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(54) A front-loading laundry washing machine for household use, in particular a washing or washing/drying machine

(57) The present invention relates to a front-loading laundry washing machine (1) for household use, in particular a washing or washing/drying machine, comprising a cabinet (2) within which a tub (3) is arranged, and having a load opening (5) that can be closed by a door (6) constrained to said cabinet (2), said door (6) comprising:
- a porthole glass (61);
- a frame (62) supporting said porthole glass (61) and adapted to abut against said cabinet (2), in particular in adjacency to the load opening (5).

The invention is characterized in that said door (6) comprises dispensing means (7) associated with said porthole glass (61), said dispensing means (7) being of the long-fill type and being capable to contain a quantity of agents which is sufficient for a plurality of operating cycles of the washing machine (1).

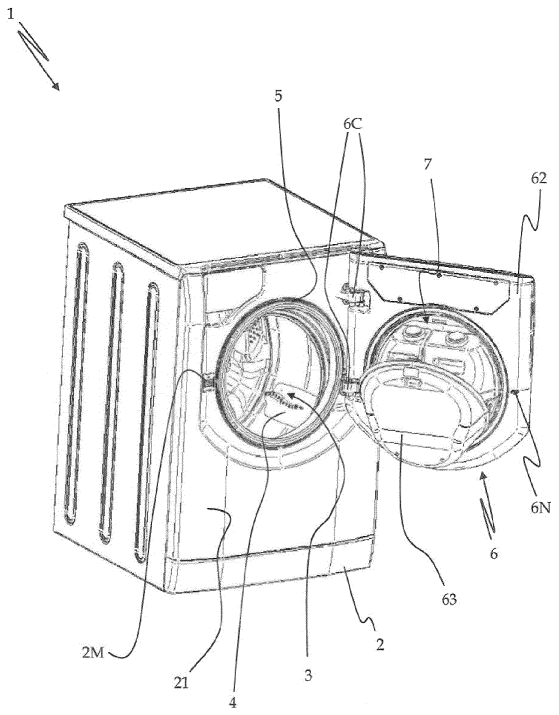

Fig. 2

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Description

[0001] The present invention relates to a front-loading laundry washing machine for household use, in particular a washing or washing/drying machine, according to the preamble of claim 1.

[0002] The invention is applicable to the field of front-loading laundry washing machines for household use, in particular washing or washing/drying machines, provided with means for dispensing washing agents (which may include washing agents such as detergent, softener, bleach, etc., or additives of various kinds), said dispensing means being located in the door that closes the load opening of the machine.

[0003] In the front-loading laundry washing machines for household use known in the art, a door is used for closing the load opening, through which the laundry to be washed is placed into a wash tub, which typically includes a rotary drum. The door usually includes a transparent porthole glass, which allows the user to see the internal portion of the rotary drum and the laundry loaded therein.

[0004] As is known, prior to each operating cycle the user of a washing machine pours a dose of a washing agent (e.g. detergent and/or softener) into a single-dose drawer in fluidic communication with the wash tub; a water duct afferent to the drawer floods the latter while the machine is in operation, so as to deliver the washing agent into the tub.

[0005] The term "single-dose drawer" refers herein to a drawer which can only contain a quantity of washing agent which is sufficient for one operating cycle of the machine, corresponding to treating one load of laundry (normally 3 to 7 Kg).

[0006] The capacity of the drawer is limited to one wash cycle; in fact, in order to prevent any washing agent deposits in the drawer, the drawer is completely emptied and must then be refilled by the user before starting the next operating cycle of the washing machine.

[0007] Such a system is *per se* functional, but requires that the drawer be filled each time by the user.

[0008] Consequently, washing machines have been developed which are equipped with at least one long-fill reservoir for washing agents; such machines allow to exploit the multi-dose capacity of the reservoir, so that a number of wash cycles can be carried out without the user having to refill the machine with a new dose of washing agent.

[0009] Washing machines of this type have been described, for example, in British patent GB 2 214 524 to Industrie Zanussi S.p.A. In this case, the washing machine base includes a certain number of washing agent bags which are installed in the machine after having been filled with respective washing agents, and which are then gradually emptied during the various operating cycles of the machine; for this purpose, the bags are made of a deformable plastic material (so that no air can enter because the bags can adapt themselves to their decreasing contents), and are in fluidic communication with a duct through which (by means of a pump) the washing agent is delivered into the tub.

[0010] Although it is no longer necessary to pour in washing agent before each operating cycle of the machine, this solution still suffers from the drawback that the entire washing agent bags must be replaced when they become empty, and the user has to carry out this task in non-optimal conditions, since the bags are located in the machine base, in a position which is not easily accessible.

[0011] Moreover, the bags are made of flexible plastic, and presumably imply a certain purchase cost in addition to that of the washing agent alone; it follows that their complete replacement is not advantageous from an economical viewpoint.

[0012] In other systems known in the art (e.g. from European patent EP 0 379 950 to Miele & Cie GmbH & CO.), in the base of the washing machine there is at least one rigid reservoir adapted to contain a volume of washing agents which is sufficient for several working cycles of the washing machine; said washing agents are then usually fed to the wash tub through suitable ducts.

[0013] These solutions, although they can overcome some drawbacks of the system previously described (such as, for example, having to replace the entire bag), still suffer from the problem that pouring in the washing agents is not an ergonomical task; in fact, it is quite common that the user has to stoop to the base of the washing machine in order to pour the washing agent into said at least one rigid reservoir.

[0014] Alternatively, the washing agent is loaded into said at least one rigid reservoir through a washing agent filling drawer, usually consisting of the drawer used for loading single doses of washing agents; said drawer is located in a remote position with respect to the reservoir, and is in fluidic communication therewith by means of suitable ducts and pumps; inevitably, these solutions increase the costs incurred for manufacturing the whole washing machine. A similar solution is described in patent application EP1884584 by the present Applicant.

[0015] Another problem of these solutions is that said at least one rigid reservoir is fixedly associated with the base of the washing machine; as a consequence, this inevitably implies that maintenance of said at least one rigid reservoir is more costly and difficult, in that it is also necessary to carry out specific cycles of the washing machine in order to clean said at least one rigid reservoir.

[0016] In this frame, it is the main object of the present invention to overcome the above-mentioned drawbacks by providing a front-loading laundry washing machine for household use, in particular a washing or washing/drying machine, which is so designed as to not require a user to manually fill the drawer each time.

[0017] It is another object of the present invention to provide a laundry washing machine which is so designed that the long-fill reservoirs (which may also be defined as high-capacity reservoirs) need not be replaced when

they become empty, so that the user is not required to carry out such a task in non-optimal conditions.

[0018] It is a further object of the present invention to provide a laundry washing machine which is so designed as to allow a user to load the washing agents into at least one long-fill reservoir easily and ergonomically, in particular without having to stoop to the base of the washing machine in order to load said washing agents.

[0019] It is another object of the present invention to provide a laundry washing machine which is so designed as to require less costly and simpler maintenance for the machine itself and for at least one rigid washing agent reservoir.

[0020] It is a further object of the present invention to provide a laundry washing machine which is so designed as to include at least one rigid washing agent reservoir, said at least one rigid reservoir being so designed as to not require, in order to be cleaned, the execution of specific cycles of the washing machine.

[0021] In order to achieve these objects, the present invention provides a front-loading laundry washing machine for household use, in particular a washing or washing/drying machine, incorporating the features set out in the appended claims, which are intended to be an integral part of the present description.

[0022] 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 example, wherein:

- Figs. 1 and 2 are a first and a second perspective views, respectively, of a front-loading laundry washing machine for household use, in particular a washing or washing/drying machine, incorporating the features of the present invention;
- Figs. 3a, 3b, 3c are a first, a second and a third perspective views, respectively, of a door of the washing machine according to the present invention;
- Figs. 4a and 4b are a first and a second different perspective views, respectively, of the door of Figs. 3a, 3b and 3c, in Fig. 4a some components of the door being transparent;
- Figs. 5a and 5b show a first and a second sectional views, respectively, of a door according to the present invention.

[0023] Figs. 1 and 2 are a first and a second perspective views, respectively, of a front-loading laundry washing machine 1 for household use, in particular a washing or washing/drying machine, according to the present invention.

[0024] The washing machine 1 comprises a cabinet 2, within which a tub 3 is arranged in a known manner. Inside the latter, a drum 4 (shown in Fig. 2) is rotated, preferably about a horizontal or substantially horizontal axis X (not shown in the drawings).

[0025] The laundry to be washed is placed inside the drum 4 through a load opening 5 associated with a front part 21 of the cabinet 2.

[0026] In particular, the axis of the drum 4 may be slightly inclined, so that it is raised towards the front part 21 of the cabinet 2; this allows a user to load the laundry into the drum 4 more easily.

[0027] The load opening 5 can be closed by means of a door 6 constrained to said cabinet 2; in Fig. 1 said door 6 is shown in the closed condition, whereas in Fig. 2 the door 6 is shown in an open condition, i.e. in the condition that allows placing laundry to be washed into the drum 4 through the load opening 5.

[0028] As can be seen in particular in Fig. 2, the switching from the open position to the closed position (and vice versa) of the door 6 is preferably obtained, in a known manner, through at least one hinge 6C; also, in order to keep the door 6 closed, it is preferably fitted, in a known manner, with a catch 6N adapted to be associated with coupling means 2M of the cabinet 2.

[0029] In addition, said door 6 comprises a porthole glass 61 and a frame 62 for supporting said porthole glass 61, the porthole glass 61 and the frame 62 being preferably included in a single front element of the door 6.

[0030] Preferably, the part of said door 6 that faces the load opening 5 protrudes in the direction of the axis of the drum 4 from the frame 62, so that, when the door 6 is closed, it at least partially enters into the load opening 5; also, when the door 6 is closed it may at least partially enter into the tub 3 and possibly into the drum 4. When the door 6 is closed, the frame 62 abuts against the front part 21 of the cabinet 2, in adjacency to the load opening 5 of said cabinet 2.

[0031] In accordance with the present invention, the door 6 comprises means (indicated as a whole by reference numeral 7 in Fig. 2) for dispensing (washing or additive) agents associated with said porthole glass 61, said dispensing means 7 being of the long-fill type, i.e. they can contain a quantity of agents which is sufficient for a plurality of operating cycles of the washing machine 1.

[0032] Figs. 3a, 3b, 3c show a first, a second and a third perspective views, respectively, of the door 6 of the washing machine 1 according to the present invention; in particular, said figures show a portion of the door 6 that faces the tub 3 in a closed condition of said door 6.

[0033] As can be seen in said Figs. 3a-3c, said long-fill dispensing means 7 comprise at least one high-capacity reservoir 71, 72, said at least one reservoir 71, 72 being adapted to contain a quantity of (washing or additive) agent which is sufficient for multiple operating cycles of the washing machine 1, and being preferably made of transparent or translucent material.

[0034] Preferably, said at least one reservoir 71, 72 comprises a first reservoir 71 for containing a first agent (e.g. a detergent) and a second reservoir 72 for containing a second agent (e.g. a softener); it is however clear that said at least one reservoir 71, 72 may comprise a larger number of reservoirs 71, 72, e.g. also a third reservoir (not shown in the annexed drawings) for containing

an additional agent (e.g. a dye fixative, a dye or the like).

[0035] In a preferred embodiment, said at least one reservoir 71, 72 comprises at least one first aperture 71A, 72A associated with an upper portion of said at least one reservoir 71, 72 for filling it with agents (e.g. softener, detergent, etc.).

[0036] Said first apertures 71A, 72A, when not in use, can be kept closed with respective plugs 71B, 72B (visible in particular in Figs. 3b and 3c). Advantageously, said at least one reservoir 71, 72 comprises a gripping element 71P, 72P (visible in particular in Figs. 3b and 3c), preferably made as one piece with the reservoir 71, 72 and adapted to make it easier for the user to extract and carry said at least one reservoir 71, 72.

[0037] In addition, said at least one reservoir 71, 72 comprises at least one second aperture 71B, 72B (shown in Figs. 5a, 5b) associated with a lower portion of said at least one reservoir 71, 72 for releasing said (washing or additive) agents into the tub 3.

[0038] The special provision of the dispensing means 7 according to the present invention allows to provide a washing machine 1 that can carry out a certain number of wash cycles without the user having to refill the machine with a new dose of agent before each wash or operating cycle of said washing machine 1.

[0039] Also, the washing machine 1 according to the present invention does not require said at least one reservoir 71,72 to be replaced when it becomes empty, so that the user is not compelled to carry out such a task in non-optimal working conditions.

[0040] The particular arrangement of said dispensing means 7 according to the present invention then allows the agents to be easily and ergonomically loaded into said at least one reservoir 71, 72, in particular without the user having to stoop to the base of the washing machine 1 in order to load the agents.

[0041] Furthermore, the provisions of the present invention ensure simpler and cheaper maintenance of the washing machine 1, in particular said washing machine 1 being so designed as to require no specific cycles for cleaning said at least one reservoir 71, 72.

[0042] Still with reference to Figs. 3a-3c, it can also be noticed that the door 6 comprises a cover 63 that allows said at least one reservoir 71,72 to be kept separate from the inside of the tub 3 and of the drum 4 when the door 6 is in the closed condition; this avoids any undesired contact between the dispensing means 7 and the laundry contained in the drum 4 while the washing machine 1 according to the present invention is in operation.

[0043] Preferably, said at least one reservoir 71, 72 is positioned between the porthole glass 61 and said cover 63, in particular in a compartment obtained between the porthole glass 61 and the cover 63.

[0044] The door 6 also comprises a gasket (not shown in the drawings), arranged between the frame 61 and the cover 63, which prevents the washing fluid from getting into the cover 63, i.e. into the compartment that houses the dispensing means 7 according to the present invention.

[0045] In a preferred embodiment, the door 6 comprises coupling means 6M, 6E (shown in Figs. 3b, 3c, 4a) adapted to associate said cover 63 with the frame 61, said coupling means 6M allowing the cover 63 to switch from a closed position (as shown in Fig. 3a) to an open position (as shown in Figs. 3b and 3c), and vice versa, and also allowing the cover 63 to stay in said closed position with respect to the frame 61.

[0046] In particular, said coupling means comprise a hinge 6M (visible in Fig. 4a) adapted to act as a pin for a rotational movement of the cover 63 from said closed position (Fig. 3a) to said open position (Figs. 3b and 3c), and vice versa; in addition, said coupling means may comprise a catching element 6E (shown in Figs. 3b and 3c) allowing the cover 63 to stay in said closed position (Fig. 3a) with respect to the frame 62.

[0047] The special provision of said coupling means 6M, 6E allows to make the cover 63 movable relative to the frame 62, without however making it susceptible of undesired removal; this turns out to be particularly advantageous, in that said coupling means 6M, 6E do not allow the cover 63 to be accidentally decoupled from the frame 61, in particular while the washing machine 1 is in operation. In fact, the cover 63 can advantageously be fully removed only when the door 6 is in the open position, by using suitable tools for removing the cover 63; of course, this prevents the washing fluid from undesirably getting into the cover 63, i.e. into the compartment that houses the dispensing means 7. As an alternative, the door 6 may be fitted with locking means (not shown in the drawings) adapted to keep the cover 63 integral with the door 6 even when said cover 63 is in the open position; such a provision offers the advantage that the user cannot leave the cover 63 outside the washing machine 1, in which case damage might occur during the operation of the washing machine 1.

[0048] Figs. 4a and 4b show a first and a second perspective views, respectively, of the door 6 of the laundry washing machine 1 according to the present invention.

[0049] In particular, these drawings show a portion of the door 6 facing the outside of the washing machine 1, i.e. that portion of the door 6 which faces away from the tub 3 and the drum 4 when the door 6 is in the closed condition.

[0050] It should be noted that in Fig. 4a the door 6 of the washing machine 1 is shown in a condition wherein said at least one reservoir 71, 72 has been removed (e.g. through a movement shown in Fig. 3c by a dashed-dotted arrow) from the compartment for the dispensing means 7 according to the present invention.

[0051] By observing Figs. 3c and 4a, one can see that the dispensing means 7 according to the present invention comprise at least one pump 81, 82 adapted to be associated with said at least one reservoir 71, 72.

[0052] Preferably, said dispensing means 7 comprise a number of pumps 81, 82 corresponding to the number of reservoirs 71, 72 associated with the porthole glass

61 of the door 6 according to the present invention. As a consequence, in a preferred embodiment said at least one pump 81, 82 comprises a first pump 81 adapted to be associated with the first reservoir 71 and a second pump 82 adapted to be associated with the second reservoir 72. Advantageously, the first pump 81 and the second pump 82 share the same motor and are fitted to the same shaft (said motor and shaft not being shown in the drawings); in this manner, when the motor is turning in a first direction of rotation the first pump 81 is activated, whereas when the motor is turning in a second direction of rotation, the second pump 82 is activated. It is however clear that the number of reservoirs 71, 72 and related pumps 81, 82 may be different than is shown in the annexed drawings.

[0053] In a preferred embodiment, said at least one pump 81, 82 is of the volumetric or peristaltic or vibration type and ensures an accurate and optimal metering of the agent to be supplied into the tub 3, said metering being advantageously estimated by the electronic control system of the washing machine 1 as a function of parameters such as cycle type and quantity of laundry. Said at least one pump 81, 82 is electrically powered by suitable wires, which in particular are routed through the hinges 6C.

[0054] If the viscosity of the agents allows, said at least one pump 81, 82 may be replaced by at least one electrovalve (not shown in the drawings), in which case the agents will be released by gravity.

[0055] From the above description and from the annexed drawings, one can also notice that the cover 63 also allows said at least one pump 81, 82 to be kept separate from the tub 3 and from the drum 4 when the door 6 is in a closed condition; this avoids any undesired contact between said at least one pump 81, 82 and the laundry contained in the drum 4 while the washing machine 1 is in operation, and prevents the washing fluid from getting into the compartment that houses the dispensing means 7, which comprise said at least one pump 81, 82, which might result in electric danger.

[0056] Furthermore, said at least one pump 81, 82 is hydraulically connected to a male element 81A, 82A adapted to be associated, in particular through a snapping action, with said second aperture 71B, 72B, in particular provided in a lower portion of said at least one reservoir 71, 72 for releasing the agents into the tub 3 of the washing machine 1. In Fig. 4a said male element 81A, 82A is shown to be substantially vertical, whereas in Figs. 5a and 5b said male element 81A, 82A is shown to be substantially horizontal; it is however clear that said male element 81A, 82A may also have different orientations, provided that it is compatible with the shape of the second aperture 71B, 72B on the reservoir 71, 72.

[0057] Preferably, the second aperture of said at least one reservoir 71, 72 comprises junction means 9 (shown in Figs. 5a and 5b) adapted to allow said at least one reservoir 71, 72 to be coupled with said at least one pump 81, 82 and/or the agents contained in the reservoir 71, 72 to flow towards the tub 3.

[0058] In a preferred embodiment, said junction means 9 comprise at least one retention valve 91, in particular of the type comprising a mechanism for closing said second aperture 71B, 72B fitted with a mobile shutter and an elastic element, said at least one retention valve 91 being associated with said second aperture 71B, 72B of said at least one reservoir 71, 72 for keeping said second aperture 71B, 72B shut when said at least one reservoir 71, 72 is extracted from the washing machine 1.

[0059] It must be pointed out that Figs. 3c and 5b show a first step of extraction of said at least one reservoir 71, 72 from the washing machine 1, said first step substantially consisting of decoupling the second aperture 71B, 72B from the male element 81A, 82A.

[0060] Preferably, said junction means 9 comprise at least one catching component 92 (shown in Fig. 5b), preferably associated with said valve 91; said catching component 92 facilitates the coupling of the valve 91 to the male element 81A, 82A and keeps said at least one reservoir 71, 72 firmly engaged. Advantageously, circular rings 94 are applied to both said retention valve 91 and said male element 81A, 82A, in order to ensure a hydraulic seal.

[0061] Said junction means 9 may also comprise a supporting surface 93 in the proximity of said at least one pump 81, 82, said supporting surface 93 being adapted to promote the sliding of said at least one reservoir 71, 72 with respect to the door 6 and to facilitate the coupling of said at least one reservoir 71, 72 to said at least one pump 81, 82.

[0062] For the purpose of ensuring a perfect seal and avoiding that any agent might get into the operating volume of said valve 91, said second aperture 71B, 72B and/or said valve 91 may be fitted with a gasket (not shown in the drawings), e.g. of the O-ring type.

[0063] In accordance with the present invention, said at least one pump 81, 82 is associated with intake means 83, 84 for releasing the agents contained in said at least one reservoir 71, 72 into the tub 3 of the washing machine 1.

[0064] Preferably, said intake means comprise at least one duct 83 preferably ending with an outlet nozzle 84 adapted to release the agents directly into said tub 3; in order to ensure adequate visibility of said at least one duct 83 preferably ending with an outlet nozzle 84, the porthole glass 61 (which is preferably made of prevalently non-transparent material) shown in Fig. 4a is transparent.

[0065] By observing Fig. 4b one can see that the porthole glass 61, which is prevalently non-transparent, comprises at least one transparent or translucent inspection window 64 that allows verifying and checking the level of the agents contained in said at least one reservoir 71, 72.

[0066] Preferably, said at least one inspection window 64 is so designed as to be positioned in front of said at least one reservoir 71, 72, so that the user can verify, said at least one reservoir 71, 72 being transparent or

translucent, the level of the agent contained in said at least one reservoir 71, 72.

[0067] The advantages offered by a front-loading laundry washing machine for household use, in particular a washing or washing/drying machine, according to the present invention are apparent from the above description.

[0068] In particular, such advantages consist of the fact that the special provision of the dispensing means 7 according to the present invention allows to provide a washing machine 1 which can carry out a certain number of wash cycles without the user having to refill the machine with a new dose of (washing or additive) agent.

[0069] Also, the washing machine 1 according to the present invention does not require said at least one reservoir 71, 72 to be replaced when it becomes empty, so that the user is not compelled to carry out such a task in non-optimal working conditions.

[0070] Another advantage of the washing machine according to the present invention is that the particular arrangement of said dispensing means 7 allows the agents to be easily and ergonomically loaded into said at least one reservoir 71, 72, in particular without the user having to stoop to the base of the washing machine 1 in order to load the agents.

[0071] Furthermore, the special provisions of the present invention ensure simpler and cheaper maintenance of the washing machine 1, in particular said washing machine 1 being so designed as to require no specific cycles for cleaning said at least one reservoir 71, 72.

[0072] The front-loading laundry washing machine for household use, in particular a washing or washing/ drying 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.

[0073] For example, the washing machine 1 according to the present invention may be so designed as to additionally comprise a traditional system for loading the agents into the tub 3. In such a case, the control system (not shown in the drawings) of the washing machine 1 preferably recognizes said traditional type of loading (e.g. carried out by pouring a powder agent into a suitable drawer of said washing machine), and will accordingly execute an appropriate operating program in which said at least one pump 81, 82 is not activated.

[0074] In particular, said recognition of the type of agent loading may occur by measuring the conductivity of the liquid present in the tub 3.

[0075] It is apparent that such a provision allows to provide a washing machine 1 which is extremely versatile, in that it can be indifferently loaded with liquid agents (preferably poured into said at least one high capacity reservoir 71, 72) or with powder agents (preferably poured into a suitable drawer of the washing machine 1).

[0076] It can therefore be easily understood that the present invention is not limited to the above-described front-loading laundry washing machine for household use, in particular a washing or washing/drying 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. A front-loading laundry washing machine (1) for household use, in particular a washing or washing/drying machine, comprising a cabinet (2) within which a tub (3) is arranged, and having a load opening (5) that can be closed by a door (6) constrained to said cabinet (2), said door (6) comprising:

   - a porthole glass (61);
   - a frame (62) supporting said porthole glass (61) and adapted to abut against said cabinet (2), in particular in adjacency to the load opening (5),

   characterized in that

   said door (6) comprises dispensing means (7) associated with said porthole glass (61), said dispensing means (7) being capable to contain a quantity of agents which is sufficient for a plurality of operating cycles of the washing machine (1).

2. A laundry washing machine (1) according to claim 1, **characterized in that** said long-fill dispensing means (7) comprise at least one high-capacity reservoir (71, 72), said at least one reservoir (71, 72) being adapted to contain a quantity of agent which is sufficient for multiple working cycles of the washing machine (1), said at least one reservoir (71, 72) comprising in particular a first reservoir (71) for containing a first agent and a second reservoir (72) for containing a second agent.

3. A laundry washing machine (1) according to one or more of the preceding claims, **characterized in that** said at least one reservoir (71, 72) comprises at least one first aperture (71A, 72A) associated with an upper portion of said at least one reservoir (71, 72) for filling the latter with agents, and at least one second aperture (71B, 72B) associated with a lower portion of said at least one reservoir (71, 72) for releasing said agents into the tub (3).

4. A laundry washing machine (1) according to one or more of the preceding claims, **characterized in that** said dispensing means (7) according to the present invention comprise at least one pump (81, 82) adapted to be associated with said at least one reservoir (71, 72).

5. A laundry washing machine (1) according to claim 4, **characterized in that** said dispensing means (7) comprise a number of pumps (81, 82) corresponding to the number of reservoirs (71, 72) associated with the porthole glass (61) of the door (6).

6. A laundry washing machine (1) according to one or more of claims 4 and 5, **characterized in that** said at least one pump (81, 82) comprises a first pump (81) adapted to be associated with the first reservoir (71) and a second pump (82) adapted to be associated with the second reservoir (72), said first (81) and second (82) pumps sharing the same motor and being fitted to the same shaft.

7. A laundry washing machine (1) according to one or more of claims 4 to 6, **characterized in that** said at least one pump (81, 82) is of the volumetric or peristaltic or vibration type and ensures an accurate and optimal metering of the washing agent to be supplied into the tub (3).

8. A laundry washing machine (1) according to one or more of claims 4 to 7, **characterized in that** said at least one pump (81, 82) is hydraulically connected to a male element (81A, 82A) adapted to be associated, in particular through a snapping action, with a second aperture (71B, 72B) provided in a lower portion of said at least one reservoir (71, 72) for releasing the washing agents into the tub (3), said second aperture (71B, 72B) of said at least one reservoir (71, 72) comprising in particular junction means (9) adapted to allow said at least one reservoir (71, 72) to be coupled to said at least one pump (81, 82) and/or the agents contained in the reservoir (71, 72) to flow towards the tub (3), said junction means (9) comprising preferably at least one retention valve (91), in particular of the type comprising a mechanism for closing said second aperture (71B, 72B) fitted with a mobile shutter and an elastic element, said at least one retention valve (91) being associated with said second aperture (71B, 72B) of said at least one reservoir (71, 72) for keeping said second aperture (71B, 72B) shut when said at least one reservoir (71, 72) is extracted from the washing machine (1).

9. A laundry washing machine (1) according to one or more of the preceding claims 4 to 8, **characterized in that** said at least one pump (81, 82) is associated with intake means (83, 84) for releasing into the tub (3) the agents contained in said at least one reservoir (71, 72).

10. A laundry washing machine (1) according to claim 9, **characterized in that** said intake means comprise a duct (83) preferably ending with an outlet nozzle (84) adapted to release the agents directly into said tub (3).

11. A laundry washing machine (1) according to one or more of the preceding claims, **characterized in that** said door (6) comprises a cover (63) which allows said dispensing means (7) to be kept separate from the tub (3) and from the drum (4) when said door (6) is closed.

12. A laundry washing machine (1) according to claim 11, **characterized in that** said door (6) comprises coupling means (6M, 6E) which allow a rotational movement of the cover (63) in order to switch from a closed position to an open position, and vice versa, and which allow the cover (63) to stay in said closed position with respect to the frame (62).

13. A laundry washing machine (1) according to one or more of the preceding claims, **characterized in that** said porthole glass (61) comprises at least one inspection window (64) for verifying and checking the level of the agents contained in said at least one reservoir (71, 72).

14. A laundry washing machine (1) according to claim 13, **characterized in that** said porthole glass (61) is mostly made of non-transparent material and said at least one reservoir (71, 72) and said inspection window (64) are made of transparent and/ or translucent material.

15. A door (6) for a laundry washing machine (1) according to one or more of the preceding claims 1 to 14.

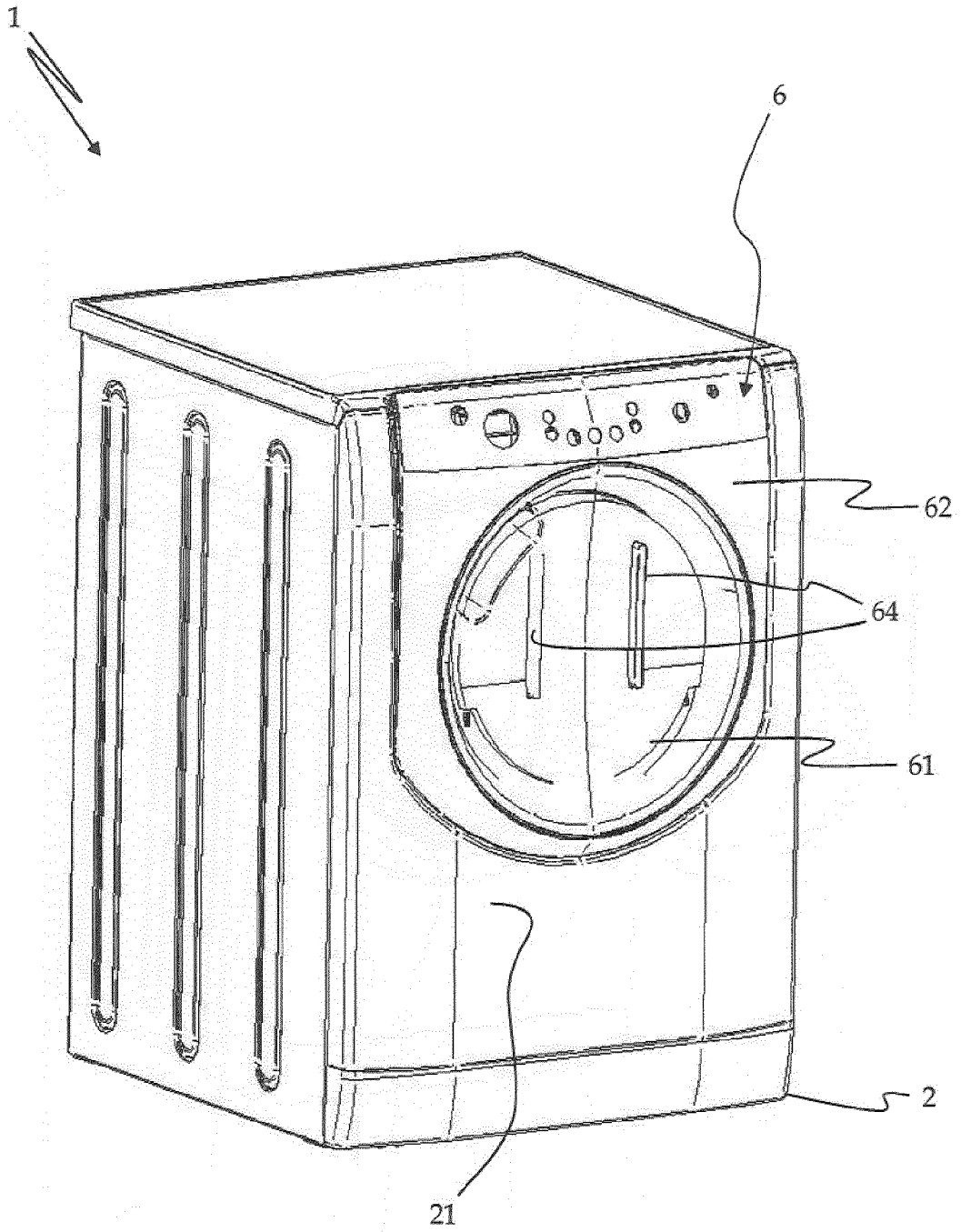


Fig. 1

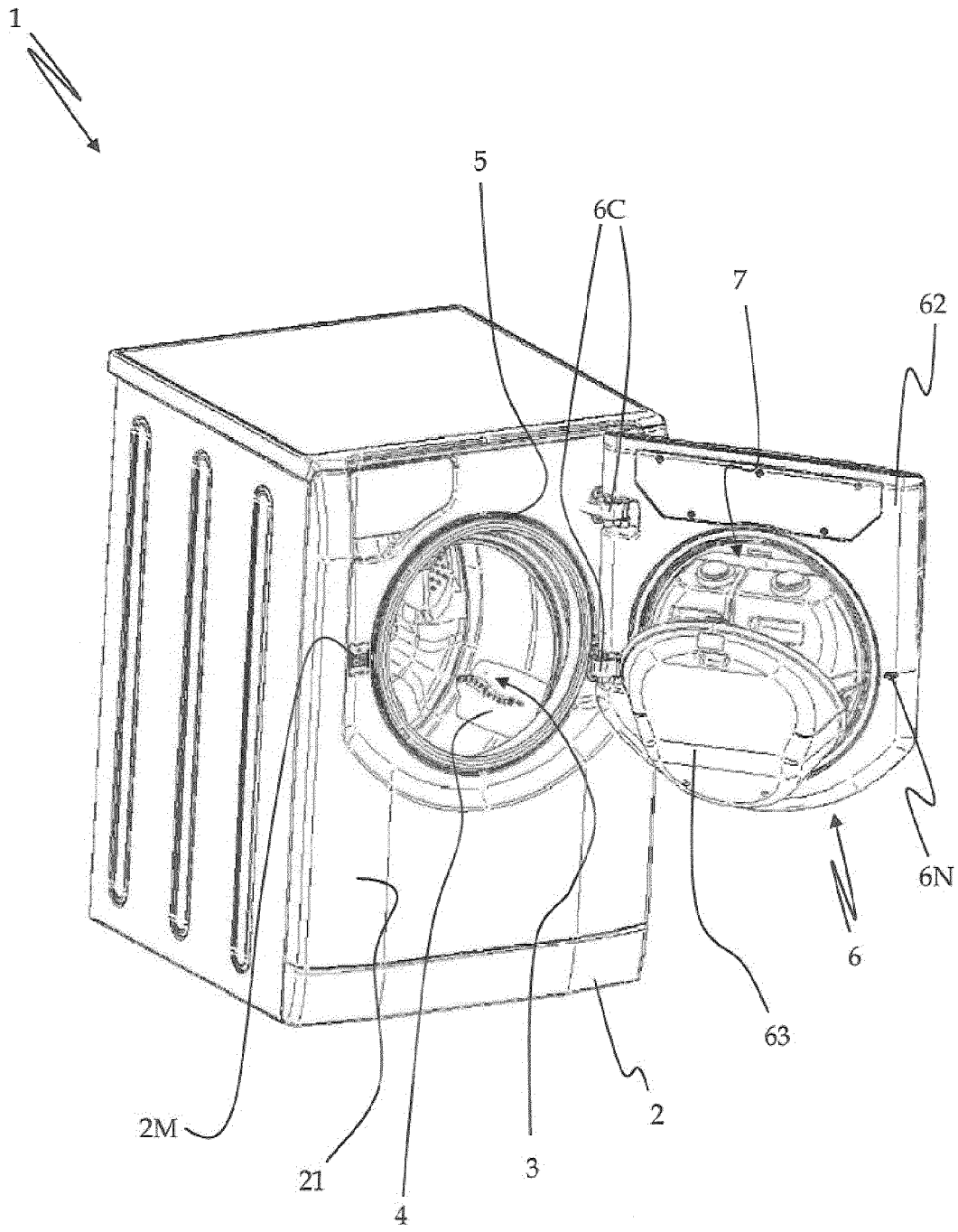


Fig. 2

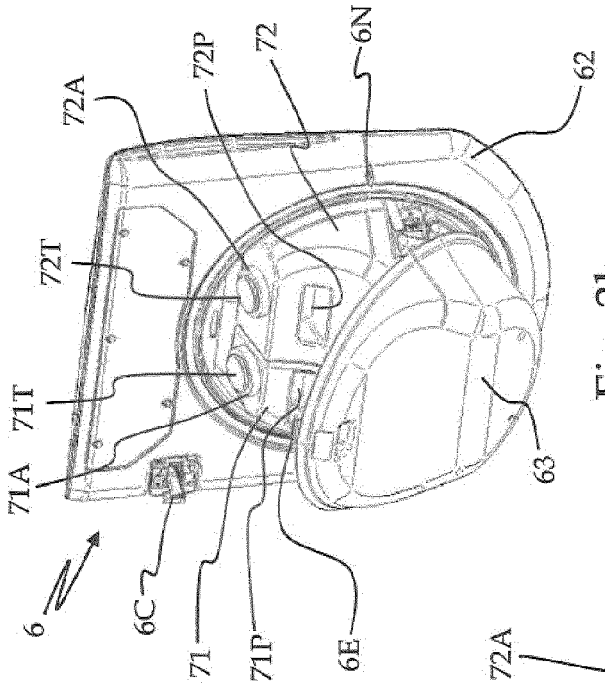


Fig. 3b

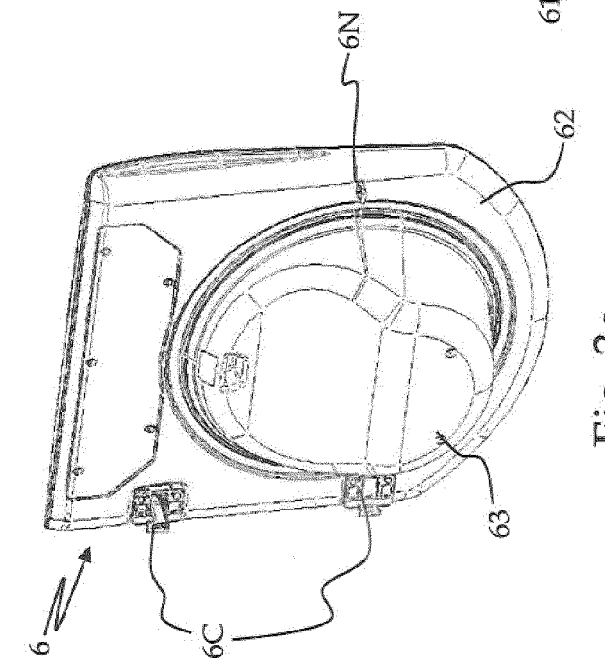


Fig. 3a

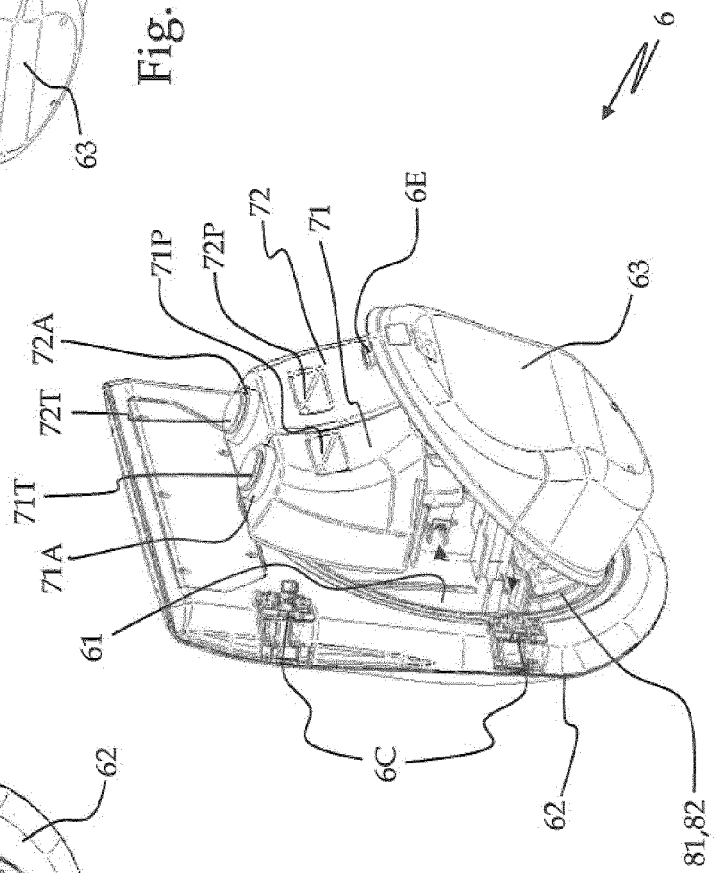


Fig. 3c

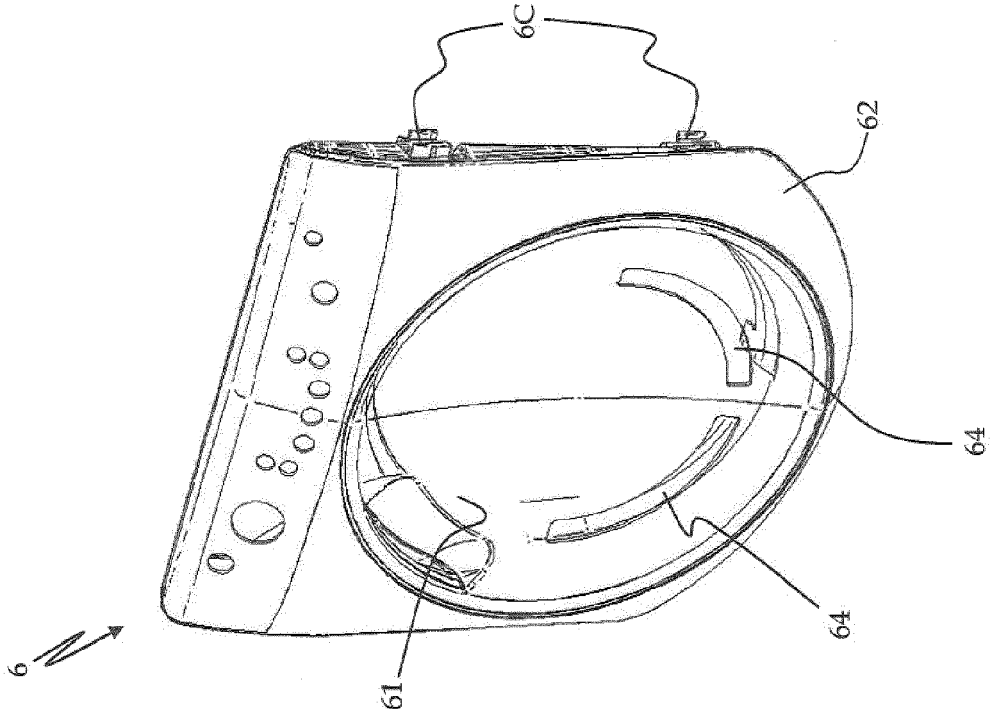


Fig. 4b

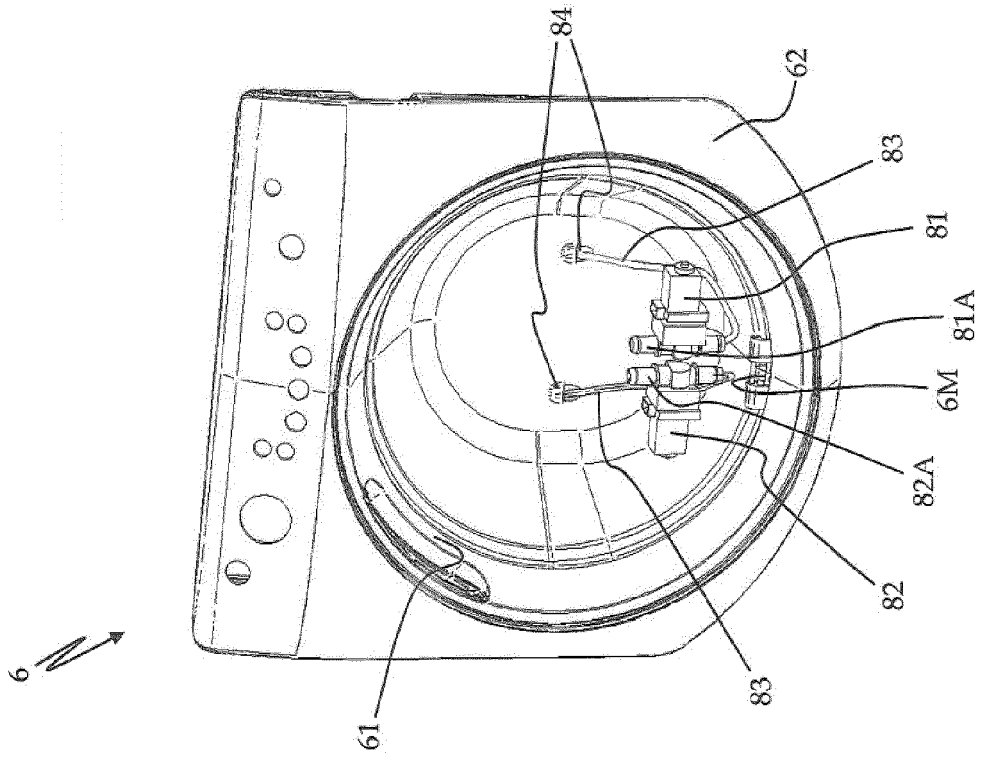


Fig. 4a

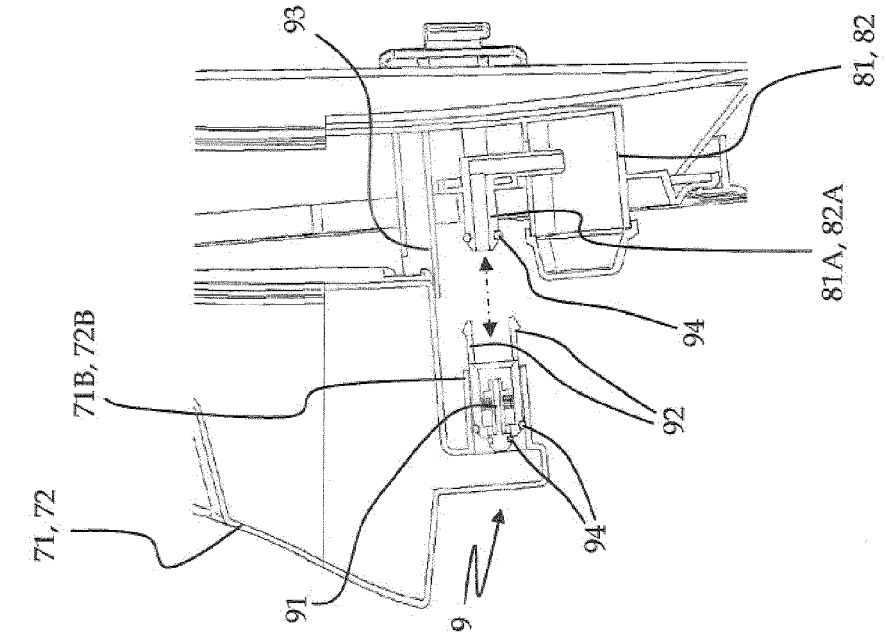
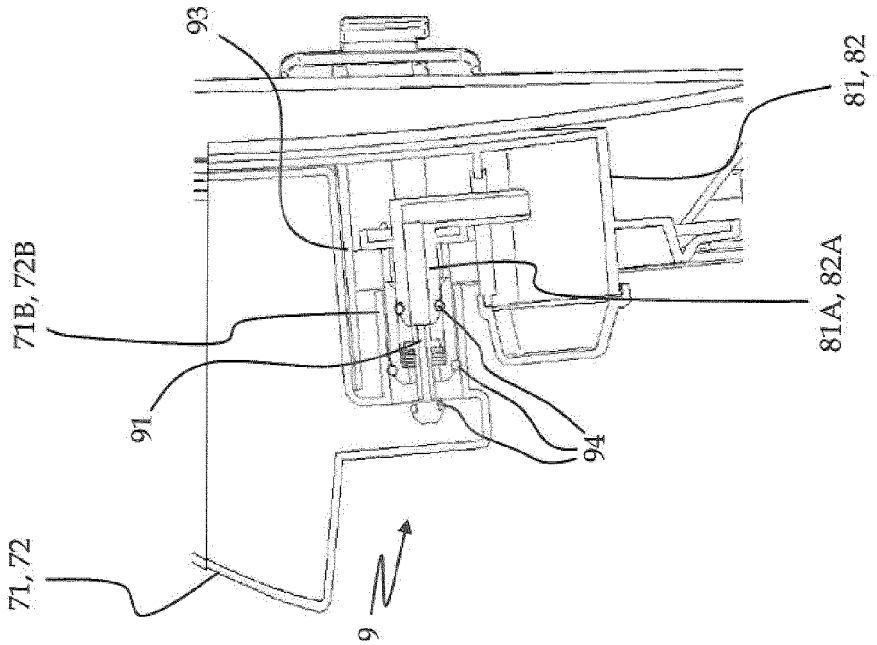

93
81, 82
81A, 82A
94
92
71B, 72B
71, 72
91
94
9

Fig. 5b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71, 72
9

Fig. 5a

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 6039

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 March 2013	Diaz y Diaz-Caneja

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1

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

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