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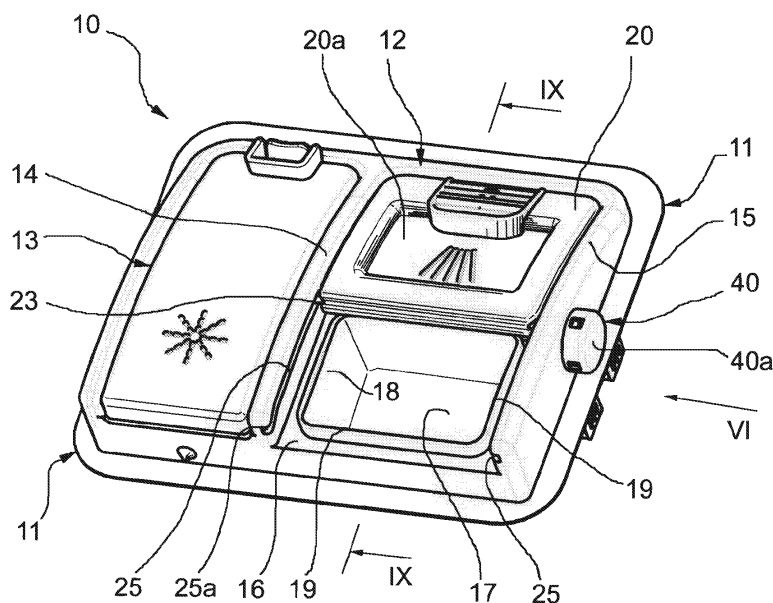
(54) Device for distributing a washing agent, particularly for a dishwasher

(57) The device is intended in particular for a dishwasher (1) provided with a front door (5) oscillating around a substantially horizontal axis (A-A). It comprises a support structure (11) intended to be fixed to the internal face of the door (5) and in which a tub receptacle (17) is defined, operatively turned towards the inside of the machine (1) and suitable for holding a quantity of washing agent, a lid (20) guided in a sliding manner in the structure (11) and manually displaceable, against the action of a recall spring (44), from an open position to a closed position of the receptacle, respectively distant from and close to said

axis (A-A); and a retention device (30, 31) associated with the lid (20) and suitable for retaining it in the closed position, against the action of the recall springs (44).

The retention device (30, 31) is fitted in the support structure (11) at one side of the receptacle (17) different from the one closest to said axis (A-A) and can be deactivated by means of an electrically controlled actuator device (37), as well as by means of a manually activated release element (40) which is also mounted moveably in the support structure (11) at one side of the receptacle (17) different from the side closest to said axis (A-A).

FIG.2a



Description

[0001] This invention concerns a device for distributing a washing agent, in particular for a dishwasher provided with a front door oscillating around a substantially horizontal axis.

[0002] One purpose of this invention is to propose a distributor device which is simple and economical to realize, ergonomically improved, and with safe and reliable operation.

[0003] This and other purposes are realized according to the invention with a device for distributing a washing agent comprising

a support structure intended to be fixed to the internal face of the abovementioned door and in which a tub receptacle is defined, operatively turned towards the inside of the machine and suitable for holding a quantity of washing agent,

a lid guided in a sliding manner in said structure and manually displaceable, against the action of elastic means of recall, from an open position to a closed position of said receptacle, respectively distant from and close to said axis; and

means of retention associated with the lid and suitable for retaining it in the closed position, against the action of said means of recall; the means of recall being fitted in the support structure at one side of said receptacle different from the one closest to said axis and being deactivatable by means of an electrically controlled actuator device, as well as by means of a manually activated release element which is also mounted moveably in the support structure at one side of said receptacle different from the side closest to said axis.

[0004] In one manner of realization the abovementioned manually activated release element is fitted moveably in the support structure in a lateral position relative to the path of the lid.

[0005] Further characteristics and advantages of the invention will appear from the detailed description which follows, given for purely exemplificative and nonlimiting purposes, with reference to the attached drawings, in which:

figure 1 is a view in perspective of a dishwasher provided with a distributor device according to this invention.

figures 2a and 2b are perspective views of a distributor device according to the invention, shown with the lid open and, respectively, with the lid closed;

figure 3 is a rear perspective view of the distributor device according to figures 2a and 2b;

figure 4 is a partial cutaway view along the line IV-IV of figure 2b;

figure 5 is a cutaway view similar to the one in figure 4 and shows the distributor device in a different condition;

figure 6 is a lateral view according to the arrow VI in figure 2a;

figure 7 is a partial cutaway view along the line VII-VII of figure 6;

figure 8 is a view in partial perspective of a distributor device according to this invention; and

figures 9 and 10 are partial cutaway views along the line IX-IX of the figure 2a and, respectively, along the line X-X of figure 2b.

[0006] As a whole 1 in figure 1 indicates a dishwasher of a type known per se.

[0007] In general the machine 1 comprises a casing 2, with a substantially parallelepiped form, in which is defined a washing chamber 3 accessible through a front opening face 4 in the casing 2 with which a closing door 5 is associated. The door 5 is articulated to the structure of the machine 1 in correspondence with a horizontal axis A-A, at its bottom horizontal side.

[0008] The door 5 is therefore capable of assuming a vertical position in which it recloses the washing chamber 3, and a lowered position, shown in figure 1, in which it permits easy access to a distributor device for washing agents indicated as a whole as 10.

[0009] In a manner known per se, the distributor device 10 is mounted in the internal face of the door 5 of the machine 1. In the example of embodiment illustrated in the drawings, this distributor device 10 is of the type known as integrated, i.e. comprising a single support structure or body 11, in which both a distributor device 12 for a liquid, solid or powder washing agent, and a distributor device 13 for a rinsing or brightening agent are realized.

[0010] The invention is not moreover limited to the implementation of the washing agent distributor device in integrated form with an adjacent distributor device for a rinsing agent.

[0011] With reference in particular to figures from 2a to 6, 9 and 10, the shaped body 11 of the washing agent distributor device 12 has two facing walls or sides 14 and 15, with a convex arched external profile. Defined between these facing walls or sides 14, 15 is a lowered area 16 (figures 2a and 2b) in the part of which closest to the A-A axis of articulation of the door is a concave receptacle 17, essentially in the manner of a tub, with an inlet 18 bordered by an edge in relief 19 (figures 2a, 9 and 10).

[0012] The receptacle 17 is intended to hold a quantity of the washing agent which must be distributed during the washing stage of a dishwasher operating cycle.

[0013] The distributor device 12 also comprises a lid 20, mounted in a sliding form between the lateral walls or sides 14 and 15 of the body 11, in a guided manner along an arched trajectory, essentially on a generally cylindrical surface.

[0014] The lid 20 is mobile in particular from a receptacle 17 open or uncovered position, shown in figures 2a, 4, 6 and 9, to a closed position of this receptacle 17, shown in figures 2b, 8 and 10.

[0015] As can be seen for example in figures 2a and 2b, on the outer face of the lid 20 is a hollow 20a usable

as a receptacle for holding a quantity of detergent for use in a prewash stage in the dishwasher operating cycle.

[0016] The lid 20 can be moved manually, against the action of elastic means of recall described below, from the open position to the closed position of the receptacle 17, along a substantially curvilinear path, at right angles to the horizontal axis A-A of oscillation of the door 5 of the dishwasher.

[0017] When the lid 20 is in the closed position and respectively in the open position of the receptacle 17, it is relatively (more) near to and respectively (less) far from the A-A axis.

[0018] As has been said previously, in the passage from the open position towards the closed position the lid 20 slides carrying out an essentially cylindrical trajectory, with the convexity turned towards the inside of the washing chamber 3 of the dishwasher.

[0019] In the embodiment illustrated as an example, when the door 5 of the dishwasher is closed, the closed and open positions of the lid 20 are situated at vertically different levels. In particular, in the passage from the open position to the closed position the lid 20 carries out a rotation essentially from the top to the bottom.

[0020] As can be seen in particular in figures 4, 5 and 8, on each of two of its opposite sides 21, 22 the lid 20 has a respective pair of sliding formations in the manner of protruding pegs 23, 24, staggered with respect to one another along the operating displacement direction of the same with respect to the body 11.

[0021] These grooves are arched, in such a way that they are capable of permitting the displacement of the lid 20 substantially according to an arched trajectory, as has already been said above.

[0022] In a manner not illustrated, conveniently associated with the bottom face is an annular sealing gasket intended, when the lid is in the closed position, to couple with tightness with the edge 12 of the inlet of the tub receptacle 17.

[0023] As can be seen in figure 2a and as can be better seen in figure 9, the guide grooves 25 and 26 are shaped in such a way that their ends operatively nearest the A-A axis of the door 5 of the dishwasher have a sharp deviation of direction 25a at their terminal part.

[0024] The arrangement is such that when the front sliding formations 23 of the lid enter and then pass the deviation of direction 25a of the associated guide grooves 25, the lid 20 carries out a sharp oscillation in its approach to the edge 19 of the washing agent receptacle 17.

[0025] With reference to the figures from 7 to 10, a shaped element indicated as a whole by 30 is mounted revolving around an axis B-B in the structure 11.

[0026] With reference in particular to the figures 8-10, the end of the element 30 turned to the lid 20 has a protruding terminal appendix 31, essentially shaped in L form.

[0027] With reference to figure 8, also obtained in said part of the end of element 30 is a recess 32, the cross section of which is essentially in V form, or dihedral, be-

tween two walls 33 and 34 essentially parallel to the B-B axis.

[0028] The revolving shaped element 30 also has a transversally protruding appendix or wing 35 (figures 7 and 8) capable of cooperating, in a manner which will be better described below, with a mobile element 36 of an electrically controlled actuator 37. In the example illustrated, the actuator 37 comprises a solenoid or bobbin 38 (figure 7), the excitation of which is capable of provoking an axial displacement of the nucleus 36. The latter is coupled with the appendix or wing 35 of the shaped revolving element 30, in such a way that a translation by it (towards the left when looking at figure 7) is capable of provoking a rotation of the element 30 (clockwise when looking at figure 7, anticlockwise when looking at figure 8).

[0029] The shaped terminal element 31 of the revolving element 30 is capable of cooperating with the lid 20 to retain the latter in the closed position, as shown in figure 10.

[0030] In practice, in use the user can make the lid 20 move from the open position (figure 9) to the closed position (figure 10) manually by sliding it along the guide grooves 25. During the final stage of the closing stroke, when the front guide formations 23 of the lid 20 engage the terminal parts 25a of the grooves 25, the lid 20 (which up to this point had been able to slide without interfering with the formation 31 of the element 30) performs a certain displacement in the direction of the receptacle 17 and the revolving element 30 of a sufficient magnitude to allow that when a part 20b (figures 9 and 10) of its rear edge descends it gets stuck on said formation 31 of the revolving element 30. In this condition, the lid 20 is retained in the closed position.

[0031] In a manner not illustrated, associated with the revolving element 30 is an elastic device such as a spring working by torsion, which tends to keep it in the position illustrated in figure 10, the terminal formation 31 of which is suitable for keeping the lid 20 in the closed position.

[0032] The revolving element 30 is capable of being made to revolve around the axis B-B and therefore to leave the position according to figures 8 and 10, following excitation of the electrically controlled actuator 37: in this case the rotation of the element 30 causes a displacement of its terminal formation 31, moving away from the receptacle 17.

[0033] The lid 20 follows this displacement of the terminal appendix 31 of the revolving element 30: initially the lid 20 remains retained, however, by the formation 31 in any case until, having passed the terminal part 25a of the guide grooves 25, the lid 20 moves away from the receptacle 17 to a sufficient extent to permit its bottom edge 20b to clear the abovementioned formation 31 of the element 30. Under the action of elastic means of recall, the lid 20 can then return itself to the open position shown in figure 9.

[0034] The release of the lid 20 from the terminal appendix 31 of the revolving element 30 can also be pro-

voked by a release element indicated overall as 40 in figures 2a, 2b, 4-6 and 8. In the embodiment illustrated in these figures the release element 40 comprises a head 40a with an essentially cylindrical outer peripheral shell 40b, in which a plurality of openings 40c is obtained (figures 4 and 5).

[0035] Extending from the head 40a is an integral cylindrical axial rod 40d, a terminal distal part 40e of which with a reduced cross section extends into the recess 32 of the revolving element 30, as can be seen in particular in figure 8, in a facing relationship with the wall 33 of this recess.

[0036] With reference to figures 4 and 5, respective appendices 15a protruding laterally from the wall 15 of the support body 11 extend with a certain axial play in the openings 40c of the head 40a of the release element. These appendices are provided with respective end teeth 15b, with an inclined profile, capable of engaging themselves by snapping into the abovementioned openings 40c. The appendices 15a extend between the external shell 40b of the head 40 and a further internal cylindrical shell 40f, coaxial with the first.

[0037] The arrangement described above is such that the release element 40 is axially translatable relative to the support body or structure 11, but is blocked angularly with respect to it.

[0038] The shank or rod 40d of the release element 40 extends to the inside of a shaped tubular body indicated as a whole by 41. In the embodiment illustrated, this body has an initial end part 41a, with an increased diameter, which extends in a revolving manner inside a cylindrical passage 42 in the wall or side 15 of the support body or casing 11.

[0039] The body 41 also comprises a second part 41b, with a relatively reduced diameter, which extends in a revolving manner, but with quite a narrow coupling, in an inner tubular formation 43 of the body 11 of the distributor device.

[0040] With reference to the figures 4, 5 and 8, a helical spring 44 is arranged between the head 40a of the release element 40 and the part 41a of the tubular body 41. This spring 44 works both as a compression spring, and as a torsion spring: on one side this tends to press the release element 40 to the axial position shown in figure 4, as well as to a predetermined angular position.

[0041] The part 41b of the tubular body 41 has two end annular grooves 41c externally, and an intermediate spiral-form groove 41d.

[0042] Between the outer surface of the part 41b of the tubular body 41 and the inner surface of the tubular formation 43, as well as in the grooves 41c and 41d, is a viscous material, for example a lubricating grease, intended during operation to counter the relative rotation of the body 41 inside this formation. The purpose of the arrangement of this viscous material, as will appear more clearly below, is to create a dampening or deceleration effect on the movement of the lid 20 from the closed position to the open position, with a view to the reduction

of operating noise.

[0043] This is because the lid 20 is in fact kinematically coupled with the revolving element 41 in the manner which will now be described.

5 **[0044]** The element 41, adjacent to the shoulder defined between its parts 41a and 41b, has a toothing 45 (figures 4, 5 and 8) which meshes with a corresponding arched rack 46 realized in the bottom part of the side 21 of the lid 20 (in particular see figure 8).

10 **[0045]** The arrangement is such that when the user displaces the lid from the open position (figure 2a) to the closed position (figure 2b), the rack 46 of this lid causes a rotation of the tubular body 41. Following this rotation, the helical spring 44 is torsion-loaded.

15 **[0046]** Having reached the closed position (figure 2b), the lid 20 is held there following the engagement of its edge 20b with the terminal appendix 31 of the revolving element 30 (figure 10), as already described above. The spring 44 then stays torsionally preloaded.

20 **[0047]** If in this condition the user manually exerts a pressure on the head 40 of the release element 40, this release element 40 passes from the axial position of figure 4 to the axial position of figure 5: the spring 44 is also compression-loaded, and the shank 40e of the release element, acting on the surface 33 of the revolving element 30 (figure 8) provokes a rotation of the latter, and this is followed by the release of the lid 20 from the appendix 31 of the element 30, as already better described above, and the return of the lid 20 to the open position (figure 2a and 9) under the action of the spring 44 which discharges its own torsional preload. The displacement of the lid 20 towards the open position is effectively commanded by the tubular body 41 which is driven in rotation by the spring 44, and by the toothing 45 of the latter which is coupled with the rack 46 of the lid.

30 **[0048]** The rotation of the body 41, and therefore the displacement of the lid 20, is braked or dampened by the presence of the viscous material arranged between the body 41 and the tubular formation 43 in which the latter is fitted revolving.

35 **[0049]** With reference to figures 4 and 5, the input into its seat of the abovementioned viscous material can be realized conveniently through two passages 47 and 48 provided in the wall of the tubular formation 43, and then subsequently closed tight, for example by means of a sealing material, or by heat-sealing. One of these passages is used in effect for inputting viscous material into the seat, while the other permits the air to escape.

40 **[0050]** The dampening effect described above is obviously also realized when the opening of the lid 20 is commanded by a control unit in the dishwasher by means of activation of the actuator 37. In this case, release of the lid 20 from the terminal appendix 31 of the element 30 is provoked by the rotation of the latter caused by displacement of the mobile nucleus 36 of the actuator 37. With regard to everything else, the lid 20 opening procedures correspond to what has been described above.

45 **[0051]** In variants of embodiment not illustrated, the

release element 40 can be realized in such a way as to be able to rotate around its axis in the manner of a knob, relatively to the support structure 11 of the distributor device, to provoke a corresponding rotation of the revolving element 30 around the axis B-B and therefore determine the release of the lid 20 from the closed position.

[0052] Naturally, without prejudice to the principle of the invention, the forms of actuation and the embodiment details can be widely varied with respect to what has been described and illustrated for non-limiting exemplary purposes only, without thereby departing from the scope of the invention as defined in the annexed claims.

Claims

1. Device for distributing a washing agent, in particular for a dishwasher (1) provided with a front door (5) oscillating around a substantially horizontal axis (A-A) comprising a support structure (11) intended to be fixed to the internal face of said door (5) and in which a tub receptacle (17) is defined, operatively turned towards the inside of the machine (1) and suitable for holding a quantity of washing agent, a lid (20) guided in a sliding manner in said structure (11) and manually displaceable, against the action of elastic means of recall (44), from an open position to a closed position of said receptacle, respectively distant from and close to said axis (A-A); and means of retention (30, 31) associated with the lid (20) and suitable for retaining it in the closed position, against the action of said means of recall (44); the means of recall (30, 31) being fitted in the support structure (11) at one side of said receptacle (17) different from the one closest to said axis (A-A) and being de-activatable by means of an electrically controlled actuator device (37), as well as by means of a manually activated release element (40) which is also mounted moveably in the support structure (11) at one side of said receptacle (17) different from the side closest to said axis (A-A).
2. Device according to Claim 1, in which said manually activated release element (40) is fitted in the support structure (11) laterally with respect to the path of said lid (20) .
3. Device according to Claim 1 or 2, in which the release element (40) is axially translatable with respect to the support structure (11), in the manner of a button, against the action of elastic means of contrast (44) for the de-activation of said means of retention (30,31).
4. Device according to Claim 1 or 2, in which the release element (40) can be actuated manually in revolution

around its own axis, relative to said support structure (11), essentially in the manner of a knob, for the de-activation of said means of retention (30,31).

5. Device according to any of the previous claims, in which the means of retention comprise a sole control device (30, 31) fitted revolving in the support structure (11) around a second axis (B-B) and suitable for cooperating with the abovementioned electrically controlled actuator device (37) as well as the manually activated release device (40).
6. Device according to any of Claims 1 to 3, in which the lid (20) is coupled with the abovementioned elastic means of recall (44) by means of a kinematic mechanism (41, 45; 46) including a transmission element (41) revolving in a dampened manner in a seat (43) prepared in said support structure (11).
7. Device according to Claim 6 in which said kinematic mechanism comprises a rack (46) integral with the lid (20), meshing with a toothing (45) of said revolving transmission element (41).
8. Device according to Claim 6 or 7, in which said transmission element (41) is mounted revolving in a seat (43) with the interposition of a viscous damping material.
9. Device according to any of the previous claims in which the lid (20) has, on each of its two opposite sides (21, 22), at least one respective sliding formation (23, 24) engaged in guiding means (25) prepared in the facing walls (14, 15) of the support structure (11).
10. Device according to Claim 9, in which said guiding means comprise arched grooves (25) prepared in said facing walls (14, 15) of the support structure (11).
11. Device according to Claim 9, in which said guide grooves (25) are shaped in such a way that during the passage of the lid (20) from the open position to the closed position, this lid (20) is capable of displacing itself, moving to engage with the abovementioned means of retention (31, 30).
12. Device according to any of the previous claims, in which the lid (20) has a hollow (20a) in its outer face, suitable for holding a quantity of washing agent usable in an initial stage of a washing cycle.

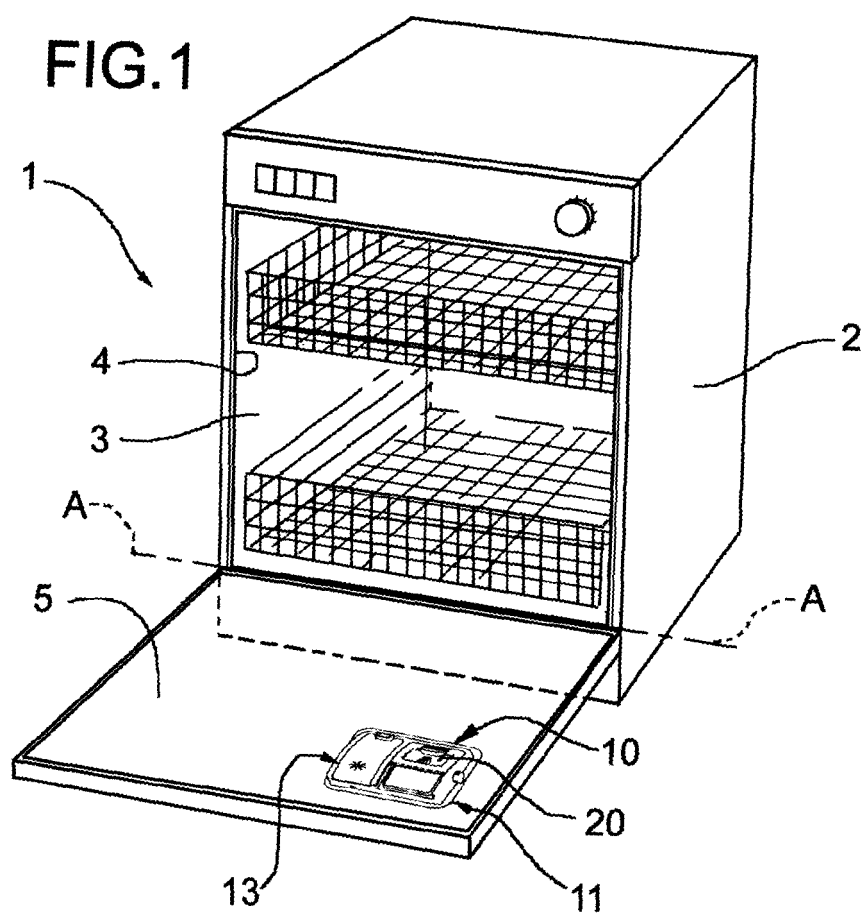


FIG.2a

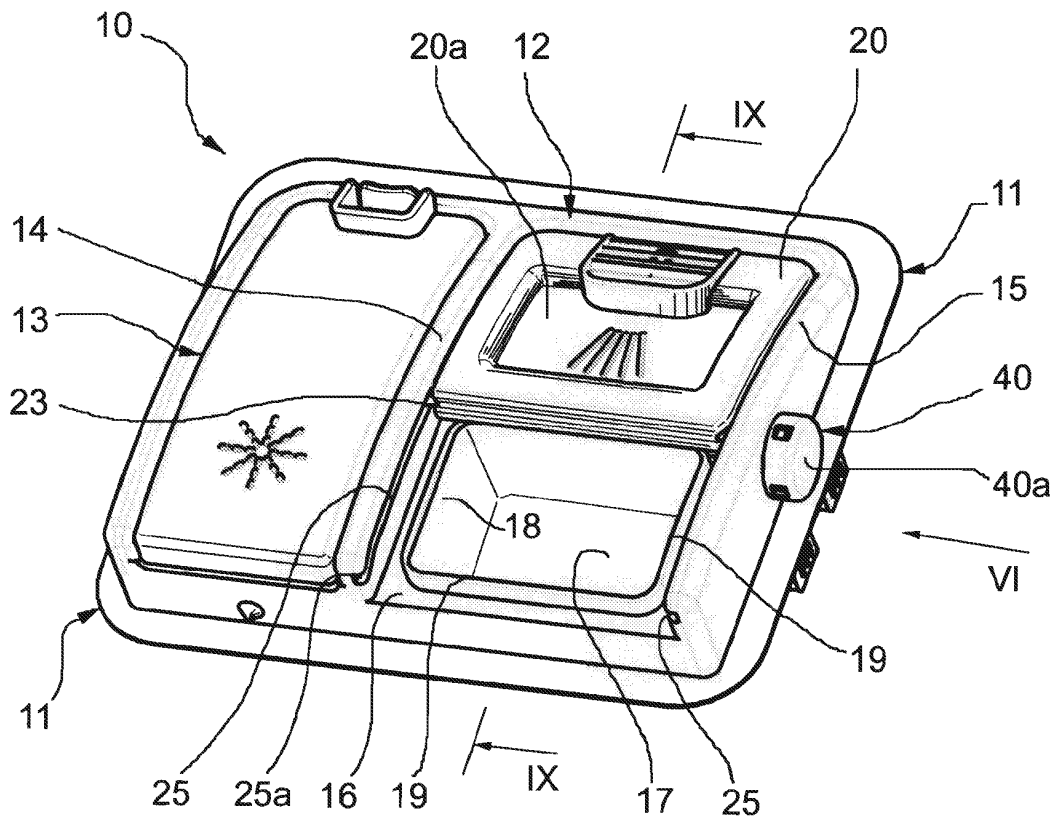
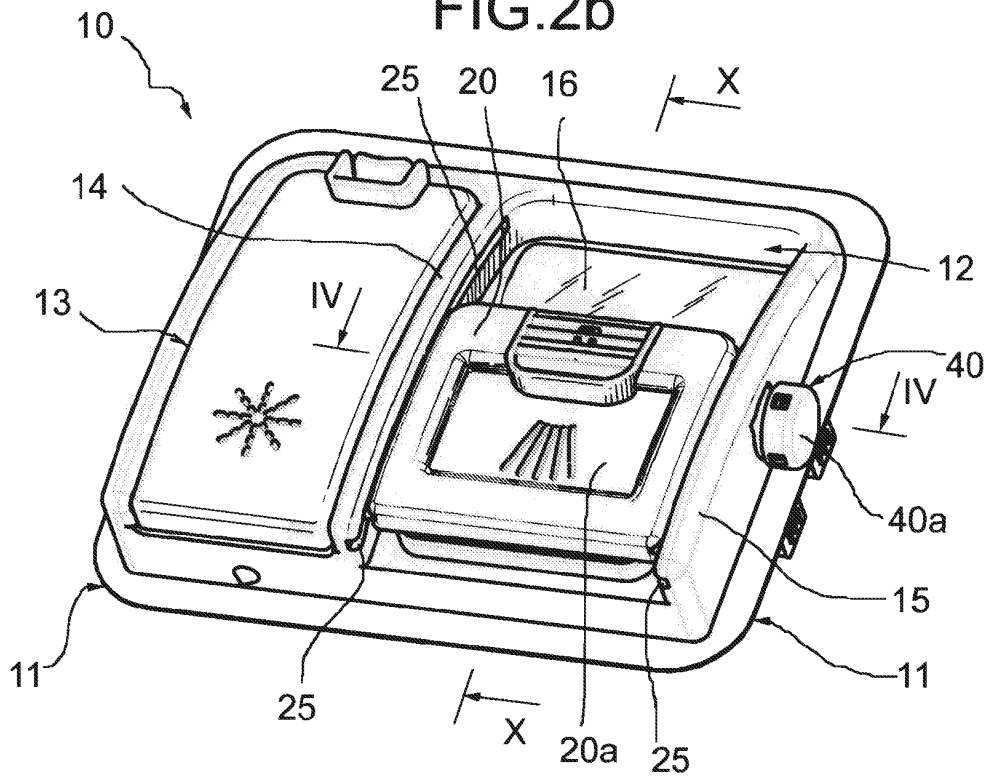


FIG.2b



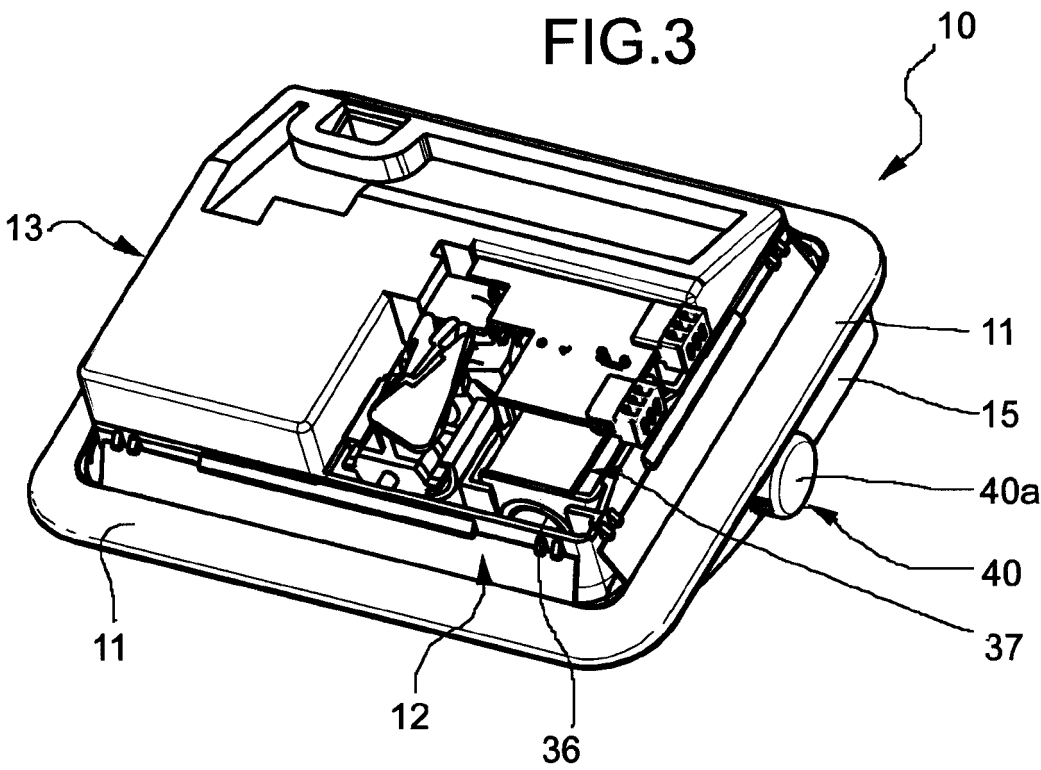


FIG.4

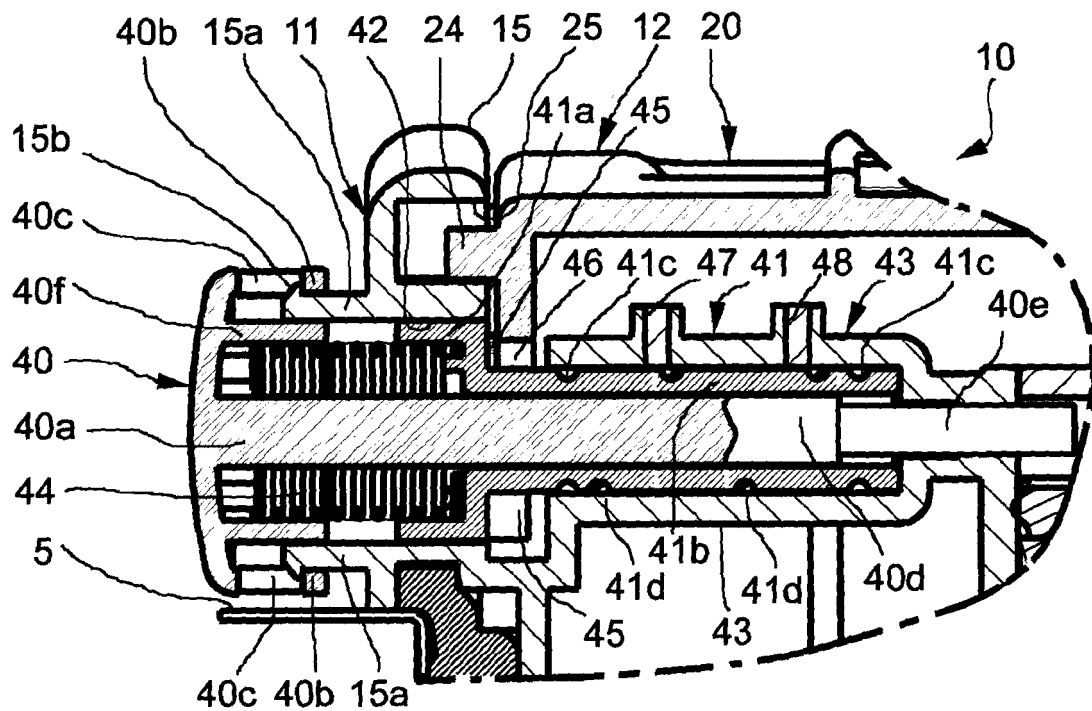


FIG.5

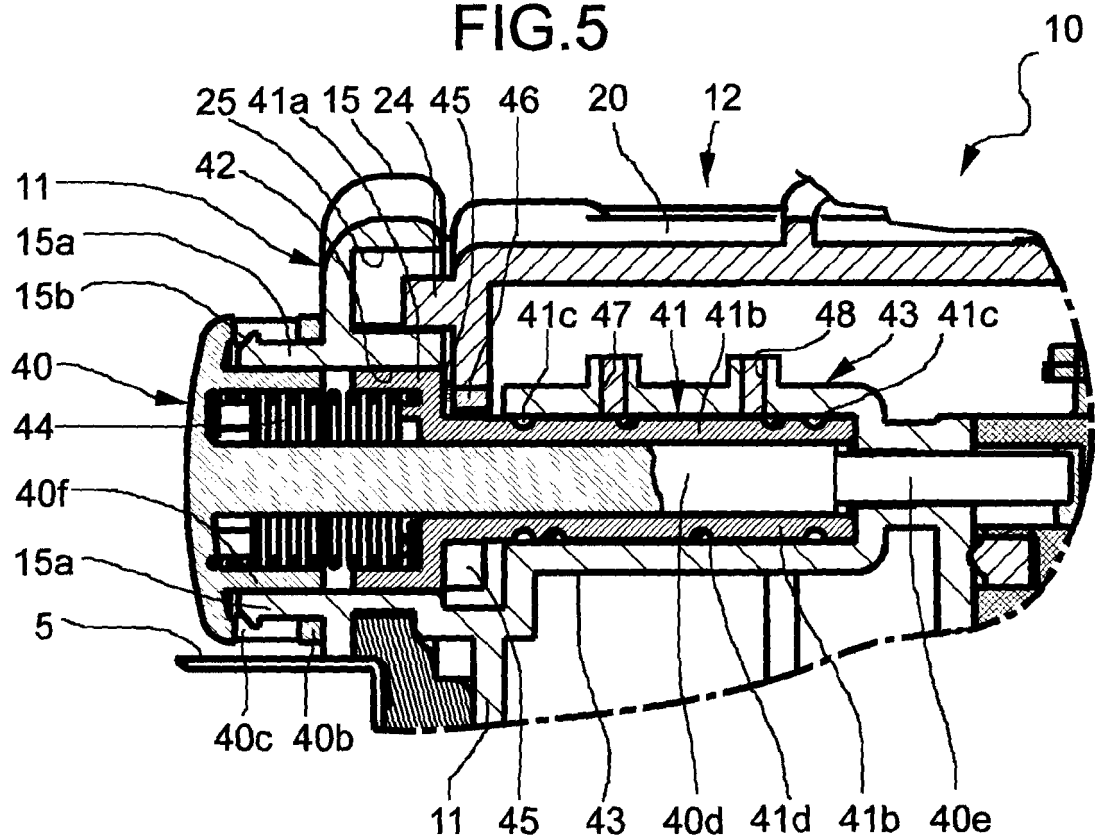


FIG.6

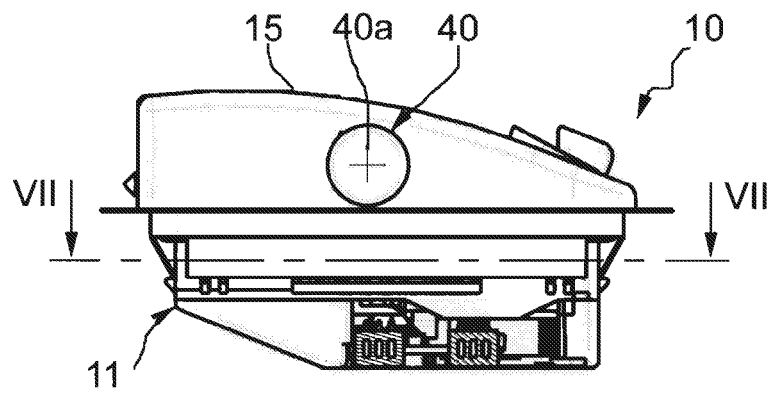


FIG.7

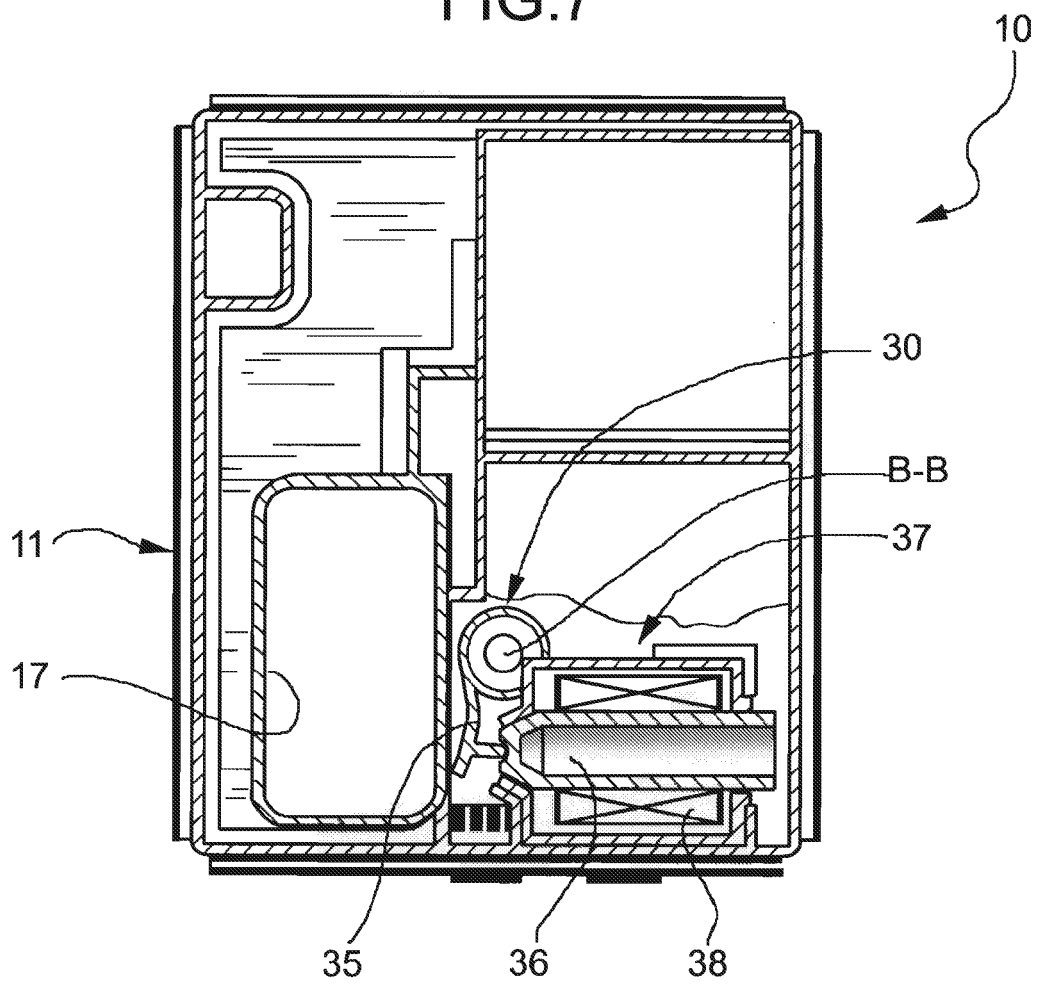


FIG.8

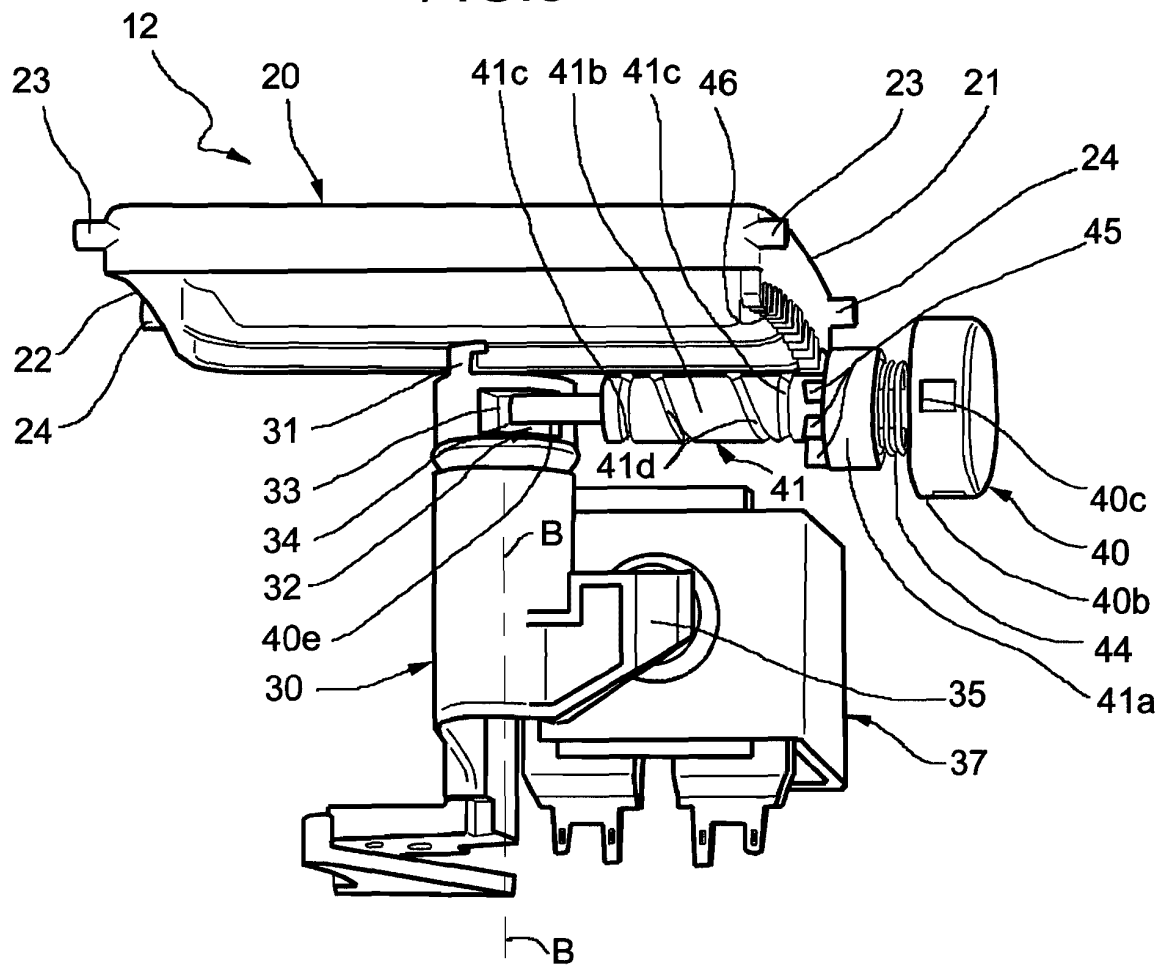


FIG.9

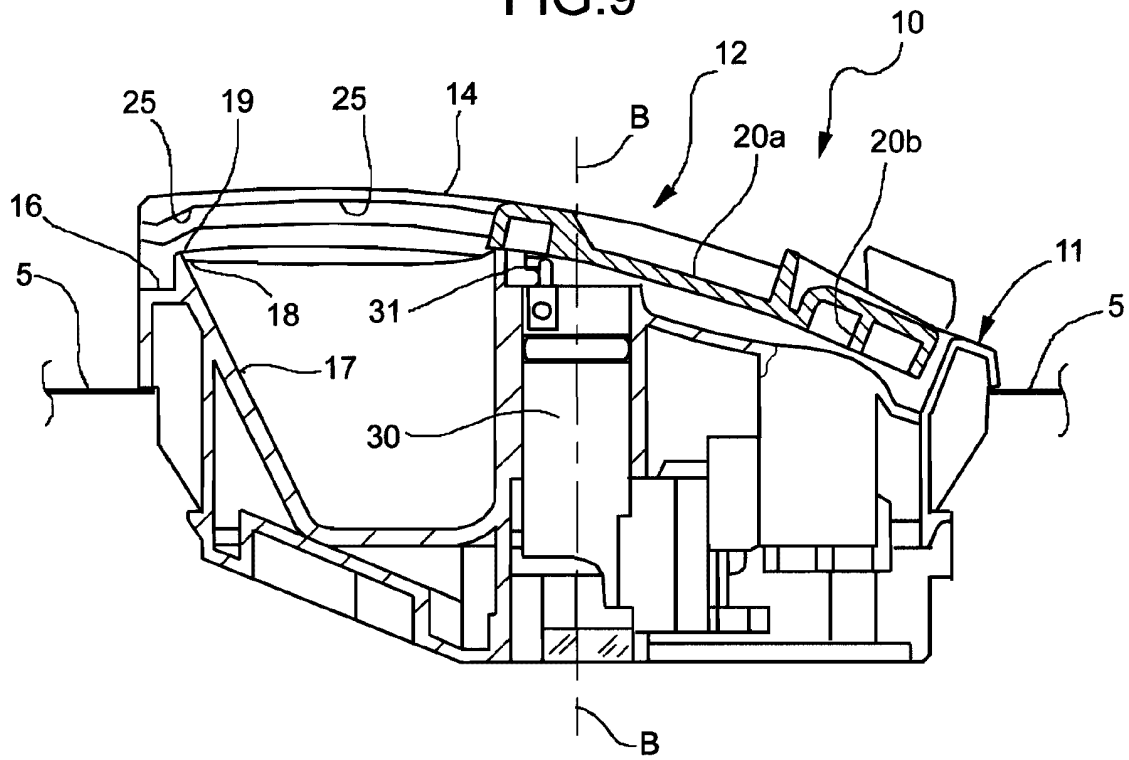


FIG.10

