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

(11) **EP 3 272 930 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
**24.01.2018 Bulletin 2018/04**

(51) Int Cl.:
***D06F 39/02*** *(2006.01)*

(21) Application number: **16180617.9**

(22) Date of filing: **21.07.2016**

(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**
Designated Validation States:
**MA MD**

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# (54) LAUNDRY WASHING MACHINE EQUIPPED WITH A TREATING AGENTS DISPENSER

(57) The present invention relates to a laundry washing machine (1) comprising a treating agents dispenser (20) having a drawer (22; 122; 222) comprising one or more compartments (23a, 23b, 23c, 23d) for receiving at least one agent for treating laundry, a supporting structure (21) on which said drawer (22; 122; 222) can slide and a water distributor (35) comprising at least one channel for conveying water from an external water source to the compartments (23a, 23b, 23c, 23d). A guard element (50; 150) is movably connected to an underside (22b; 122b) of the drawer (22; 122; 222).

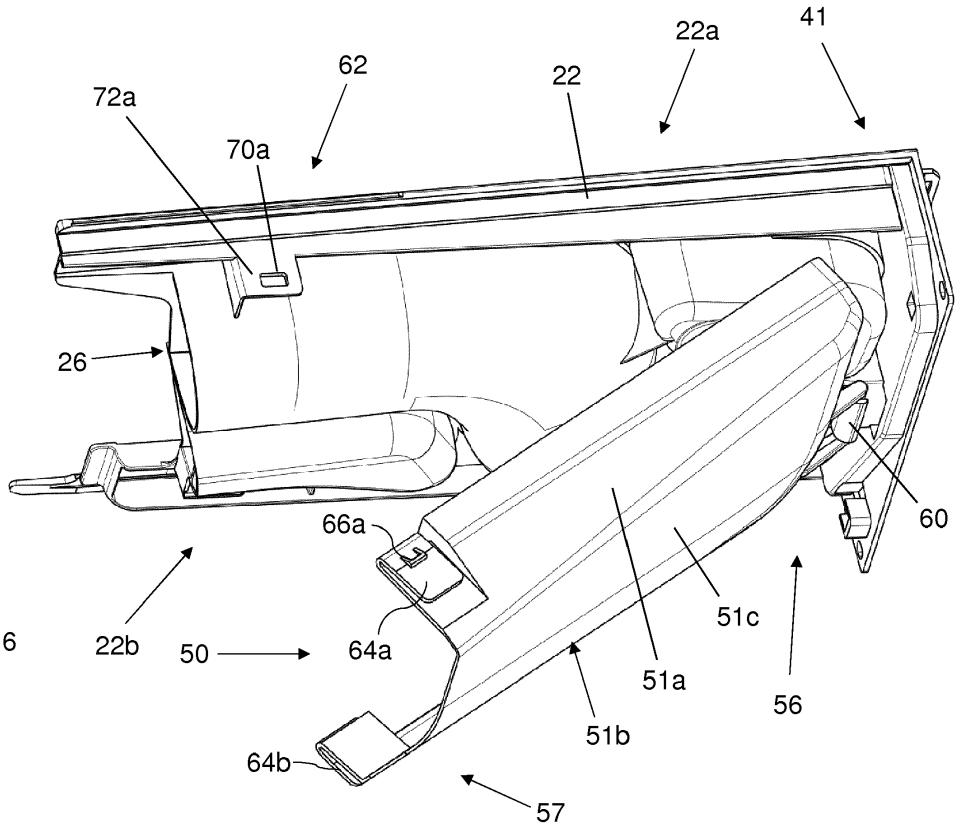


FIG.6

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## Description

**[0001]** The present invention concerns the field of laundry washing techniques.

**[0002]** In particular, the present invention refers to a treating agents dispenser in a laundry washing machine.

BACKGROUND ART

**[0003]** Nowadays the use of laundry washing machines, both "simple" laundry washing machines (i.e. laundry washing machines which can only wash and rinse laundry) and laundry washing-drying machines (i.e. laundry washing machines which can also dry laundry), is widespread.

**[0004]** In the present description the term "laundry washing machine" will refer to both simple laundry washing machine and laundry washing-drying machine.

**[0005]** Laundry washing machines generally comprise an external casing, or cabinet, provided with a washing tub which contains a rotatable perforated drum where the laundry is placed. A loading/unloading door ensures access to the drum.

**[0006]** Laundry washing machines typically comprise a treating agents dispenser for the introduction of water and treating agents (i.e. detergent, softener, rinse conditioner, etc.) into the tub.

**[0007]** Known treating agents dispensers comprise a drawer having one or more compartments adapted to be filled with at least one treating agent and one or more respective channels for conveying water to the compartments.

**[0008]** Treating agents dispenser also comprises a housing on which the drawer can slide from a normal closed position to an opening position.

**[0009]** The housing is typically mounted at an opening provided on the upper part of the front side of the cabinet. The opening allows entrance and exit of the drawer so that it can be positioned by the user in said positions.

**[0010]** The housing of the known type preferably has a box-like structure comprising upright side walls which are connected below by a bottom side wall.

**[0011]** The treating agents dispenser then comprises a water distributor which connects above the upright side walls of the housing. The water distributor is advantageously placed above the compartments and opportunely shaped to define said channels which are provided with apertures allowing water coming from an external water source to fall down in the underlying compartments.

**[0012]** The bottom side wall of the housing communicates with a supply pipe connected to the tub for guiding and supplying the water, which passes through the compartments and which mixes with the treating agent, into the tub. Compartments are opportunely shaped to allow the treating agent and water flowing therethrough to reach the bottom side of the housing and then, from there, to the tub through the supply pipe.

**[0013]** In preferred known embodiments, compartments comprises an aperture through which water and treating agent flow and then, from there, towards the bottom side of the housing. In further preferred known embodiments, compartments comprise a siphon. Water coming from the channel flushed into the compartment triggers the siphon and treating agent is drawn through the siphon. Treating agent and water then fall down into the housing.

**[0014]** In further preferred know embodiments, compartments are shaped so that water and treating agent overflow from the compartment and fall down into the housing.

**[0015]** However, the treating agents dispensers belonging to the known art poses some drawbacks.

**[0016]** A first drawback posed by the treating agents dispensers of the known art and/or the laundry washing machines having such dispenser lies in that residues of treating agents, especially powder treating agents, often stuck at the side walls of the housing. Residues of treating agent may accumulate and may form a sticky, gelatinous mass, which will ultimately adhere to the side walls of the housing.

**[0017]** Another drawback posed by the treating agents dispensers of the known art is that the accumulation of treating agent may favour the proliferation of bacteria, which may then worsen the hygienic conditions and may cause bad smells.

**[0018]** A further drawback posed by the treating agents dispensers of the known art lies in that water and/or treating agent may leak from the drawer when the latter is extracted from the housing by the user and eventually getting the floor dirty.

**[0019]** The object of the present invention is therefore to overcome the drawbacks posed by the known technique.

**[0020]** It is a first object of the invention to provide a laundry washing machine that makes it possible to reduce or prevent accumulation of residues of treating agent in the treating agents dispensers.

**[0021]** It is another object of the invention to provide a laundry washing machine that makes it possible to remove residues of treating agent in the treating agents dispensers.

**[0022]** It is another object of the invention to provide a laundry washing machine that makes it possible to reduce proliferation of bacteria therefore improving hygienic conditions.

**[0023]** It is a further object of the invention to provide a laundry washing machine that makes it possible to avoid housecleaning.

DISCLOSURE OF INVENTION

**[0024]** The applicant has found that by providing a laundry washing machine having a treating agents dispenser comprising a drawer having one or more compartments for receiving at least one agent for treating

laundry wherein a guard element is movably connected to an underside of the drawer, it is possible to reduce or prevent accumulation of residues of treating agent in the treating agents dispenser or allowing removal of residues compared to known techniques.

**[0025]** Advantageously, the guard element may be easily moved in an opened position with respect to the drawer and then cleaned by the user.

**[0026]** The present invention relates, therefore, to a laundry washing machine connectable to an external water source comprising a cabinet supporting a washing tub enclosing a rotatable washing drum suited to receive laundry and a treating agents dispenser connectable to said external water source and fluidly connected to said washing tub, said treating agents dispenser comprising:

- a drawer comprising one or more compartments for receiving at least one agent for treating laundry;
- a supporting structure on which said drawer can slide;
- a water distributor comprising at least one channel for conveying water from said external water source to at least one of said one or more compartments of said drawer;

wherein a guard element is movably connected to an underside of said drawer.

**[0027]** According to a preferred embodiment of the invention, the guard element is swingably connected to the underside of said drawer.

**[0028]** According to another preferred embodiment of the invention, the guard element is removably connected to the underside of the drawer.

**[0029]** Preferably, the guard element is hinged to the underside of the drawer to allow the pivoting of the guard element with respect to the underside of the drawer.

**[0030]** In a preferred embodiment of the invention, the guard element is hinged to the underside of the drawer at a front part thereof.

**[0031]** In another preferred embodiment of the invention, the guard element is hinged to the underside of the drawer at a rear part thereof.

**[0032]** According to a preferred embodiment of the invention, the treating agents dispenser comprises a release device realesably connecting the guard element to the underside of the drawer.

**[0033]** Preferably, the release device comprises an elastic tongue provided with a tooth associated to the guard element or the drawer, the tooth being apt to be received in a slot associated to the drawer or the guard element, respectively.

**[0034]** In a further preferred embodiment of the invention, the release device comprises an elastic tongue provided with a slot associated to the guard element or the drawer, the slot being apt to receive a tooth associated to the drawer or the guard element, respectively.

**[0035]** According to a preferred embodiment of the invention, a side of the guard element facing the underside of the drawer comprises at least one rib defining at least one channel apt to canalize liquid therethrough.

**[0036]** Preferably, at least one of said one or more compartments comprises and outlet apt to fluidly connecting said at least one of said one or more compartments to the underside of the drawer. In a preferred embodiment of the invention, the outlet comprises a siphon.

**[0037]** According to a preferred embodiment of the invention, the guard element comprises two side lateral walls and a bottom side wall joining said side lateral walls.

**[0038]** Preferably, the length of the guard element is equal to, or greater than, the length of the drawer.

**[0039]** Preferably, the width of the guard element is equal to, or slightly smaller than, the width of the drawer.

**[0040]** According to a preferred embodiment of the invention, the water distributor is placed above the drawer when the treating agents dispenser is mounted in an operational position.

**[0041]** Preferably, the drawer is slidable from a closed position to an opened position or from an opened position to a closed position.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0042]** Further characteristics and advantages of the present invention will be highlighted in greater detail in the following detailed description of preferred embodiments of the invention, provided with reference to the enclosed drawings.

**[0043]** In the drawings, corresponding characteristics and/or components are identified by the same reference numbers. In such drawings:

- Figure 1 shows a perspective view of a laundry washing machine equipped with a treating agents dispenser with the drawer in an opened position according to a preferred embodiment of the invention;
- Figure 2 shows the laundry washing machine of Figure 1 with the upper side wall removed therefrom;
- Figure 3 shows the laundry washing machine of Figure 2 with an element of the treating agents dispenser removed therefrom;
- Figure 4 is a plan view from above of the drawer of Figure 3;
- Figure 5 is a perspective view from below of the drawer of Figure 4 in a first operative condition;
- Figure 6 shows the drawer of Figure 5 in a different operative condition;
- Figure 7 shows an enlarged view of a detail of Figure 5;
- Figure 8 shows the detail of Figure 7 in a different operative condition;
- Figure 9 shows a plan view of Figure 7 sectioned along line IX°-IX°;
- Figure 10 shows an enlarged view of a detail of Figure 5 from another point of view;
- Figure 11 shows a plan view of Figure 10 sectioned along line XI°-XI°;

- Figure 12 is a perspective view from below of a drawer in a first operative condition according to a further preferred embodiment of the invention;
- Figure 13 shows the drawer of Figure 12 in a different operative condition;
- Figure 14 is a perspective view of an element of Figure 13 isolated from the rest;
- Figure 15 shows a plan view of Figure 12 sectioned along line XV°-XV°;
- Figure 16 is a perspective view from below of a drawer in an operative condition according to a further preferred embodiment of the invention;
- Figure 17 is a perspective view of a detail of the drawer of Figure 16 in a closed position;
- Figure 18 shows a plan view of Figure 17 sectioned along line XVIII°-XVIII°.

DETAILED DESCRIPTION OF THE INVENTION

**[0044]** The present invention has proved to be particularly advantageous when applied to laundry washing machines, as described below. It should in any case be underlined that the present invention is not limited to laundry washing machines.

**[0045]** On the contrary, the present invention can be conveniently applied to laundry washing-drying machines (i.e. laundry washing machines which can also dry laundry).

**[0046]** In the present description, therefore, the term "laundry washing machine" will refer to both simple laundry washing machine and laundry washing-drying machine.

**[0047]** A laundry washing machine 1 equipped with a treating agents dispenser 20 according to a preferred embodiment of the invention is described with reference to Figures 1 to 11.

**[0048]** The laundry washing machine 1 comprises an external casing or cabinet 2, in which a washing tub, not shown, is provided that contains a perforated washing drum, not shown, where the laundry to be treated can be loaded. The cabinet 2 comprises a vertical front side wall 2a, a vertical rear side wall 2b, two vertical lateral side walls 2c, 2d and an upper side wall 2e.

**[0049]** The cabinet 2 is provided with a loading/unloading door 8 which allows access to the drum.

**[0050]** Laundry washing machine 1 advantageously comprises a control unit (not shown), connected to the various parts of the laundry washing machine 1 in order to ensure its operation. Laundry washing machine 1 preferably comprises an interface unit 16, connected to the control unit, accessible to the user and by means of which the user may select and set the washing parameters, like for example a desired washing program. Usually, other parameters can optionally be inserted by the user, for example the washing temperature, the spinning speed, etc.. The interface unit 16 preferably comprises a display 16a which displays machine working conditions.

**[0051]** The unit interface 16 then preferably comprises one or more selector devices which allow to select the appropriate washing program and/or to set other parameters.

**[0052]** The laundry washing machine 1 advantageously comprises said treating agents dispenser 20 to supply treating agents into the tub during a washing cycle.

**[0053]** Treating agents may comprise, for example, detergents, rinse additives, fabric softeners or fabric conditioners, waterproofing agents, fabric enhancers, rinse sanitization additives, chlorine-based additives, etc..

**[0054]** Advantageously, the treating agents dispenser 20 comprises a box-shaped housing 21, connected to the cabinet 2, internally to the latter, preferably by suitable fixing means, comprising, for example, screws or rivets, not illustrated, or also glue, or welding.

**[0055]** In the enclosed Figures, the housing 21 is advantageously substantially prism shaped, and it is connected to the frontal side wall 2a of the cabinet 2, opportunely in an upper region of the latter, positioned above the tub.

**[0056]** The housing 21 preferably comprises two inclined side walls 21a and 21b, as visible in Figure 3.

**[0057]** An outlet port 21c is preferably defined at the rear portion of the housing 21. The outlet port 21c is adapted to allow the flowing of a liquid into a supply pipe (not shown) fluidly connecting the treating agents dispenser 20 to the tub.

**[0058]** The housing 21 is suited to receive a removable drawer 22 which can be extracted from the housing 21, such as to protrude from the cabinet 2 in an opened position, as illustrated for example in figures 1, 2 or 3, or can be fully inserted into the housing 21 in a closed position, such position not illustrated in the Figures.

**[0059]** The drawer 22 preferably comprises a front panel 15 associated to a frontal part 41 of the drawer 22 and preferably has a handle by means of which the drawer 22 can be moved from the closed position and an opened position and, vice-versa, can be moved from the opened position to the closed position.

**[0060]** The drawer 22 comprises an upper side 22a and an opposite underside 22b.

**[0061]** The drawer 22 is preferably provided with one or more compartments 23a, 23b, 23c, 23d adapted to be filled with treating agents.

**[0062]** The compartments 23a, 23b, 23c, 23d are preferably opened upwardly to allow filling with treating agents from above.

**[0063]** In the embodiment illustrated in the Figures, there are four compartments, 23a, 23b, 23c and 23d.

**[0064]** In different embodiments, not illustrated, the number of compartments may be different, according to the desired type and number of treating agents which are used in the particular model of laundry washing machine.

**[0065]** The first compartment 23a is preferably adapted for receiving a powder detergent; the second compartment 23b is preferably adapted for receiving a quantity of liquid detergent; the third compartment 23c is preferably adapted for receiving bleach; the fourth compart-

ment 23d is preferably adapted for receiving a softener.

**[0066]** In different embodiments, other treating agents may be used, such as fabric conditioners, waterproofing agents, fabric enhancers, rinse sanitization additives, chlorine-based additives, etc.

**[0067]** The treating agents dispenser 20 further comprises a water distributor 35, associated to the housing 21 and placed above the drawer 22 in such a way to allow the flowing of water to one or more of said compartments 23a, 23b, 23c, 23d.

**[0068]** At this purpose, the water distributor 35 preferably comprises one or more channels, not shown, adapted for selectively conveying water to one or more of said compartments 23a, 23b, 23c, 23d.

**[0069]** The channels are opportunely shaped for conveying water to one or more of said compartments 23a, 23b, 23c, 23d of the drawer 22 when the latter is placed in its closed operative position.

**[0070]** The water distributor 35 is apt to be connected to an external water source, which could comprise, for example, the plumbing of the building in which the laundry washing machine 1 is installed. The first water source is preferably a source for the adduction of cold water.

**[0071]** The water distributor 35 is preferably connected to the external water source by means of valves 40.

**[0072]** The first compartment 23a is preferably provided with an aperture 26 defined at the rear of the first compartment 23a. The aperture 26 is adapted to allow the flowing of a liquid therethrough and then to the side walls 21a, 21b of the housing and the outlet port 21c to convey liquid to the supply pipe towards the tub.

**[0073]** The other compartments 23b, 23c and 23d of the drawer 22 are preferably provided with respective siphons 24a, 24b and 24c.

**[0074]** The first siphon 24a connects the second compartment 23b to the underside 22b of the drawer 22. Analogously, the second siphon 24b connects the third compartment 23c to the underside 22b of the drawer 22 and the third siphon 24c connects the fourth compartment 23d to the underside 22b of the drawer 22.

**[0075]** Aperture 26 and siphons 24a, 24b and 24c define outlets apt to fluidly connecting a respective compartment 23a, 23b, 23c and 23d to the underside 22b of the drawer 22.

**[0076]** According to an aspect of the invention, the treating agents dispenser 20 comprises a guard element 50 movably associated to the underside 22b of the drawer 22.

**[0077]** The guard element 50 according to a preferred embodiment of the invention is apt to be positioned in a first operative position, or closed position as illustrated in Figure 5, and in a second operative position, or opened position as illustrated in Figure 6.

**[0078]** The guard element 50 preferably comprises two side lateral walls 51a, 51b and a bottom side wall 51c joining side lateral walls 51a, 51b. The guard element 50, therefore, is preferably U-shaped.

**[0079]** The length of the guard element 50 is preferably equal to, or greater than, the length of the drawer 22.

**[0080]** The width of the guard element 50 is then preferably equal to, or slightly smaller than, the width of the drawer 22.

**[0081]** The guard element 50 is normally maintained in the closed position, in particular when the drawer 22 is fully inserted into the housing 21 in the closed position, which corresponds to the normal working position.

**[0082]** The guard element 50 is advantageously arranged below the siphons 24a, 24b and 24c and therefore it collects the liquid coming from the siphons.

**[0083]** In a preferred embodiment, the bottom side wall 51c of the guard element 50 is slightly inclined with respect to the horizontal plane so that to provide a ramp sloping down towards the rear side of the drawer 22. The liquid may therefore flow towards the rear side of the drawer 22 and in particular towards the outlet port 21c and, from there, into the supply pipe up to the tub.

**[0084]** The guard element 50 advantageously guides the water and the treating agents drawn through the siphons 24a, 24b and 24c towards the tub.

**[0085]** Furthermore, in particular when the length of the guard element 50 is greater than the length of the drawer 22, the guard element 50 also advantageously collects the liquid coming from the aperture 26 of the first compartment 23a, for example water and powder detergent, and it conveys it substantially directly to the outlet port 21c and then to the tub. This avoids, or reduces the risk, that residues of treating agent, in particular detergent, stuck at the side walls 21a, 21b of the housing 21 and/or reduces splashing of liquid.

**[0086]** Furthermore, advantageously, in particular when the width of the guard element 50 is equal to the width of the drawer 22, the guard element 50 substantially entirely surrounds the underside 22b of the drawer 22. This avoids, or reduces the risk, that residues of treating agent falling from the compartments 23a, 23b, 23c and 23d stuck at the side walls 21a, 21b of the housing 21 and/or reduces splashing of liquid.

**[0087]** The guard element 50 is also preferably maintained in the closed position when the drawer 22 is extracted from the housing 21, such as to protrude from the cabinet 2 in an opened position, as illustrated for example in figures 1, 2 or 3 (for example when a compartment is filled with a treating agent).

**[0088]** Advantageously, leaking liquid from the drawer 22, for example water and/or treating agents, do not fall down but again guided towards the outlet port 21c and from there into the supply pipe up to the tub. This prevent the floor getting wet.

**[0089]** According to a further aspect of the invention, the guard element 50 is moved in the opened position, in particular when the drawer 22 is totally extracted from the housing 21.

**[0090]** The guard element 50 in the opened position may be easily cleaned by the user, for example by flushing with water or by rubbing with a cloth.

**[0091]** Accumulation of residues of treating agents is

therefore prevented. This guarantees good hygienic conditions of the guard element 50 and of the treating agents dispenser 20, in particular when the laundry washing machine 1 in not used for a long time between two successive washing cycles.

**[0092]** More preferably, the guard element 50 is swingably associated to the underside 22b of the drawer 22. The guard element 50 is hinged to the underside 22b of the drawer 22 at the front part 41 thereof, which allows the pivoting of the guard element 50 with respect to the underside 22b of the drawer 22.

**[0093]** While in the preferred embodiment illustrated the guard element 50 is hinged at the front part 41 of the drawer 22, it has to be underlined that in different embodiments the guard element may be hinged at any different position of the underside of the drawer.

**[0094]** As illustrated in Figures 10 and 11, a shaft 54 is supported by means of two ribs 55a, 55b extending from a front side 56 of the guard element 50. The shaft 54 is rotatably received in a seat 58 defined by a curved tongue 60 protruding from the drawer 22.

**[0095]** A release device 62, then, allows a rear side 57 of the guard element 50 to be realesably connected to the underside 22b of the drawer 22.

**[0096]** The release device 62 preferably comprises a first elastic tongue 64a at a first side of the guard element 50 provided with a respective first tooth 66a which is apt to be received in a corresponding first rectangular slot 70a defined in a first protruding tab 72a of the drawer 22.

**[0097]** The release device 62 further preferably comprises a second elastic tongue 64b at a second side of the guard element 50 provided with a respective second tooth, not visible in the Figures, which is apt to be received in a corresponding second rectangular slot, not visible in the Figures, defined in a second protruding tab of the drawer 22.

**[0098]** In the first operative position of the guard element 50, the teeth 66a are received in the slots 70a of the tabs 72a, as illustrated in Figure 7.

**[0099]** The second operative position of the guard element 50 is obtained by disengagement of the teeth 66a from the slots 70a by acting on the elastic tongues 64a, 64b. In particular, the elastic tongues 64a, 64b are deflected so that the teeth 66a disengage the slots 70a. The guard element 50 is then rotated around the shaft 54 and positioned in the opened position.

**[0100]** More preferably, the guard element 50 further to its displacement in the opened position may be preferably completely removed from the drawer 22.

**[0101]** In the preferred embodiment above described, removal of the guard element 50 is obtained by forcing out the shaft 54 of the guard element 50 from the seat 58 of the drawer 22.

**[0102]** Removal of the guard element 50 make the cleaning operations easy.

**[0103]** While in the preferred embodiment illustrated the release device comprises two elastic tongues provided with teeth associated to said guard element and slots defined in protruding tabs of the drawer, it has to be underlined that in different embodiments slots may be defined in the elastic tongues and teeth may be associated to the drawer.

**[0104]** Furthermore, while in the preferred embodiment illustrated the release device 62 comprises two elastic tongues provided with teeth associated to said guard element and slots defined in protruding tabs of the drawer, it has to be underlined that in different embodiments the two elastic tongues provided with teeth may be associated to the drawer and slots may be defined in the guard element.

**[0105]** In different embodiments, then, the number of teeth and corresponding slots may be different, even just one tooth and one slot.

**[0106]** It has to be understood that shape of the teeth and/or of the slots may be any shape suitable to obtained said releasability, as illustrated for example in embodiment illustrates in Figures 16 to 18.

**[0107]** Figures 12 to 15 illustrate a further embodiment of a drawer 122 of a treating agents dispenser according to the present invention.

**[0108]** The drawer 122 comprises an upper side 122a and an opposite underside 122b. A guard element 150 is movably associated to the underside 122b of the drawer 122.

**[0109]** The guard element 150 is apt to be positioned in a first operative position, or closed position as illustrated in Figure 12, and in a second operative position, or opened position as illustrated in Figure 13.

**[0110]** The guard element 150 preferably comprises two side lateral walls 151a, 151b and a bottom side wall 151c joining side lateral walls 151a, 151b.

**[0111]** The length of the guard element 150 is preferably equal to, or greater than, the length of the drawer 122.

**[0112]** The guard element 150 is normally maintained in the closed position, in particular when the drawer 122 is fully inserted into the housing 21 in the closed position or when the drawer 122 is extracted from the housing 21, such as to protrude from the cabinet 2 in an opened position, as described above.

**[0113]** Advantageously, leaking liquid from the drawer 122, for example water and/or treating agents, do not fall down but are guided towards the outlet port 21c through the side walls 21a, 21b of the housing 21 and from there into the supply pipe up to the tub. This prevent the floor getting wet.

**[0114]** The guard element 150 is moved in the opened position, in particular when the drawer 122 is totally extracted from the housing 21.

**[0115]** More preferably, the guard element 150 is swingably associated to the underside 122b of the drawer 122. The guard element 150 is hinged to the underside 122b of the drawer 122 at the rear part 142 thereof, which allows the pivoting of the guard element 150 with respect to the underside 122b of the drawer 122.

**[0116]** Two pins 155a, 155b of the guard element 150,

shown in Figure 14, are rotatably received in respective seats, non visible, defined in the drawer 122.

**[0117]** A release device 162, then, allows a front side 156 of the guard element 150 to be realesably connected to the underside 122b of the drawer 122.

**[0118]** The release device 162 preferably comprises an elastic tongue 164a provided with a tooth 166a at a first side of the guard element 150 which is apt to be received in a corresponding slot 170a defined at the frontal part 141 of the drawer 122. A closed rib 175 defines an aperture 176 wherein, advantageously, a finger of the user may be inserted.

**[0119]** In the first operative position of the guard element 150, the tooth 166a is received in the slot 170a of the drawer 122, as illustrated in Figures 12 and 15.

**[0120]** The second operative position of the guard element 150 is obtained by disengagement of the tooth 166a from the slot 170a by acting on the elastic tongue 164a. In particular, the elastic tongue 164a may be deflected by the action the user's finger inserted in the aperture 176 so that the tooth 166a disengages the slot 170a. The guard element 150 is then rotated around the pins 155a, 155b and positioned in the opened position.

**[0121]** More preferably, the guard element 150 further to its displacement in the opened position may be preferably completely removed from the drawer 122.

**[0122]** In the preferred embodiment above described, removal of the guard element 150 is obtained by forcing out the pins 155a, 115b from the seats of the drawer 122.

**[0123]** The bottom side wall 151c of the guard element 150 is slightly inclined with respect to the horizontal plane so that to provide a ramp sloping down towards the rear side of the drawer 122.

**[0124]** Preferably, the inner side of the bottom side wall 151c of the guard element 150, i.e. the side facing the underside 122b of the drawer 122, is provided with ribs 171a, 171b, 171c which define respective channels 180a, 180b, 180c and 180d, as illustrated in Figure 14.

**[0125]** Channels 180a, 180b, 180c and 180d help to canalize the liquid coming from the compartments of the drawer 122 towards the outlet port 21c of the housing 21 and, from there, into the supply pipe up to the tub.

**[0126]** With reference to Figures 16 to 18 a drawer 222 according to a further preferred embodiment of the invention is described.

**[0127]** The drawer 222 differs from the drawer 22 previously described with reference to Figures 1 to 11 in that the release device 262 comprises hemispheres 266a on elastic tongues 264a, instead of teeth 66a, which are apt to be received in corresponding oval slots 270a, instead of rectangular slots 70a.

**[0128]** This preferred embodiment achieves all the advantages above described for the previous embodiments.

**[0129]** It has thus been shown that the present invention allows all the set objects to be achieved. In particular, it makes it possible to realize a laundry washing machine that makes it possible to reduce or prevent residues of treating agent in the treating agents dispensers .

**[0130]** It is underlined that the laundry washing machines illustrated in the enclosed figures are of the front-loading type; however it is clear that the system according to the invention can be applied as well to a top-loading laundry washing machine, substantially without any modification.

**[0131]** While the present invention has been described with reference to the particular embodiments shown in the figures, it should be noted that the present invention is not limited to the specific embodiments illustrated and described herein; on the contrary, further variants of the embodiments described herein fall within the scope of the present invention, which is defined in the claims.

## Claims

1. A laundry washing machine (1) connectable to an external water source comprising a cabinet (2) supporting a washing tub enclosing a rotatable washing drum suited to receive laundry and a treating agents dispenser (20) connectable to said external water source and fluidly connected to said washing tub, said treating agents dispenser (20) comprising:

   - a drawer (22; 122; 222) comprising one or more compartments (23a, 23b, 23c, 23d) for receiving at least one agent for treating laundry;
   - a supporting structure (21) on which said drawer (22; 122; 222) can slide;
   - a water distributor (35) comprising at least one channel for conveying water from said external water source to at least one of said one or more compartments (23a, 23b, 23c, 23d) of said drawer (22; 122; 222);

   wherein a guard element (50; 150) is movably connected to an underside (22b; 122b) of said drawer (22; 122; 222).

2. A machine (1) according to claim 1, wherein said guard element (50; 150) is swingably connected to said underside (22b; 122b) of said drawer (22; 122; 222).

3. A machine (1) according to claim 1 or 2, wherein said guard element (50; 150) is removably connected to said underside (22b; 122b) of said drawer (22; 122; 222).

4. A machine (1) according to any of the preceding claims, wherein said guard element (50; 150) is hinged to said underside (22b; 122b) of said drawer (22; 122; 222) to allow the pivoting of said guard element (50; 150) with respect to said underside (22b; 122b) of said drawer (22; 122; 222).

**5.** A machine (1) according to claim 4, wherein said guard element (50; 150) is hinged to said underside (22b; 122b) of said drawer (22; 122; 222) at a front part thereof (41) or at a rear part thereof (142).

**6.** A machine (1) according to any of the preceding claims, wherein treating agents dispenser (10) comprises a release device (62; 162; 262) realesably connecting said guard element (50; 150) to said underside (22b; 122b) of said drawer (22; 122; 222).

**7.** A machine (1) according to claim 6, wherein said release device (62; 162; 262) comprises an elastic tongue (64a; 164a; 264a) provided with a tooth (66a; 166a; 266a) associated to said guard element (50; 150) or said drawer (22; 122; 222), said tooth (66a; 166a; 266a) being apt to be received in a slot (70a; 270a) associated to said drawer (22; 122; 222) or said guard element (50; 150), respectively.

**8.** A machine (1) according to claim 6, wherein said release device comprises an elastic tongue provided with a slot associated to said guard element or said drawer, said slot being apt to receive a tooth associated to said drawer or said guard element, respectively.

**9.** A machine (1) according to any of the preceding claims, wherein a side of said guard element (150) facing said underside (122b) of said drawer (122) comprises at least one rib (171a, 171b, 171c) defining at least one channel (180a, 180b, 180c) apt to canalize liquid therethrough.

**10.** A machine (1) according to any of the preceding claims, wherein at least one of said one or more compartments (23a, 23b, 23c, 23d) comprises and outlet (26, 24a, 24b, 24c, 24d) apt to fluidly connecting said at least one of said one or more compartments (23a, 23b, 23c, 23d) to said underside (22b; 122b) of said drawer (22; 122; 222).

**11.** A machine (1) according to claim 10, wherein said outlet comprises a siphon (24a, 24b, 24c, 24d).

**12.** A machine (1) according to any of the preceding claims, wherein said guard element (50; 150) comprises two side lateral walls (51a, 51b; 151a, 151b) and a bottom side wall (51c; 151c) joining said side lateral walls (51a, 51b; 151a, 151b).

**13.** A machine (1) according to any of the preceding claims, wherein the length of said guard element (50; 150) is equal to, or greater than, the length of said drawer (22; 122; 222).

**14.** A machine (1) according to any of the preceding claims, wherein said water distributor (35) is placed above said drawer (22; 122; 222) when said treating agents dispenser (10) is mounted in an operational position.

**15.** A machine (1) according to any of the preceding claims, wherein said drawer (22; 122; 222) is slidable from a closed position to an opened position or from an opened position to a closed position.

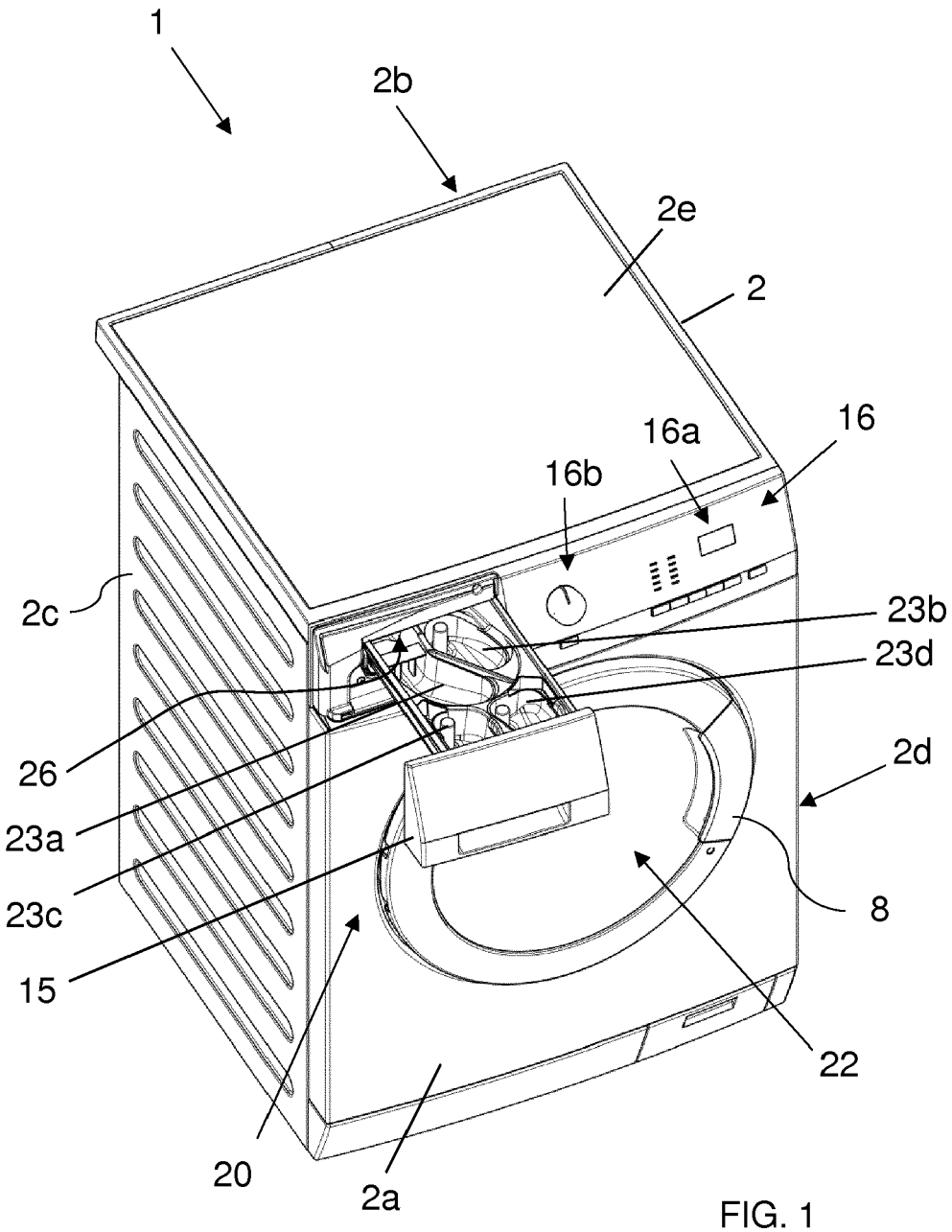



FIG. 1

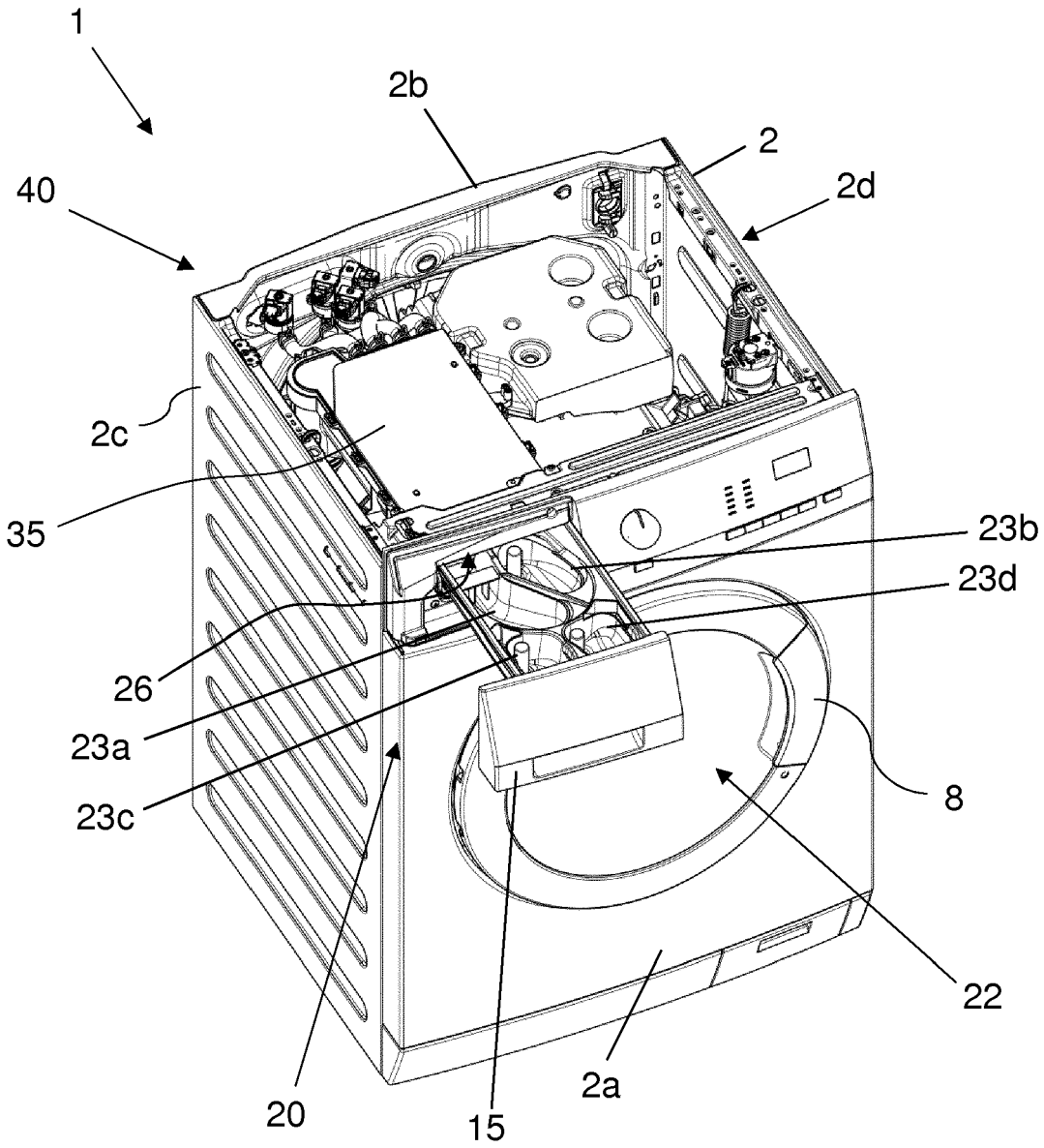



FIG. 2

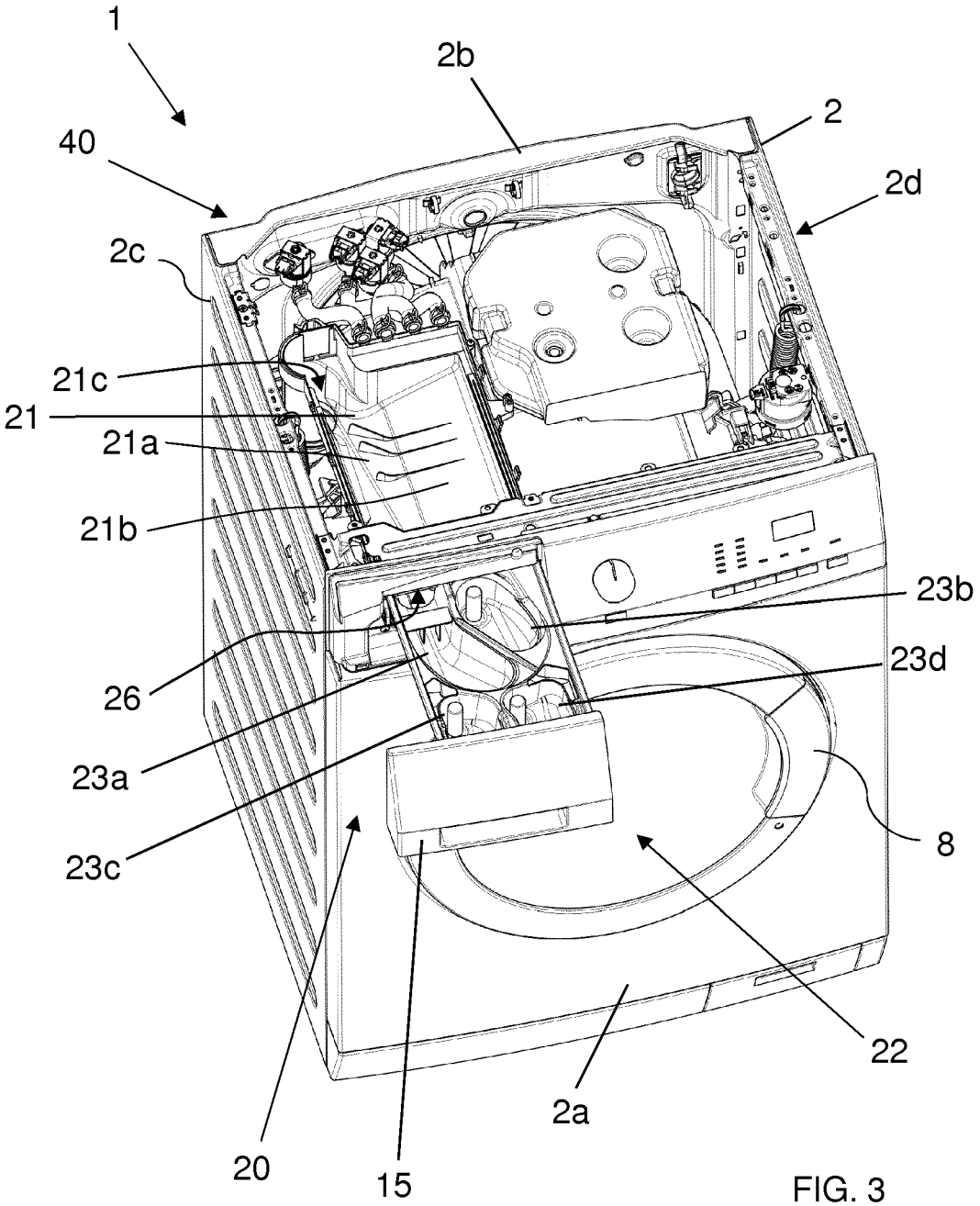



FIG. 3

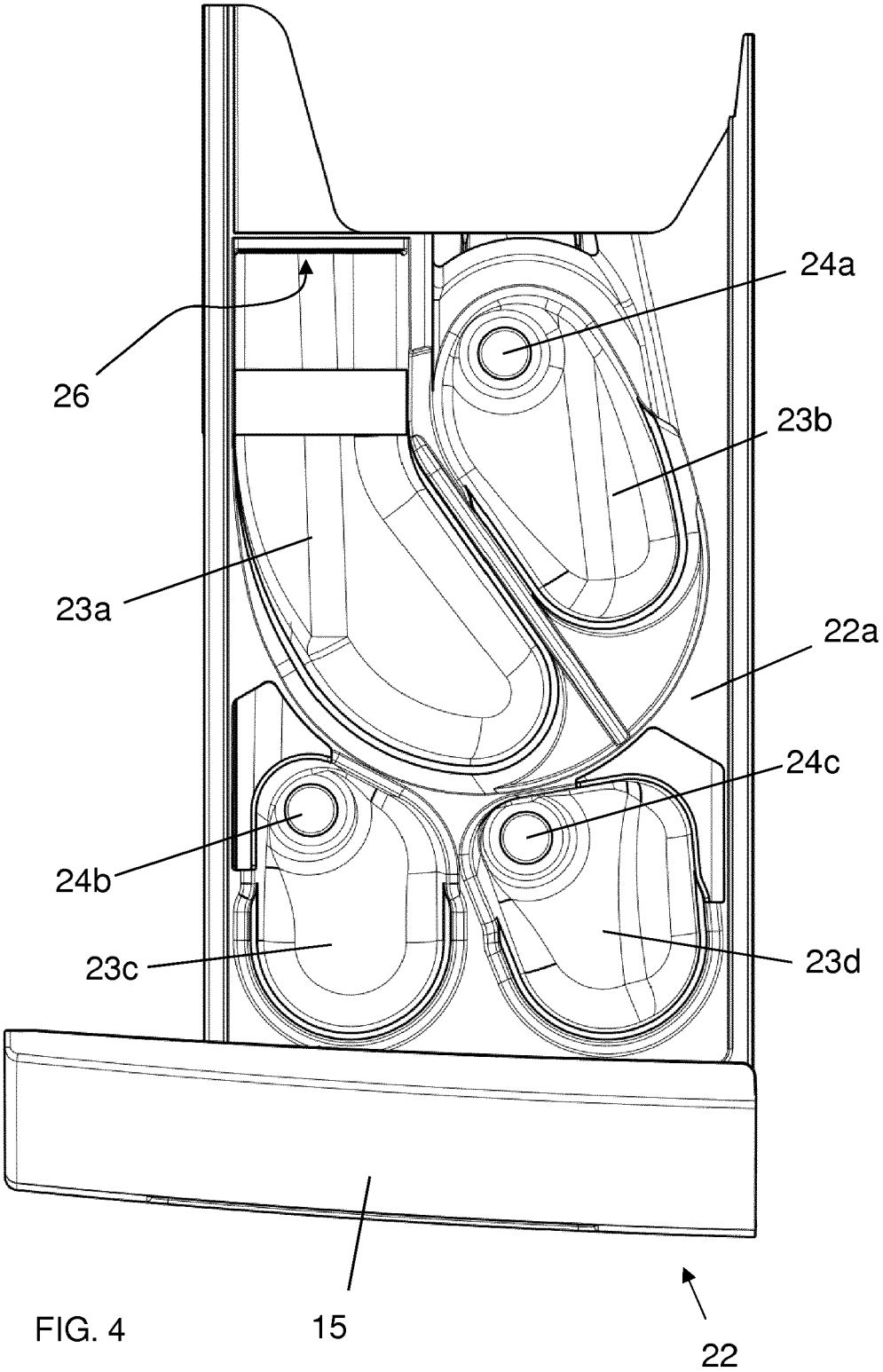



FIG. 4

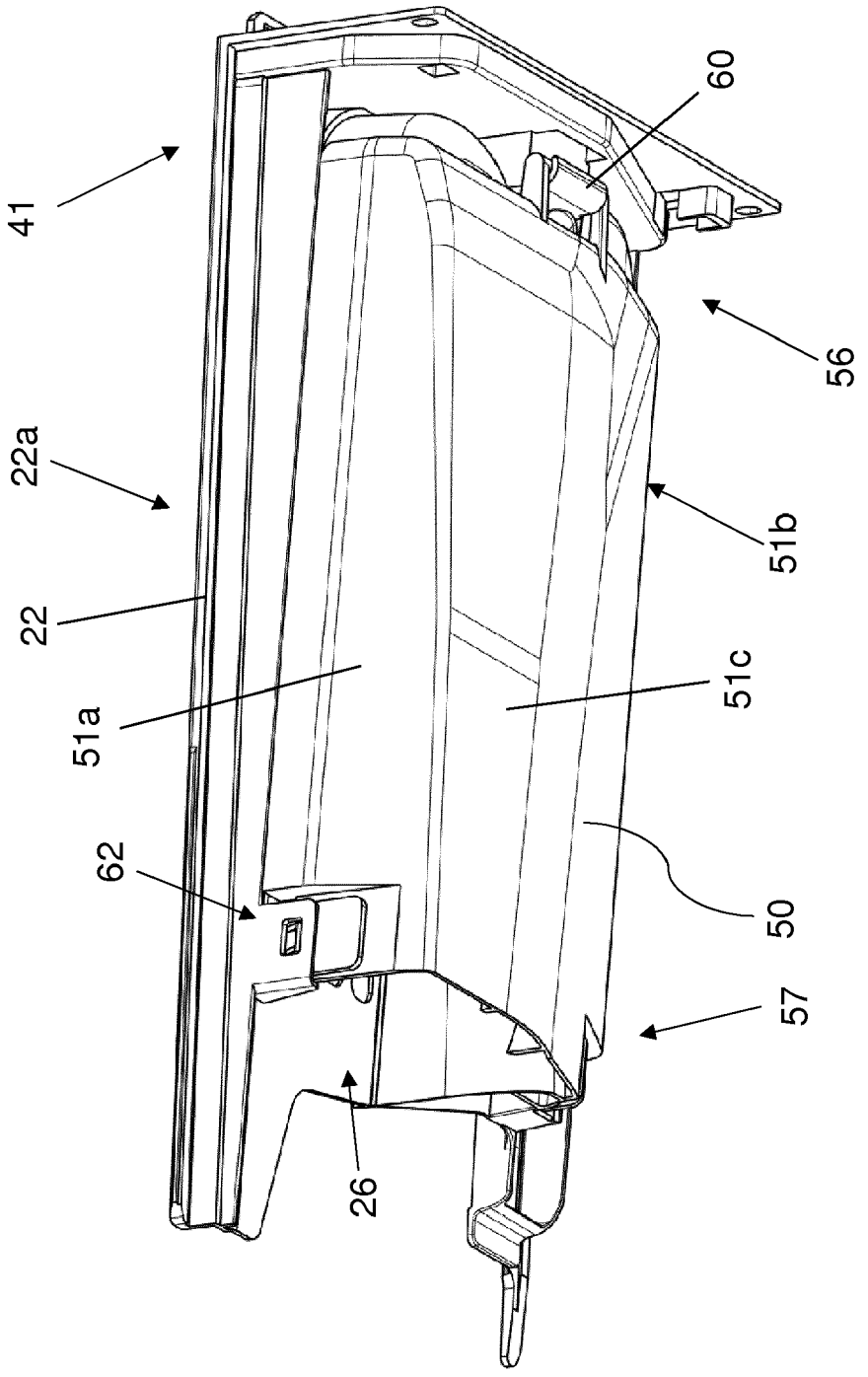



FIG.5

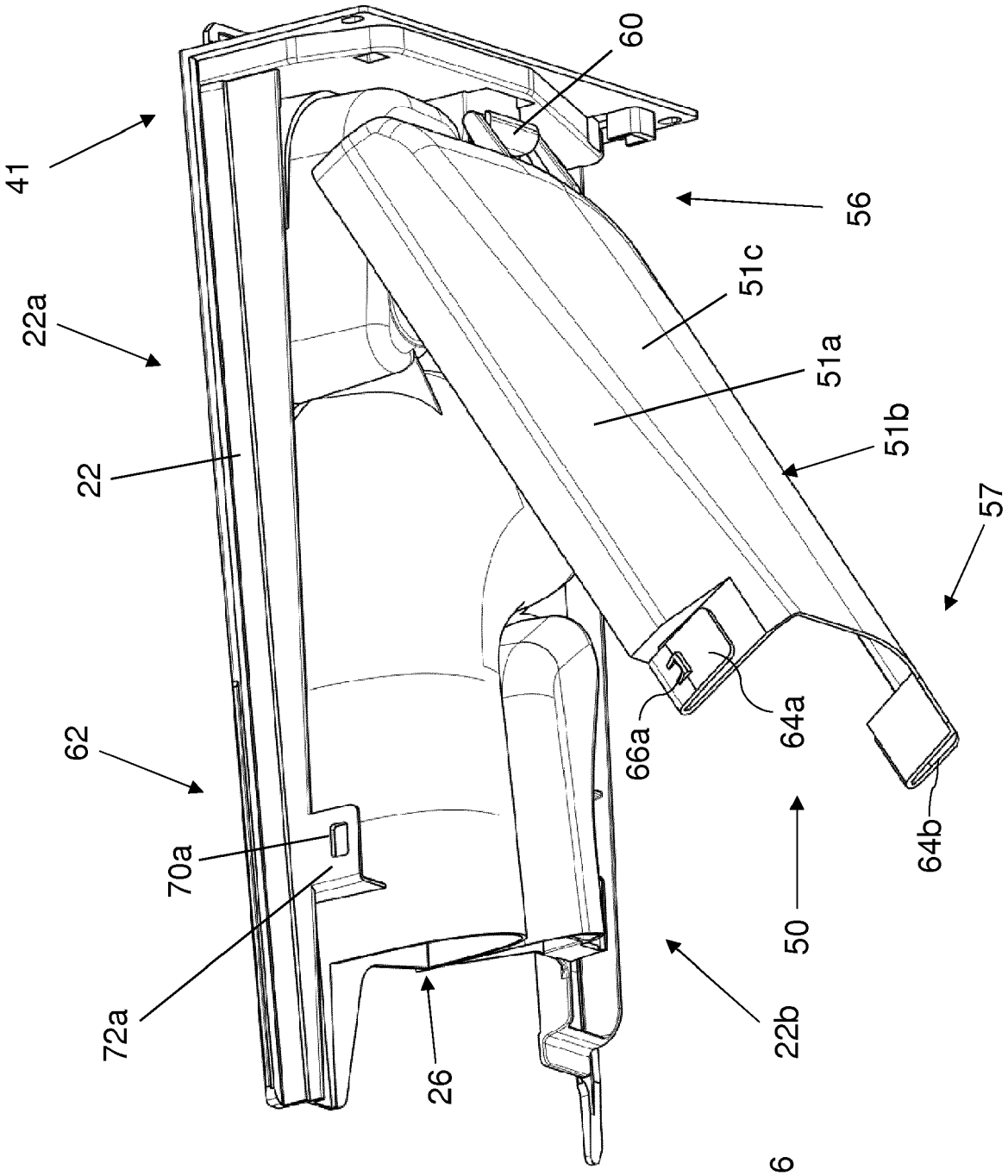



FIG.6

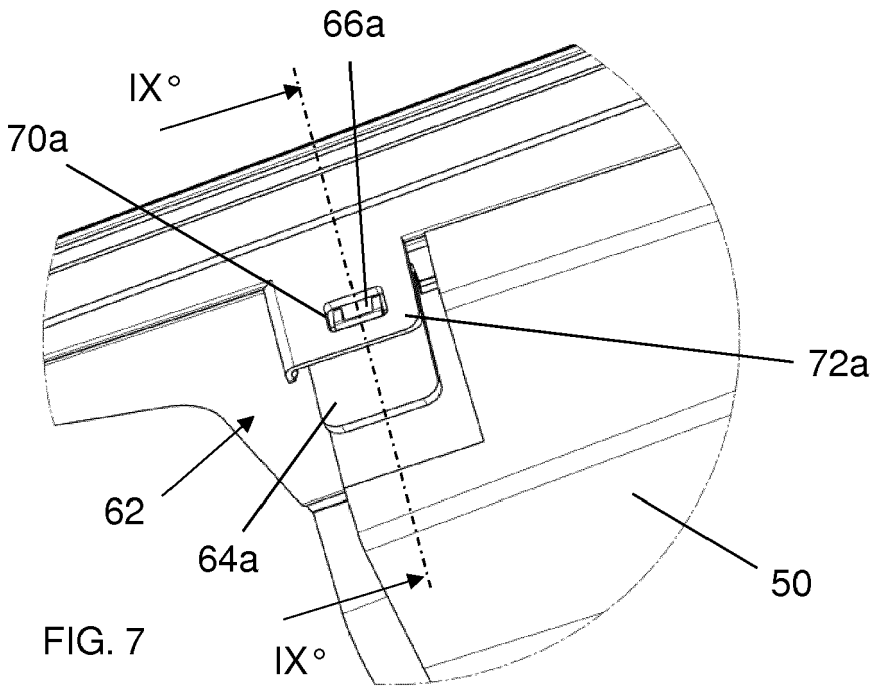



FIG. 7

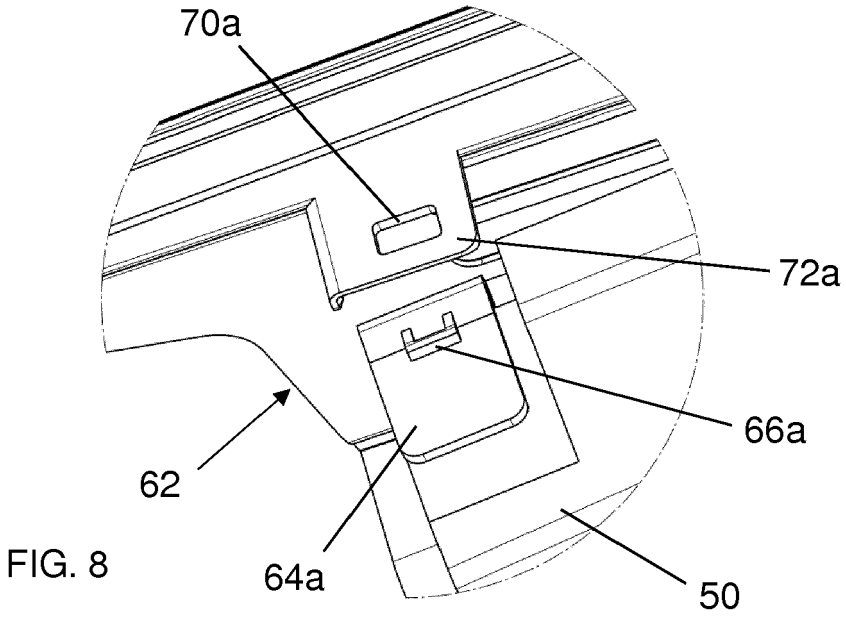
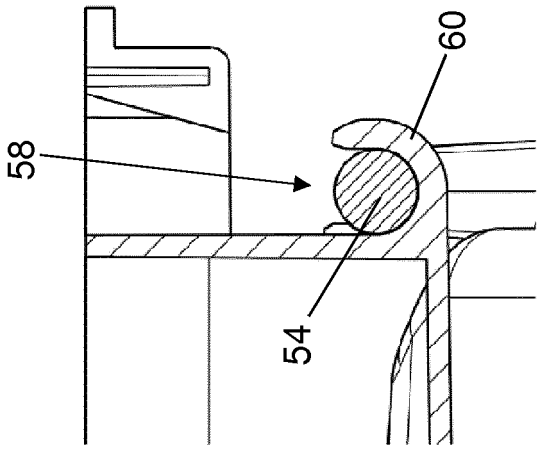



FIG. 8

FIG.11



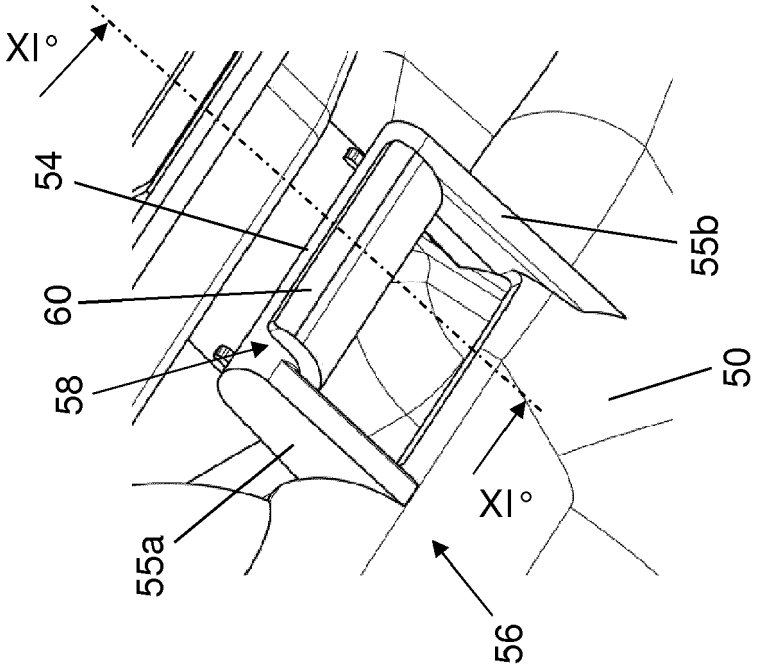




FIG.10

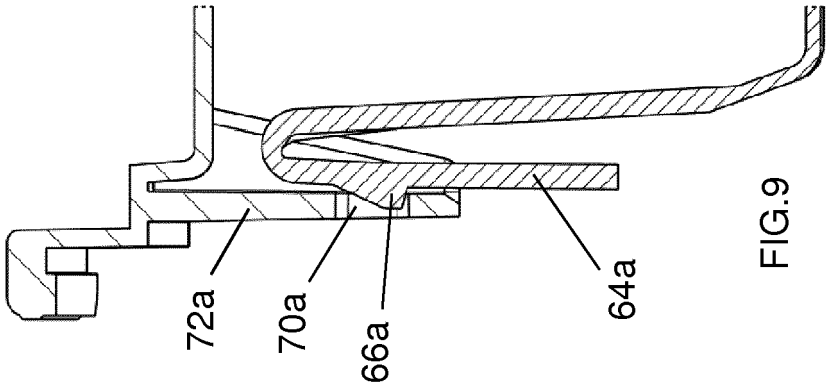



FIG.9

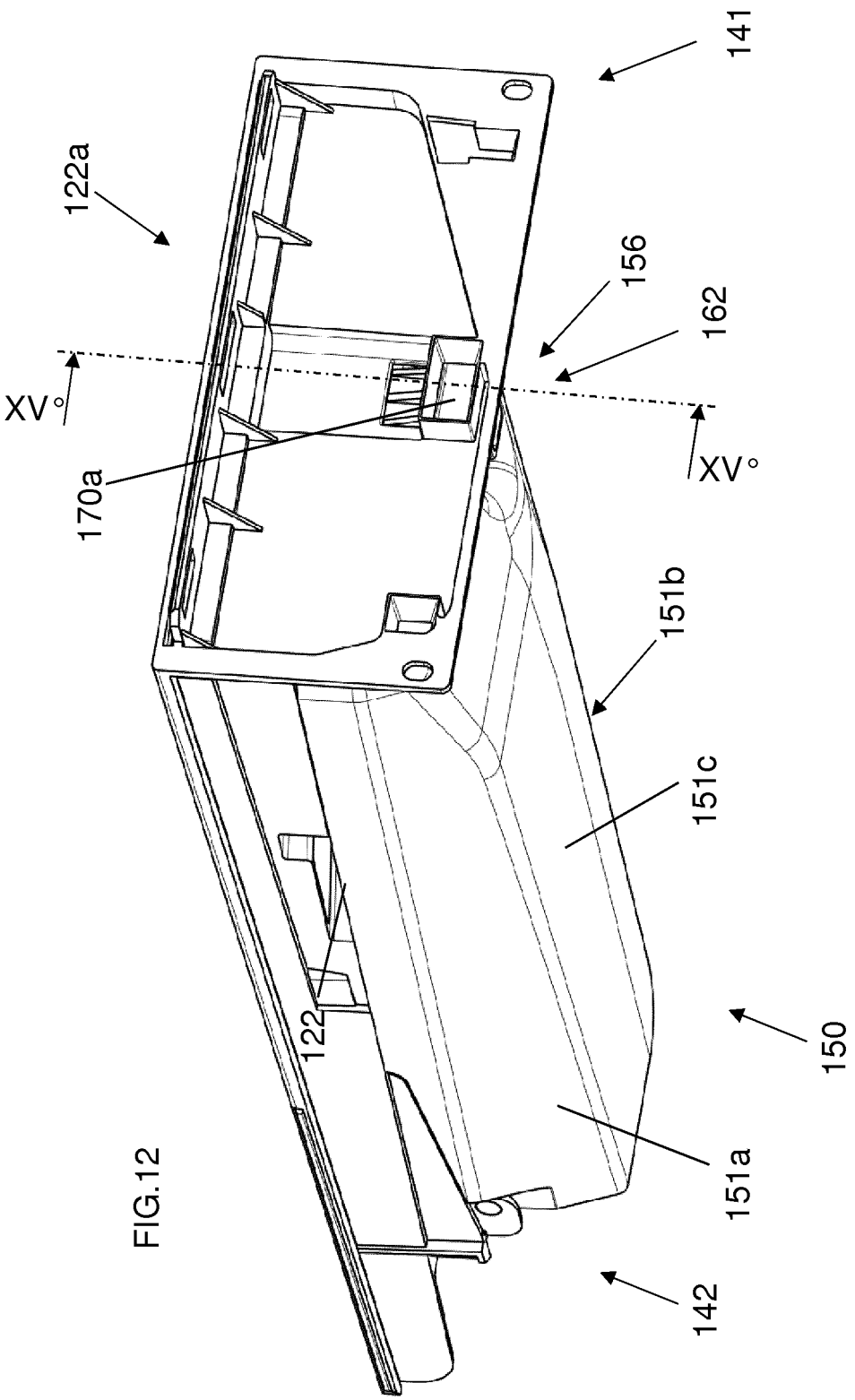



FIG.12

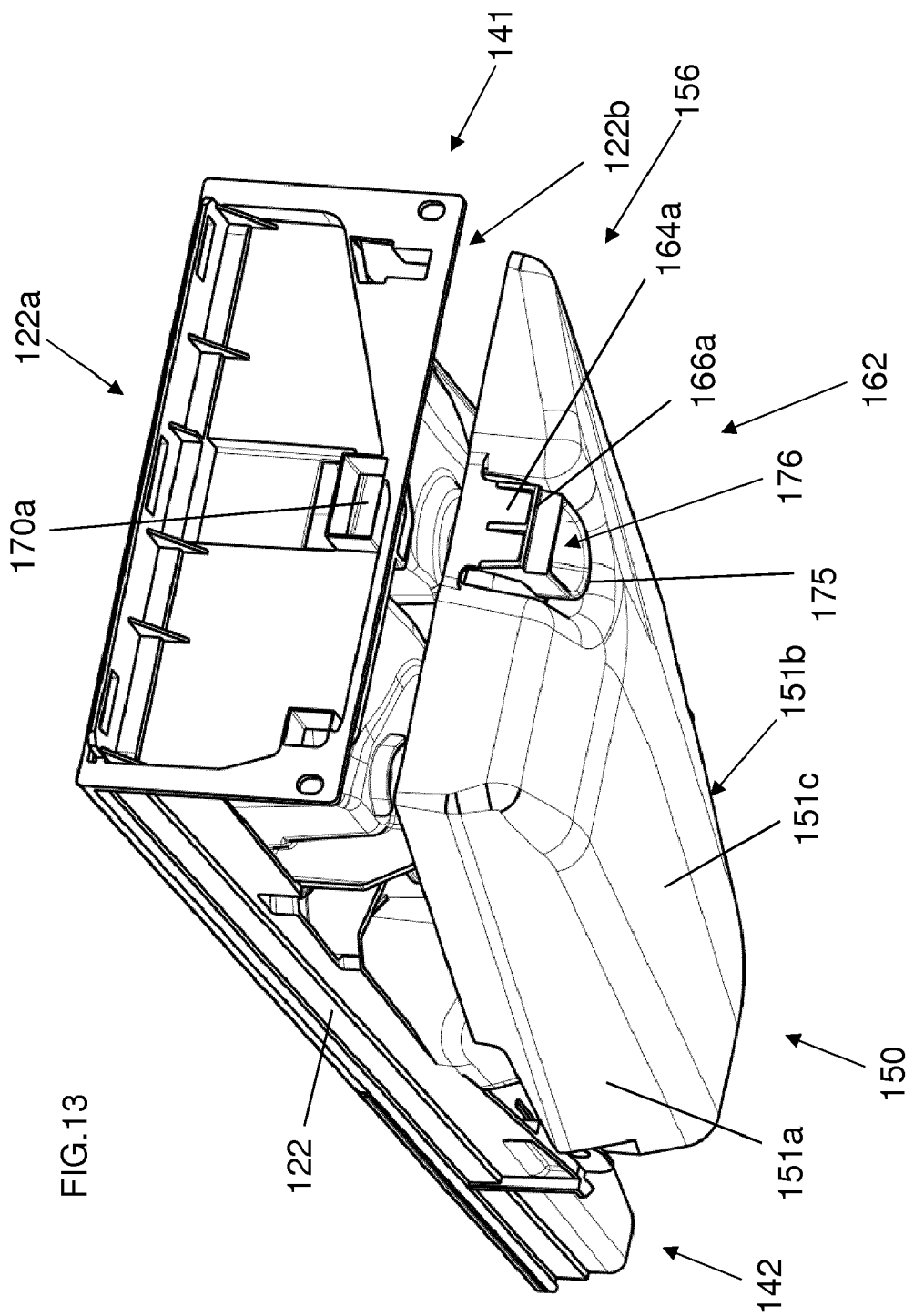

141
122b
156
164a
122a
166a
162
170a
176
175
151b
151c
150
122
151a
142

FIG.13

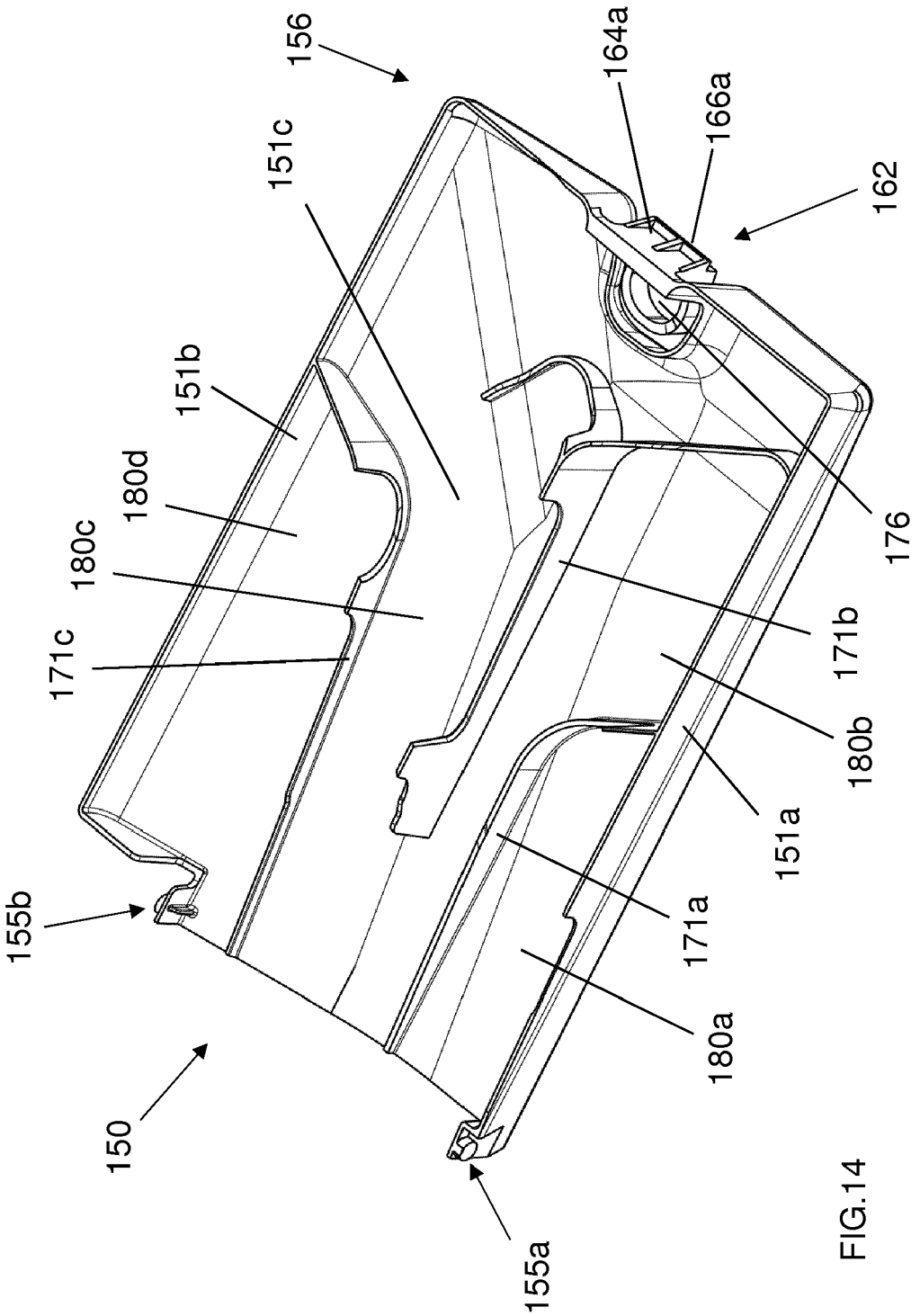

156
164a
166a
162
151c
151b
180d
180c
171c
176
171b
180b
151a
155b
171a
180a
150
155a

FIG.14

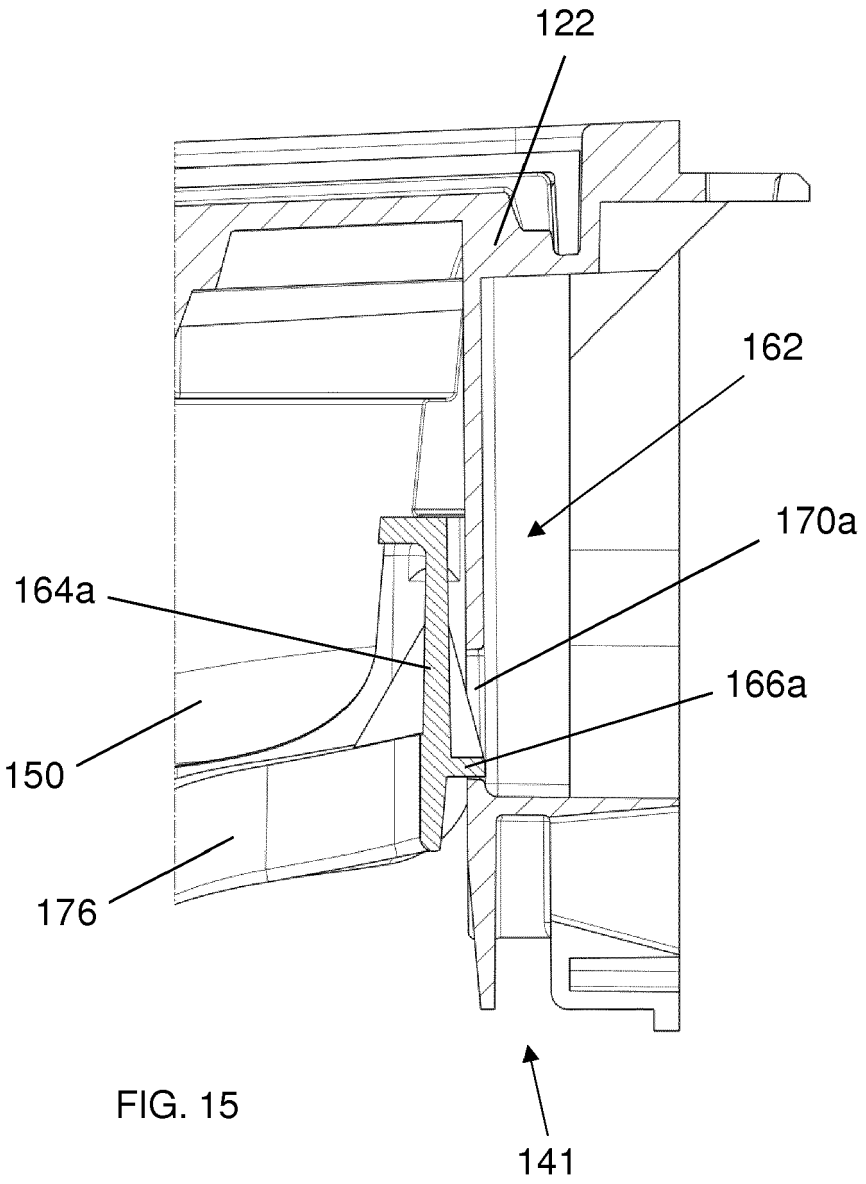
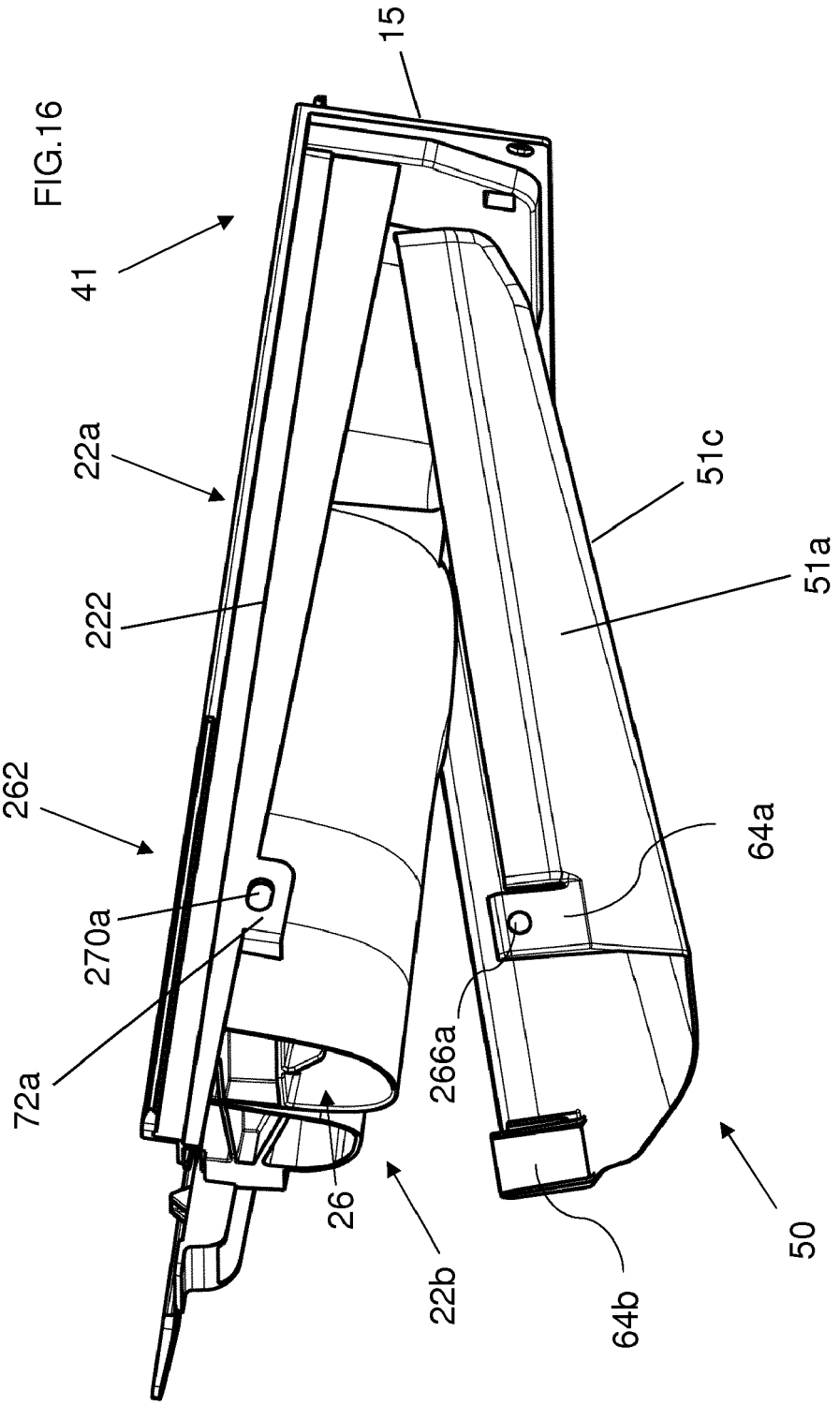



FIG. 15

FIG.16



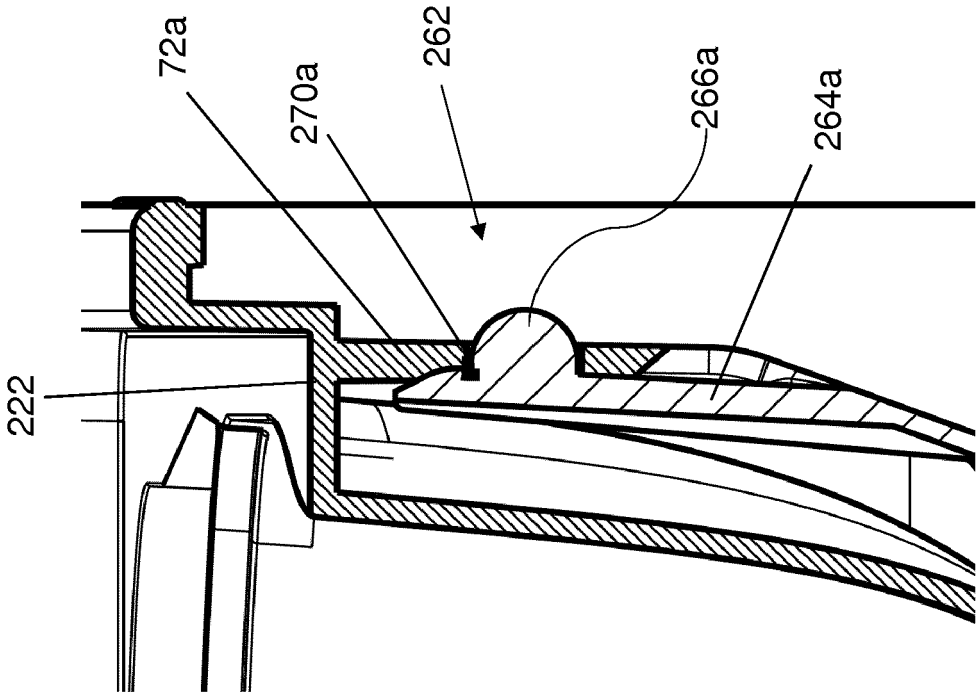

72a
270a
262
266a
264a
222

FIG.18

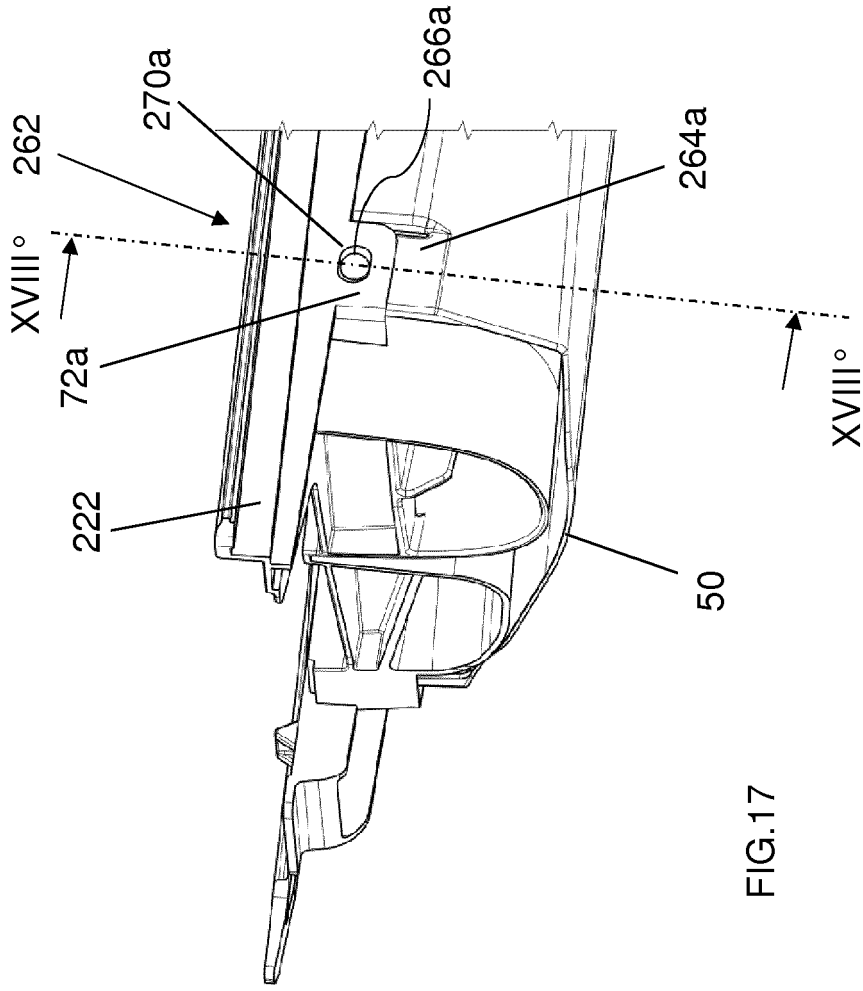

266a
270a
262
264a
XVIII°
72a
XVIII°
222
50

FIG.17

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# EUROPEAN SEARCH REPORT

Application Number
EP 16 18 0617

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
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| A | US 2003/145633 A1 (MERKLE SCOTT A [US] ET AL) 7 August 2003 (2003-08-07) * paragraph [0014] - paragraph [0025]; figure 1 * | 1-15 | |

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D06F

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 17 November 2016 | Spitzer, Bettina |

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EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 18 0617

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17-11-2016

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