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(54) **LIQUID DISPENSER DEVICE FOR A WASHING MACHINE AND WASHING MACHINE THEREOF**

FLUSSIGKEITSVERSORGUNGSVORRICHTUNG FÜR EINE WASCHMASCHINE UND WASCHMASCHINE DAMIT

DISPOSITIF DE DISTRIBUTION DE LIQUIDE POUR UNE MACHINE A LAVER ET MACHINE A LAVER CORRESPONDANTE

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Description

[0001] The present invention relates to a dispenser device for dispensing a liquid for 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, comprising said liquid dispenser device.

[0003] It is known that household washing machines, particularly dishwashers, comprise a dispenser device for supplying 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 sidewalls 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) provided with lateral edges, from which a transversal wall rises;
- a second half-shell (or cover), which has a shape substantially corresponding to that of the first half-shell and is fixed to the transversal wall of said first half-shell,

wherein a cavity is defined between the walls of the first half-shell and second half-shell. Said first and second half-shells are usually obtained from plastic material by injection moulding, and are joined together by welding, generally vibration or hot-blade welding. Moreover, the dispenser devices known in the art typically comprise a plurality of components that allow the device to perform many different basic functions (hence the name "multi-function device" usually given to the dispenser devices known in the art); for example, said components may comprise:

- an air-break device associated with a liquid supply duct, for preventing the liquid from flowing back in the event of a pressure drop in the water main,
- an opening for venting the vapours generated inside the wash tub.

[0006] It should also be noted that, in a washing machine of a known type, the dispenser device is usually associated with a softener device, which comprises a resin container that contains ion-exchange resins, and a regeneration tank, which contains an agent (in particular, brine) for regenerating the ion-exchange resins.

[0007] As a consequence, the dispenser device is so realized as to comprise:

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

[0008] It must be pointed out that the dispenser devices known in the art may lack a chamber dedicated to collecting the regeneration liquid, since they can be so realized as to comprise a single chamber in which the liquid is collected, which is then selectively directed (in particular, via a switching valve) towards either the resin container or the regeneration tank.

[0009] As far as the air-break device is concerned, it is required in order to avoid the risk that chemical solutions, dirty water or germ-enriched water might enter the drinking-water supply network, which risk may arise especially when a pressure drop occurs in the drinking-water supply network (e.g. during maintenance or repair work) and the washing machine connected to such water supply network is turned on at the same time.

[0010] In solutions known in the art such as, for example, the one shown in document EP2586356, dispenser devices are so constructed that either the first half-shell (or bottom wall) or, respectively, the second half-shell (or cover) are integral with first and second half-ducts tapered at respective ends facing each other to form the air-break device, wherein the first half-duct constitutes an extension of a supply duct formed by mutually facing sidewalls protruding from the bottom wall and closed by said cover; when said half-ducts are integral with the cover, said mutually facing sidewalls are so realized as to protrude from the cover, and are closed by the bottom wall.

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

[0012] In particular, an important drawback 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 into the wash tub of the washing machine or into any devices interposed between the dispenser device and said tub, regular water outflow from the dispenser device will be inhibited; such a 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.

[0013] Document DE 29 08 824 A1 discloses a dispenser device made of two halves with an air-break device.

[0014] It is therefore clear that the dispenser devices known in the art cannot ensure the proper operation of the air-break device under 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.

[0015] It should be noted that a malfunctioning dispenser device may also cause uncontrolled leakage of liquid outside the dispenser device, and such leakage may also cause electrical safety problems because it may affect electric components installed in the lower part of the washing machine, or dripping of liquid onto the floor whereon the washing machine stands.

[0016] In order to try to overcome such drawbacks, it is known in the art to realize the dispenser device in such

a way that it comprises an insert made from plastic material which is positioned in the terminal part of a supply duct to form the air-break device, said insert being provided with an emitter that constitutes an extension of the supply duct and a receiver, wherein the emitter and the receiver of the insert have a tapered shape; typically, the respective ends of the emitter and receiver of the insert are arranged along the same straight line.

[0017] However, also those solutions known in the art which are equipped with an air break consisting of an insert suffer from a few drawbacks.

[0018] In such solutions, in fact, the dispenser device is made up of three parts that are manufactured separately by injection moulding and then welded together, so as to obtain the various functions required; in this context, the necessity of assembling the various parts makes the production process rather costly and complex.

[0019] In particular, the positioning of the insert between the two half-shells must necessarily be effected through the interposition of suitable sealing elements between the insert and the other components of the dispenser device, i.e. both between the insert and the first half-shell and between the insert and the second half-shell.

[0020] It is apparent that the use of such sealing elements, in addition to increasing the costs of the dispenser device, also makes the latter very difficult to assemble; in this context, it is also evident that a wrong positioning of the sealing elements will jeopardize the operation of the air-break device, resulting in the adverse effects already highlighted above with reference to the other known types of air-break devices.

[0021] In this frame, it is the main object of the present invention to provide a dispensing device for dispensing a liquid for a washing machine for household use, in particular a dishwasher, and a related washing machine comprising said dispenser device, which are so realized as to overcome the drawbacks of prior-art solutions.

[0022] In particular, it is one object of the present invention to provide a dispenser device which is so constructed that its parts are assembled in such a way as to ensure adequate sealing of the dispenser device, and in particular of those ducts or tracts of the dispenser device in which water will flow.

[0023] It is another object of the present invention to realize the dispenser device in such a way as to reduce the cost incurred for assembling its parts and make the production process less complex.

[0024] It is another object of the present invention to provide a dispenser device and a related washing machine which are constructed in such a way that the normal water outflow from the dispenser device will not be inhibited even in case of a malfunction of said dispenser device, particularly even in case of clogging of the output ducts leading into the tub of the washing machine and/or into any devices interposed between the dispenser device and said tub.

[0025] It is a further object of the present invention to

provide a dispenser device and a related washing machine which can ensure the proper operation of the air-break device and prevent the liquid from flowing back into the water main under adverse conditions.

[0026] It is another object of the present invention to provide a dispenser device and a related washing machine which are constructed in such a way as to avoid any uncontrolled leakage of liquid outside the dispenser device, thus preventing any electrical safety problems and/or dripping of liquid onto the floor whereon the washing machine stands. It is a further object of the present invention to provide a dispenser device which is simple, economical and as small as possible in size.

[0027] Such 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.

[0028] Further objects, features and advantages of the present invention will become apparent in the light of the following detailed description and the annexed drawings, which are provided herein merely by way of non-limiting explanatory example, wherein:

- Fig. 1 schematically shows an exploded perspective view of a dispenser device for dispensing a liquid for a washing machine for household use, in particular a dishwasher, according to the present invention;
- Fig. 2A is a front view of a portion of the dispenser device of Fig. 1, whereas Fig. 2B is a sectional view along the straight line A-A of Fig. 2A;
- Fig. 3 schematically shows an exploded perspective view of a first variant of the dispenser device according to the present invention;
- Fig. 4A is a front view of a portion of the dispenser device of Fig. 3, whereas Fig. 4B is a sectional view along the polyline B-B of Fig. 4A;
- Fig. 5 schematically shows an exploded perspective view of a second variant of the dispenser device according to the present invention;
- Fig. 6A is a front view of a portion of the dispenser device of Fig. 5, whereas Fig. 6B is a sectional view along the straight line C-C of Fig. 6A.

[0029] Referring now to the annexed drawings, in Figures 1, 3 and 5 reference numeral 1 designates as a whole a dispenser device for dispensing a liquid for a washing machine for household use, in particular a dishwasher, according to the present invention.

[0030] It should be noted that the annexed drawings do not show the washing machine for household use, in particular a dishwasher, that comprises said dispenser device 1.

[0031] The dispenser device 1 comprises a first half-shell 10 (or bottom wall), from the lateral edge of which a transversal wall 10P rises, and a second half-shell 20

(or cover) which has a shape substantially corresponding to that of the first half-shell 10 and is fixed to the upper edge of said transversal wall 10P so as to form an inner cavity 2. As a result, the dispenser device 1 comprises said inner cavity 2 and is therefore hollow inside. In particular, said half-shells 10, 20 can be made from plastic material by injection moulding, and the coupling of the two half-shells 10, 20 is preferably accomplished by means of a welding process, in particular a vibration or hot-blade welding process.

[0032] In addition, the dispenser device 1 preferably has, as a whole, a flat shape, particularly in order to facilitate the coupling thereof to a wall of the washing machine without taking 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. The dispenser device 1 comprises a supply duct 11 supplying water from a water main, wherein said supply duct 11 is formed by mutually facing sidewalls 11P protruding from the first half-shell 10 and closed at their free edge (or upper edge) by the second half-shell 20. It should be noted that, in accordance with the present invention, said sidewalls 11P may also be so realized as to protrude from the second half-shell 20 and be closed by the first half-shell 10; therefore, in the course of the present description reference will always be made to the first half-shell 10 to indicate that component from which the sidewalls 11P protrude. It must also be pointed out that, along at least a part thereof, a sidewall 11P may coincide with one of said transversal walls 10P.

[0033] The supply duct 11 is associated with a first fitting 3A that protrudes from the sidewall 10P and permits the connection of the dispenser device 1 to the water main; in particular, the first fitting 3A is connected to the water main through a suitable pipe associated with an electrovalve controlled by a control device of the washing machine (the pipe, the electrovalve and the control device are not shown in the annexed drawings). Furthermore, the first fitting 3A and the supply duct 11 may be associated with a meter (not shown in the annexed drawings), in particular a volumetric one, that allows measuring the liquid being fed into the dispenser device 1. Preferably, said meter is a turbine-type meter comprising 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 with foils enclosed within an envelope filled with inert gas, or a Hall-effect sensor. Also, the meter may be integrated with the body of the dispenser device 1, or may be made as a separate unit. As is known in the art, the meter, in particular of the volumetric type, generates signals that are sent to a control device (not shown), in particular an electronic or electromechanical one, of the washing machine for the purpose of determining the quantity of liquid flowing through the dispenser device 1. The dispenser device 1 preferably comprises an opening 4 for collecting and venting vapours, in particular coming from a wash tub, since said opening 4 communicates with the inner

cavity 2 of the dispenser device 1. Preferably, said opening 4 is substantially circular in shape, in particular being formed in 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 a monolithic body, said opening 4 may be formed in at least one of the main faces forming the dispenser device 1.

[0034] The dispenser device 1 comprises also a compartment 4A located above the opening 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 opening 4, in particular said compartment 4A comprising a second opening 4B for discharging the vapours out of the dispenser device 1 (e.g. into the environment).

[0035] The dispenser device 1 according to the present invention comprises an insert 30 that comprises at least one emitter 31 and at least one receiver 32 having respective ends facing each other, leaving a gap in between to form an air break.

[0036] It should be noted that the dispenser device 1 is also known in the art as "multifunction device", in that it comprises a plurality of components that allow the device to perform many different basic functions.

[0037] In the embodiment shown in the annexed drawings, at least said emitter 31 (which may also be defined as "spray nozzle") has a tapered shape, in particular its cross-section being narrowest at the end that is closest to the receiver 32. In accordance with a preferred embodiment (see, in particular, Figures 4B and 6B), also said receiver 32 has a tapered shape, in particular its cross-section being narrowest at the end that is closest to the emitter 31.

[0038] Moreover, the emitter 31 and/or the receiver 32 are preferably realized as tubular elements, i.e. elements having a closed cross-section.

[0039] Preferably, the respective ends of the emitter 31 and receiver 32 are arranged along the same straight line; as a consequence, the air-break device is preferably of the "injection" type (also known as "AD type"), since the emitter 31 constitutes an injector (which may also be defined as "spray nozzle") that allows the fluid to flow into the receiver 32 (which may also be defined as "collection nozzle") that faces towards it.

[0040] In particular, the end of the receiver 32 preferably has a larger cross-section than the end of the emitter 31, so as to be able to receive the liquid coming from said emitter 31.

[0041] As can be seen especially in Figures 2B, 4B and 6B, the insert 30 may also be realized in such a way as to comprise an intermediate element 33 positioned between the emitter 31 and the receiver 32, wherein said intermediate element 33 comprises:

- a second receiver element 33A facing towards said emitter 31, leaving a gap in between to form a first air break;
- a second emitter element 33B facing towards said

receiver 32, leaving a gap in between to form a second air break.

[0042] It should be noted that the compartment 4A is preferably realized in such a way as to collect the liquid that has not flowed past at least one of said air breaks, in particular in the tract comprised between the emitter 31 and the receiver.

[0043] In accordance with the present invention, the dispenser device 1 comprises a first partition wall 12A protruding from said first half-shell 10 and coupled to said mutually facing sidewalls 11P, in particular for closing said supply duct 11. In this regard, it must be pointed out that said closing is essentially obtained by co-operation between the first partition wall 12A, the sidewalls 11P and said second half-shell 20.

[0044] It should be noted that said first partition wall 12A may be so constructed as to be coupled to both sidewalls 11P to form a surface disposed at an angle relative to each one of said sidewalls 11P (as shown by way of example in the embodiments illustrated in Figures 2A, 4A and 5A, wherein said first partition wall 12A develops substantially perpendicular to both sidewalls 11P), or said first partition wall 12A may be so constructed as to be essentially an extension of one of said sidewalls 11P and be coupled to the other sidewall 11P so as to form a surface at an angle relative to the latter.

[0045] Furthermore, in accordance with the present invention, the dispenser device 1 comprises a first passage 41 formed between the first partition wall 12A and the second half-shell 20 to allow the liquid to flow from the supply duct 11 to the emitter 31. In particular, said first passage 41 is formed or obtained between a free edge (which may also be defined as upper edge, i.e. a portion of the first partition wall 12A that faces towards the second half-shell 20, but is not coupled to the sidewalls 11P and to the first half-shell 10) of the first partition wall 12A and said second half-shell 20.

[0046] It should be noted that said first passage 41 can be obtained, at least partially, by means of a concavity (or recess) formed on the inner surface of the second half-shell 20 (i.e. that surface of the second half-shell 20 which faces towards the first half-shell 10 and towards the first partition wall 12A) in a position corresponding to the first partition wall 12A. This embodiment is shown in Figures 1 to 4B; in particular, it can be observed in this respect that the second half-shell 20 may be so realized as to have a corresponding rise on its external surface (i.e. the surface opposite the one facing towards the first half-shell 10 and towards the first partition wall 12A) in a position corresponding to said concavity. In addition or as an alternative, said first passage 41 may be obtained by lowering at least a portion of said first partition wall 12A (in this regard, see the third embodiment shown in Figures 5 to 6B), in particular said lowering being provided by at least a portion of the first partition wall 12A which is lower than the sidewalls 11P.

[0047] In particular, in the first embodiment shown in

Figures 1 to 2B, the first passage 41 is substantially aligned with the supply duct 11 (in particular, with the terminal portion of the supply duct 11) and/or with the emitter 31; conversely, in the second embodiment shown in Figures 3 to 4B, the first passage 41 develops at an angle, in particular perpendicularly, relative to the supply duct 11 and/or the emitter 31.

[0048] In accordance with the present invention, said insert 30 comprises a first chamber 34A in fluidic communication with the emitter 31 and positioned between the emitter 31 and the first partition wall 12A, wherein said first chamber 34A has at least one opening 35A in its portion facing towards the second half-shell 20 to allow the liquid coming from the supply duct 11 and from the first passage 41 to enter the first chamber 34A.

[0049] In accordance with the present invention, the dispenser device 1 comprises a second partition wall 12B protruding from said first half-shell 10, wherein the dispenser device 1 comprises a second passage 42 formed between the second partition wall 12B and the second half-shell 20 to allow the liquid to flow from the receiver 32 to a collection chamber 5. In particular, said second passage 42 is formed or obtained between a free edge of the second partition wall 12B and said second half-shell 20. The free edge of the second partition wall 12B may also be defined as an upper edge, and essentially consists of that portion of the second partition wall 12B which faces towards the second half-shell 20.

[0050] In substance, the second partition wall 12B cooperates with the first partition wall 12A to define a seat 13 adapted to house the insert 30; it should be noted that said seat 13 may preferably be realized through the co-operation of said partition walls 12A, 12B with further septa or bulkheads protruding from the first half-shell 10.

[0051] It must be pointed out that the second passage 42 can be obtained substantially in the same manner as described with reference to the first passage 41. In fact, the second passage 42 can also be obtained:

- at least partially by means of a concavity formed on the inner surface of the second half-shell 20 in a position corresponding to the second partition wall 12B. In this context, the second half-shell 20 may be so realized as to have a rise on its outer surface in a position corresponding to said concavity (as shown in Figures 1 to 4B);
- by lowering at least a portion of said second partition wall 12B (as shown in the third embodiment illustrated in Figures 5 to 6B), in particular said lowering being provided by at least a portion of the second partition wall 12B which is lower than the sidewalls 11P.

[0052] Moreover, the second passage 42 may also be substantially aligned with the receiver 32 (e.g. as shown in the first embodiment illustrated in Figures 1 to 2B), or may develop at an angle, in particular perpendicularly, relative to said receiver 32 (e.g. as shown in the second

embodiment illustrated in Figures 3 to 4B).

[0053] In accordance with the present invention, said insert 30 comprises a second chamber 34B in fluidic communication with the receiver 32 and positioned between said receiver 32 and the second partition wall 12B, where-
 5 in said second chamber 34B has at least one second opening 35B in its portion facing towards the second half-shell 20 to allow the liquid coming from the receiver 32 and flowing through the second chamber 34B to enter the second passage 42.

[0054] In accordance with a preferred embodiment, the insert 30 comprises a first septum 36A and a second septum 36B lying in abutment with the first partition wall 12A and the second partition wall 12B, respectively; in particular, the first septum 36A and the second septum 36B delimit those portions of, respectively, the first chamber 34A and the second chamber 34B which are in prox-
 10 imity to, respectively, the first partition wall 12A and the second partition wall 12B.

[0055] The particular provisions of the present invention make it possible to overcome the drawbacks of prior-art dispenser devices by providing a dispenser device 1 which is realized in a manner such that, when the first half-shell 10, the second half-shell 20 and the insert 30 are assembled together, the dispenser device will be properly sealed, particularly in those areas of the dispenser device 1 where the liquid will flow.

[0056] In particular, the provision of the first partition wall 12A and first passage 41 (as well as the second partition wall 12B with the respective second passage 42) makes it possible to position the insert 30 between the two half-shell 10, 20 without having to resort to the interposition of any sealing elements between the insert 30 and the first half-shell 10 and between the insert 30 and the second half-shell 20.
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[0057] In fact, the first partition wall 12A and the first passage 41 (as well as the second partition wall 12B and the second passage 42) will prevent the liquid flowing through the dispenser device 1 from undesirably seeping through the interstices between the mating surfaces of the insert 30 and of the two half-shells 10, 20.
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[0058] In this regard, it must be pointed out that, in accordance with the teachings of the present invention, the liquid arriving at the first fitting 3A will then flow (optionally after having been measured by a volumetric meter) in the supply duct 11, go through the first passage 41, cross the air-break (from the emitter 31 to the receiver 32), go through the second passage 42 and enter the collection chamber 5.

[0059] In such a context it is therefore apparent that it is the very presence of the partition walls 12A, 12B and passages 41, 42 that will prevent the interstices between the mating surfaces of the insert 30 and the two half-shells 10, 20 from being lapped by the flowing liquid.

[0060] In addition, at least a portion of the free edge of the first partition wall 12A and/or of the second partition wall 12B can be used for realizing an optimal coupling between the first half-shell 10 and the second half-shell
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20; in particular, said coupling can be adequately effected by means of a vibration or hot-blade welding process.

[0061] It is therefore apparent that the dispenser device 1 according to the present invention can be properly assembled without having to resort to the interposition of any sealing elements (e.g. gaskets, typically O-rings) between the insert 30 and the two half-shells 10, 20.
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[0062] The dispenser device 1 according to the present invention is thus conceived in a manner such that its parts (i.e. the first half-shell 10, the second half-shell 20 and the insert 30) can be assembled together at low costs and in a manner such as to reduce the complexity of the production process.
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[0063] The dispenser device 1 made in accordance with the teachings of the present invention therefore ensures a regular water outflow from the dispenser device 1 even in case of a malfunction of said dispenser device 1, since it guarantees the optimal operation of the air break, which in turn will avoid any backflow of liquid into the water network even under adverse conditions, while also preventing any electrical safety problems and/or dripping of liquid onto the floor whereon the washing machine stands.
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[0064] The dispenser device 1 according to the present invention is therefore simple, economical, and small in size.
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[0065] The dispenser device 1 according to the present invention further comprises a second fitting 5A that allows the collection chamber 5 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 5 to the regeneration tank is controlled by an electrovalve (not shown) controlled by the control device of the washing machine; as is known, the capacity of the collection chamber 5 is preferably suited to the quantity and/or volume of resins in the resin container.
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[0066] Said dispenser device 1 further comprises a septum 6 that allows separating the collection chamber 5 from a second collection chamber 7 associated with a third fitting 7A; as a consequence, after having filled the collection chamber 5 and having risen above the level of the septum 6, the liquid will overflow into the second collection chamber 7 and will then reach the wash tub, through the third fitting 7A, after having flowed through a softener device (not shown), in particular through a resin container (containing ion-exchange resins) of said softener device.
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[0067] In substance, in accordance with the teachings of the present invention, after having filled the collection chamber 5 and risen above the level of the septum 6, the liquid will overflow into the second collection chamber 7 to reach the wash tub after having flowed through the resin container of a softener device. The liquid in the collection chamber 5 will be delivered (in particular when an electrovalve is opened) into the regeneration tank in order to regenerate the resins contained in the resin con-
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tainer.

[0068] It should also be noted that the dispenser device 1 according to the present invention may also be so realized that the collection chamber 5 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 5 to the resin container and/or to the regeneration tank.

[0069] 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.

[0070] In fact, the particular provisions of the present invention make it possible to overcome the drawbacks of prior-art dispenser devices by providing a dispenser device 1 realized in a manner such that, when the first half-shell 10, the second half-shell 20 and the insert 30 are assembled together, the dispenser device will be properly sealed, particularly in those areas of the dispenser device 1 where the liquid will flow.

[0071] In particular, the provision of the partition walls 12A, 12B and the respective passages 41, 42 (obtained between said partition walls 12A, 12B and the second half-shell 20) makes it possible to position the insert 30 between the two half-shells 10, 20 without having to resort to the interposition of any sealing elements between the insert 30 and the other components.

[0072] In fact, the partition walls 12A, 12B and the passages 41, 42 make it possible to prevent the liquid flowing through the dispenser device 1 from undesirably seeping through the interstices between the mating surfaces of the insert 30 and of the two half-shells 10, 20; in this regard, it is evident that the presence of the partition walls 12A, 12B and passages 41, 42 will prevent said interstices between the mating surfaces of the insert 30 and of the two half-shells 10, 20 from being lapped by the flowing liquid.

[0073] In addition, at least a portion of the free edge of the first partition wall 12A and/or of the second partition wall 12B can be used for realizing an adequate coupling between the first half-shell 10 and the second half-shell 20; in particular, said coupling can be effected by means of a vibration or hot-blade welding process.

[0074] It is therefore apparent that the dispenser device 1 according to the present invention can be assembled with confidence without having to resort to the interposition of any suitable sealing elements between the insert 30 and the two half-shells 10, 20.

[0075] The dispenser device 1 according to the present invention is thus conceived in a manner such that its parts (i.e. the first half-shell 10, the second half-shell 20 and the insert 30) can be assembled together at low costs and in a manner such as to reduce the complexity of the production process.

[0076] The dispenser device 1 made in accordance with the teachings of the present invention therefore en-

sure a regular water outflow from the dispenser device 1 even in case of a malfunction of said dispenser device 1, since it guarantees the optimal operation of the air break, which in turn will avoid any backflow of liquid into the water network even under adverse conditions, while also preventing any electrical safety problems and/or dripping of liquid onto the floor whereon the washing machine stands.

[0077] It is also apparent that the dispenser device 1 according to the present invention is simple, economical, and small in size.

Claims

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

- a first half-shell (10), from the lateral edge of which a transversal wall (10P) rises;
- a second half-shell (20), which has a shape substantially corresponding to that of the first half-shell (10) and is fixed to the upper edge of said transversal wall (10P) so as to form an inner cavity (2);
- a supply duct (11) supplying water from a water main, wherein said supply duct (11) is formed by mutually facing sidewalls (11P) protruding from the first half-shell (10) and closed at their free edge by the second half-shell (20);
- an insert (30) comprising at least one emitter (31) and at least one receiver (32) having respective ends facing each other, leaving a gap in between to form an air break,

said dispenser device (1) being **characterized in that** it comprises:

- a first partition wall (12A) protruding from said first half-shell (10) and coupled to said mutually facing sidewalls (11P), in particular for closing said supply duct (11);
- a first passage (41) formed between the first partition wall (12A) and the second half-shell (20) to allow the liquid to flow from the supply duct (11) to the emitter (31), in particular said first passage (41) being formed between a free edge of the first partition wall (12A) and said second half-shell (20).

2. Dispenser device (1) according to claim 1, **characterized in that** said first passage (41) is obtained, at least partially, by means of a concavity formed on the inner surface of the second half-shell (20) in a position corresponding to the first partition wall (12A), in particular said inner surface consisting of

- a surface of the second half-shell (20) facing towards the first half-shell (10) and the first partition wall (12A).
3. Dispenser device (1) according to claim 2, **characterized in that** the second half-shell (20) is so realized as to have a corresponding rise on its outer surface in a position corresponding to said concavity, in particular said outer surface consisting of a surface of the second half-shell (20) opposite to that which faces towards the first half-shell (10) and towards the first partition wall (12A).
 4. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** said first passage (41) is formed by lowering at least a portion of said first partition wall (12A), in particular said lowering being provided by at least a portion of the first partition wall (12A) which is lower than the sidewalls (11P).
 5. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** said insert (30) comprises a first chamber (34A) in fluidic communication with the emitter (31) and positioned between the emitter (31) and the first partition wall (12A), wherein said first chamber (34A) has at least one opening (35A) in its portion facing towards the second half-shell (20) to allow the liquid coming from the supply duct (11) and from the first passage (41) to enter the first chamber (34A).
 6. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** said dispenser device (1) comprises:
 - a second partition wall (12B) protruding from said first half-shell (10);
 - a second passage (42) formed between the second partition wall (12B) and the second half-shell (20) to allow the liquid to flow from the receiver (32) to a collection chamber (5), in particular said second passage (42) being formed between a free edge of the second partition wall (12B) and said second half-shell (20).
 7. Dispenser device (1) according to claim 6, **characterized in that** the second partition wall (12B) cooperates with the first partition wall (12A) to define a seat (13) adapted to house the insert (30), in particular said seat (13) being obtained through the cooperation of said partition walls (12A, 12B) with further septa or bulkheads protruding from the first half-shell (10).
 8. Dispenser device (1) according to one or more of claims 6 and 7, **characterized in that** said second passage (42) is obtained, at least partially, by means of a concavity formed on the inner surface of the second half-shell (20) in a position corresponding to the second partition wall (12B), in particular said second half-shell (20) comprising a rise on its outer surface in a position corresponding to said concavity.
 9. Dispenser device (1) according to one or more of claims 6 to 8, **characterized in that** said second passage (42) is formed by lowering at least a portion of said second partition wall (12B), in particular said lowering being provided by at least a portion of the second partition wall (12B) which is lower than the sidewalls (11P).
 10. Dispenser device (1) according to one or more of claims 6 to 9, **characterized in that** said insert (30) comprises a second chamber (34B) in fluidic communication with the receiver (32) and positioned between said receiver (32) and the second partition wall (12B), wherein said second chamber (34B) has at least one second opening (35B) in its portion facing towards the second half-shell (20) to allow the liquid coming from the receiver (32) and flowing through the second chamber (34B) to enter the second passage (42).
 11. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** said insert (30) comprises a first septum (36A) and a second septum (36B) lying in abutment with the first partition wall (12A) and the second partition wall (12B), respectively.
 12. Dispenser device (1) according to claim 11, **characterized in that** the first septum (36A) and the second septum (36B) delimit those portions of, respectively, the first chamber (34A) and the second chamber (34B) which are in proximity to, respectively, the first partition wall (12A) and the second partition wall (12B).
 13. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** the emitter (31) and/or the receiver (32) are made as tubular elements, wherein the respective ends of the emitter (31) and of the receiver (32) are arranged along the same straight line.
 14. Dispenser device (1) according to one or more of the preceding claims, **characterized in that** said insert (30) is so realized as to comprise an intermediate element (33) positioned between the emitter (31) and the receiver (32), wherein said intermediate element (33) comprises:
 - a second receiver element (33A) facing towards said emitter (31), leaving a gap in between to form a first air break;

- a second emitter element (33B) facing towards said receiver (32), leaving a gap in between to form a second air break.

15. Washing machine comprising a dispenser device (1) according to one or more of the preceding claims 1 to 14.

Patentansprüche

1. Spendervorrichtung (1) zum Spenden einer Flüssigkeit für eine Haushaltswaschmaschine, insbesondere eine Geschirrspülmaschine, wobei die Spendervorrichtung (1) von dem Typ ist, der umfasst:

- eine erste Halbschale (10), von deren seitlichem Rand sich eine Querwand (10P) erhebt;
- eine zweite Halbschale (20), deren Form im Wesentlichen derjenigen der ersten Halbschale (10) entspricht und die am oberen Rand der Querwand (10P) befestigt ist, um einen inneren Hohlraum (2) zu bilden;
- einen Versorgungskanal (11), der Wasser von einer Wasserleitung zuführt, wobei der Versorgungskanal (11) durch einander zugewandte Seitenwände (11P) gebildet wird, die von der ersten Halbschale (10) vorstehen und an ihrem freien Rand durch die zweite Halbschale (20) verschlossen sind;
- einen Einsatz (30), der mindestens einen Emitter (31) und mindestens eine Aufnahme (32) umfasst, deren jeweilige Enden einander zugewandt sind, wobei dazwischen ein Spalt verbleibt, um eine Luftunterbrechung zu bilden,

wobei die Spendervorrichtung (1) **dadurch gekennzeichnet ist, dass** sie umfasst:

- eine erste Trennwand (12A), die aus der ersten Halbschale (10) herausragt und mit den einander zugewandten Seitenwänden (11P) verbunden ist, insbesondere zum Verschließen des Versorgungskanals (11);
- einen ersten Durchgang (41), der zwischen der ersten Trennwand (12A) und der zweiten Halbschale (20) ausgebildet ist, um zu ermöglichen, dass die Flüssigkeit von dem Versorgungskanal (11) zu dem Emitter (31) fließt, wobei der erste Durchgang (41) insbesondere zwischen einer freien Kante der ersten Trennwand (12A) und der zweiten Halbschale (20) ausgebildet ist.

2. Spendervorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Durchgang (41) zumindest teilweise durch eine Konkavität erhalten wird, die an der Innenfläche der zweiten Halbschale (20) in einer der ersten Trennwand (12A) entspre-

chenden Position ausgebildet ist, wobei die Innenfläche insbesondere aus einer der ersten Halbschale (10) und der ersten Trennwand (12A) zugewandten Fläche der zweiten Halbschale (20) besteht.

3. Spendervorrichtung (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** die zweite Halbschale (20) so ausgeführt ist, dass sie an ihrer Außenfläche in einer der genannten Konkavität entsprechenden Position eine entsprechende Erhöhung aufweist, wobei diese Außenfläche insbesondere aus einer Fläche der zweiten Halbschale (20) besteht, die derjenigen gegenüberliegt, die der ersten Halbschale (10) und der ersten Trennwand (12A) zugewandt ist.

4. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der erste Durchgang (41) durch Absenken mindestens eines Teils der ersten Trennwand (12A) gebildet wird, wobei die Absenkung insbesondere durch mindestens einen Teil der ersten Trennwand (12A) erfolgt, der niedriger als die Seitenwände (11P) ist.

5. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (30) eine erste Kammer (34A) umfasst, die in Fluidverbindung mit dem Emitter (31) steht und zwischen dem Emitter (31) und der ersten Trennwand (12A) angeordnet ist, wobei die erste Kammer (34A) in ihrem der zweiten Halbschale (20) zugewandten Teil mindestens eine Öffnung (35A) aufweist, um zu ermöglichen, dass die von dem Versorgungskanal (11) und von dem ersten Durchgang (41) kommende Flüssigkeit in die erste Kammer (34A) eintritt.

6. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Spendervorrichtung (1) umfasst:

- eine zweite Trennwand (12B), die von der ersten Halbschale (10) vorsteht;
- einen zweiten Durchgang (42), der zwischen der zweiten Trennwand (12B) und der zweiten Halbschale (20) ausgebildet ist, um zu ermöglichen, dass die Flüssigkeit von der Aufnahme (32) zu einer Sammelkammer (5) fließt, wobei insbesondere der zweite Durchgang (42) zwischen einem freien Rand der zweiten Trennwand (12B) und der zweiten Halbschale (20) ausgebildet ist.

7. Spendervorrichtung (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** die zweite Trennwand (12B) mit der ersten Trennwand (12A) zusammenwirkt, um einen Sitz (13) zu definieren, der zur Aufnahme des Einsatzes (30) geeignet ist, wobei der Sitz (13) ins-

besondere durch das Zusammenwirken der Trennwände (12A, 12B) mit weiteren Septen oder Schotten, die aus der ersten Halbschale (10) herausragen, erhalten wird.

8. Spendervorrichtung (1) nach einem oder mehreren der Ansprüche 6 und 7, **dadurch gekennzeichnet, dass** der zweite Durchgang (42) zumindest teilweise durch eine Konkavität erhalten wird, die auf der Innenfläche der zweiten Halbschale (20) an einer der zweiten Trennwand (12B) entsprechenden Stelle ausgebildet ist, wobei die zweite Halbschale (20) insbesondere eine Erhöhung auf ihrer Außenfläche an einer der Konkavität entsprechenden Stelle aufweist.
9. Spendervorrichtung (1) nach einem oder mehreren der Ansprüche 6 bis 8, **dadurch gekennzeichnet, dass** der zweite Durchgang (42) durch Absenken mindestens eines Teils der zweiten Trennwand (128) gebildet wird, wobei das Absenken insbesondere durch mindestens einen Teil der zweiten Trennwand (128) erfolgt, der niedriger als die Seitenwände (11P) ist.
10. Spendervorrichtung (1) nach einem oder mehreren der Ansprüche 6 bis 9, **dadurch gekennzeichnet, dass** der Einsatz (30) eine zweite Kammer (34B) umfasst, die in Fluidverbindung mit der Aufnahme (32) steht und zwischen der Aufnahme (32) und der zweiten Trennwand (128) angeordnet ist, wobei die zweite Kammer (34B) in ihrem der zweiten Halbschale (20) zugewandten Teil mindestens eine zweite Öffnung (358) aufweist, damit die von der Aufnahme (32) kommende und durch die zweite Kammer (34B) fließende Flüssigkeit in den zweiten Durchgang (42) eintreten kann.
11. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (30) ein erstes Septum (36A) und ein zweites Septum (36B) umfasst, die an der ersten Trennwand (12A) bzw. der zweiten Trennwand (128) anliegen.
12. Spendervorrichtung (1) nach Anspruch 11, **dadurch gekennzeichnet, dass** das erste Septum (36A) und das zweite Septum (36B) die Teile der ersten Kammer (34A) bzw. der zweiten Kammer (34B) abgrenzen, die sich in der Nähe der ersten Trennwand (12A) bzw. der zweiten Trennwand (128) befinden.
13. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Emitter (31) und/oder die Aufnahme (32) als rohrförmige Elemente ausgebildet sind, wobei die jeweiligen Enden des Emitters (31) und des Empfängers (32) entlang dergleichen gera-

den Linie angeordnet sind.

14. Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Einsatz (30) so ausgeführt ist, dass er ein Zwischenelement (33) umfasst, das zwischen dem Emitter (31) und der Aufnahme (32) angeordnet ist, wobei das Zwischenelement (33) umfasst:

- ein zweites Aufnahmeelement (33A), das dem Emitter (31) zugewandt ist und dazwischen einen Spalt freilässt, um eine erste Luftunterbrechung zu bilden;
- ein zweites Emitterelement (338), das der Aufnahme (32) zugewandt ist, wobei ein Spalt dazwischen gelassen wird, um einen zweiten Luftspalt zu bilden.

15. Waschmaschine mit einer Spendervorrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche 1 bis 14.

25 Revendications

1. - Dispositif de distribution (1) pour distribuer un liquide pour une machine à laver à usage domestique, en particulier un lave-vaisselle, ledit dispositif de distribution (1) étant du type qui comprend :
- une première demi-coque (10), à partir du bord latéral de laquelle se dresse une paroi transversale (10P) ;
 - une seconde demi-coque (20), qui présente une forme correspondant sensiblement à celle de la première demi-coque (10) et est fixée au bord supérieur de ladite paroi transversale (10P) de manière à former une cavité interne (2) ;
 - une conduite d'alimentation (11) fournissant de l'eau à partir d'une conduite d'eau principale, ladite conduite d'alimentation (11) étant formée par des parois latérales (11P) se faisant face, faisant saillie de la première demi-coque (10) et fermées à leur bord libre par la seconde demi-coque (20) ;
 - un insert (30) comprenant au moins un émetteur (31) et au moins un récepteur (32) ayant des extrémités respectives se faisant face, laissant un espace entre eux pour former une coupure anti-retour,
- ledit dispositif de distribution (1) étant **caractérisé par le fait qu'il** comprend :
- une première paroi de séparation (12A) faisant saillie de ladite première demi-coque (10) et couplée auxdites parois latérales (11P) se fai-

- sant face, en particulier pour fermer ladite conduite d'alimentation (11) ;
- un premier passage (41) formé entre la première paroi de séparation (12A) et la seconde demi-coque (20) pour permettre au liquide de s'écouler de la conduite d'alimentation (11) à l'émetteur (31), en particulier ledit premier passage (41) étant formé entre un bord libre de la première paroi de séparation (12A) et ladite seconde demi-coque (20).
2. - Dispositif de distribution (1) selon la revendication 1, **caractérisé par le fait que** ledit premier passage (41) est obtenu, au moins partiellement, au moyen d'une concavité formée sur la surface interne de la seconde demi-coque (20) dans une position correspondant à la première paroi de séparation (12A), en particulier ladite surface interne consistant en une surface de la seconde demi-coque (20) tournée vers la première demi-coque (10) et la première paroi de séparation (12A).
 3. - Dispositif de distribution (1) selon la revendication 2, **caractérisé par le fait que** la seconde demi-coque (20) est réalisée de manière à se présenter à une hauteur correspondante sur sa surface externe dans une position correspondant à ladite concavité, en particulier ladite surface externe consistant en une surface de la seconde demi-coque (20) opposée à celle qui est tournée vers la première demi-coque (10) et vers la première paroi de séparation (12A).
 4. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit premier passage (41) est formé par abaissement d'au moins une partie de ladite première paroi de séparation (12A), en particulier ledit abaissement étant fourni par au moins une partie de la première paroi de séparation (12A) qui est plus basse que les parois latérales (11P).
 5. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit insert (30) comprend une première chambre (34A) en communication fluidique avec l'émetteur (31) et positionnée entre l'émetteur (31) et la première paroi de séparation (12A), ladite première chambre (34A) présentant au moins une ouverture (35A) dans sa partie tournée vers la seconde demi-coque (20) pour permettre au liquide provenant de la conduite d'alimentation (11) et du premier passage (41) d'entrer dans la première chambre (34A).
 6. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit dispositif de distribution (1) comprend :
 - une seconde paroi de séparation (12B) faisant saillie de ladite première demi-coque (10) ;
 - un second passage (42) formé entre la seconde paroi de séparation (12B) et la seconde demi-coque (20) pour permettre au liquide de s'écouler du récepteur (32) dans une chambre de collecte (5), en particulier ledit second passage (42) étant formé entre un bord libre de la seconde paroi de séparation (12B) et ladite seconde demi-coque (20).
 7. - Dispositif de distribution (1) selon la revendication 6, **caractérisé par le fait que** la seconde paroi de séparation (12B) coopère avec la première paroi de séparation (12A) pour définir un siège (13) adapté à loger l'insert (30), en particulier ledit siège (13) étant obtenu grâce à la coopération desdites parois de séparation (12A, 12B) avec d'autres septa ou cloisons faisant saillie de la première demi-coque (10).
 8. - Dispositif de distribution (1) selon une ou plusieurs des revendications 6 et 7, **caractérisé par le fait que** ledit second passage (42) est obtenu, au moins partiellement, au moyen d'une concavité formée sur la surface interne de la seconde demi-coque (20) dans une position correspondant à la seconde paroi de séparation (12B), en particulier ladite seconde demi-coque (20) se trouvant à une hauteur sur sa surface externe dans une position correspondant à ladite concavité.
 9. - Dispositif de distribution (1) selon une ou plusieurs des revendications 6 à 8, **caractérisé par le fait que** ledit second passage (42) est formé par abaissement d'au moins une partie de ladite seconde paroi de séparation (12B), en particulier ledit abaissement étant fourni par au moins une partie de la seconde paroi de séparation (12B) qui est plus basse que les parois latérales (11P).
 10. - Dispositif de distribution (1) selon une ou plusieurs des revendications 6 à 9, **caractérisé par le fait que** ledit insert (30) comprend une seconde chambre (34B) en communication fluidique avec le récepteur (32) et positionnée entre ledit récepteur (32) et la seconde paroi de séparation (12B), ladite seconde chambre (34B) ayant au moins une seconde ouverture (35B) dans sa partie tournée vers la seconde demi-coque (20) pour permettre au liquide provenant du récepteur (32) et s'écoulant à travers la seconde chambre (34B) d'entrer dans le second passage (42).
 11. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit insert (30) comprend un premier septum (36A) et un second septum (36B) venant en butée contre respectivement la première paroi de sé-

paration (12A) et la seconde paroi de séparation (12B).

12. - Dispositif de distribution (1) selon la revendication 11, **caractérisé par le fait que** le premier septum (36A) et le second septum (36B) délimitent les parties respectivement de la première chambre (34A) et de la seconde chambre (34B) qui sont à proximité respectivement de la première paroi de séparation (12A) et de la seconde paroi de séparation (12B). 5 10
13. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** l'émetteur (31) et/ou le récepteur (32) sont réalisés sous la forme d'éléments tubulaires, les extrémités respectives de l'émetteur (31) et du récepteur (32) étant disposées le long de la même ligne droite. 15
14. - Dispositif de distribution (1) selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit insert (30) est réalisé de manière à comprendre un élément intermédiaire (33) positionné entre l'émetteur (31) et le récepteur (32), ledit élément intermédiaire (33) comprenant : 20 25
- un second élément récepteur (33A) tourné vers ledit émetteur (31), laissant un espace entre les deux pour former une première coupure anti-retour ; 30
 - un second élément émetteur (33B) tourné vers ledit récepteur (32), laissant un espace entre les deux pour former une deuxième coupure anti-retour. 35
15. - Machine à laver comprenant un dispositif de distribution (1) selon une ou plusieurs des revendications précédentes 1 à 14. 40

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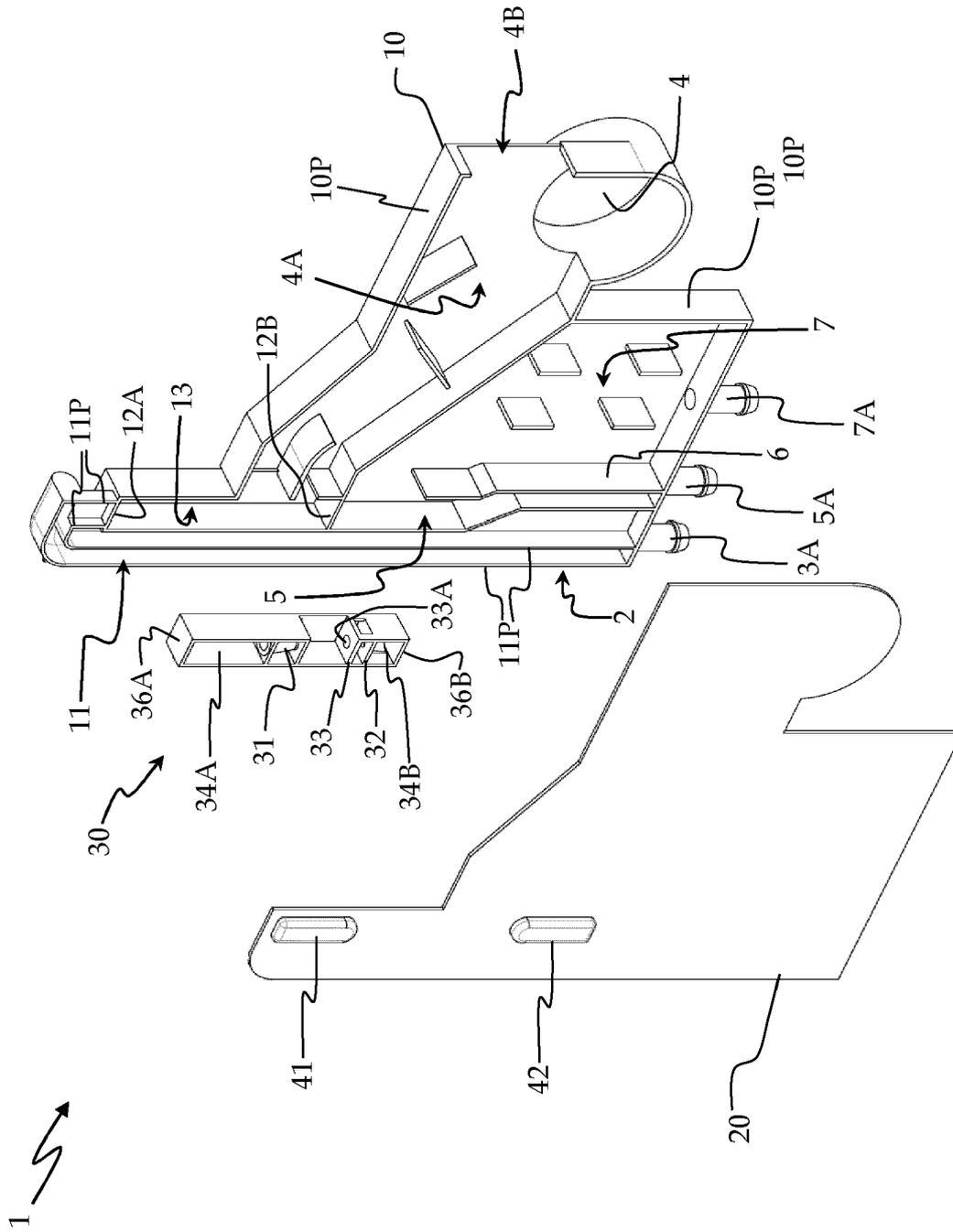


Fig. 1

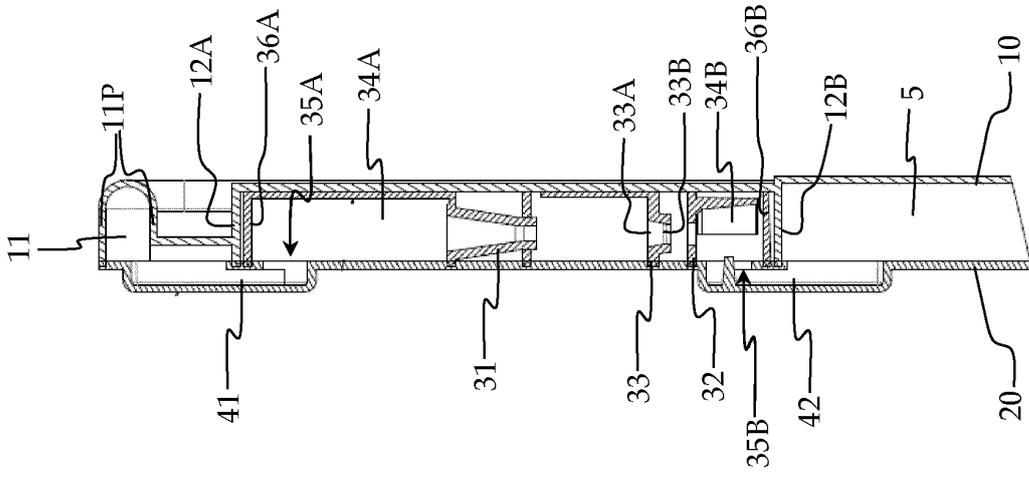


Fig. 2B

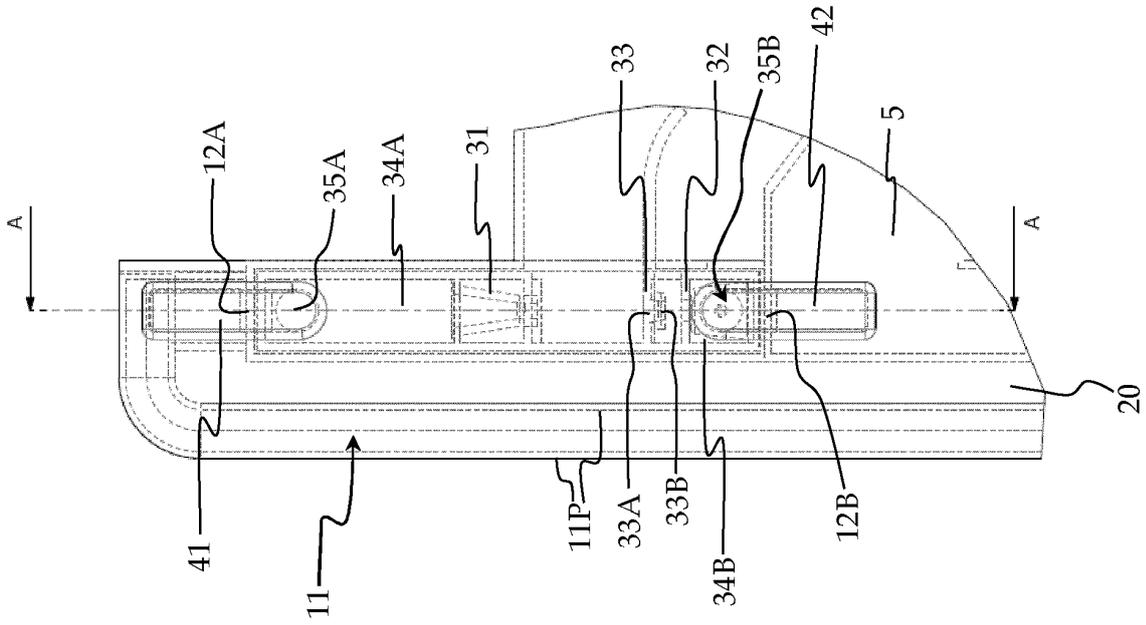


Fig. 2A

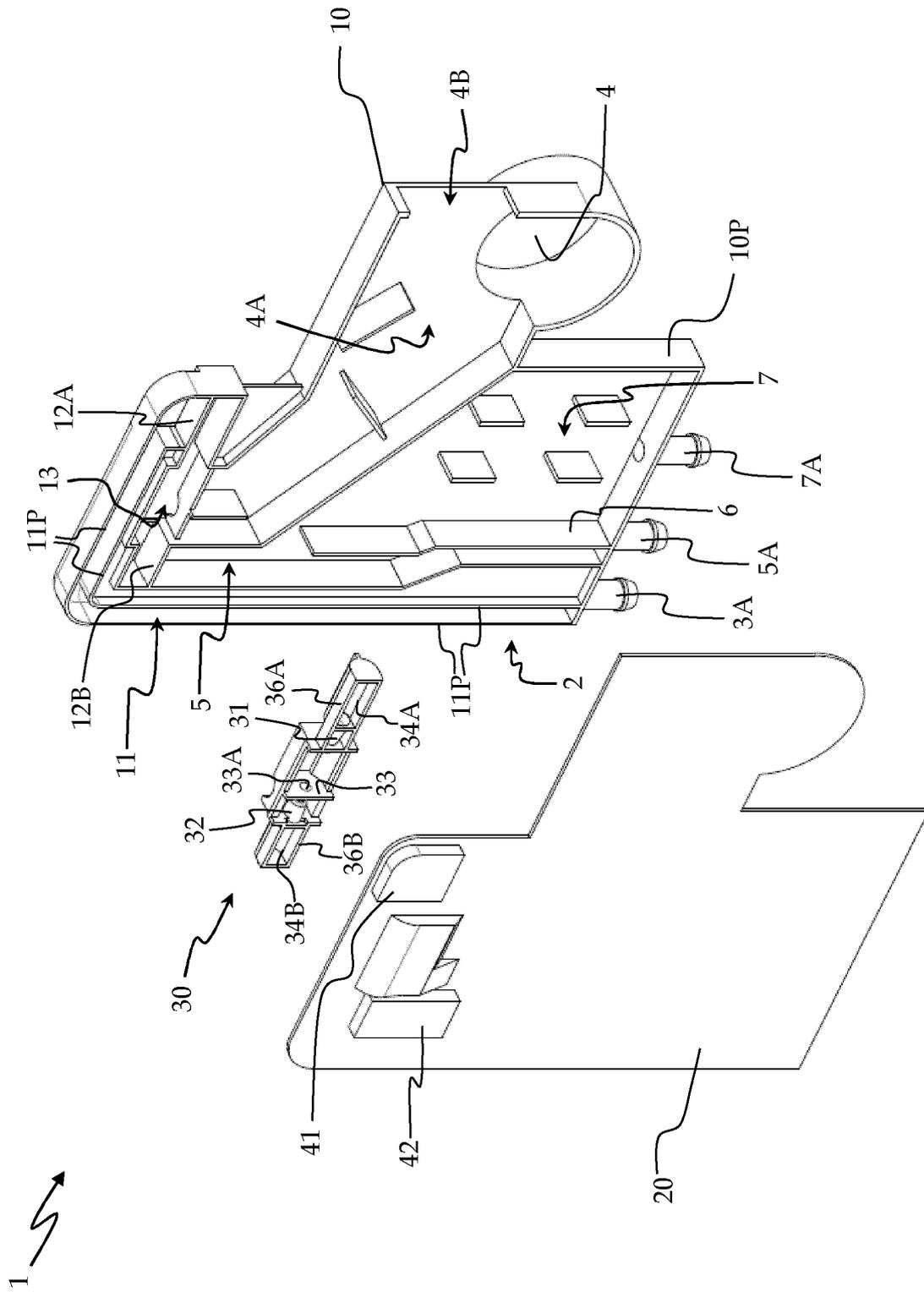


Fig. 3

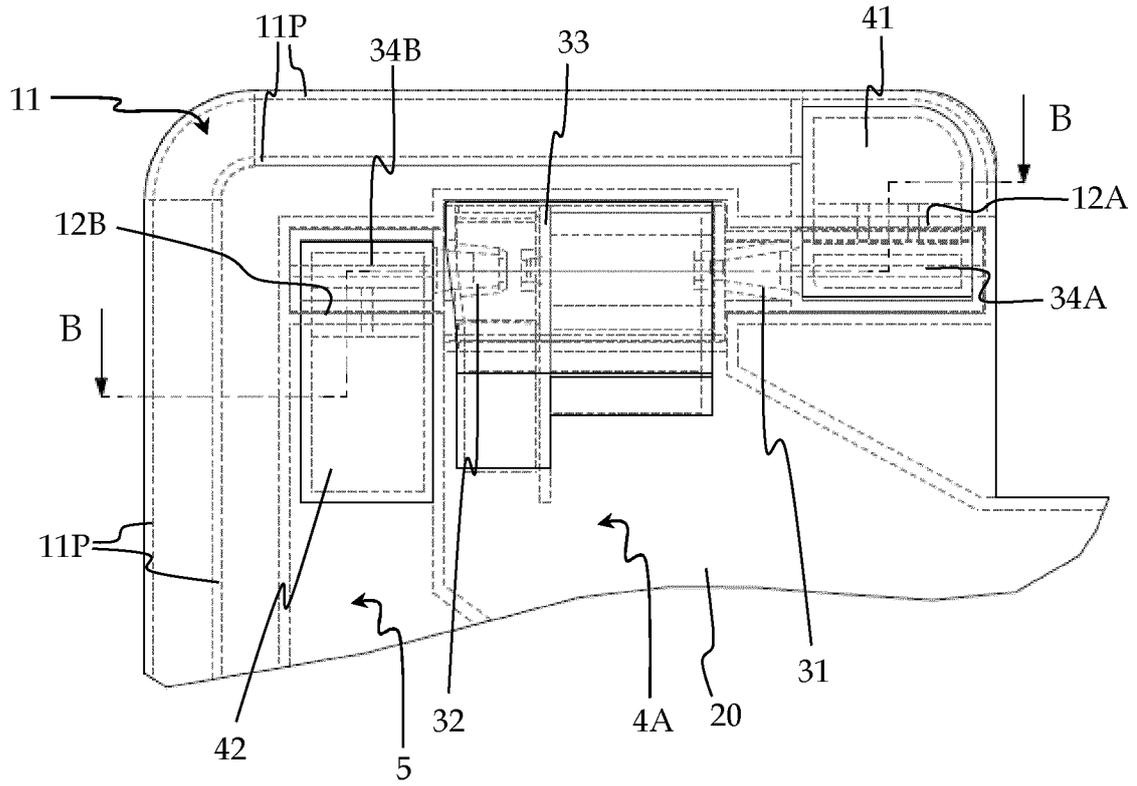


Fig. 4A

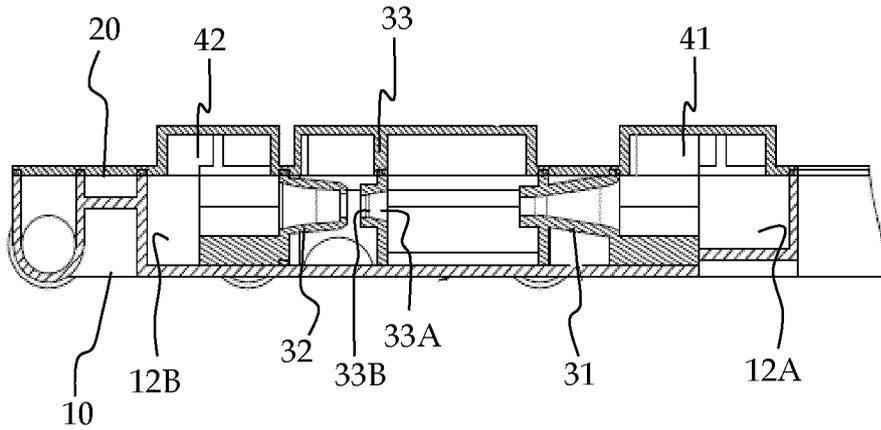


Fig. 4B

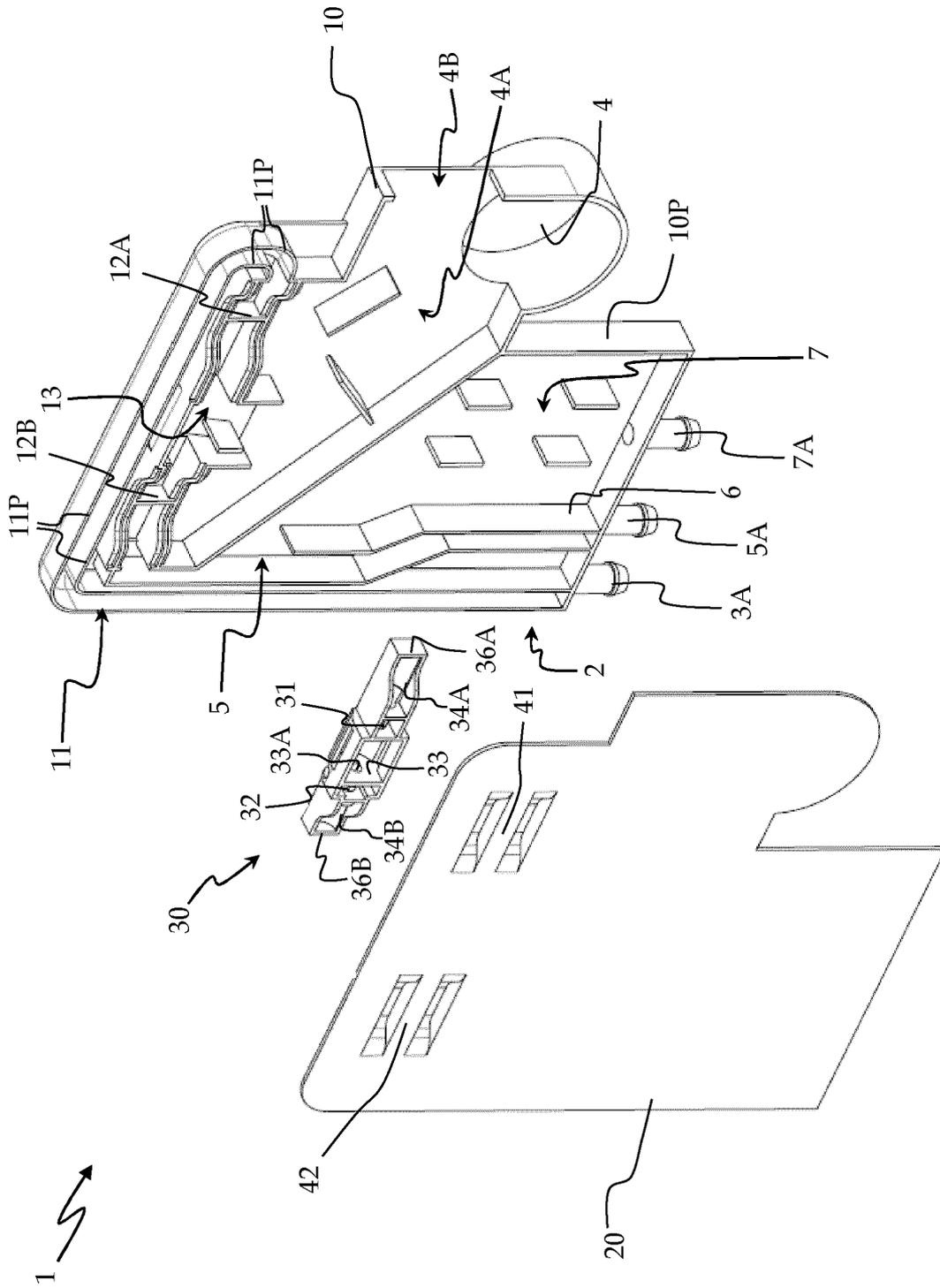


Fig. 5

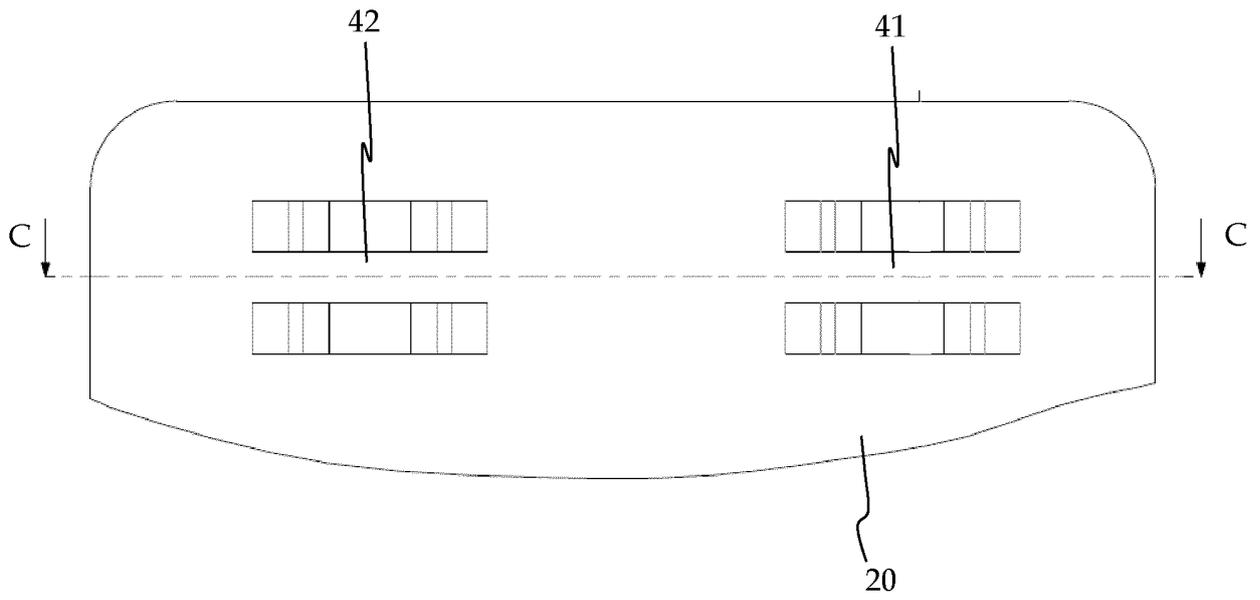


Fig. 6A

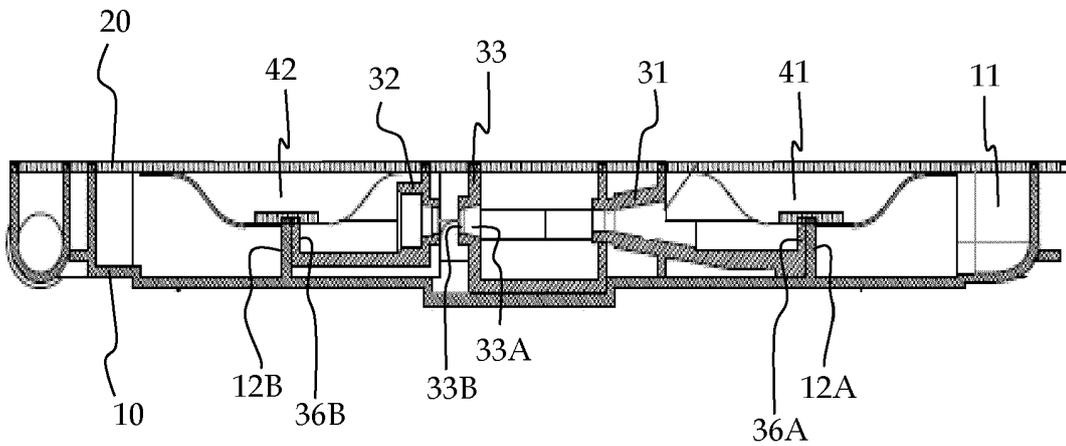


Fig. 6B

REFERENCES CITED IN THE DESCRIPTION

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