-dimensional view of the detergent dispenser comprising sliding cover opening system in the prior art.

**Figure 15** ; A three-dimensional view of the detergent dispenser comprising sliding cover opening system on the front door of a dishwasher in the prior art.

## REFERENCE NUMBERS

**[0018]**

| | |
|---|---|
| **1.** | Detergent dispenser |
| **2.** | Rinse aid receptacle |
| **3.** | Detergent bed |
| **3.1.** | Detergent flow channels |
| **3.2.** | Cover fitting element |
| **3.3.** | Spring protrusion |
| **3.4.** | Fixing lug |
| **3.5.** | Lower surface |
| **4.** | Cover |
| **4.1.** | Cover spring |
| **5.** | Cover latch |
| **5.1.** | Cover latch lug |
| **6.** | Gasket |
| **7.** | Motion spring |
| **10.** | Outer body |
| **20.** | Detergent dispenser with circular cover opening |
| **21.** | Cover |
| **30.** | Detergent dispenser with sliding cover opening |
| **31.** | Sliding cover |
| **32.** | Beveled detergent receptacle |
| **A:** | Dishwasher |
| **B:** | Front Door |
| **C:** | Detergent |

## DETAILED DESCRIPTION OF THE PRESENT INVENTION

**[0019]** In this detailed description, the preferred embodiments of the detergent dispenser (1) according to the present invention are described only for the subject

to be understood better without any limiting effect.

**[0020]** The present invention is related to improvements made in the detergent dispenser of dishwashers, which is mounted at the back of front door (B) in the dishwashers (A). A three-dimensional view of the detergent dispenser (1) comprising said improvements is given in Figure 1. Accordingly, detergent dispenser (1) mainly consists of a detergent bed (3), rinse aid receptacle (2) and motion mechanism provided within an outer body (10). The detergent (C) and rinse aid agent, which help washing the dishes, are added into the detergent dispenser (1) by the user before the machine (A) starts to work.

**[0021]** The detergent bed (3) is designed in a mobile manner in the detergent dispenser (1) according to the present invention. While detergent bed (3) is closed in Figure 1, it is opened in Figure 2. Detergent (C) that enables the dishes to be washed and is provided as tablet, liquid and powder is placed into the detergent bed (3).

**[0022]** Detergent flow channels (3.1) are provided in the form of openings on the body of detergent bed (3). As can be seen better in Figures 2 and 8, detergent flow channels (3.1) are configured so as to enable the flow of detergent (C) melted while the machine (A) is working, into the machine (A) automatically.

**[0023]** With reference to Figures 5 and 6, a motion spring (7) and latch (5) are provided in the detergent dispenser (1) according to the present invention for the motion of detergent bed (3). The motion spring (7) is a spring embedded horizontally within the outer body (10). There is a spring protrusion (3.3) on the lower surface (3.5) of the detergent bed (3). Said spring protrusion (3.3) enters into the opening wherein the motion spring (7) is provided, while the detergent bed (3) is closed, and compresses the motion spring (7). The latch (5) is a triggering member connected to the upper section of the detergent bed (3). While the detergent bed (3) is closed, a fixing lug (3.4) provided at the back of the detergent bed, and a latch lug (5.1) provided on the latch (5) are interlocked. Thus, detergent bed (3) is fixed in closed position and remains in installed position after being compressed by the motion spring (7). The side profile cross-sectional view of the detergent dispenser in a closed position is given in Figure 5. The interaction of spring bed (3.3) and motion spring (7) while the detergent bed (3) is in closed position, and positioning of latch lug (5.1) and fixing lug (3.4) are given in the side profile cross-section in Figure 5. However, detergent bed (3) is seen from side profile when it is opened in Figure 6. While the detergent bed (3) is opened, the motion spring (7) is released and latch lug (5.1) and fixing lug (3.4) are separated from each other.

**[0024]** A mobile cover (4) that provides sealing for liquid and powder detergent when the detergent cover (3) is closed is provided at the lower section of the detergent bed (3). The view of collapsible cover (4) is seen in a side profile cross-section received from the bottom of detergent dispenser (1) according to the present invention is seen in Figure 7. The cover (4) is connected to the outer body (10) in a hinged manner by means of cover springs (4.1). The cover (4) closes the bottom of the detergent bed (3) while the detergent bed (3) is closed (Figure 1). When detergent bed (3) is opened, it pushes and opens the cover (4). Meanwhile, the cover (4) remaining in horizontal axis performs a 90-degree rotating motion through the hinged region thereof and switches to the open position. While the cover (4) is being opened, the cover spring (4.1) is compressed and installed. Thus, the cover (4) is closed automatically with the effect of compressed cover spring when the detergent bed (3) is pushed upwards (+y) by the user.

**[0025]** The view of collapsible cover (4) is seen in a side cross-section received from the bottom of detergent dispenser (1) according to the present invention in Figure 7. A gasket (6) that provides the sealing of detergent bed (3) is provided on the cover (4). Moreover, there is a gasket fitting lug (3.2) that compresses the gasket when the cover (4) is closed, at the lower section of detergent bed (3).

**[0026] The working principle of the detergent dispenser (1) according to the present invention is as follows:**

Before the dishwasher (A) is started, the front door (B) is opened and detergent tablet (C) is placed into the detergent bed (3) of the detergent dispenser (1) and rinse aid liquid is filled into the rinse aid receptacle (2). The three-dimensional view of the detergent bed (3) in which detergent (C) is placed, is given in Figure 9. After detergent (C) and rinse aid are placed, detergent bed (3) is closed by being pushed upwards (+y) by the user. When the detergent bed (3) is pushed to the utmost level, the spring protrusion (3.3) at the lower surface (3.5) of the bed fits into the opening where the motion spring (7) is provided, and compresses the motion spring (7). Again meanwhile, the fixing lug (3.4) at the back top section of the detergent bed (3) fits into the latch lug (5.1) and is locked. Therefore, when the user leaves the detergent bed (3), the detergent bed (3) remains in a closed and installed position. In Figure 3, the detergent bed (3) of the detergent dispenser (1) according to the present invention, which is mounted to the front door (B) of the dishwasher (A), is seen in a closed position.

**[0027]** After the detergent bed (3) is closed, the front door (B) of the dishwasher (A) is closed and the machine (A) is started after choosing the washing programs on the front board. After starting command, the machine (A) starts to work. After water is received, the heater is activated and circulation motor operates. Meanwhile, an actuator pushes the latch (5) forwards. When the latch (5) is pushed, latch lug (5.1) and detergent bed (3) fixing lug (3.4) are separated from each other. The installed motion spring (7) also pushes the detergent bed (3) forwards and opens thereof. The detergent bed (3) is seen in an opened manner in the side profile cross-sectional view of the dishwasher (A) in Figure 10. The detergent bed (3) released from the latch lug (5.1) moves in a vertical manner and switches to open position. While the deter-

gent bed (3) is being opened, it pushes the cover (4) at the lower section downwards (-y) and opens thereof. In Figure 4, the detergent bed (3) of the detergent dispenser (1), which is mounted to the front door (B) of the dishwasher (A), is seen in an open position.

**[0028]** When detergent bed (3) and cover (4) are opened, detergent (C) in the detergent bed (3) does not fall into the machine (A) and remains within the detergent bed (3).

**[0029]** Therefore, the pressure water sprayed while the machine (A) is working passes through the detergent flow channels (3.1) on the body of detergent bed (3), and melts the detergent (C). The melted detergent (C) flows into the machine (A) by passing through the flow channels (3.1).

**[0030]** Thanks to the present invention, detergent tablet (C) is kept within the detergent bed (3) during the washing process. Therefore, the drawbacks arising from the fact that the detergent (C) falls into the unsuitable places within the machine (A) in the present applications are prevented and washing efficiency and performance are increased. Volume decrease in the upper rack is prevented thanks to a cover (4) embodiment moving downwards (-y) rather than moving into the machine (A) as in the present applications.

## Claims

1. A detergent dispenser (1), which is positioned within the dishwasher (A) and comprises a detergent bed (3) in which the detergent (C) is positioned, and a cover (4) that closes the detergent bed (3) and provides sealing, **characterized in** comprising the following in order to provide the motion of said detergent bed (3) on vertical axis;

    - a latch (5) serves as a trigger for the motion of detergent bed (3),
    - a latch lug (5.1) configured on said latch (5),
    - a fixing lug (3.4) provided on the lower surface (3.5) of detergent bed (3), interlocking with said latch lug (5.1) and fixing the detergent bed (3) within the detergent dispenser (1),
    - a spring protrusion (3.3) provided on the lower surface (3.5) of the detergent bed (3),
    - a motion spring (7) which is positioned within the detergent dispenser (1) and set up with the pressure applied by said spring protrusion (3.3) when the fixing lug (3.4) is connected with latch lug (5.1), and switches to free position when fixing lug (3.4) is released from latch lug (5.1) and enables the detergent bed (3) to move outside the detergent dispenser (1).

2. The detergent dispenser (1) according to Claim 1, **characterized in** comprising detergent flow channels (3.1) that enable the water sprayed within the machine (A) to enter into the detergent bed (3) when detergent bed (3) is opened, and melt the detergent (C) and enable thereof to be flowed into the machine (A).

3. The detergent dispenser (1) according to Claims 1, **characterized in** comprising at least one cover spring that enables the cover (4) to be opened in a hinged manner while the detergent bed (3) is moving downwards (-y), and to be closed automatically with the force of spring while the detergent bed (3) is being closed.

4. The detergent dispenser (1) according to Claim 1, **characterized in** comprising gasket (6) that provides sealing between detergent bed (3) and the cover (4).

5. The detergent dispenser (1) according to Claim 4, **characterized in** comprising a gasket fitting lug (3.2) that compresses said gasket (6) when the cover (4) is closed, at the lower section of detergent bed (3).

6. Working method of the mechanism providing the motion of said detergent bed (3) according to Claim 1, **characterized in** comprising the following process steps:

    - When the detergent bed (3) is pushed upwards (+y), the spring protrusion (3.3) at the lower surface (3.5) thereof fitting into the opening where the motion spring (7) is positioned and compressing the receptacle motion spring (7),
    - By interlocking the fixing protrusion on the bed lower surface (3.5) with said latch lug (5.1) and being locked, and the detergent bed (3) being fixed in a locked and set up position within the detergent dispenser (1),
    - The latch (5) being activated by an actuator in order to open the installed detergent bed (3),
    - The fixing lug (3.4) being released from the latch lug (5.1) with the motion provided for the latch (5) and thus, eliminating the pressure on the motion spring (7),
    - The released motion spring (7) pushing the detergent bed (3) downwards (-y) and thus, detergent bed (3) moving outside the detergent dispenser (1).

7. Method according to Claim 6, **characterized in that** during the downward (-y) motion of the detergent bed (3), it pushes and opens the cover (4) that covers the detergent bed (3) and meanwhile, sets up the cover spring (4.1).

8. Method according to Claim 7, **characterized in that** the cover spring is released when the detergent bed (3) is pushed into the detergent dispenser (1) and

thus, the cover (4) is closed automatically.

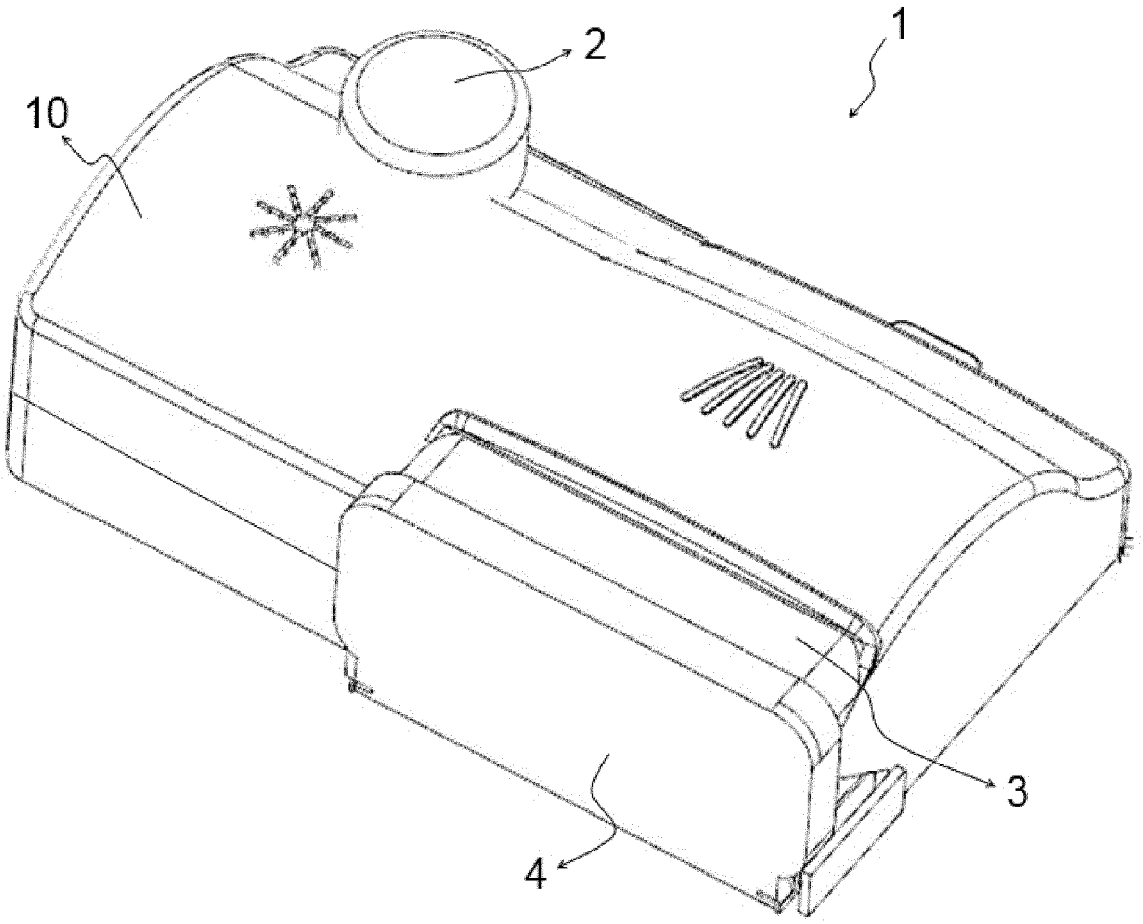



Figure 1

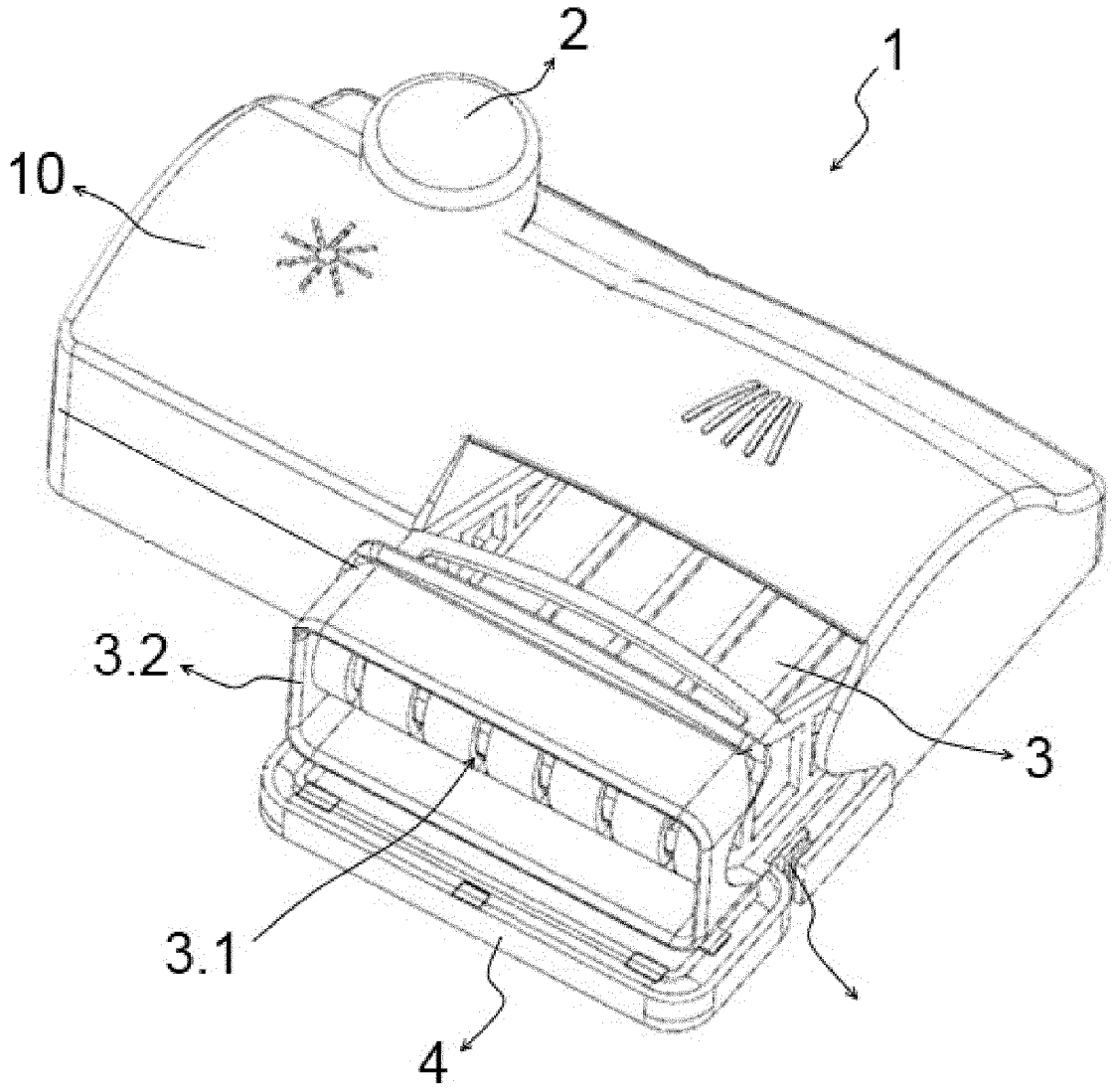



**Figure 2**

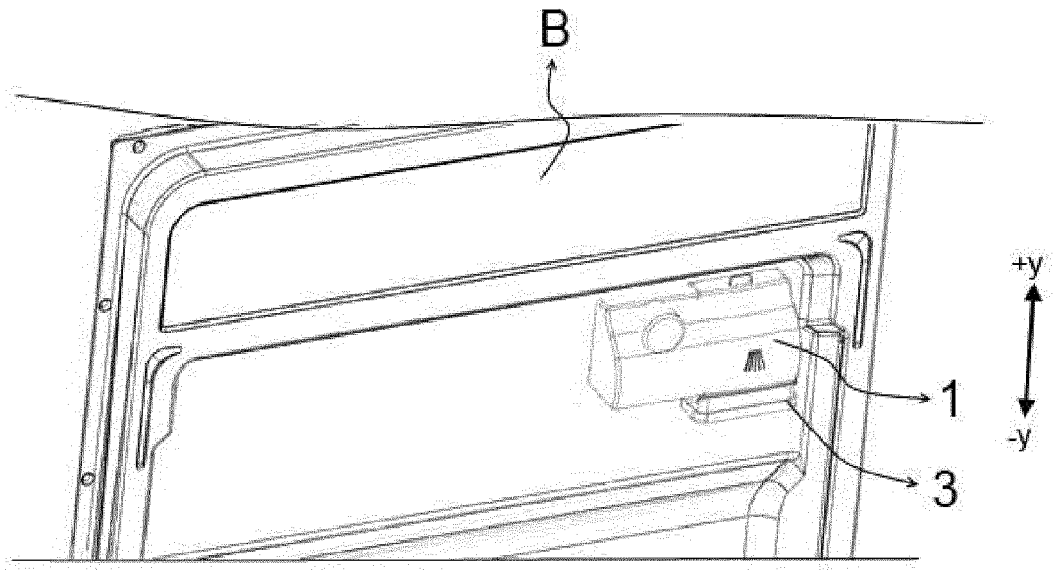



Figure 3

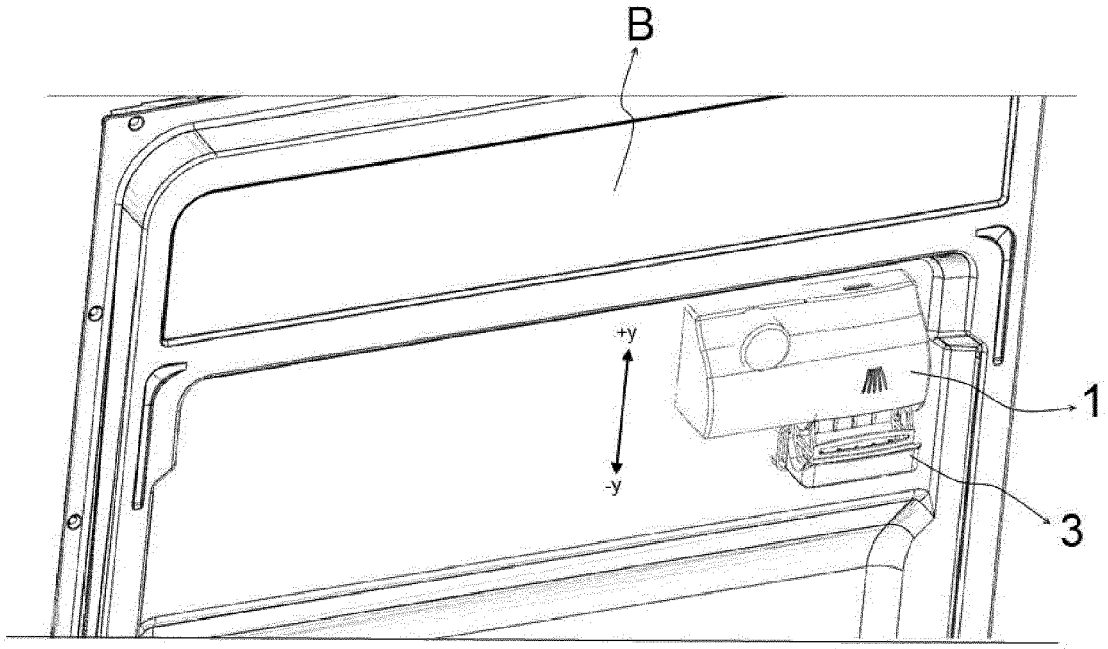



Figure 4

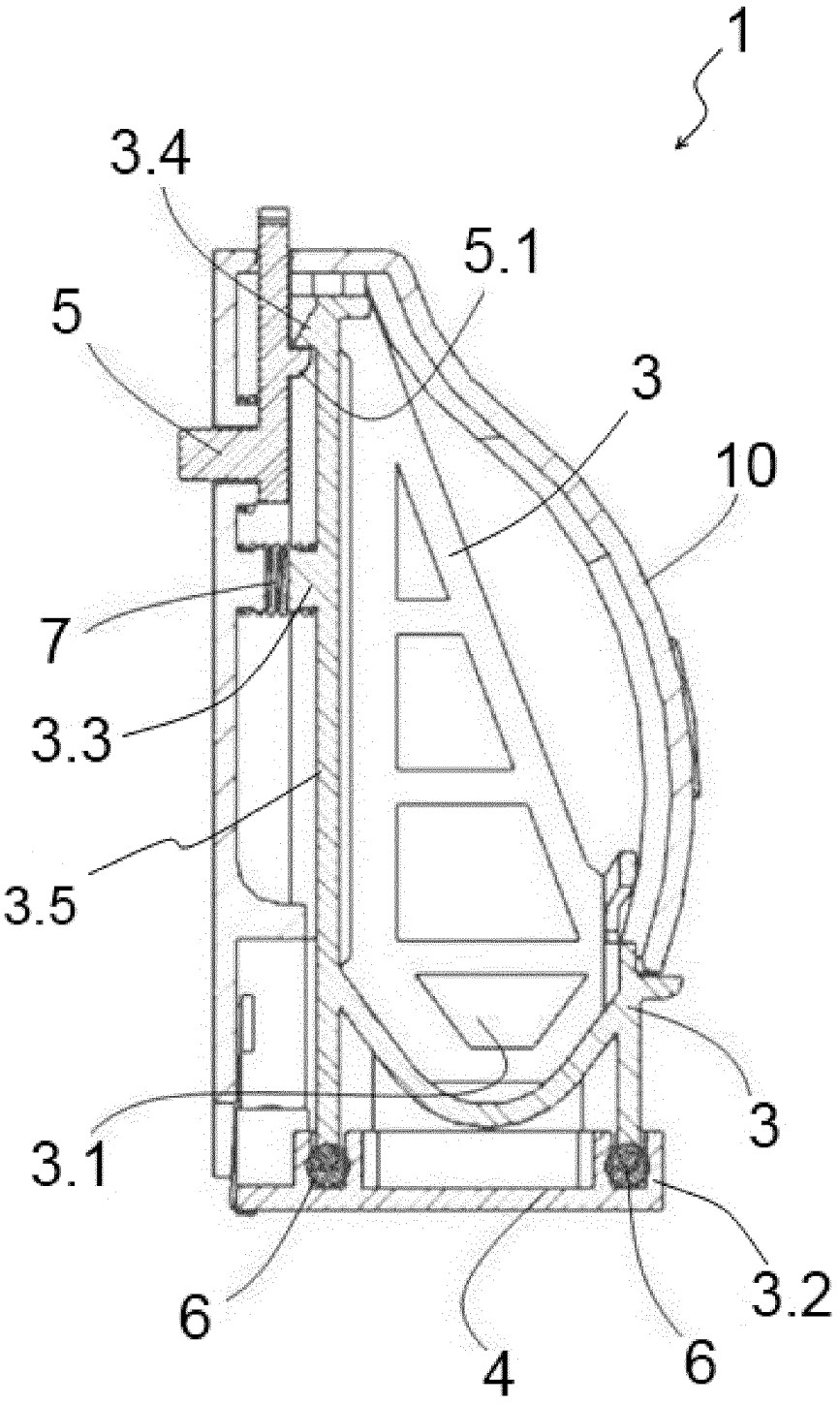



Figure 5

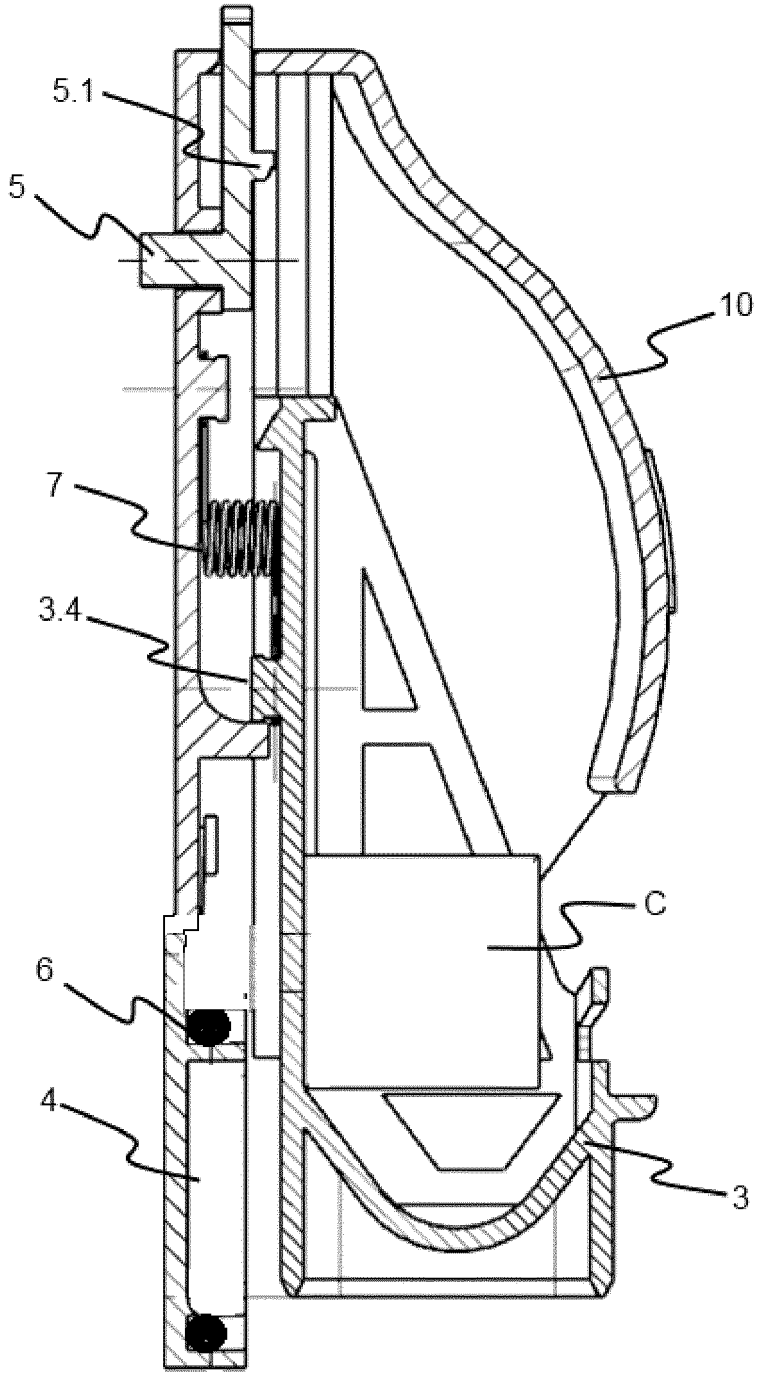



Figure 6

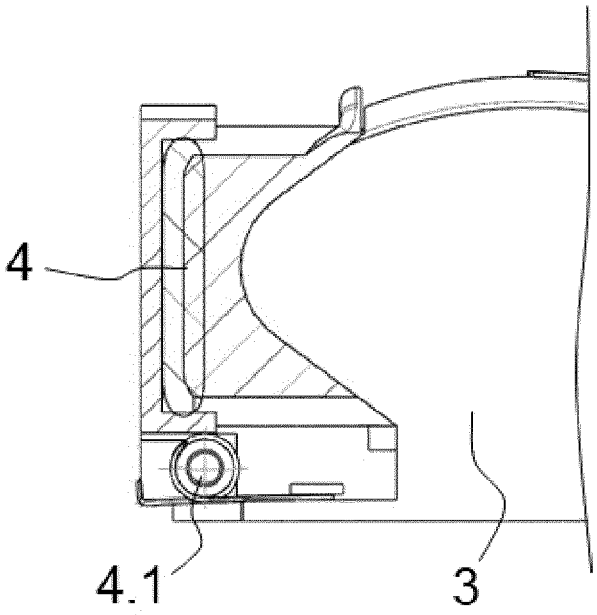



Figure 7

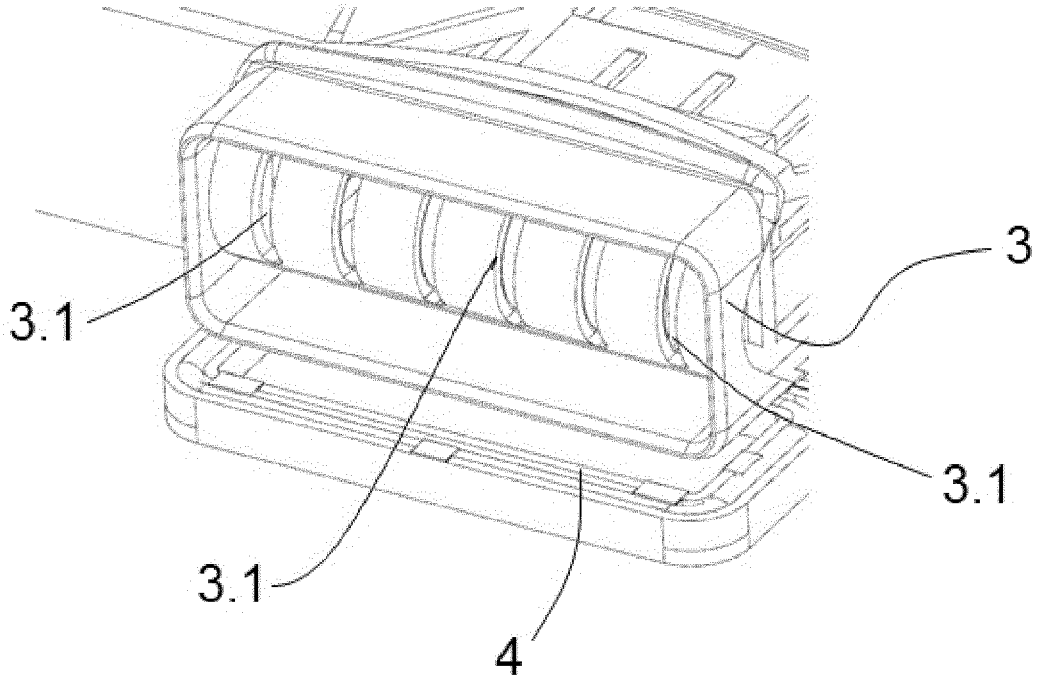



**Figure 8**

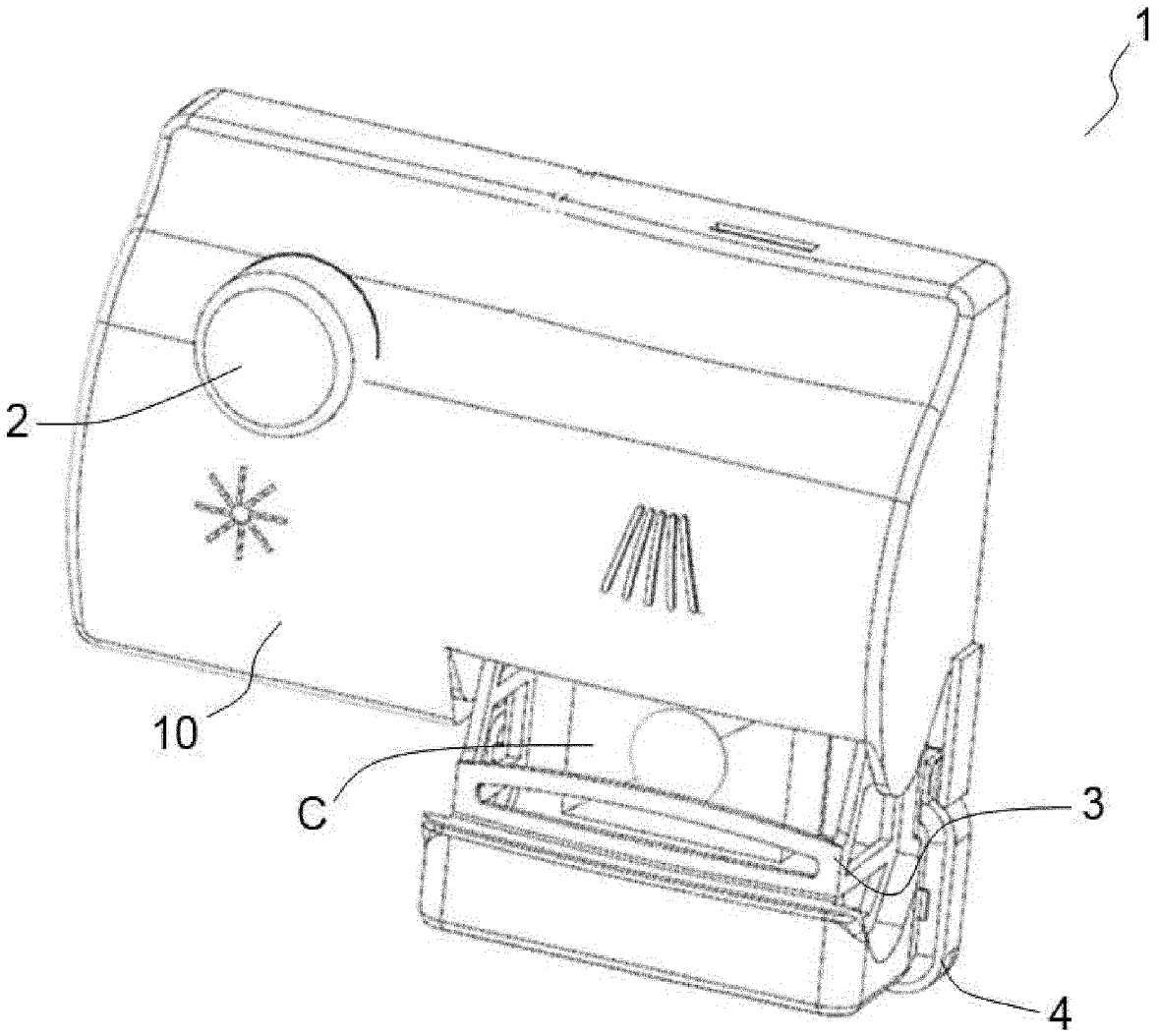



Figure 9

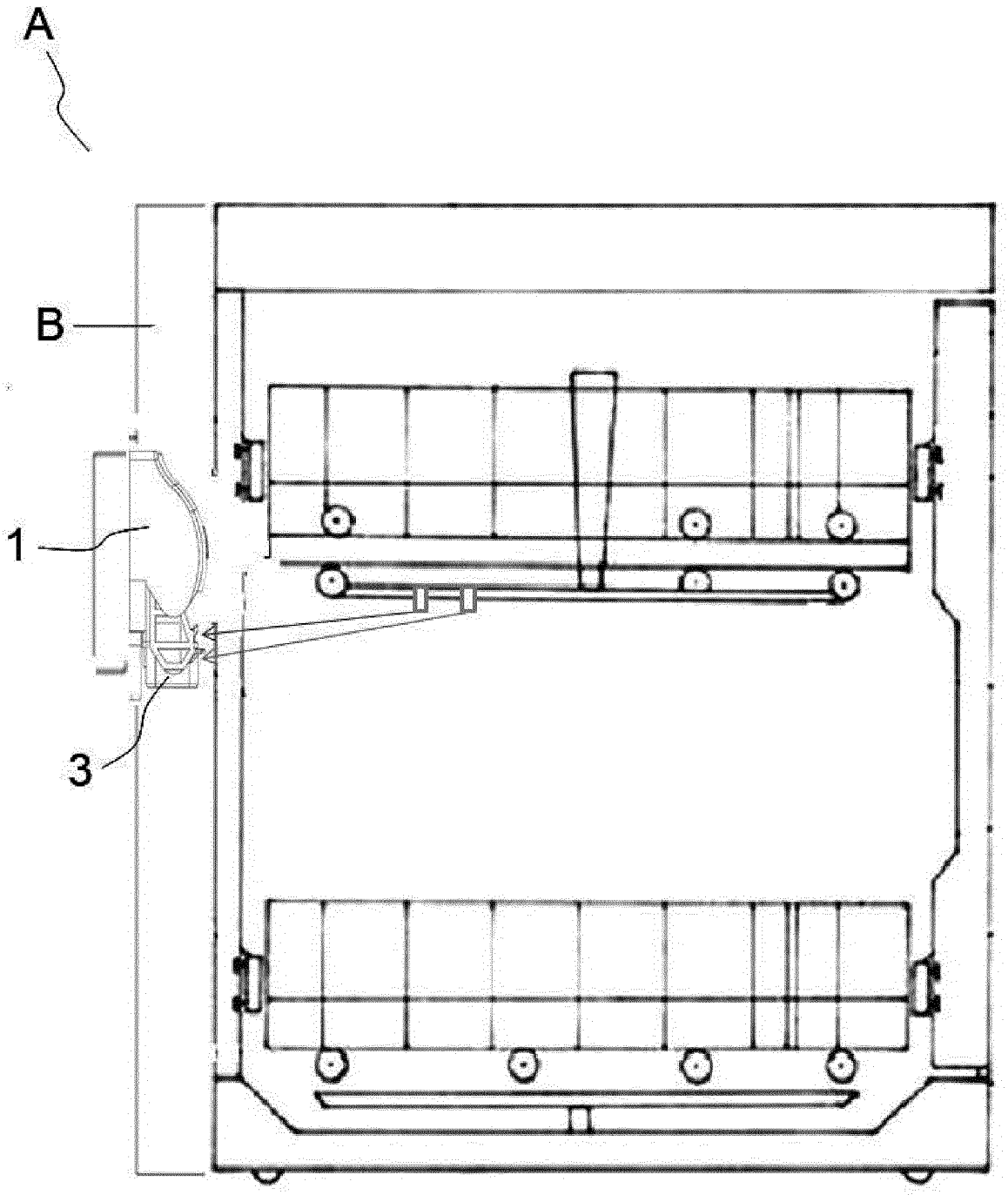
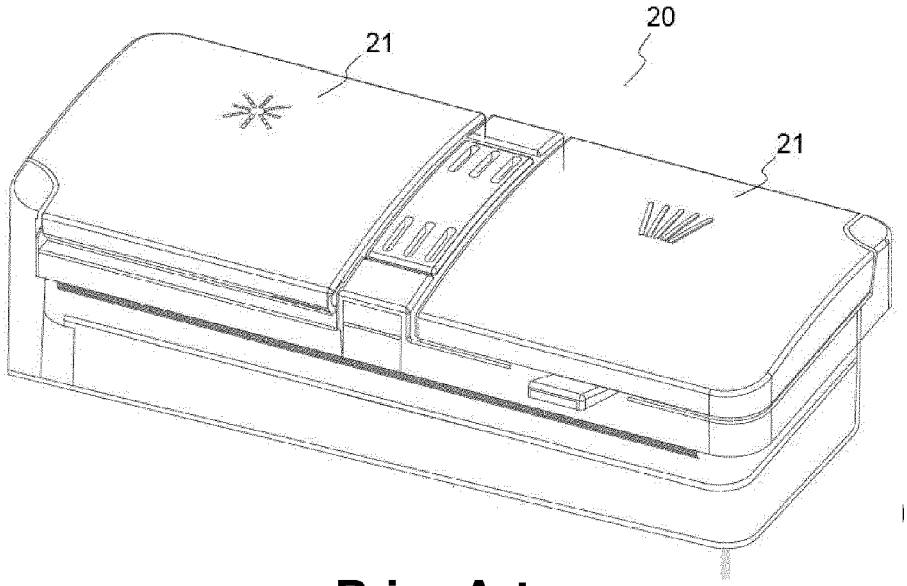
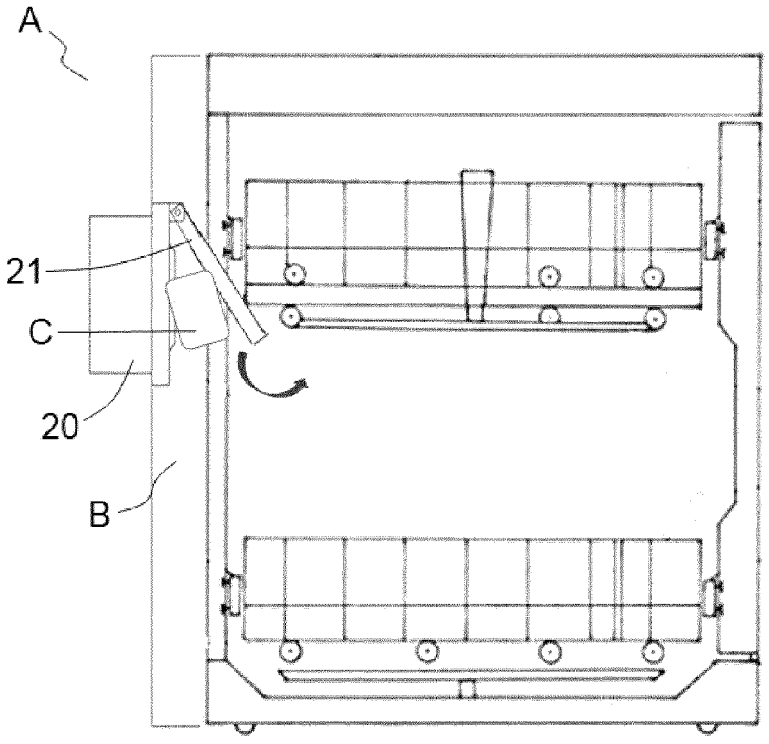


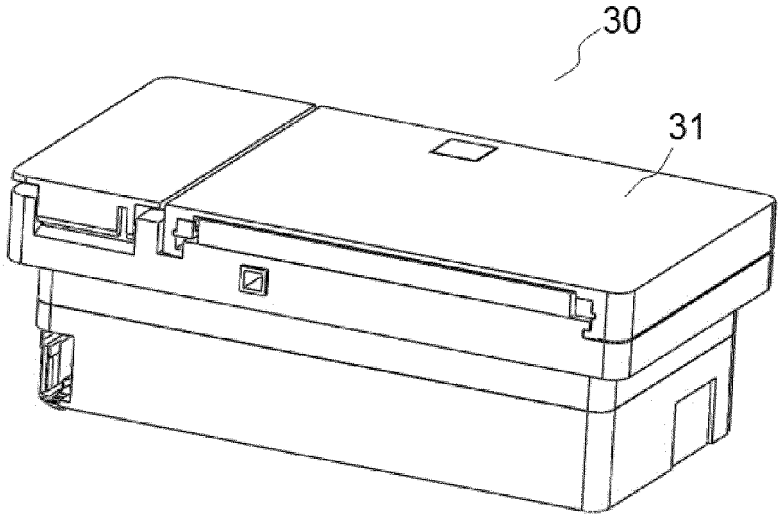

Figure 10



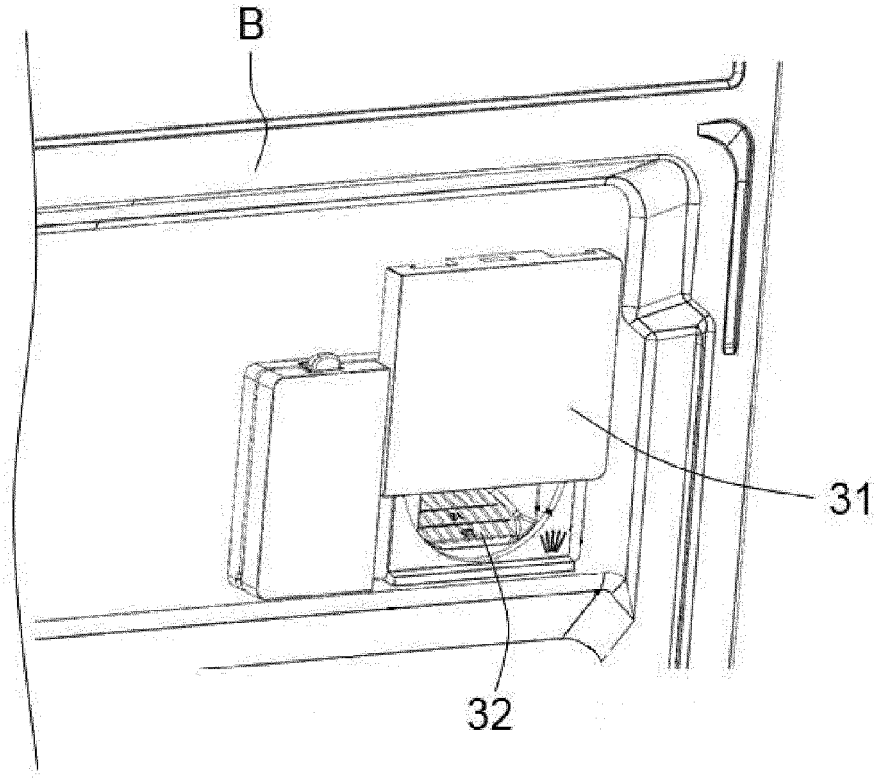

Prior Art
Figure 11




Prior Art
Figure 12




Prior Art
Figure 13




Prior Art
Figure 14

Europäisches Patentamt
European Patent Office
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# EUROPEAN SEARCH REPORT

Application Number
EP 15 15 9864

## 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<br>Y | US 6 058 946 A (BELLATI RICCARDO PAOLO FEDERIC [IT] ET AL)<br>9 May 2000 (2000-05-09)<br>* column 10, line 32 - column 11, line 20; figures 5-8 * | 1,2,6<br>3,7,8 | INV.<br>A47L15/44 |
| X | US 3 850 185 A (GUTH L)<br>26 November 1974 (1974-11-26)<br>* column 3, line 45 - column 5, line 37; figure 2 * | 1,6 | |
| Y | WO 2007/023475 A1 (ARCELIK AS [TR]; KUCUKCOSKUN BULENT [TR])<br>1 March 2007 (2007-03-01)<br>* paragraph [0034] - paragraph [0051]; figures 2-8 * | 3,7,8 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC)<br>A47L |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 13 July 2015 | Beckman, Anja |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 15 9864

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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13-07-2015

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 6058946 A | 09-05-2000 | AU 733560 B2 | 17-05-2001 |
| | | AU 4282197 A | 30-04-1998 |
| | | BR 9705152 A | 11-01-2000 |
| | | CA 2219199 A1 | 25-04-1998 |
| | | DE 69711805 D1 | 16-05-2002 |
| | | DE 69711805 T2 | 14-11-2002 |
| | | ES 2175283 T3 | 16-11-2002 |
| | | US 6058946 A | 09-05-2000 |
| | | ZA 9709552 A | 26-04-1999 |
| US 3850185 A | 26-11-1974 | NONE | |
| WO 2007023475 A1 | 01-03-2007 | TR 200801238 T1 | 21-07-2008 |
| | | WO 2007023475 A1 | 01-03-2007 |

EPO FORM P0459

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