(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 918 215 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.09.2015 Bulletin 2015/38

(51) Int Cl.:
A47L 15/44 *(2006.01)*

(21) Application number: **14425028.9**

(22) Date of filing: **14.03.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Bonferraro S.p.A.**
37060 Bonferraro (VR) (IT)

(72) Inventors:
- **Ambrosi, Andrea**
  37052 Casaleone VR (IT)
- **Pinaroli, Eros**
  37060 Castel d'Azzano VR (IT)

(74) Representative: **Concone, Emanuele et al**
Società Italiana Brevetti S.p.A.
Via Carducci 8
20123 Milano (IT)

(54) **Detergent dispenser for dishwasher**

(57) Detergent dispenser for dishwasher comprising a body (1) in which there is arranged a tray (2) for the load of the detergent which is closable by a cover (3) movable between a closed position and an open position of the tray (2) that is provided with means for the active dispensing of the detergent such as a pusher (8), fixed externally on the bottom of the tray (2) and slidably mounted in the body (1), and a spring (9) compressed between a wall (1c) of the body (1) and the pusher (8) so as to push it outwards in the direction perpendicular to the plane of the door, the tray (2) being formed by a flexible membrane fixed to the body (1) only along its own perimeter in order to be able to be turned inside out passing from concave to convex.

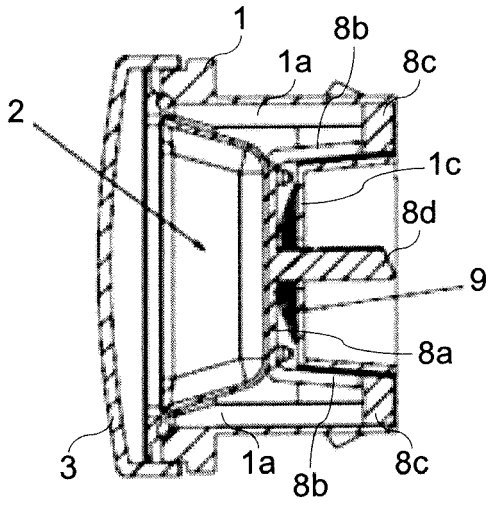

Fig.5

EP 2 918 215 A1

Description

[0001] The present invention relates to dishwashing machines, and in particular to a detergent dispenser in which the tray containing the detergent is provided with means for the active dispensing of the detergent.

[0002] It is well known that a dishwasher typically includes inside the door a dispenser substantially consisting of a tray which is closable by a cover that engages a latch, said cover being biased open by a spring. When the door is open in the horizontal position, the tray is loaded by the user with the detergent required for the washing cycle and then the cover is manually closed by overcoming the resistance of the spring. In this way it is possible to close the dishwasher door without the detergent falling out of the tray, which will then be opened at the right moment in the cycle by unlocking the cover latch by means of an actuator.

[0003] A typical example of a dispenser provided with a cover that slides linearly is described in EP 0780087, but the cover can also be hinged to the tray along one side thereof so as to rotate about an axis disposed in the plane of the door, as illustrated in US 2012/090463, or the cover can rotate in the plane of the door being keyed on a shaft perpendicular thereto, as shown in US 4149657. In the present description specific reference will be made to a dispenser with a sliding cover of the first type mentioned above, but it is clear that what is being said is applicable with obvious modifications to a dispenser with a cover of any other type.

[0004] Regardless of the type of mechanism used to displace the cover and open the detergent tray placing it in communication with the wash tank, in prior art dishwashers said tray is invested passively by at least one jet of water coming from a nozzle specially dedicated to washing off the detergent from the tray. This jet of water typically comes from a nozzle of the upper sprayer, mounted under the upper rack of the dishwasher, and must have a vertical extension sufficient to be effective throughout the range of vertical adjustment of the basket.

[0005] Consequently, during all the time of rotation of the upper sprayer there is this jet of water that invests not only the tray, even when it is still closed or is already empty, but also areas of the door and of the wash tank that do not need to be sprayed. This generates the double drawback of an unnecessary consumption of water and an increase in noise.

[0006] Note that the use of this tray washing jet is made necessary by the fact that powder detergents tend to compact and stick to the tray due to the conditions of temperature, vibration and humidity in which they are stored in the tray in the initial stages of the cycle before releasing the latch. It may also happen that the user loads the detergent in the tray long before the start of the wash cycle, so that environmental humidity has time to cause the adhesion of the detergent to the tray being the detergent strongly hygroscopic. On the other hand, it is not advisable to use liquid detergents in dishwashers because they have the disadvantage of not providing the same washing performance as powders, since certain essential components cannot by liquefied and/or do not remain in suspension.

[0007] Another solution is that of using cleaning tablets which however on average cost 30% more than powder detergents due to the additional processes to which they are subjected, being no more than powders with the addition of binders and pressed in molds. Despite the higher cost, a tablet of detergent has substantially the same drawbacks of the powder detergent since prior to use it must be removed from its moisture-proof wrapping, necessary to prevent the disintegration of the tablet during storage, and then once inserted into the dispenser it can crumble and stick to the tray.

[0008] Finally it should be taken into account that the dishwasher must be able to operate with any type of detergent, depending on the choice of the user, ensuring the same degree of washing effectiveness and using completely the dose of detergent loaded into the dispenser.

[0009] The purpose of the present invention is therefore to provide a detergent dispenser for dishwasher that is free from said drawbacks. Said object is achieved by means of a dispenser in which the tray is provided with means for the active dispensing of the detergent, whereby it is not necessary for the tray to be exposed to the washing action of the sprayer as in traditional dispensers. Other advantageous features of the present dispenser are specified in the subsequent claims, in particular the use of a single actuator for both the unlocking of the latch and the activation of the means for the active dispensing of the detergent.

[0010] A first great advantage of the present dispenser is to reduce the water consumption of the dishwasher as well as its noise, being able to do without the water jet dedicated to washing the tray.

[0011] A second significant advantage of this dispenser is that of having a higher reliability, because even if the detergent compacts and sticks to the tray the mechanism for the active dispensing is not affected and the dispenser is able to introduce the detergent in the washing liquid, which is not always the case with the traditional tray washing jet if the jet is not strong enough.

[0012] A further advantage of said dispenser derives from the fact that the upper sprayer is simpler and can dedicate all its nozzles to washing the dishes with even stronger water jets, since it does not have a nozzle dedicated to washing the tray.

[0013] Still another advantage of this type of dispenser resides in the possibility of placing it in different positions in the door, since it is no longer necessary to place it in correspondence of the upper sprayer to be reached by the dedicated tray washing jet.

[0014] Note also that such a dispenser maintains the advantage of being usable with any type of detergent (powder, liquid or tablets) and that its size does not vary significantly thus allowing to fit it in the dishwasher door

as a traditional dispenser. It follows that it is easily applicable to any model of dishwasher without requiring special modifications to the machine structure and/or to the arrangement of its components, since any small changes required affect only the door.

[0015] Further advantages and characteristics of the dispenser according to the present invention will become apparent to those skilled in the art from the following detailed description of some embodiments thereof with reference to the attached drawings in which:

Fig.1 is a front perspective view from above of a first embodiment of a dispenser according to the invention, ready to dispense with the cover in the closed position;
Fig.2 is a rear view of the dispenser of Fig.1 with a part of the body removed to show some internal components;
Fig.3 is an enlarged rear perspective view of the components shown in Fig.2, with the body of the dispenser represented in transparency to show other details;
Fig.4 is a rear perspective view of one of the components shown in Fig.3;
Fig.5 is a sectional view along line A-A of Fig.2;
Fig.6 is a perspective view similar to Fig.1, with the cover in the open position and the tray in communication with the wash tank;
Fig.7 is a rear view similar to Fig.2, with the components in the position corresponding to the condition of Fig.6;
Fig.8 is a sectional view along line A-A of Fig.7;
Fig.9 is a rear view similar to Fig.7, with the components in the position corresponding to the activation of the means for the active dispensing of the detergent;
Fig.10 is a sectional view along line A-A of Fig.9;
Fig.11 is a perspective view similar to Fig.6, with the cover in the open position and the tray in the condition corresponding to Fig.10;
Fig.12 is a rear view similar to Fig.9, with the components in the rest position after activation of the means for the active dispensing of the detergent;
Fig.13 is a cross-sectional view along line A-A of Fig. 12, indicating the user's manual intervention for the restoration of the means for the active dispensing of the detergent;
Fig.14 is a rear view same as Fig.12, but with the components in the position corresponding to the restoration phase of the means for the active dispensing of the detergent;
Fig.15 is a sectional view along line B-B of Fig.14;
Fig.16 is a perspective view similar to Fig. 1 of a second embodiment of a dispenser according to the invention, ready to dispense with the cover in the closed position;
Fig.17 is a rear view of the dispenser of Fig.16 with a part of the body removed to show some internal components;
Fig.18 is a sectional view along line C-C of Fig.17;
Fig.19 is a sectional view along line D-D of Fig.17;
Fig.20 is a perspective view similar to Fig.16, with the cover in the open position and the tray in communication with the wash tank;
Fig.21 is a rear view similar to Fig.17, with the components in the position corresponding to the condition of Fig.20;
Fig.22 is a sectional view along line C-C of Fig.21;
Fig.23 is a sectional view along line D-D of Fig.21;
Fig.24 is a rear view similar to Fig.21, with the components in the position corresponding to the initial stage of activation of the means for the active dispensing of the detergent;
Fig.25 is a sectional view along line C-C of Fig.24;
Fig.26 is a sectional view along line D-D of Fig.24;
Fig.27 is a rear view similar to Fig.24, with the components in the position corresponding to the complete activation of the means for the active dispensing of the detergent;
Fig.28 is a sectional view along line C-C of Fig.27;
Fig.28 is a sectional view along line D-D of Fig.27;
Fig.30 is a rear perspective view of a third embodiment of a dispenser according to the invention, with a portion of the bottom removed to show some internal components and with the cover in the open position;
Fig.31 is a rear view of the dispenser of Fig.30; and
Fig.28 is a sectional view along line E-E of Fig.31;

[0016] Referring to Figures 1 to 5, there is seen that a dispenser according to the invention conventionally includes a body 1 at one end of which there is inserted a tray 2 for the load of the detergent which is closable by a sliding cover 3 that is pushed open by a spring (not shown) when an actuator 4 unlocks a latch (not shown) that holds it in the closed position. Typically, actuator 4 does not act directly on the latch but rather on a rotating lever 5 pivoted to body 1 through a pin 6 so as to rotate in the plane of the dishwasher door. A return spring 7 is arranged between body 1 and lever 5 to operate in contrast to actuator 4, so as to bring lever 5 back to the initial rest position when actuator 4 is turned off (spring 7 is only shown schematically in Fig.2 and is omitted in Fig.3).

[0017] A first novel aspect of the present dispenser, as mentioned above, lies in the presence on tray 2 of means for the active dispensing of the detergent which essentially consist of a pusher 8, externally fixed on the bottom of tray 2, and a spring 9 compressed between body 1 and said pusher 8 so as to push it outwards in the direction perpendicular to the plane of the door.

[0018] More specifically, as better shown in Fig.4, pusher 8 is formed by a rectangular plate 8a shaped and dimensioned for attachment to the bottom of tray 2, by perpendicular uprights 8b that extend from the short sides of plate 8a and are provided with pegs 8c whose longitudinal axes are parallel to plate 8a, and by an L-shaped hook 8d which extends perpendicularly from the

center of plate 8a on the same side of uprights 8b.

[0019] Pusher 8 is slidably mounted in body 1, as better shown in Fig.3, through pegs 8c which slide along guides formed by pairs of ribs 1a perpendicular to the plane of the door, while hook 8d passing through a corresponding hole 1b protrudes to the rear of a wall 1c that supports spring 9. The purpose of hook 8d is to act as a latch for the activation of the means for the active dispensing of the detergent, since once disengaged it allows spring 9 to push outwards pusher 8 and with it tray 2 which is formed by a flexible membrane fixed to body 1 only along its own perimeter.

[0020] In a second novel aspect of the present invention, the locking of hook 8d in its rest position and its subsequent release are preferably achieved using the same rotating lever 5 moved by actuator 4 and spring 7. In this way, it is not necessary to add other electrical components for the activation of the means for the active dispensing of the detergent since use is made of the same components already present for the release of cover 3. To this purpose, lever 5 extends up to hook 8d with an L-shaped arm 5a, whose end engages hook 8d thus keeping spring 9 compressed between wall 1c and plate 8a.

[0021] In the light of the description above, the simple and effective operation of the present dispenser is readily understood with the aid of figures 6 to 15. When the dishwasher door is open in a horizontal position with the dispenser open and empty, the user pours in tray 2 the detergent powder or liquid (or inserts a tablet of detergent without its protective wrapping), and then closes cover 3, thus obtaining the initial condition shown in Fig.1, in the same way that with a traditional dispenser.

[0022] Once closed the dishwasher door, in the established phase of the wash cycle the control unit of the machine activates actuator 4 to release cover 3 thus putting tray 2 in communication with the wash tank (Fig. 6). To this purpose, actuator 4 pushes lever 5 making it rotate around pin 6 against the resistance of spring 7, and in these first few millimeters of travel actuator 4 causes the unlocking of the latch of cover 3 that slides sideways under the push of its spring as it normally occurs in traditional dispensers. Note that at the end of this first release phase arm 5a still engages hook 8d (Fig.7), as is also evident from Fig.8 that differs from Fig.5 only for the absence of cover 3.

[0023] Continuing in its travel, actuator 4 performs a second release phase by continuing to rotate lever 5 until arm 5a disengages from hook 8d (Fig.9) and thus releases plate 8a which kept spring 9 compressed. At this point spring 9 can push plate 8a outwards (Fig.10) and with it the bottom of tray 2, so that the flexible membrane that acts as a detergent container is turned inside out allowing the complete emptying of the detergent (Fig.11). The linear and balanced movement of pusher 8 under the action of spring 9 is guaranteed by pegs 8c which slide in the guides of body 1 defined by ribs 1a, ensuring a smooth passage of hook 8d through hole 1b of wall 1c.

[0024] Note that at this stage tray 2 is not only reversed from concave to convex, but it also protrudes toward the inside of the wash tank and is therefore subject to a certain washing action by water jets that bounce off from the dishes and by streams of water dripping down the door.

[0025] At the end of its operating phase, actuator 4 is deactivated and returns to its rest position, together with lever 5, under the push of the return spring 7 (Fig.12) as normally occurs in traditional dispensers. This position of the components 4, 5 and 7 corresponds to the initial position shown in Fig.2, but in this condition arm 5a does not engage hook 8d which is on the other side of wall 1c. To restore the actual initial condition and be able to reload the detergent in tray 2 for the next wash cycle, the user must press on the bottom of tray 2 (Fig.13) pushing consequently pusher 8 which, thanks to pegs 8c, slides in guides 1a compressing spring 9 until it arrives in contact with arm 5a which is positioned in front of hole 1b in correspondence with the hooking portion of hook 8d (Fig. 14).

[0026] Continuing the compression of spring 9, by means of a coupling between two corresponding slanted surfaces formed on the faces of components 8d and 5a that come into contact in this phase, as shown in Fig.15 where tray 2 is omitted, the push of the user on pusher 8 also causes the rotation of lever 5 against the resistance of spring 7 allowing the passage of hook 8d. Once the hooking portion of hook 8d has passed beyond arm 5a, the return spring 7 brings lever 5 back to its rest position so that arm 5a returns to engage hook 8d as in the initial position of Fig.2. In this condition, tray 2 is back to a concave shape and can accommodate detergent again, so that the user can reload the dispenser and manually close cover 3 as it normally occurs in traditional dispensers.

[0027] Referring now to figures 16 to 19, there is illustrated a second embodiment of a dispenser according to the invention which differs from the first embodiment in the tray with the related means for the active dispensing of the detergent. There is no change in the operation of the spring-loaded sliding cover 3, Fig.16 being equal to Fig.1 only seen from another angle, and of actuator 4 which unlocks the latch thereof by acting on lever 5 which rotates around pin 6, with the return spring 7 arranged between body 1 and lever 5 to return the latter to its initial position when actuator 4 is turned off (Fig. 17).

[0028] In this second embodiment the means for the active dispensing of the detergent essentially consist of a scraper 10 shaped and dimensioned to extend along half of the perimeter of tray 2'. The ends of scraper 10 are pivoted to tray 2' so that scraper 10 can rotate 180° around an axis X arranged in the plane of the door. In the path from a semi-perimeter to the other, scraper 10 scrapes the entire inner surface of tray 2' thus removing the detergent that may have stuck to it.

[0029] Note that tray 2' will therefore have a semicircular shape in a section along a plane perpendicular to the axis of rotation X (Fig.18), but it can have any shape

in a section along a plane perpendicular to said plane of section. In fact, tray 2' shown in the drawings occupies the same space of the rectangular tray 2 of the first embodiment, therefore it does not have a hemispherical shape which however it could have if it were wider.

[0030] Also in this embodiment the rotation of scraper 10 is preferably achieved by using the same rotating lever 5 moved by actuator 4 and spring 7, so as not to require other electrical components for the activation of the means for the active dispensing of the detergent. To this purpose, lever 5 is provided on its front face with a protrusion 5b which engages with play a toothed sector 11, in correspondence of a cavity 11a, which is pivoted to body 1 through a pin 12 so as to rotate in a plane perpendicular to the dishwasher door (Fig.19). This toothed sector 11 engages in turn a toothed wheel 13 coaxial with the axis of rotation X and integral with a shaft (not shown) on which is keyed the inner end of scraper 10. A return spring 14 is also preferably arranged between body 1 and the toothed sector 11 to help spring 7 return the toothed sector 11 to the initial position when actuator 4 is turned off.

[0031] In the light of the description above, the simple and effective operation of the second embodiment of the present dispenser is readily understood with the aid of figures 20 to 29.

[0032] When the control unit of the machine activates actuator 4 to release cover 3, actuator 4 pushes lever 5 making it rotate around pin 6 against the resistance of spring 7. In these first few millimeters of travel, actuator 4 causes the unlocking of the latch of cover 3 that slides sideways under the push of its spring as it normally occurs in traditional dispensers (Fig.20). Note that at the end of this release phase (Fig.21) protrusion 5b has moved only within cavity 11 a and has not yet caused any rotation of the toothed sector 11 (Fig.23), as is also evident from Fig.22 that differs from Fig.18 only for the position of cover 3.

[0033] Continuing in its travel, actuator 4 continues to rotate lever 5 (Fig.24) so that projection 5b drives into rotation the toothed sector 11 around pin 12 against the resistance of the return spring 14. This rotation of the toothed sector 11, clockwise in the view of Fig.26, in turn causes an opposite rotation (counterclockwise in Fig.26) of the toothed wheel 13 around axis X which results in a corresponding rotation of scraper 10 in tray 2' (Fig.25). With a suitable calculation of the transmission ratio between the toothed sector 11 and the toothed wheel 13, when actuator 4 has completed its travel (Fig.27) scraper 10 has completed its 180° rotation (Fig.28), thus acting on the entire inner surface of tray 2' in order to ensure the dispensing of the detergent.

[0034] At the end of its operating phase, actuator 4 is deactivated and returns to its rest position, together with lever 5, under the push of the return spring 7 as it normally occurs in traditional dispensers. Consequently, also projection 5b returns to its rest position of Fig.19 causing, with the aid of spring 14 which has reached the maximum extension (Fig.29), the reverse rotation of the toothed sector 11 and toothed wheel 13 which in turn brings scraper 10 back to its rest position of Fig.18. Therefore also the return travel of scraper 10 is useful for scraping tray 2' in the opposite direction, to better guarantee the total removal of the detergent from the inner surface thereof.

[0035] Finally, making reference to figures 30 to 32, there is illustrated a third embodiment of the dispenser that differs from the previous ones always in the tray with the related means for the active dispensing of the detergent. The operation of the spring-loaded sliding cover 3, which is shown in Fig.30 already in the open position, remains unchanged and is not repeated again here.

[0036] In this third embodiment, the means for the active dispensing of the detergent essentially consist of a vibrating motor 15 fixed externally on the bottom of tray 2" by means of a plate 16, in a similar way to plate 8a of the first embodiment. Tray 2" is substantially rectangular and preferably also made as tray 2 of the first embodiment, i.e. a flexible membrane fixed to body 1 only along its own perimeter.

[0037] The only difference of tray 2" resides in the lower side more inclined than the upper side, said sides being so defined in the operating position of Fig.32, so as to facilitate the dispensing by gravity of the detergent. In fact, the simple operation of this dispenser consist in activating, after the opening of cover 3, the vibrating motor 15 which generates the vibration of plate 16 and therefore of tray 2" allowing the detachment and complete dispensing of the detergent. Note that tray 2" might also have a rigid structure as tray 2', provided that it is flexibly attached to body 1 so as to allow the vibrating motor 15 to shake it effectively without transmitting excessive vibrations to body 1 which would make noisy the dispenser operation.

[0038] Obviously, in this case, the activation of the means for the active dispensing of the detergent is independent from actuator 4 that releases cover 3, since the vibrating motor 15 is already in itself an electrical component that is switched on and off directly by the control unit of the dishwasher same as actuator 4.

[0039] It is clear that the embodiments of the dispenser according to the invention described and illustrated above are just examples susceptible of various modifications. In particular, the shape, size and arrangement of the tray for the load of the detergent can be varied according to the needs, as well as the means for moving cover 3 and for the activation of the means for the active dispensing of the detergent. For example, in the first two embodiments there could be provided a specific electrical or mechanical component for said activation, such as a second actuator or a second lever driven by actuator 4. Moreover, actuator 4 rather than unlocking the latch of the spring-loaded cover 3 might directly control the movement of cover 3, which would therefore not be spring-loaded.

Claims

1. Detergent dispenser for dishwasher comprising a body (1) in which there is arranged a tray (2; 2'; 2") for the load of the detergent which is closable by a cover (3) movable under the action of an actuator (4) between a closed position and an open position of said tray (2; 2'; 2"), **characterized in that** the tray (2; 2'; 2") is provided with means for the active dispensing of the detergent.

2. Detergent dispenser for dishwasher according to claim 1, **characterized in that** the means for the active dispensing of the detergent are operatively connected to the actuator (4) so as to be activated by said actuator (4) after it has caused the displacement of the cover (3) to the open position of the tray (2; 2'; 2").

3. Detergent dispenser for dishwasher according to claim 1 or 2, **characterized in that** the means for the active dispensing of the detergent essentially consist of a pusher (8), fixed externally on the bottom of the tray (2) and slidably mounted in the body (1), and a spring (9) compressed between a wall (1c) of the body (1) and said pusher (8) so as to push it outwards in the direction perpendicular to the plane of the door, the tray (2) being formed by a flexible membrane fixed to the body (1) only along its own perimeter in order to be able to be turned inside out passing from concave to convex.

4. Detergent dispenser for dishwasher according to the preceding claim, **characterized in that** the pusher (8) is formed by a rectangular plate (8a) shaped and dimensioned for attachment to the bottom of the tray (2), by perpendicular uprights (8b) that extend from the short sides of said plate (8a) and are provided with pegs (8c) whose longitudinal axes are parallel to the plate (8a), and by an L-shaped hook (8d) that extends perpendicularly from the center of the plate (8a) on the same side of said perpendicular uprights (8b), the pusher (8) being slidably mounted in the body (1) by means of said pegs (8c) which slide along guides formed by pairs of ribs (1a) perpendicular to the plane of the door, said hook (8d) passing through a corresponding hole (1b) so as to protrude to the rear of the wall (1c) that supports the spring (9) in order to act as a latch to hold the means for the active dispensing of the detergent in the rest position.

5. Detergent dispenser for dishwasher according to the preceding claim, **characterized in that** in the rest position the hook (8d) is engaged by an arm (5a) which extends from a lever (5) rotating in the plane of the door under the action of the actuator (4) that overcomes the resistance of a return spring (7), the faces of the hook (8d) and of said arm (5a) opposite to the faces in contact in said engagement condition being shaped as two corresponding slanted surfaces suitable to convert a push on the pusher (8) in the direction perpendicular to the plane of the door into a rotation of the lever (5) against the resistance of said spring (7) until the restoration of the engagement condition.

6. Detergent dispenser for dishwasher according to claim 1 or 2, **characterized in that** the means for the active dispensing of the detergent essentially consist of a scraper (10) shaped and dimensioned to extend along half of the perimeter of the tray (2'), the ends of said scraper (10) being pivoted to the tray (2') so that the scraper (10) can rotate 180° around an axis of rotation (X) disposed in the plane of the door, the tray (2') having a semicircular shape at least in the section along a plane perpendicular to said axis of rotation (X).

7. Detergent dispenser for dishwasher according to the preceding claim, **characterized in that** it includes a lever (5) rotating in the plane of the door under the action of the actuator (4) that overcomes the resistance of a return spring (7), said lever (5) being provided on its front face with a projection (5b) which engages with play a toothed sector (11) hinged to the body (1) so as to rotate in a plane perpendicular to the dishwasher door, said toothed sector (11) engaging in turn a toothed wheel (13) integral with a shaft on which is keyed one end of the scraper (10).

8. Detergent dispenser for dishwasher according to the preceding claim, **characterized in that** it further comprises a return spring (14) arranged between the body (1) and the toothed sector (11) so as to bring it back to the initial position when the actuator (4) is turned off.

9. Detergent dispenser for dishwasher according to claim 1, **characterized in that** the means for the active dispensing of the detergent essentially consist of a vibrating motor (15) fixed externally on the bottom of the tray (2") by means of a plate (16).

10. Detergent dispenser for dishwasher according to the preceding claim, **characterized in that** the tray (2") is formed by a flexible membrane fixed to the body (1) only along its own perimeter or by a rigid structure flexibly attached to the body (1).

11. Detergent dispenser for dishwasher according to claim 9 or 10, **characterized in that** the tray (2") is substantially rectangular and has a lower side more inclined than the upper side, said sides being so defined in the operating position for dispensing.

12. Dishwasher, **characterized in that** it includes a de-

tergent dispenser according to any of the preceding claims.

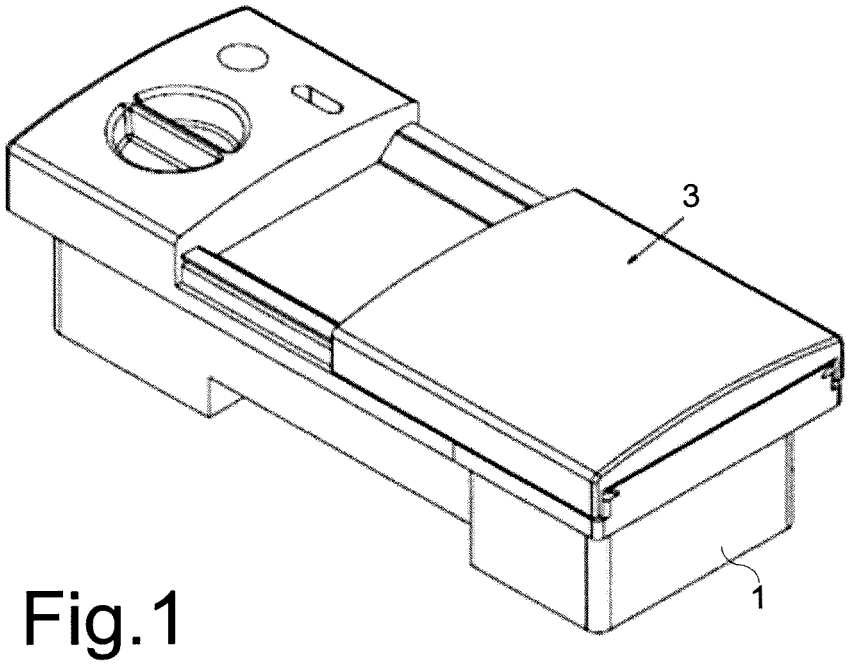

Fig.1

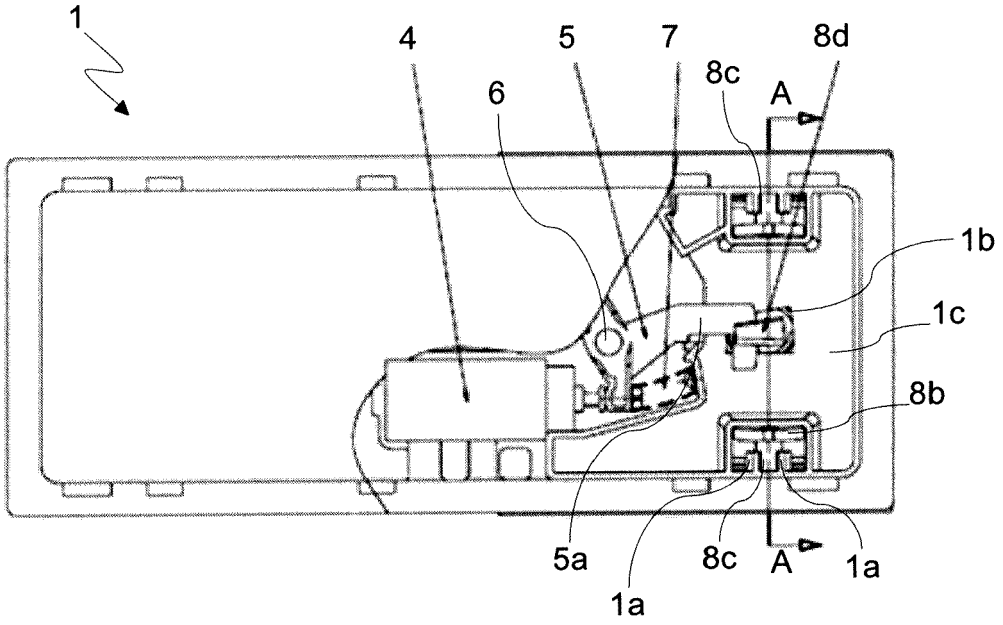

Fig.2

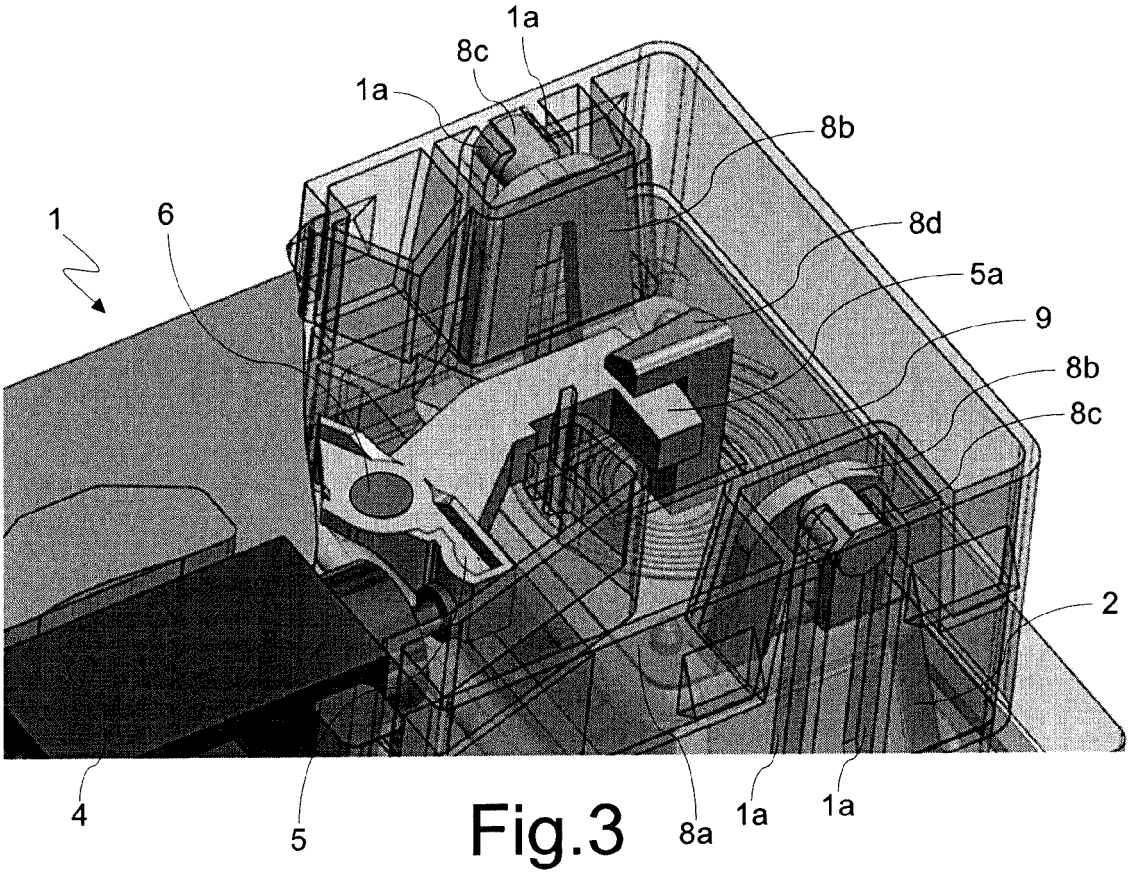

Fig.3

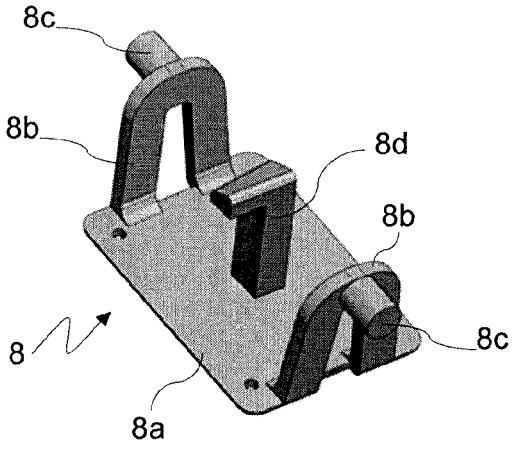

Fig.4

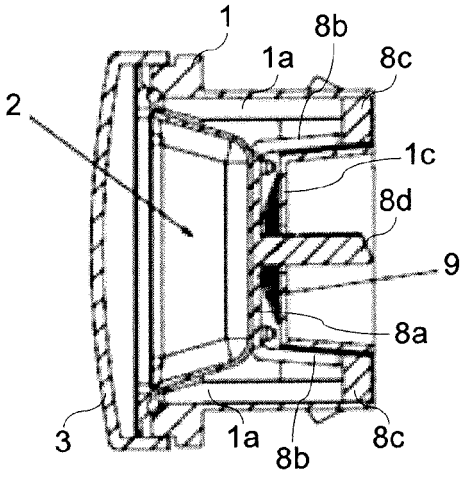

Fig.5

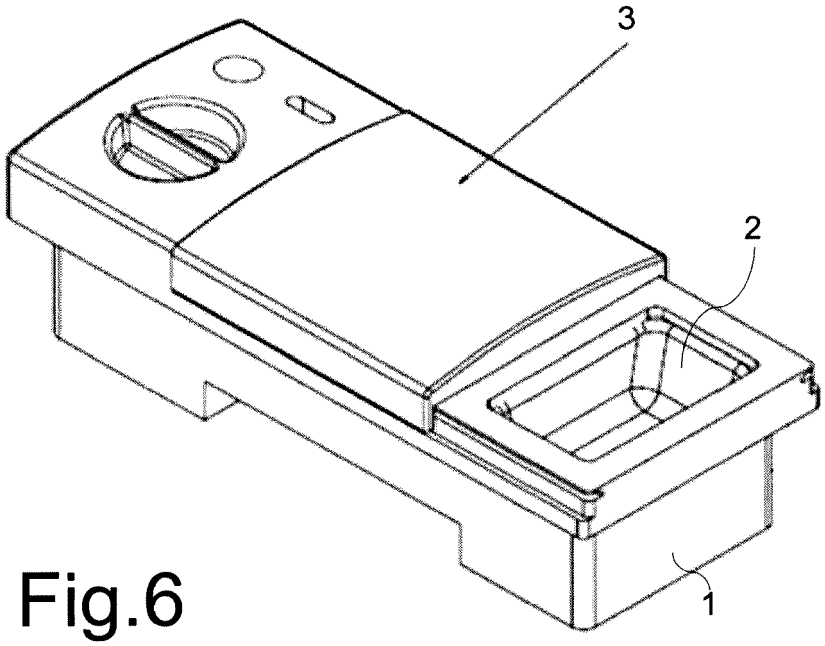

Fig.6

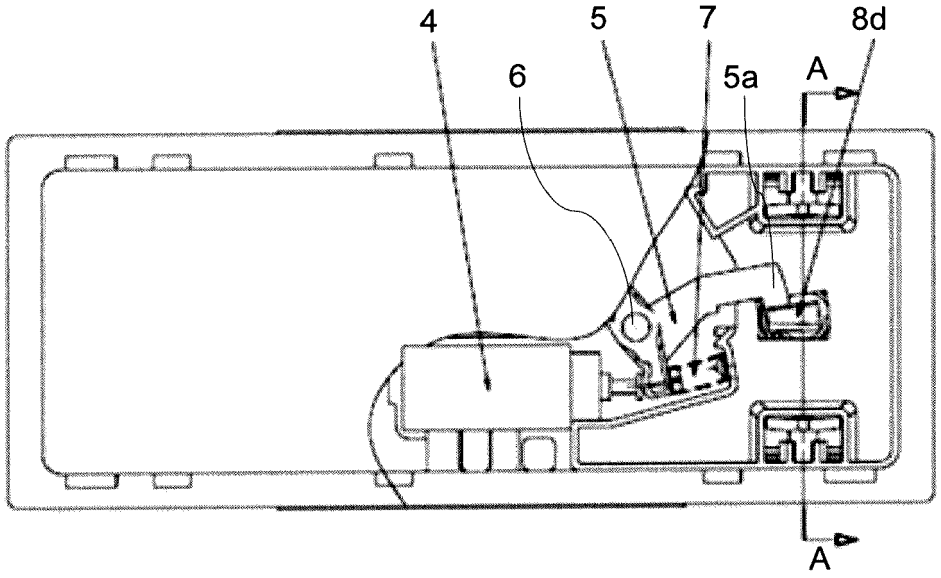

Fig.7

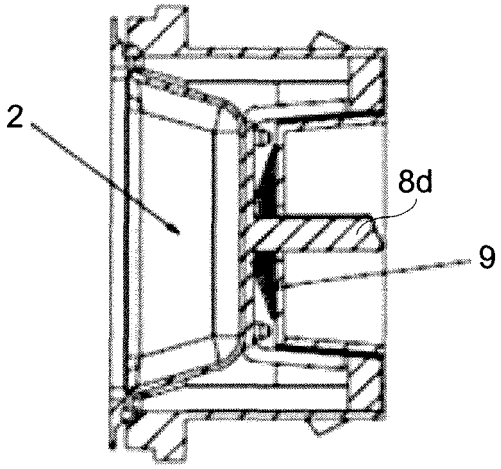

Fig.8

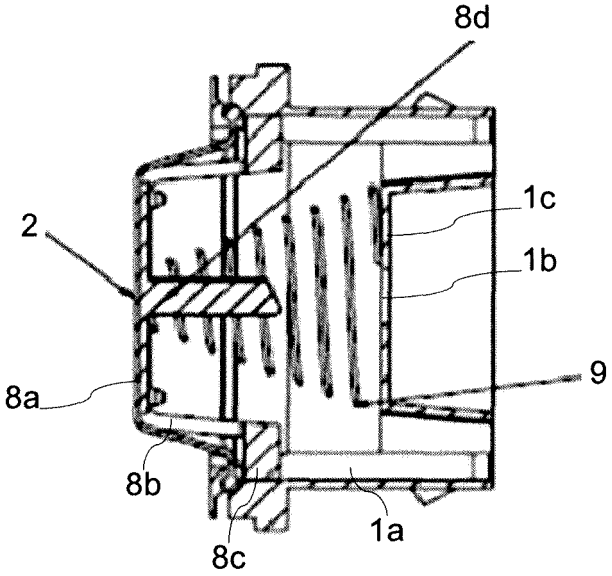

Fig.10

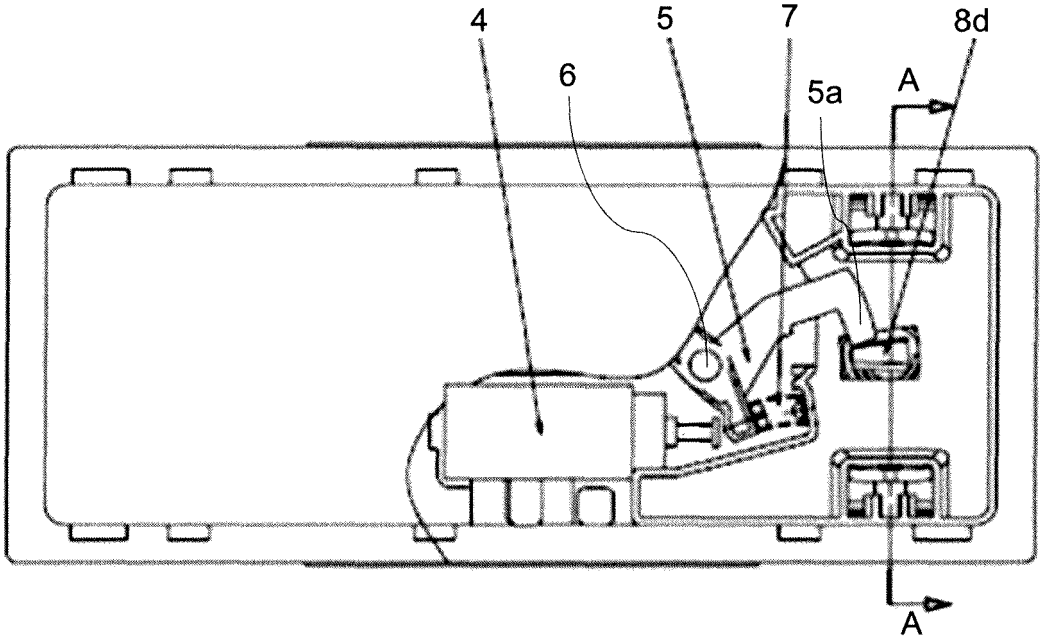

Fig.9

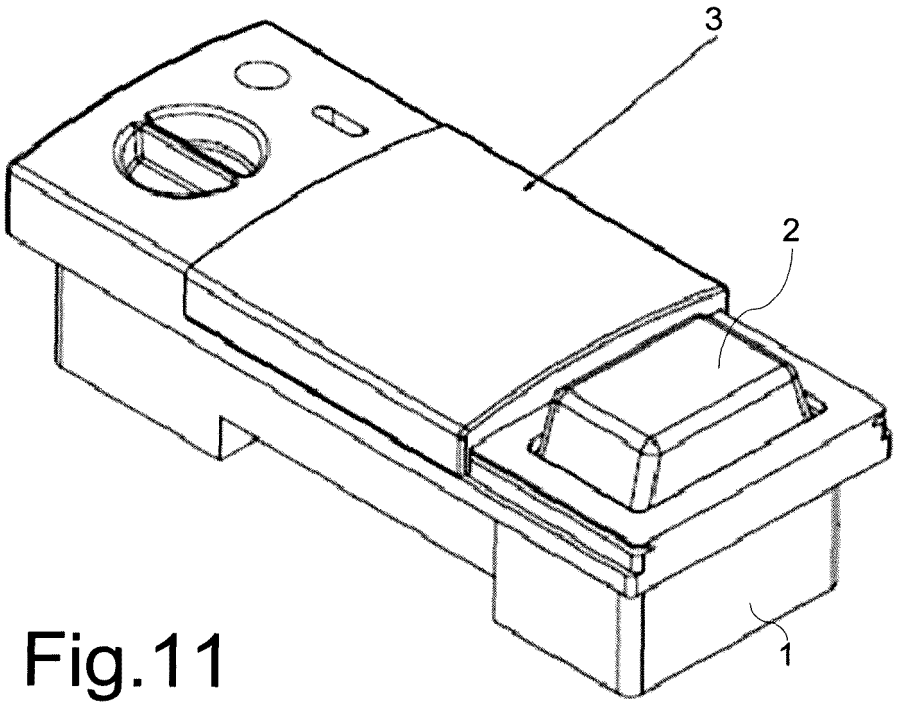

Fig.11

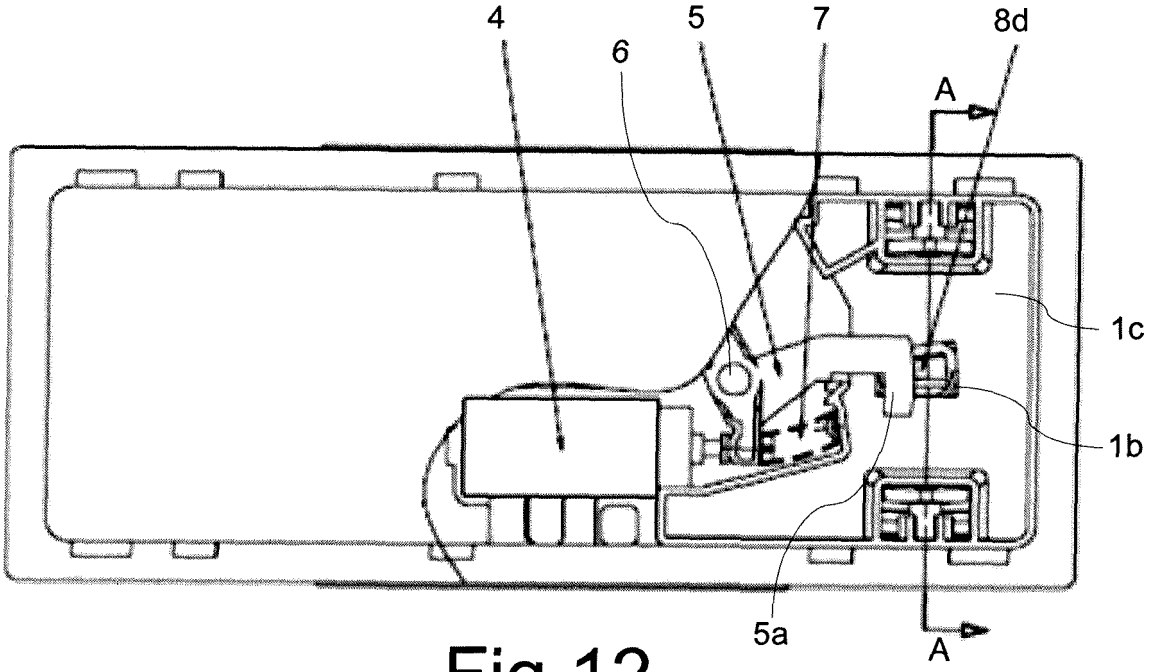

Fig.12

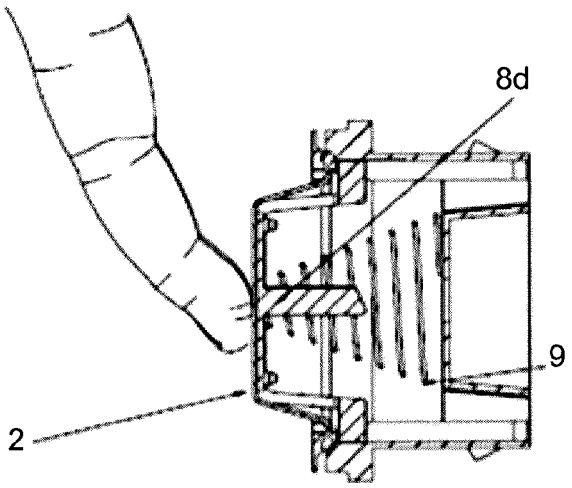

Fig.13

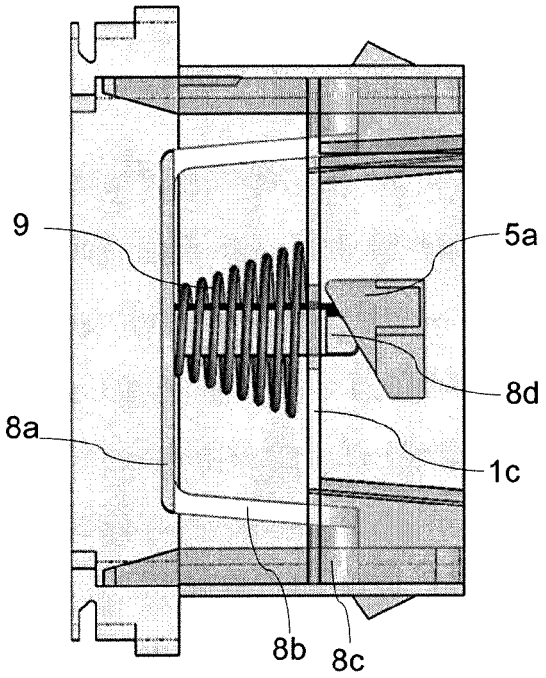

Fig.15

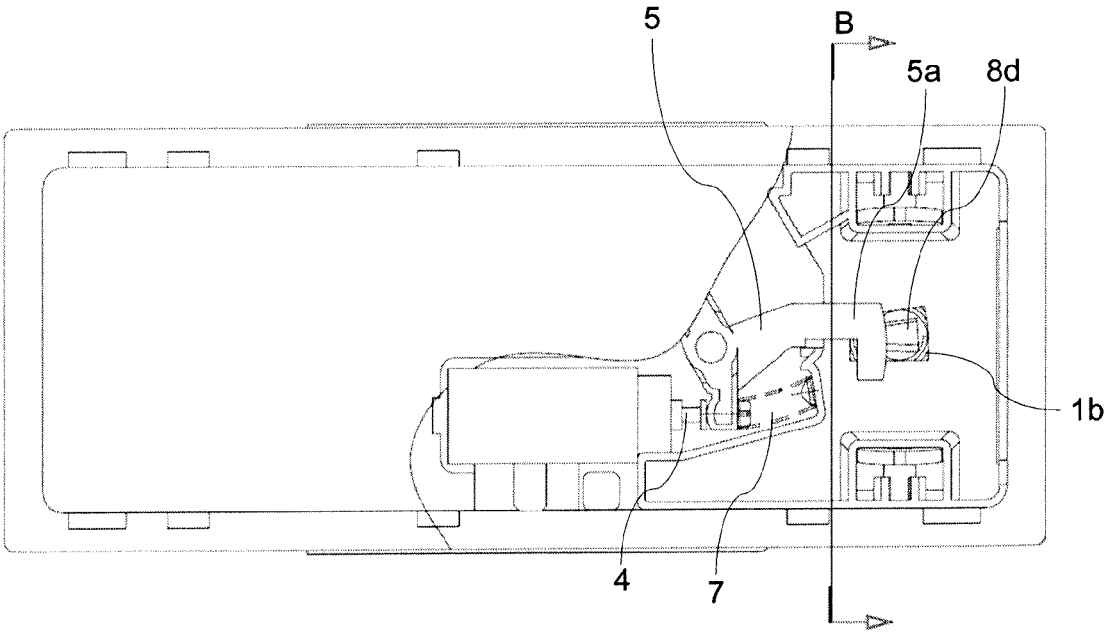

Fig.14

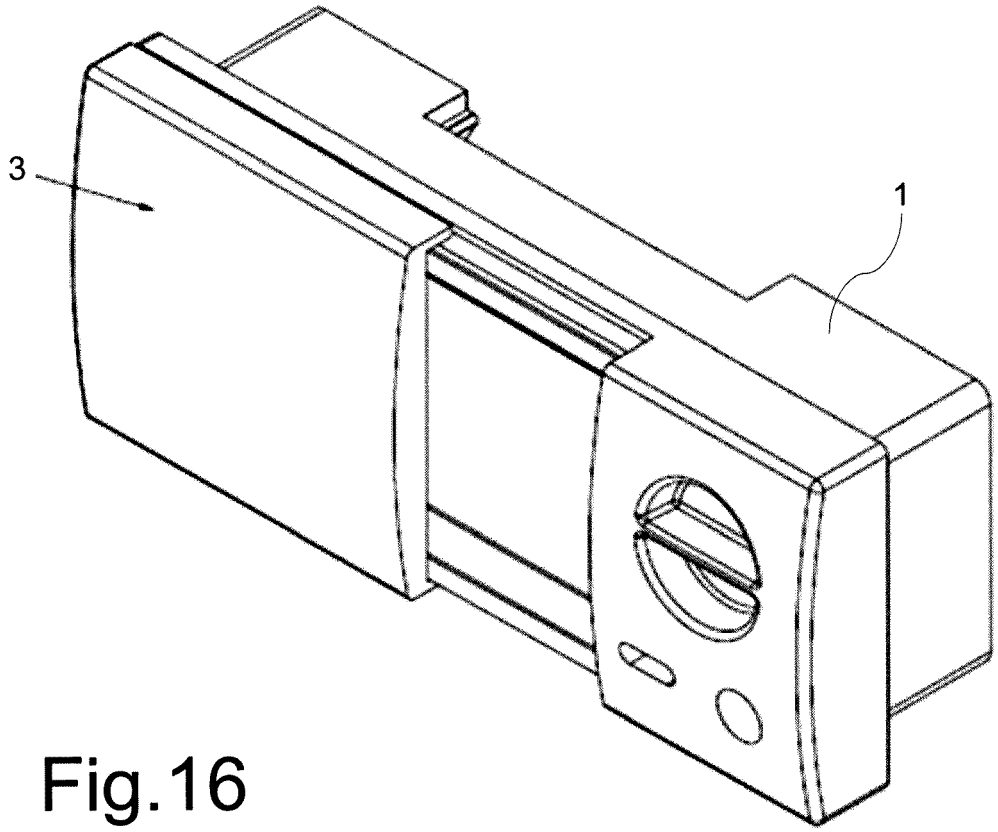

Fig.16

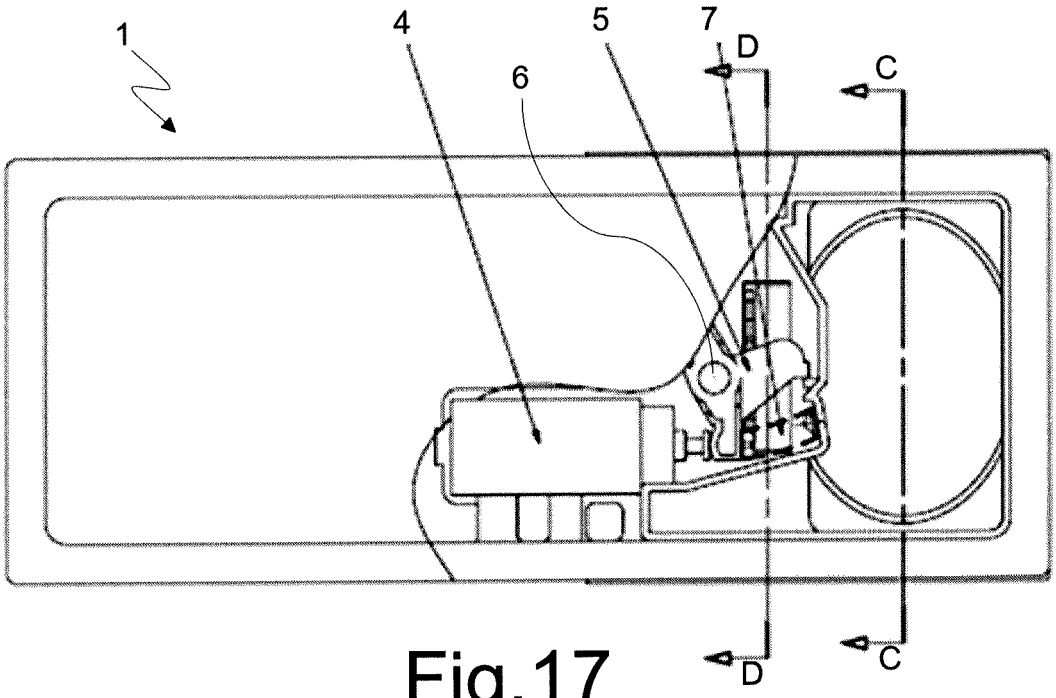

Fig.17

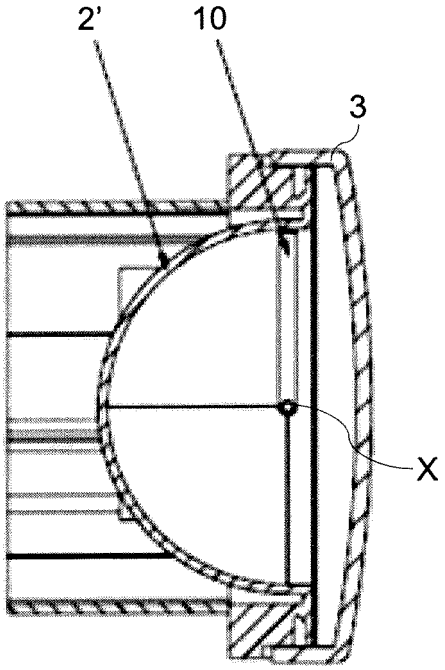

Fig.18

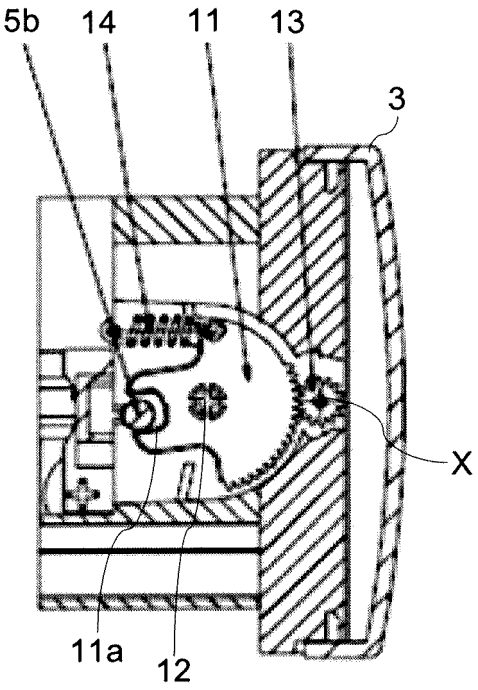

Fig.19

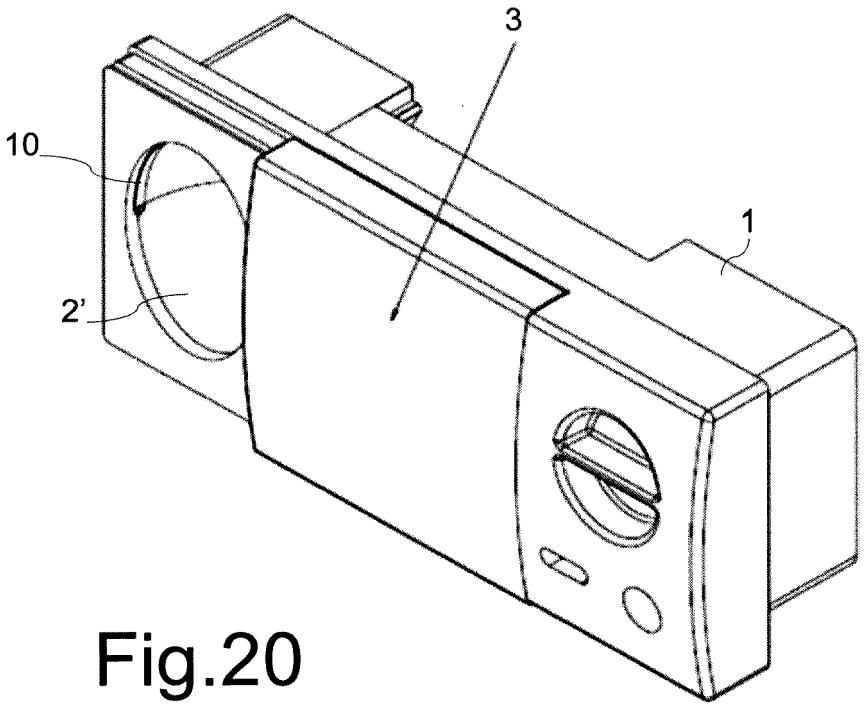

Fig.20

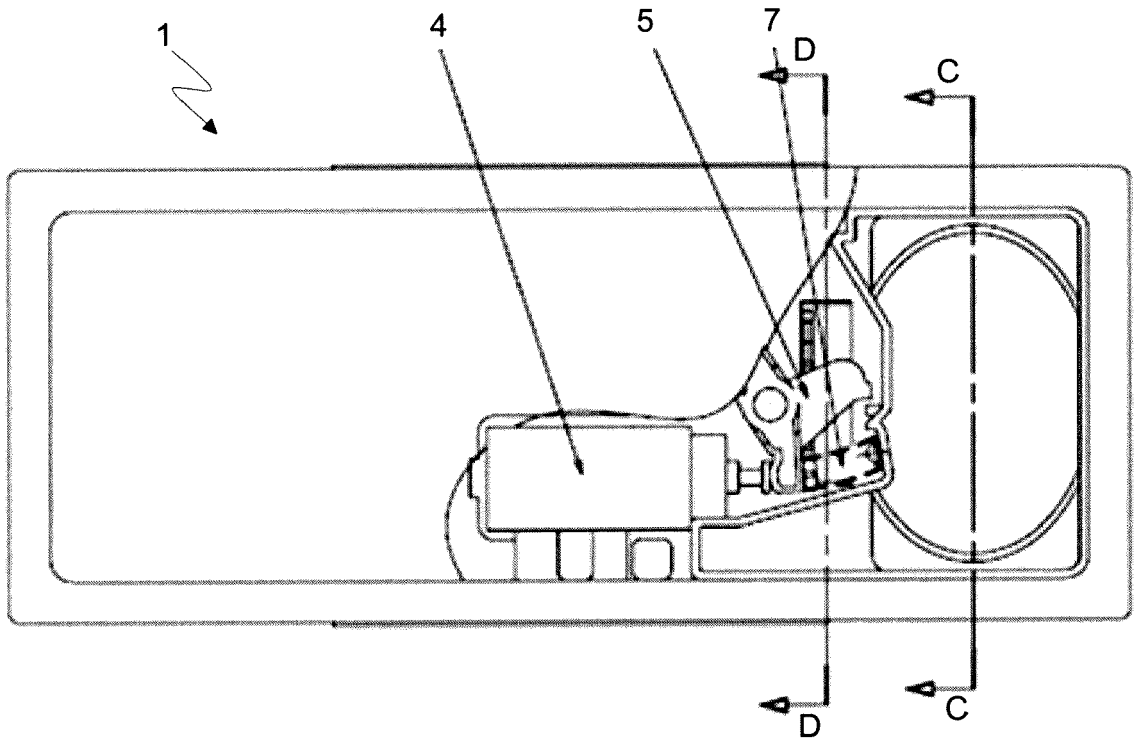

Fig.21

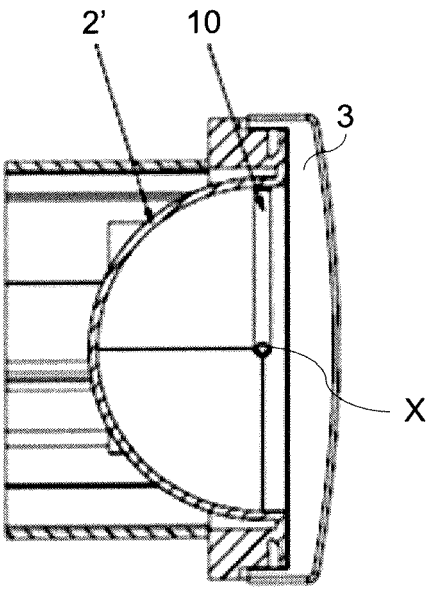

Fig.22

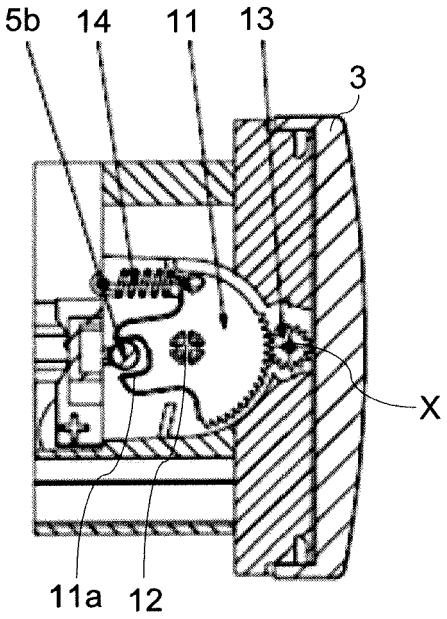

Fig.23

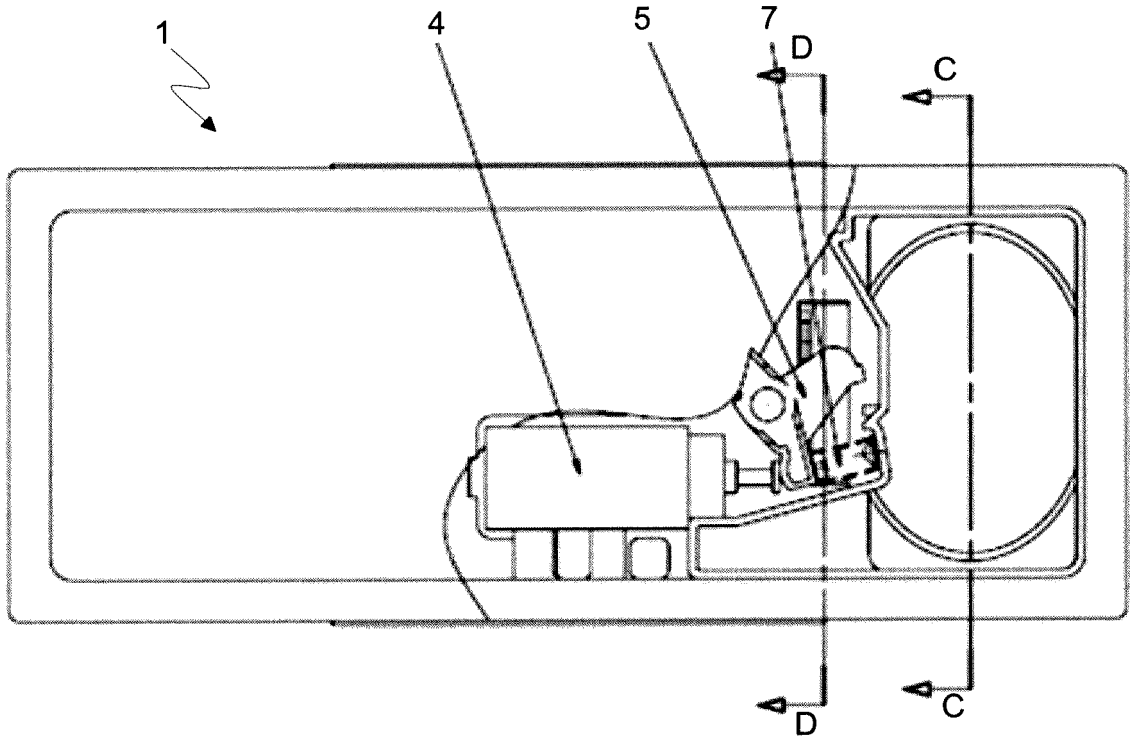

Fig.24

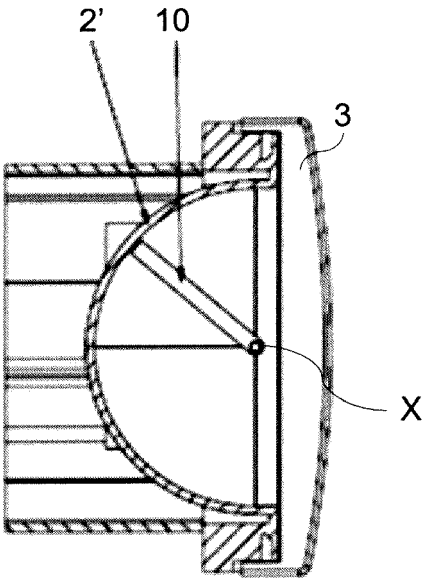

Fig.25

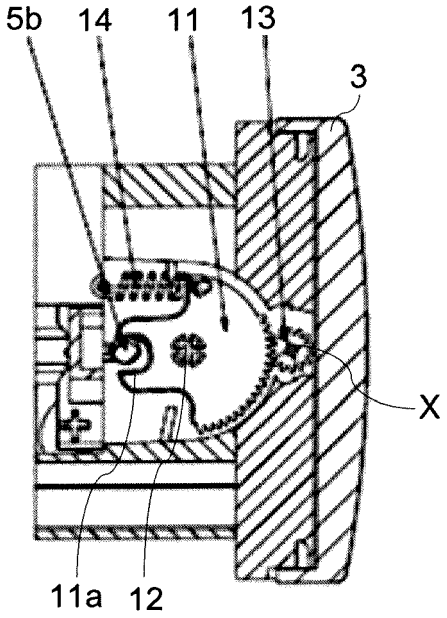

Fig.26

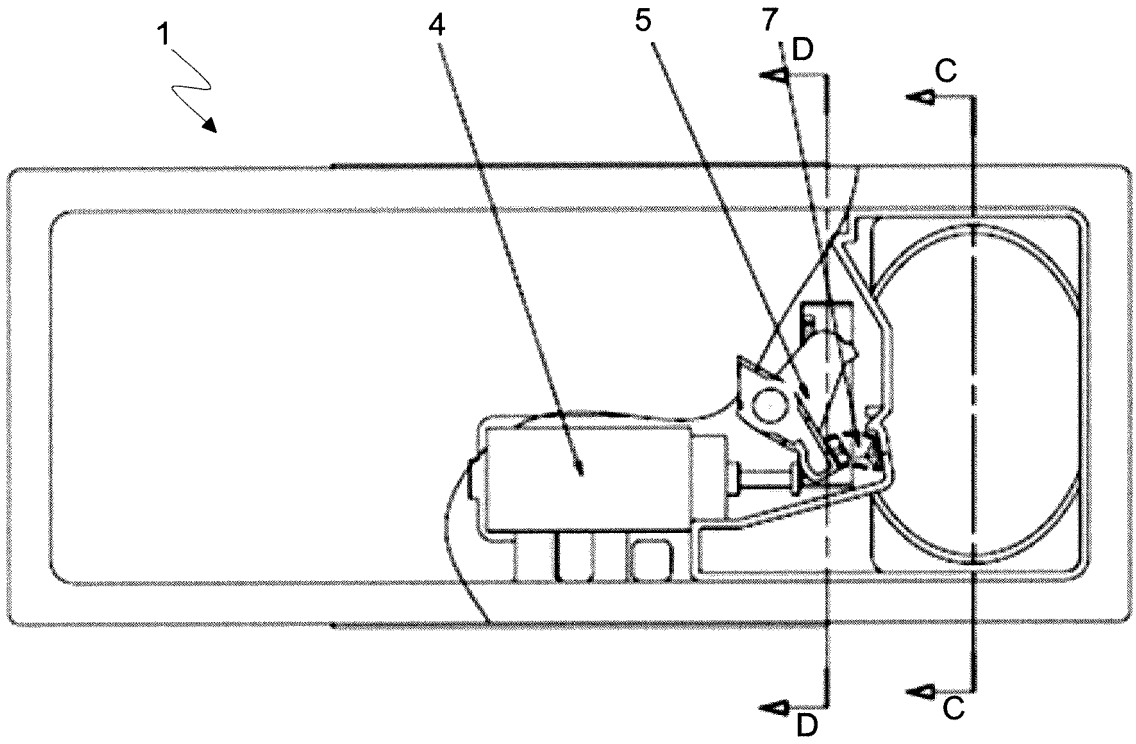

Fig.27

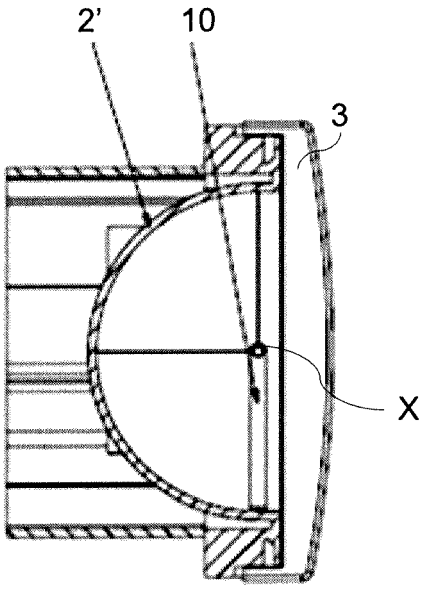

Fig.28

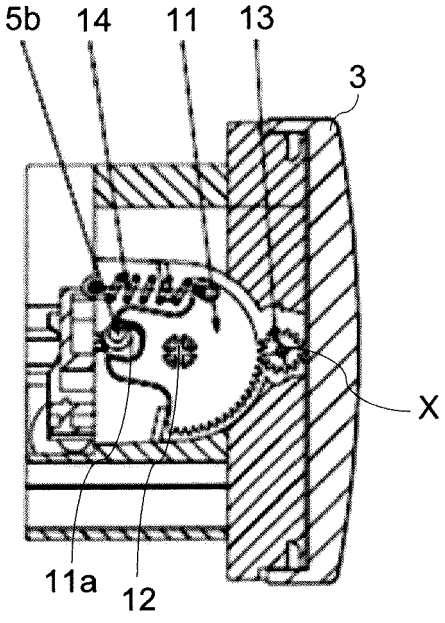

Fig.29

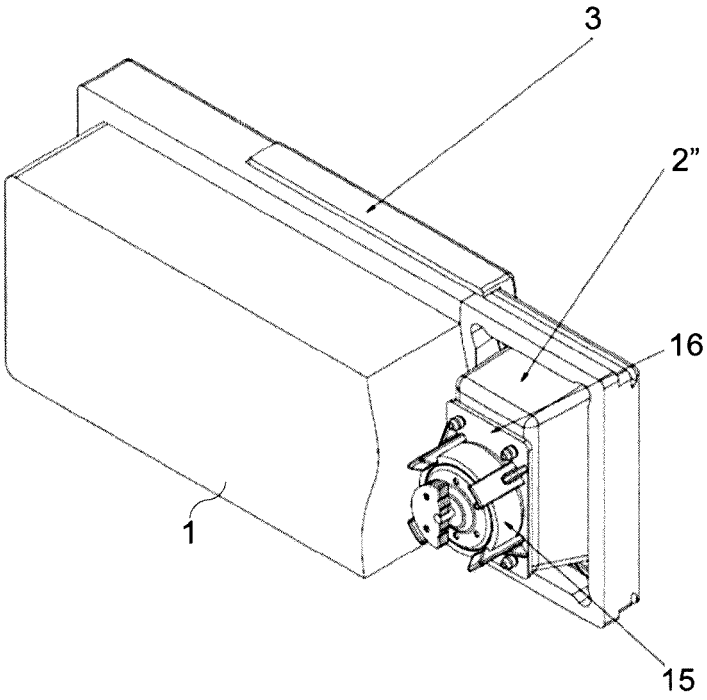

Fig.30

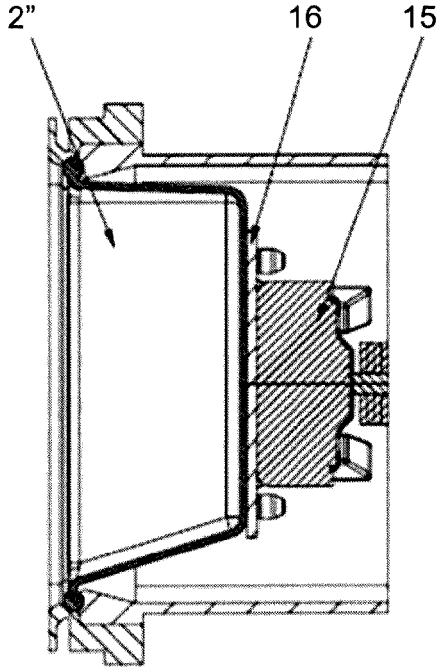

Fig.32

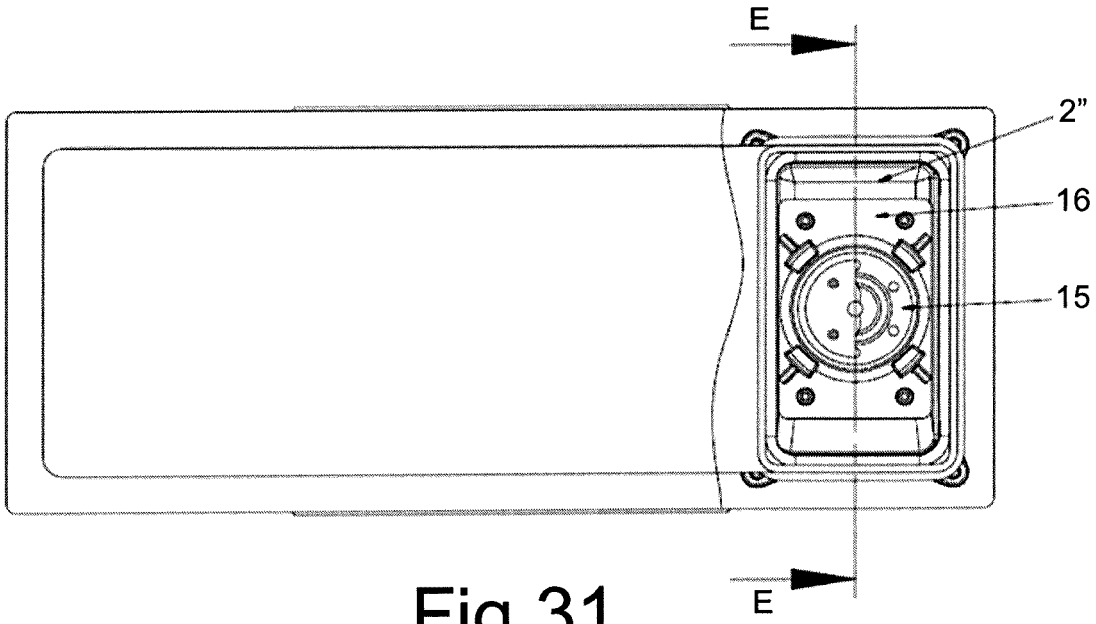

Fig.31

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 42 5028

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	EP 2 478 819 A1 (T & P SPA [IT]) 25 July 2012 (2012-07-25) * paragraph [0030] - paragraph [0073]; figures *	1,2,12	INV. A47L15/44
X	DE 43 44 205 A1 (AWECO KUNSTSTOFFTECH GERAETE [DE]) 29 June 1995 (1995-06-29) * column 3, line 11 - column 4, line 57; figures 1,2 *	1,12	
A	DE 37 24 849 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 9 February 1989 (1989-02-09) * the whole document *	1,12	

TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 August 2014	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 14 42 5028

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-08-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2478819 A1	25-07-2012	NONE	
DE 4344205 A1	29-06-1995	NONE	
DE 3724849 A1	09-02-1989	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0780087 A **[0003]**
- US 2012090463 A **[0003]**
- US 4149657 A **[0003]**