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(54) WATER SUPPLY DEVICE FOR A HOUSEHOLD WASHING MACHINE, IN PARTICULAR A DISHWASHER, AND HOUSHOLD WASHING MACHINE HAVING SUCH A DEVICE

(57) The present invention relates to a dispenser device (1) for dispensing a liquid in a washing machine for household use, in particular a dishwasher, said dispenser device (1) being of the type that comprises:
- an inner cavity (2);
- an air-break device (10) associated with a supply duct (3) for supplying the liquid coming from the water main;
- an aperture (4) for collecting and venting vapours, in particular coming from a wash tub, said aperture (4) being such as to communicate with the inner cavity (2) of the dispenser device (1).

The present invention is characterized in that said air-break device (10) is positioned in said aperture (4).

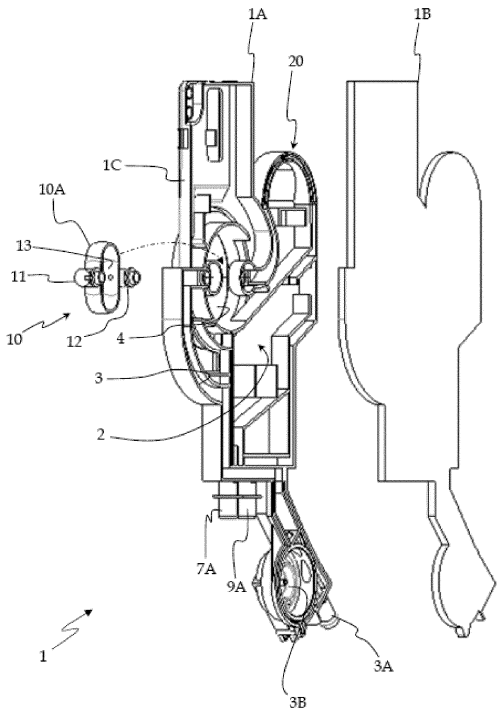

Fig. 1

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Description

[0001] The present invention relates to a dispenser device for dispensing a liquid in a washing machine for household use, in particular a dishwasher, according to the preamble of claim 1.

[0002] The present invention also relates to an associated washing machine for household use, in particular a dishwasher.

[0003] It is known that household washing machines, particularly dishwashers, comprise a dispenser device for dispensing a washing liquid into the wash tub.

[0004] Said dispenser device is typically made from plastic material and is positioned outside the wash tub, generally in association with one of the side walls of the washing machine.

[0005] In particular, this type of dispenser device typically consists of a flat, hollow body comprising:

- a first half-shell (or bottom wall) with transverse walls;
- a second half-shell (or cover), which is so shaped as to substantially match the shape of the first half-shell and which is secured to the transverse walls of said first half-shell.

[0006] Usually said first and second half-shells are obtained from plastic material by injection moulding, and are joined together by welding, generally by hot-blade welding.

[0007] Moreover, the dispenser devices known in the art typically comprise a plurality of components that allow the device to carry out several different functions (hence the name "multifunction device" usually given to dispenser devices); for example, said components may comprise:

- an air-break device associated with a liquid supply duct, for preventing the liquid from returning into the water main should a vacuum be created therein,
- an opening for venting the vapours generated inside the wash tub.

[0008] In particular, the air-break devices are necessary to avoid the risk that chemical solutions, dirty water or germ-enriched water may penetrate the drinking water main, especially when a vacuum is generated in the drinking water main (e.g. while maintenance or repair work is being carried out) and the washing machine connected to said water main is turned on at the same time.

[0009] It should also be noted that, in a washing machine of a known type, the dispenser device is usually associated with a softener device that comprises a resin container, which contains ion-exchange resins, and a regeneration tank, which contains an agent (in particular, brine) for regenerating the ion-exchange resins; as a consequence, the dispenser device is so designed as to comprise:

- a first duct connected to the resin container of the softener device;
- at least one chamber for collecting the resin regeneration liquid, said at least one chamber being connected to the regeneration tank of the softener device by means of a second duct.

[0010] The dispenser devices known in the art may even lack a chamber dedicated to collecting the regeneration liquid, since they may be so designed as to comprise a single chamber in which the liquid is collected to be then directed (in particular, via a switching valve) towards the resin container or the regeneration tank.

[0011] However, the dispenser devices known in the art suffer from a few drawbacks.

[0012] In particular, a considerable drawback of the solutions known in the art is that the air-break device must be so designed as to ensure a minimum distance between the tract where the liquid is injected and the tract that receives said liquid. For example, according to some regulations it is necessary that there is a distance of at least 20 mm between the liquid injection tract and any other wall. Consequently, it is clear that the air-break device will take much room inside the washing machine where the dispenser device will have to be installed; this is clearly in contrast to the requirements of modern washing machines, which tend to leave less room available for the various components.

[0013] It is therefore apparent that a drawback of the dispenser devices known in the art lies in the fact that they cannot be made as small as possible while also being easy to manufacture and economical.

[0014] A further problem suffered by the solutions known in the art is that, in the event of a malfunction of the dispenser device and/ or clogging of the output ducts leading to the tub of the washing machine or to any devices between the dispenser device and said tub, the regular water outflow from the dispenser device will be inhibited; the malfunction of the dispenser device may even prevent the air-break device from performing its function of preventing the liquid from flowing back into the water main.

[0015] It is therefore clear that the dispenser devices known in the art cannot ensure proper operation of the air-break device in adverse conditions, and this problem may also lead to adverse consequences on the water main to which the dispenser device and the associated washing machine are connected.

[0016] It should be noted that a malfunctioning dispenser device may also cause uncontrolled leakage of liquid outside the dispenser device itself, and such leakage may cause electrical safety problems because it may affect electric components installed in the lower part of the washing machine, or dripping of water onto the floor whereon the washing machine stands.

[0017] In this frame, it is the main object of the present invention to provide a dispenser device for dispensing a liquid in a washing machine for household use, in partic-

ular a dishwasher, and a related washing machine comprising said dispenser device, which are so designed as to overcome the drawbacks of the prior art.

[0018] In particular, it is one object of the present invention to provide a dispenser device, and a related washing machine, which are so designed that the air-break device will not take up much room inside the washing machine in which the dispenser device is to be installed.

[0019] It is another object of the present invention to realize a dispenser device, and a related washing machine, in such a way that the dimensions of the entire dispenser device can be kept as small as possible, said dispenser device being also easy to manufacture and economical.

[0020] It is a further object of the present invention to provide a dispenser device, and a related washing machine, which are so designed that the regular water outflow from the dispenser device will not be inhibited in the event of a malfunction of said dispenser device, in particular also in the event of clogging of the output ducts leading to the tub of the washing machine and/or to any devices between the dispenser device and said tub.

[0021] It is another object of the present invention to provide a dispenser device, and a related washing machine, that can ensure optimal operation of the air-break device, thus preventing the liquid from flowing back into the water main even in adverse conditions.

[0022] It is yet another object of the present invention to provide a dispenser device, and a related washing machine, which are so designed as to avoid the risk of uncontrolled leakage of water outside the dispenser device, thus preventing electric safety problems and/or dripping of water onto the floor whereon the washing machine stands.

[0023] Said objects are achieved by the present invention through a dispenser device for dispensing a liquid in a washing machine for household use, in particular a dishwasher, and a related washing machine comprising said dispenser device, incorporating the features set out in the appended claims, which are an integral part of the present description.

[0024] Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting explanatory example, wherein:

- Fig. 1 schematically shows an exploded perspective view of a dispenser device for dispensing a liquid in a washing machine for household use, in particular a dishwasher, according to the present invention;
- Fig. 2 schematically shows a vertical sectional view of the dispenser device according to the present invention;
- Fig. 3 schematically shows a vertical sectional view of a different embodiment of the dispenser device according to the present invention.

[0025] Fig. 1 schematically shows an exploded perspective view of a dispenser device for dispensing a liquid in a washing machine for household use, in particular a dishwasher, according to the present invention.

[0026] In said figure, reference numeral 1 designates the liquid dispenser device for dispensing a liquid, which comprises an inner cavity, designated as a whole by reference numeral 2; the annexed drawings do not show the washing machine for household use, in particular a dishwasher, that comprises said dispenser device 1.

[0027] Preferably, the dispenser device 1 comprises a first half-shell 1A and a second half-shell 1B that are substantially symmetrical and coupled to each other, so as to form said inner cavity 2; as a result, the dispenser device 1 comprises said inner cavity 2 and is, therefore, hollow. In particular, said half-shells 1A, 1B can be made from plastic material by injection moulding, and the coupling of the two half-shells 1A, 1B can be accomplished by means of a welding process, in particular a hot-blade welding process, carried out on a perimetric wall 1C of at least one of said half-shells 1A, 1B. It is however clear that the dispenser device 1 may also be so designed as to comprise a monolithic body, in particular made from plastic material by injection moulding, comprising two main faces (typically substantially rectangular in shape) facing each other and connected together by a perimetric wall so as to define an inner cavity.

[0028] It should be noted that the dispenser device 1 is also known in the prior art as a "multifunction device".

[0029] Furthermore, the dispenser device 1 as a whole preferably has a flat shape, particularly in order to facilitate the coupling thereof to a wall of the washing machine without taking up too much room; in particular, in an operating condition, the dispenser device 1 is associated with the washing machine in such a way as to prevalently lie in a vertical plane.

[0030] In Figures 1 and 2 it can be seen that the dispenser device 1 comprises an air-break device (designated as a whole by reference numeral 10) associated with a supply duct 3 for supplying the liquid coming from the water main, for preventing the liquid from returning into the water main.

[0031] Preferably, the supply duct 3 is formed by facing side walls rising in the inner cavity 2. In particular, said side walls protrude from one of the half-shells 1A, 1B and are closed by the other half-shell 1A, 1B. In the embodiment shown in Fig. 1, said side walls protrude from the first half-shell 1A and are closed by the second half-shell 1B; it is however clear that they may be formed on the second half-shell 1B and closed by the first half-shell 1A.

[0032] The dispenser device 1 further comprises an aperture 4 for collecting and venting vapours, in particular coming from a wash tub, said aperture 4 being such as to communicate with the inner cavity 2 of the dispenser device 1. Preferably, said aperture 4 is substantially circular in shape; in particular, it is formed on at least one of the half-shells 1A, 1B of the dispenser device 1; it is clear that, if the dispenser device 1 is made as one mon-

olithic piece, said aperture 4 will be obtained on at least one of the main faces that make up the dispenser device 1.

[0033] The dispenser device 1 further comprises a first compartment 4A positioned above the aperture 4 (in an operating condition, i.e. when the dispenser device 1 is associated with a washing machine) for venting and/or condensing said vapours coming from the aperture 4, in particular said first compartment 4A comprising a second aperture 4B for draining the vapours out of the dispenser device 1 (e.g. into the environment); preferably, said second aperture 4B is located at the top of the first compartment 4A.

[0034] In accordance with the present invention, the air-break device 10 is positioned in said aperture 4.

[0035] In particular, the air-break device 10 comprises a first half-duct 11 and a second half-duct 12 provided with respective ends facing each other, leaving a gap in between to create the air break.

[0036] In the embodiment shown in Figures 1 to 3, the first half-duct 11 and the second half-duct 12 have a tapered shape, in particular the narrower cross-section consisting of the respective ends, wherein said respective ends are arranged along the same straight line. Preferably, the ends of the first half-duct 11 and of the second half-duct 12 are positioned at a distance of at least 20 mm, so as to allow the liquid to follow an adequate air path in compliance with the regulations in force in the industry. Moreover, the end of the second half-duct 12 preferably has a larger cross-section than the end of the first half-duct 11, so that it can receive the liquid coming from said first half-duct 11. As a consequence, the air-break device 10 is preferably of the "injection" type (also known as "AD type"), since the first half-duct 11 forms an injector (that can also be defined as a "spray nozzle"), which allows the fluid to flow into the facing second half-duct 12 (which can also be defined as a "collection nozzle").

[0037] It should be noted that the first half-duct 11 is essentially an extension of the supply duct 3.

[0038] In the embodiment shown in Figures 1 and 2, the first air-break device 10 comprises an insert 10A (of the "injection" or "AD" type) that comprises the first half-duct 11 and the second half-duct 12, both having a tapered shape, and wherein the respective ends are arranged along the same straight line. Note that, in Fig. 1, the path for inserting the insert 10A into the aperture 4 is represented by means of a dashed-dotted arrow.

[0039] The insert 10A comprises a room 13 positioned between the first half-duct 11 and the second half-duct 12, in particular said room 13 having a substantially cylindrical shape.

[0040] In a preferred embodiment, said room 13 has a height (that substantially corresponds to the distance between the ends of the first half-duct 11 and of the second half-duct 12) of approx. 20 mm and a diameter of at least 40 mm. Also, said room 13 comprises a slit 13A allowing the liquid that does not succeed in crossing the air-break device 10 to flow into the aperture 4 (to be then delivered into the tub through said aperture 4).

[0041] It should be noted that in the embodiment shown in Fig. 3 the first half-duct 11 and the second half-duct 12 are directly obtained in the aperture 4 of said dispenser device 1. Preferably, in such an embodiment the first half-duct 11 and the second half-duct 12 are obtained, in particular by moulding, directly on the first half-shell 1A of said dispenser device 1; it is however clear that the first half-duct 11 and the second half-duct 12 may be obtained, at least partially, on the second half-shell 1B of the dispenser device 1.

[0042] The particular provisions of the present invention allow overcoming the drawbacks of prior-art dispenser devices by providing a dispenser device 1 which is so designed as to comprise an air-break device 10 that does not take up much room inside the washing machine in which the dispenser device 1 is to be installed.

[0043] It is therefore clear that the peculiar arrangement of the air-break device 10 according to the teachings of the present invention allows keeping the dimensions of the entire dispenser device 1 as small as possible, while also making it easy and economical to manufacture.

[0044] According to the present invention, in fact, the air-break device 10 is located in an unoccupied space (consisting of the aperture 4 for venting and/or condensing the vapours) that was already present in prior-art devices. Moreover, laboratory tests have shown that the position of the air-break device 10 does not affect the proper operation of the aperture 4, in that the vapours coming from the tub of the washing machine are still collected and vented in an optimal manner.

[0045] It can also be seen in the annexed figures that the supply duct 3 is associated with a first fitting 3A for connecting the dispenser device 1 to the water main; also, the first fitting 3A is connected to the water main through a suitable pipe associated with an electrovalve controlled by a control unit, in particular of electronic or electromechanical type, of the washing machine (the pipe, the electrovalve and the control unit are not shown in the annexed drawings). Furthermore, the supply duct 3 can be associated with a volumetric flow meter 3B that allows measuring the liquid being fed into the dispenser device 1. Preferably, said flow meter 3B is of the turbine type and comprises an impeller fitted with a magnet associated with an element sensing the magnetic field generated by the magnet; for example, said sensing element may be a Reed contact, provided with foils enclosed within an enclosure filled with inert gas, or a Hall-effect sensor. Also, the volumetric flow meter 3B may be integrated into the body of the dispenser device 1, or may be made as a separate unit. As is known, the volumetric flow meter 3B generates signals that are sent to the control unit of the washing machine for the purpose of determining the quantity of liquid flowing through the dispenser device 1.

[0046] The dispenser device 1 may also comprise a second air-break device (designated as a whole by ref-

erence numeral 20) positioned in the inner cavity 2 of the dispenser device 1 and arranged in series with respect to the first air-break device 10.

[0047] In substance, the dispenser device 1 according to the present invention may be so designed as to comprise a first air-break device 10 (positioned in the aperture 4) and a second air-break device 20 (positioned in the cavity 2 of the dispenser device 1), which are arranged in succession or consecutively one after the other, in particular with respect to the path followed by the liquid coming from the supply duct 3 and from the water main.

[0048] In particular, the second air-break device 20 comprises a first tract 21 and a second tract 22 provided with respective ends facing each other, leaving a gap in between to create a second air break.

[0049] Preferably, the second half-duct 12 of the air-break device 10 is associated with a pipe 5 that leads to the first tract 21 of the second air-break device 20. Also as concerns the second air-break device 20, the end of the second tract 22 preferably has a larger cross-section than the end of the first tract 21, so that it can collect the liquid coming from said first tract 21.

[0050] In the embodiment shown in the annexed drawings, the first tract 21 and the second tract 22 are so designed as to give the second air-break device 20 an arched shape; in particular, the first tract 21 and the second tract 22 are joined together by a top wall 20A and the air break essentially consists of a gap between the first tract 21 and the second tract 22, said gap being located under said top wall 20A.

[0051] In the embodiment shown in the annexed drawings, the first tract 21 and the second tract 22 are directly obtained in said inner cavity 2 of the dispenser device 1; it is however clear that said first tract 21 and second tract 22 may also belong to an insert (not shown) to be inserted into the inner cavity 2 of the dispenser device 1.

[0052] Furthermore, also the second air-break device 20 may be of the "injection" type, i.e. so designed as to have a first tract and a second tract, the respective ends of which are arranged along the same straight line; it has to be noted that such an embodiment is not shown in the annexed drawings.

[0053] The particular provisions of the present invention allow providing a dispenser device 1 designed to avoid that the regular water outflow from said dispenser device 1 might be inhibited even in case of a malfunction, in particular even in case of clogging of the output ducts leading to the tub of the washing machine and/or to any devices between the dispenser device 1 and said tub.

[0054] In fact, the peculiar provision of a first air-break device 10 and a second air-break device 20 arranged in series and in succession, in particular with respect to the path followed by the liquid, ensures optimal operation while preventing the liquid from flowing back into the water main even in adverse conditions.

[0055] Moreover, such provisions allow preventing uncontrolled leakage of water outside the dispenser device, thus preventing electric safety problems and/or dripping of water onto the floor whereon the washing machine stands.

[0056] In a preferred embodiment, the second air-break device 20 is positioned in a second compartment (designated by reference numeral 6) for collecting the liquid that does not succeed in crossing said second air-break device 20; preferably, said second compartment 6 comprises a window 6A that will allow the liquid to escape if the second compartment 6 is overfilled.

[0057] It should also be noted that said second compartment 6 is in communication with said aperture 4 for collecting the vapours coming from the wash tub; as a result, said aperture 4 also performs the function of delivering into the wash tub of the washing machine the liquid that does not succeed in crossing the air-break device 10 and/or the second air-break device 20.

[0058] The provision of said window 6A contributes to ensuring optimal operation of the dispenser device 1 and preventing the liquid from returning into the water main even in adverse conditions; in particular, said window 6A cooperates with the air-break device 10 and/or with the second air-break device 20 in order to attain such purpose.

[0059] Preferably, the dispenser device 1 according to the present invention further comprises a collection chamber 7 into which the liquid coming from the second half-duct 12 of the air-break device 10 and/or from the second tract 22 of the second air-break device 20 can enter; said collection chamber 7 is associated with a second fitting 7A that allows the collection chamber 7 to be connected to a softener device (not shown in the drawings), in particular to a regeneration tank containing an agent (in particular, brine) for regenerating ion-exchange resins. Preferably, the flow of liquid from the collection chamber 7 to the regeneration tank is controlled by an electrovalve (not shown) controlled by the control unit of the washing machine; as is known, the capacity of the collection chamber 7 is preferably suited to the quantity and/or volume of resins in the resin container.

[0060] The dispenser device 1 according to the present invention further comprises a partition 8 that allows separating the collection chamber 7 from a channel 9 associated with a third fitting 9A; as a consequence, after having filled the collection chamber 7 and having risen above the level of the partition 8, the liquid will overflow into the channel 9 and will then reach the wash tub, through the third fitting 9A, after having flowed through a softener device (not shown), in particular through a resin container (containing ion-exchange resins) of said softener device.

[0061] In substance, in accordance with the teachings of the present invention, the liquid arriving at the first fitting 3A will then proceed (possibly after having been measured by the volumetric flow meter 3B) in the supply duct 3, flow through the air-break device 10, and then enter the collection chamber 7 (possibly after having flowed through the duct 5 and the second air-break device 20). After having filled the collection chamber 7 and having risen above the level of the partition 8, the liquid

will overflow into the channel 9 to reach the wash tub, possibly after having flowed through the resin container of a softener device. The liquid in the collection chamber 7 will be delivered (in particular when an electrovalve is opened) into the regeneration tank in order to regenerate the resins contained in the resin container.

[0062] It should be noted that the dispenser device 1 according to the present invention may also be so designed that the collection chamber 7 is connected to both a resin container and a regeneration tank of a softener device (not shown in the drawings); for example, such a connection may be obtained by means of a switching element (e.g. a switching valve) allowing the liquid to be directed from the collection chamber 7 to the resin container and/ or to the regeneration tank.

[0063] The features and advantages of the dispenser device 1 according to the present invention and of the related washing machine are apparent from the above description.

[0064] In fact, the particular provisions of the present invention allow overcoming the drawbacks of prior-art dispenser devices by providing a dispenser device 1 which is so designed as to comprise an air-break device 10 that does not take up much room inside the washing machine in which the dispenser device is to be installed.

[0065] It is therefore clear that the peculiar arrangement of the air-break device 10 according to the teachings of the present invention allow keeping the dimensions of the entire dispenser device 1 as small as possible, while also making it easy and economical to manufacture.

[0066] According to the present invention, in fact, the air-break device 10 is located in an unoccupied space that was already present in prior-art devices.

[0067] Moreover, laboratory tests have shown that the position of the air-break device 10 does not affect the proper operation of the aperture 4, in that the vapours coming from the tub of the washing machine are still collected and vented correctly.

[0068] A further advantage of the dispenser device 1 according to the present invention lies in the fact that it avoids that the regular outflow of water from said dispenser device 1 might be inhibited even in case of a malfunction, particularly even in case of clogging of the output ducts leading to the tub of the washing machine and/or to any devices between the dispenser device and said tub. In fact, the peculiar provision of a first air-break device 10 and a second air-break device 20 arranged in series and in succession, in particular with respect to the path followed by the liquid, also ensures optimal operation while preventing the liquid from flowing back into the water main even in adverse conditions.

[0069] A further advantage of the dispenser device 1 according to the present invention lies in the fact that it is so designed as to prevent uncontrolled leakage of water outside the dispenser device 1, thus preventing electric safety problems and/or dripping of water onto the floor whereon the washing machine stands.

[0070] The dispenser device for dispensing a liquid in a washing machine for household use, in particular a dishwasher, and the related washing machine described herein by way of example may be subject to many possible variations without departing from the novelty spirit of the inventive idea; it is also clear that in the practical implementation of the invention the illustrated details may have different shapes or be replaced with other technically equivalent elements.

[0071] For example, the numerous possible variants include the option (not shown in the annexed drawings) of associating the insert 10A with a ring nut (not shown) for securing the dispenser device 1 to a washing machine, in particular said ring nut being suitable for being coupled to the aperture 4 of the dispenser device 1.

[0072] It can therefore be easily understood that the present invention is not limited to the above-described dispenser device and washing machine, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. Dispenser device (1) for dispensing a liquid in a washing machine for household use, in particular a dishwasher, said dispenser device (1) being of the type that comprises:

   - an inner cavity (2);
   - an air-break device (10) associated with a supply duct (3) for supplying the liquid coming from the water main;
   - an aperture (4) for collecting and venting vapours, in particular coming from a wash tub, said aperture (4) being such as to communicate with the inner cavity (2) of the dispenser device (1),

   characterized in that
   the air-break device (10) is positioned in said aperture (4).

2. Dispenser device (1) according to claim 1, **characterized in that** the first air-break device (10) comprises a first half-duct (11) and a second half-duct (12) provided with respective ends facing each other, leaving a gap in between to create the air break.

3. Dispenser device (1) according to claim 2, **characterized in that** the first half-duct (11) and the second half-duct (12) have a tapered shape, in particular the narrower cross-section consisting of the respective ends, wherein said respective ends are arranged along the same straight line.

4. Dispenser device (1) according to one or more of

claims 2 and 3, **characterized in that** the ends of the first half-duct (11) and of the second half-duct (12) are positioned at a distance of at least 20 mm.

5. Dispenser device (1) according to one or more of claims 2 to 4, **characterized in that** the end of the second half-duct (12) preferably has a larger cross-section than the end of the first half-duct (11).

6. Dispenser device (1) according to one or more of claims 2 to 5, **characterized in that** the first air-break device (10) comprises an insert (10A) comprising the first half-duct (11) and the second half-duct (12) having a tapered shape, and wherein the respective ends are arranged along the same straight line.

7. Dispenser device (1) according to claim 6, **characterized in that** said insert (10A) comprises a room (13) positioned between the first half-duct (11) and the second half-duct (12), in particular said room (13) having a substantially cylindrical shape and being provided with a slit (13A) allowing the liquid that does not succeed in crossing the air-break device (10) to flow into the aperture (4).

8. Dispenser device (1) according to claim 7, **characterized in that** said room (13) has a height of approximately 20 mm and a diameter of at least 40 mm.

9. Dispenser device (1) according to one or more of the preceding claims 6 to 8, **characterized in that** said insert (10A) is associated with a ring nut for securing the dispenser device (1) to a washing machine, in particular said ring nut being suitable for being coupled to the aperture (4) of the dispenser device (1).

10. Dispenser device (1) according to one or more of claims 2 to 5, **characterized in that** the first half-duct (11) and the second half-duct (12) are directly obtained in said aperture (4) of the dispenser device (1).

11. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** it comprises a second air-break device (20) positioned in said inner cavity (2) of the dispenser device (1) and arranged in series with respect to said air-break device (10).

12. Dispenser device (1) according to claim 11, **characterized in that** said second air-break device (20) comprises a first tract (21) and a second tract (22) provided with respective ends facing each other and leaving a gap, in particular said first tract (21) and second tract (22) being so designed as to give the second air-break device (20) an arched shape.

13. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** it comprises a first compartment (4A) positioned above the aperture (4) for venting and/or condensing said vapours coming from the aperture (4), in particular said first compartment (4A) comprising a second aperture (4B) for draining the vapours out of the dispenser device (1).

14. Dispenser device (1) according to one or more of the preceding claims 11 to 13, **characterized in that** the second air-break device (20) is positioned in a second compartment (6) for collecting the liquid that does not succeed in crossing said second air-break device (20), in particular said second compartment (6) comprising a window (6A) that will allow the liquid to escape if the second compartment (6) is overfilled.

15. Washing machine for household use, in particular a dishwasher, comprising a dispenser device (1) according to one or more of the preceding claims 1 to 14.

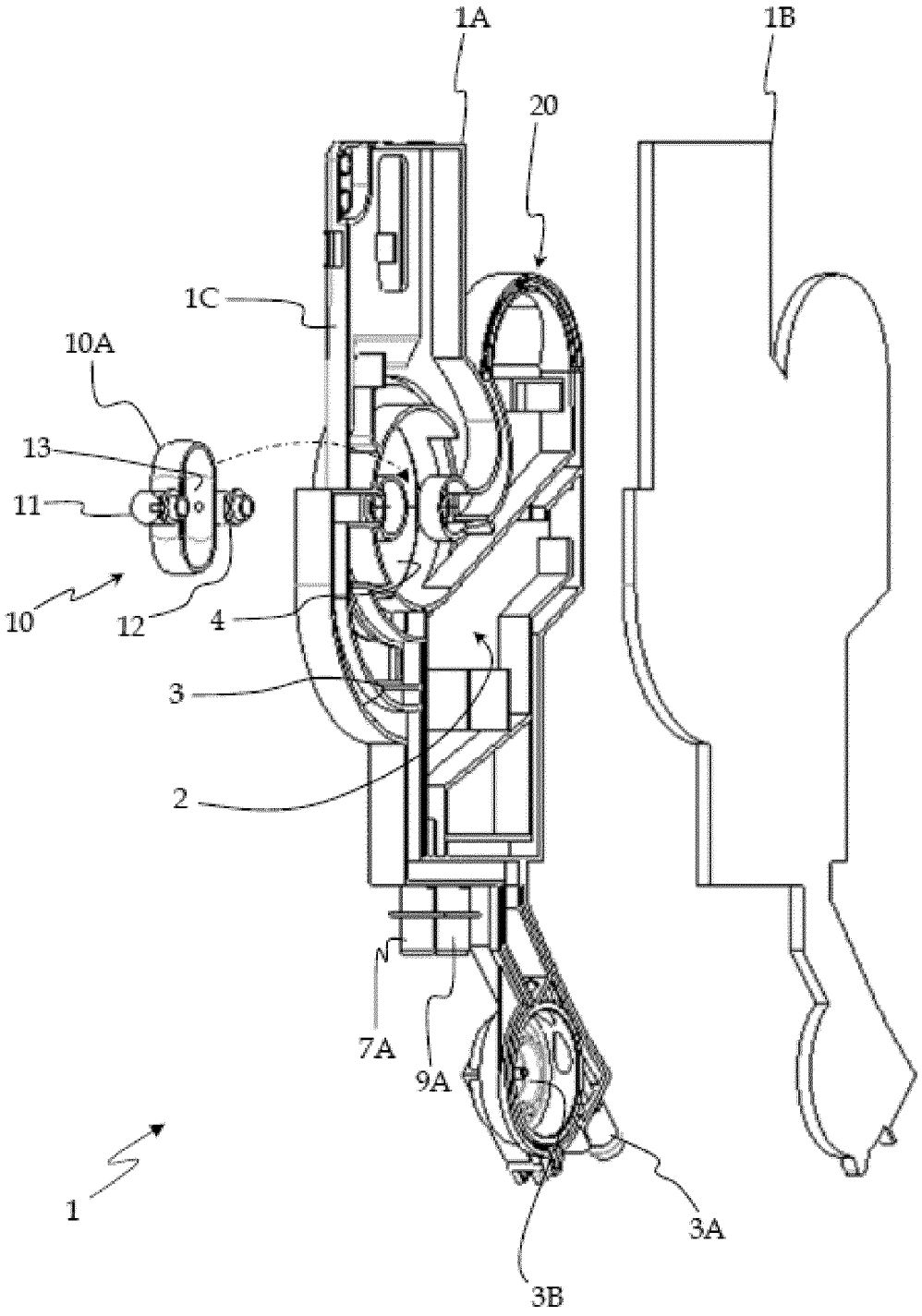

Fig. 1

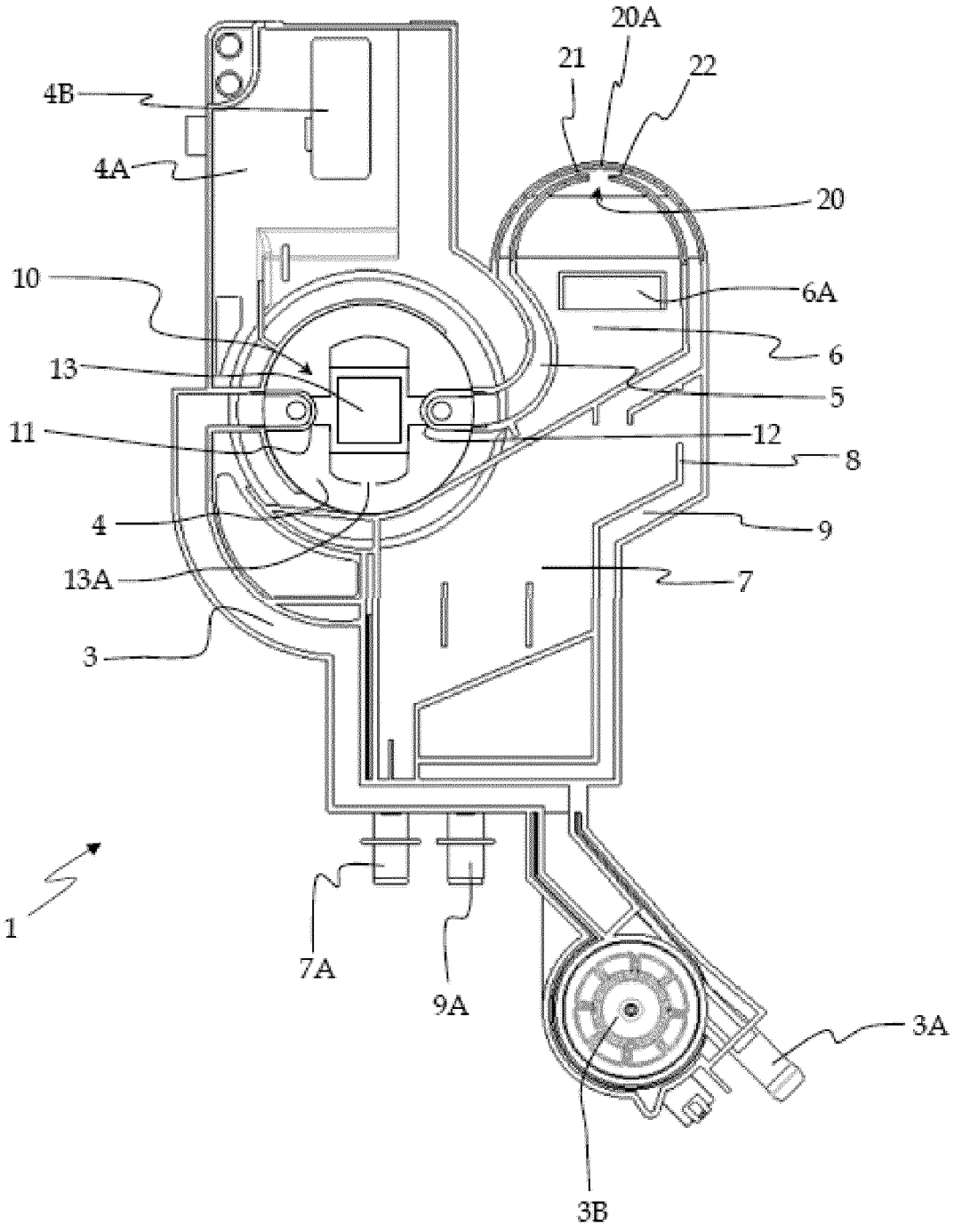

Fig. 2

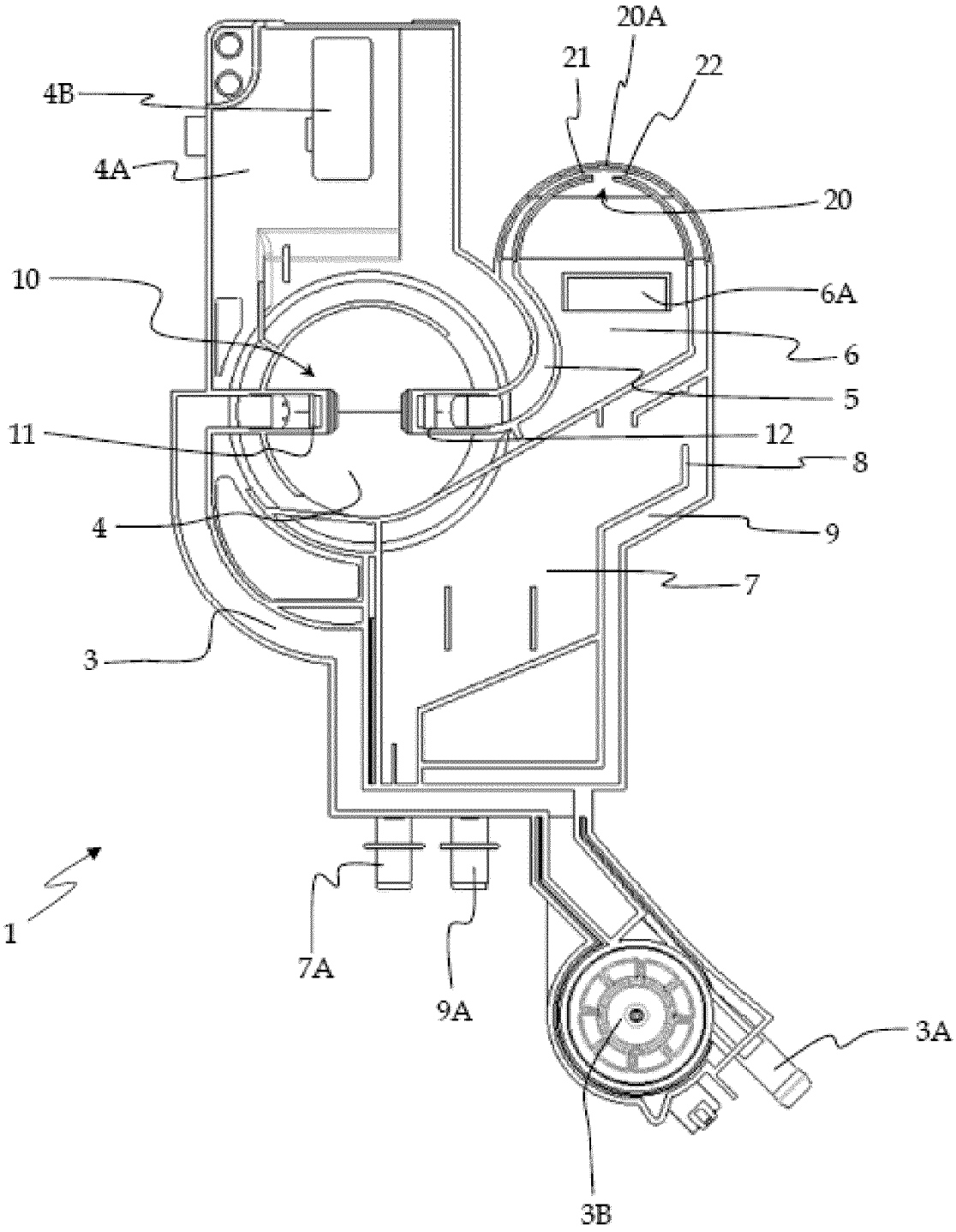

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 17 15 1402

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