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(54) **Laundry machine with discharge manifold comprising a pump assembly**

Waschmaschine mit Ablassverteiler, umfassend eine Pumpenbaugruppe

Machine à laver le linge avec collecteur d'évacuation comprenant un ensemble de pompe

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Description

[0001] The present invention relates to laundry machines, such as laundry washing machines and laundry washing/drying machines, both for domestic and professional use. More particularly, the present invention relates to a laundry machine having a compact discharge manifold comprising a pump assembly.

[0002] A household and/or professional laundry machine - such as a laundry washing machine and a laundry washing/drying machine - typically comprises a washing tub, enclosed in a casing, that houses a rotatable drum in which the laundry can be loaded/unloaded, and accessible by a user for loading/unloading the laundry through a loading/unloading aperture selectively closable by a door.

[0003] During operation, washing liquid (*e.g.*, water or water mixed with washing/rinsing products) is introduced in the tub of the laundry machine by means of an inlet hydraulic system fluidly connected to the tub. Subsequently, a washing phase starts in which the laundry previously loaded into the rotatable drum is washed thanks to the chemical reactions exerted by the washing liquid, supported by the tumbling action caused by the rotation of the drum.

[0004] At the end of the washing phase, waste liquid (*i.e.,* the washing liquid mixed with dirt particles removed from the laundry and possibly fluff lost therefrom) is drained from the washing tub before starting a rinsing phase of the washed laundry typically followed by a spin-drying phase. Furthermore, also additional waste liquid expelled from the washed laundry during the spin-drying or rinsing phase is discharged at the end of the laundry machine operation in order to avoid waste liquid stagnation, correlated unpleasant smells and dirt deposits within the drum and/or the tub.

[0005] Therefore, the laundry machine is provided with a draining system adapted to drain waste liquid during the operation of the laundry machine. Particularly, such draining system is selectively fluidly connected to the tub of the laundry machine in order to receive the waste liquid.

[0006] The draining system usually comprises a discharge duct that, at one of its ends, is connected to a discharge hole at the bottom of the washing tub for discharging the waste liquid. At the other end, the discharge duct is connected to a pump assembly adapted to drain the waste liquid from the washing tub. Such a pump assembly usually comprises a filter (for blocking small objects and/or fluff) and a drain pump (that pumps liquid out from the washing tub). A valve member is usually provided in the discharge duct in order to fluidly separate during a washing procedure the draining system from the tub. Finally, a discharge hose connects a pump assembly outlet to a house draining pipe system for disposing the waste liquid.

[0007] In some appliances, the discharge duct comprises a flexible hose that is fastened to a drain collar surrounding the discharge hole of the tub by means of a hose clamp. The flexibility of the flexible hose poses reliability issues and makes discharge system assembling complex. Indeed, the flexible hose connection with rigid (*e.g.,* the tub) components releases by time because of mechanical stress affecting the laundry appliance during its operation, caused by drum rotation and by the drain pump suction.

[0008] In other laundry machines, instead of a flexible hose, the discharge duct comprises a discharge manifold made of hard material, such as a plastic polymer, connected to the tub at the drain collar. Discharge manifold rigidity provides the discharge system with improved mechanical stability against stresses occurring during machine operation, since it is connected (*e.g.*, the manifold may be screwed to the tub) in a more stable way to the tub than the flexible hose.

[0009] EP 0 736 626 A2 discloses an integral flow directing and filter unit formed from a unitary body integrally formed by moulding plastics material, having two axially aligned rotor housings of centrifugal pump impellers formed therein which are open at their outer axial ends, a suction chamber positioned between the housings and in communication with them, two delivery outlets in communication with the said housings, a filter housing in communication with the suction chamber and an inlet in communication with the filter housing. The structure is completed by a filter lodged in the filter housing and by two independent motor units with an associated impeller coupled with the unitary body, each closing the open axial end of the rotor housing in such a way that the flow is directed into one or other of the outlets by activating one or other of the two motors.

[0010] The Applicant has perceived that the known discharge manifolds do not allow a faster assembly phase of the draining system to the tub than the flexible hoses nor a simpler interconnection between components of the draining system (*i.e.,* manifold, filter, pump, discharge hose). Therefore, the Applicant has tackled the problem of devising a satisfactory solution able to provide a discharge manifold suited for fast assembly to the tub and at the same time improving the robustness of the draining system.

[0011] The Applicant has found that by providing a discharge manifold preferably made in a single piece construction and of a hard material designed in such a way to be adapted to house a filter element and to connect with a drain pump, forming with the latter a watertight chamber for operatively housing an impeller of the pump, provides a, at least partial, solution to the drawbacks mentioned above. Indeed, the discharge manifold, the filter element housed in the manifold and the drain pump connected to the same provide a drain arrangement that may be mounted as a whole in a simple and fast way to the laundry machine, since it substantially requires only two watertight connections (*i.e.,* with the washing tub and with the discharge hose). Thus, the draining arrangement allows achieving a draining system very robust and reli-

able in a cost-effective manner, thanks to the low number of connections required.

[0012] One aspect of the present invention proposes a laundry machine for treating laundry. The laundry machine comprises a tub. The tub comprises a discharge hole for draining liquid out of the tub, a discharge manifold adapted to be fluidly connected to the discharge hole for collecting liquid drained from the tub, a filter element adapted to at least partly block fluff and or foreign bodies reaching the discharge manifold from the tub, a drain pump adapted to drain liquid from the discharge manifold, the drain pump comprising an impeller member adapted to impel a liquid. In the solution according to an embodiment of the present invention, the discharge manifold houses the filter element and is connect with the drain pump by forming an impeller chamber operatively housing the impeller member of the drain pump.

[0013] Preferred features of the present invention are set in the dependent claims.

[0014] In an embodiment of the invention, the discharge manifold comprises a first hollow portion adapted to house the filter element, and a second hollow portion adapted to collect liquid from the tub, the first hollow portion being fluidly connected to the second hollow portion.

[0015] In another embodiment of the invention, the first hollow portion comprises a pump aperture adapted to connect the first hollow portion with the drain pump and to receive the impeller member inside the first hollow portion, and an exhaust port adapted to allow outflow of liquid from the discharge manifold.

[0016] In another embodiment of the invention, the filter element is adapted to be inserted into the first hollow portion through the pump aperture and fit said first hollow portion.

[0017] In another embodiment of the invention, the filter element comprises a first filter part adapted to block foreign bodies carried by liquid drained from the tub, and a second filter part adapted to fit the pump aperture of the discharge manifold, the first filter part being fluidly connected with the second filter part.

[0018] In another embodiment of the invention, the first filter part of the filter element comprises a blocking member adapted to prevent foreign bodies from reaching the second filter part of the filter element.

[0019] In another embodiment of the invention, the second filter part of the filter element comprises an impeller aperture adapted to match the pump aperture of the first hollow portion when the filter element is inserted in the first hollow portion and an exhaust slot adapted to match the exhaust port of the first hollow portion when the filter element is inserted in the first hollow portion.

[0020] In another embodiment of the invention, the drain pump further comprises an actuator adapted to impart rotation to the impeller member, and a wall interposed between said impeller member and said actuator, the impeller member being rotatably connected to the actuator through said wall in a watertight manner.

[0021] In another embodiment of the invention, the wall is adapted to seal the impeller aperture and the pump aperture of the first hollow portion in a watertight manner, the second filter part of the filter element and the wall defining the impeller chamber adapted to house the impeller member.

[0022] In another embodiment of the invention, the first hollow portion further comprises at least one receptacle member along a periphery of the pump aperture adapted to engage with fastening members.

[0023] In another embodiment of the invention, the wall of the drain pump comprises at least one matching element adapted to match the at least one receptacle member while allowing the latter being engaged with the corresponding fastening element.

[0024] In another embodiment of the invention, the wall of the drain pump further comprises a sealing gasket adapted to seal the filter aperture.

[0025] In another embodiment of the invention, the exhaust port of the first hollow portion is adapted to be connected to a drain duct fluidly coupled to a house draining pipe system for disposing the liquid.

[0026] In another embodiment of the invention, the second hollow portion comprises a tub aperture adapted to be fluidly connected to a discharge hole provided on the tub.

[0027] In another embodiment of the invention, the discharge manifold and the filter element are made of a hard polymer.

[0028] These and others features and advantages of the solution according to the present invention will be better understood by reading the following detailed description of some embodiments thereof, provided merely by way of exemplary and non-limitative examples, to be read in conjunction with the attached drawings, wherein:

Figure 1 is an isometric view of a laundry machine in which the present invention may be implemented;

Figure 2A is an isometric view of a tub of the laundry machine of **Figure 1** according to an embodiment of the present invention;

Figure 2B is an enlarged view of a lower part of the tub of **Figure 2A** according to an embodiment of the present invention;

Figure 3A and **3B** are two isometric views of a discharge manifold made of hard material according to an embodiment of the present invention;

Figures 4A shows the discharge manifold of **Figure 3A** and **3B** while being mounted to the tub of **Figure 2A**;

Figures 4B shows the discharge manifold of **Figure 3 A** and **3B** mounted to the tub of **Figure 2A**;

Figure 5 is an exploded view of the discharge manifold of **Figure 3 A** and **3B** comprising a filter and a pump according to an embodiment of the present invention;

Figures 6 is a close up of the filter of **Figure 5**;

Figure 7A is a partial cross-sectional and enlarged view of the discharge manifold of **Figure 5** associ-

ated with the tub of **Figure 2A**;

Figure 7B is a cross-sectional and enlarged view of the discharge manifold of **Figure 5** associated with the tub of **Figure 2A**;

[0029] With reference to the drawings, **Figure 1** is an isometric view of a laundry machine **100** in which the present invention may be implemented.

[0030] The laundry machine **100** is a machine for treating laundry (such has a laundry washing machine, a laundry washing/drying machine, *etc.*) of the front-loading type. Anyway, it should be apparent from the following description that laundry machines of the top-loading type may also benefit from the solution according to the present invention.

[0031] In the example at issue, the laundry machine **100** comprises a casing or cabinet **105** preferably substantially parallelepiped-shaped, that encloses a washing tub, or simply tub **200** preferably substantially cylindrically-shaped (which is visible in **Figures 2A** and **2B**), wherein the laundry is treated, along with any other component of the laundry machine **100** necessary for its operation (*e.g.*, hydraulic, electronic and electromechanical apparatuses known in the art and, therefore not herein described for sake of conciseness).

[0032] Particularly, the tub **200** houses a rotatable drum **110** preferably substantially cylindrical-shaped, which, in operation, rotates about an axis **A** in order to tumble the laundry to be washed.

[0033] In the example of **Figure 1**, in order to allow a user to access the tub **200** and the inside of the drum **110** (for loading/unloading the laundry), a loading/unloading opening **115** is advantageously provided on a front side of the laundry machine **100.** The loading/unloading opening **115** is closable by a door **120**, which is, preferably, hinged to the casing **105** by means of a hinge (not shown in the figure). The door **120** is adapted to pivot from a closed position - wherein the door **120** closes the loading/unloading opening **115**, impeding access to the drum **110** - to an open position - wherein the door **120** is pivoted to an angle, preferably, equal to, or greater than, 90° with respect to the closed position, allowing access to the drum **110.**

[0034] In addition, preferably, although not limitatively, on a top portion of the casing **105** a user interface **125** is provided. Preferably, although not limitatively, the user interface **125** may comprise a control panel **125a** for selecting laundry treatment parameters (*e.g.*, type of washing, drying cycle washing liquid temperature, rotation speed for the drum **110**, *etc.*) and a drawer **125b** for loading laundry-treating products (*e.g.,* detergents, softeners, bleachers, *etc.*).

[0035] Turning now to **Figures 2A** and **2B**, there is shown an isometric view of the tub **200** of the laundry machine **100** and an enlarged view of a lower part of the tub **200**, respectively, according to an embodiment of the present invention.

[0036] The tub **200** has preferably a substantially cylindrical shape and is made of waterproof material which is also able to withstand operating temperatures and chemicals reactions promoted by washing liquid during the laundry machine operation. For example, the tub **200** may be made of a suitable plastic polymer, such as calcium carbonate-filled polypropylene.

[0037] Advantageously, although not limitatively, the tub **200** comprises a front half-shell **205a** and a rear half-shell **205b**, each having substantially the shape of a hollow cylinder.

[0038] In the example at issue, the front half-shell **205a** comprises a foreside **210a**, which substantially has a discoid shape. Advantageously, the foreside **210a** is provided with a front opening **215**, which is adapted to be aligned with the loading/unloading opening **115** provided in the casing **105**, and with a corresponding opening of the drum **130** (once the tub **200** is positioned inside the casing **105**). Moreover, in order to achieve a watertight connection between the loading/unloading opening **115** and the front opening **215** (in order to avoid leakages of washing liquid into the casing **105**), a bellows **220**, preferably made of an elastomeric and waterproof material, is mounted in a watertight manner (such as by glueing, by welding, by interference fitting *etc*.) to both a border of the tub front opening **215** and a border of the loading/unloading opening **115.**

[0039] The front half-shell **205a** comprises a front cylindrical sidewall **225a**, which extends substantially transversal from an outer periphery of the foreside **210a.** Advantageously, the front sidewall **225a** ends with a front half-shell border or flange **230a**, which is adapted to match a corresponding, rear half-shell border or flange **230b** of the rear half-shell **205b.**

[0040] The rear half-shell **205b** comprises a backside or backwall **210b**, which also substantially has a discoid shape. Advantageously, the backside **210b** is provided with a shaft opening (not shown). Such shaft opening advantageously rotatably houses a rotor shaft (not shown) attached to the drum **110** and rotatably connected (directly or by means of transmission elements such as a transmission belt) to an electric motor (also not shown) comprised in the laundry machine **100** in order to rotate the drum **130** during operation.

[0041] The rear half-shell **205b** comprises a rear cylindrical sidewall **225b** that extends substantially transversal from an outer periphery of the backside **210b.** The rear sidewall **225b** ends with the rear half-shell border **230b**, which matches with the front half-shell border **230a** of the front half-shell **205b.**

[0042] The foreside **210a**, the backside **210b**, and the two cylindrical sidewalls **225a** and **225b** may advantageously be provided with ribs **232** adapted to increase structural strength to the half-shells **205a** and **205b.** The foreside **210a**, the backside **210b**, and the two sidewalls **225a** and **225b** are preferably provided with fastening elements **235** protruding externally therefrom. For example, the fastening elements **235** may comprise treaded slots for screws or bolts and/or anchoring protrusions typ-

ically adapted to connect the tub **200** with a number of coil springs and/or shock-absorbers (not shown in the figures) through which the tub **200** is suspended in floating manner inside the casing **105.**

[0043] A washing liquid inlet port **237** is advantageously provided in a top portion of the bellows **220** (alternatively a different inlet port may be provided in tub **200**) and is fluidly connected to an inlet hydraulic system (not shown in the figures) in order to supply washing liquid in the tub **200** during the laundry machine **100** operation.

[0044] In the example at issue, a discharge hole **240** is advantageously provided at the bottom of the tub **200**, for example in a lower portion of the front sidewall **225a**; the discharge hole **240** serves as outlet for waste liquid. Anyway, it should be noted that the discharge hole **240** could be provided in the rear half-shell **205b** as well, or even the discharge hole **240** could be split between the two half-shells **205a** and **205b** (thus being provided partly along each one of the borders **230a** and **230b**); in general, the discharge hole **240** may be provided where it results to be more useful (*i.e*., according to the position of other component parts inside the casing **105**).

[0045] According to the invention, the discharge hole **240** is surrounded by a cylindrical wall, forming a discharge hole collar or drain collar **245**, which protrudes, outwards from the tub **200** at a periphery of the discharge hole **240**, and has a free end that delimits a collar bottom aperture **245t** (*i.e.,* opposite to the discharge hole **240** in the front sidewall **225a**).

[0046] The drain collar **245** is provided with a plurality of drain-connection elements adapted to the connection to the tub **200** of a discharge duct such as the discharge manifold **300** (shown in **Figures 3A** - **7B**) in a variety of manners. The plurality of drain-connection elements comprises different connection elements adapted to connect together the drain collar **245** and the discharge manifold **300** for collecting the waste liquid; different types of connections may be supported, each of which may depend on a type of the discharge duct **300** used. For example, the drain collar **245** may be provided at once with any combination of sets of receptacles for screws and/or bolts, bayonet mounting elements, threaded portions, snap-fitting members, sacrificial portions (*e.g.,* for welding of the discharge manifold **300**), *etc.*

[0047] According to the invention, as best shown in **Figures 2A** and **2B**, drain-connection elements comprise a number of hollow appendages preferably internally threaded or self-threading, such as three hollow appendages **250a**, **250b** and **250c** that protrude from the tub **200** around the drain collar **245**, and a fourth hollow appendage **250d**, preferably internally threaded or self threading, that is provided in the proximity of the drain collar **245**, and is formed with an axis that is transversal, preferably orthogonal, with respect to the axis of the hollow appendages **250a**, **250b** and **250c.** As shown in the figures, the hollow appendages **250a**, **250b**, **250c** and **250d** have substantially the shape of a hollow cylinder, but other shapes, such as hollow prisms or a hollow frustoconical shapes, are not excluded.

[0048] At least one hollow appendage **250a**, **250b**, **250c** and **250d** is advantageously designed for engaging with a threaded fastening element. For example, at least one hollow appendage **250a**, **250b**, **250c** and **250d** may serve as female receptacle for screws or bolts; alternatively or in addition, at least one hollow appendage **250a**, **250b**, **250c** and **250d** may be provided with hooking elements (such as properly shaped slots) adapted to engage corresponding snap-fitting members (such as lugs) provided on the discharge manifold **300.** As an alternative, the hollow appendages **250a**, **250b**, **250c** and **250d** may be adapted to engage different fastening elements; for example, the hollow appendages **250a** and **250d** may be adapted to serve as female receptacle for screws while the hollow appendages **250b** and **250d** may be adapted to engage corresponding snap-fitting members.

[0049] Advantageously, although not limitatively, the three hollow appendages **250a**, **250b** and **250c** are spaced apart from the drain collar **245**, being connected thereto through a respective reinforcement and connection element, such a connection rib **255.** In this way, a collar band **245a** of the drain collar **245** ranging from its free end (*i.e.,* in correspondence of the collar bottom aperture **245t**) to the connection ribs **255** remains advantageously clear and easily reachable; thus, such collar band **245a** may be used as(for) further drain-connection element for achieving a coupling between the drain collar **245** and the discharge manifold **300** (as will be discussed in detail later on). Alternatively, one or more (up to all) of the hollow appendages **250a**, **250b** and **250c** may be formed adjacent (*i.e.,* in contact with) the drain collar **245** (and possibly formed integral therewith) or completely separated therefrom.

[0050] Advantageously, although not limitatively, one or more hollow appendage **250a**, **250b**, **250c** and **250d** may be provided formed in the half-shell **205b** or **205a** opposite to the half-shell **205a** or **205b** in which the drain collar **245** is provided. In the example at issue, the fourth hollow appendage **250d** may be provided on the rear half-shell **205b** at the rear border **230b** thereof in a position proximal to the drain collar **245** once the two half-shells **205a** and **205b** are associated together. In the case the drain collar **245** is formed partly in the front half-shell **205a** and partly in the rear half-shell **205b**, hollow appendages **250a**, **250b**, **250c** and **250d** may be formed in both the half-shells **205a** and **205b.**

[0051] During a manufacturing phase of the laundry machine **100**, the two half-shells **205a** and **205b** are joined together, with the drum **130** enclosed therein, by matching and coupling the corresponding borders **230a** and **230b** in any suitable manner (*e.g.*, by welding); in this way, the tub **200** rotatably houses the drum **130.**

[0052] Considering now **Figure 3A** and **3B**, they are exploded views of a drain discharge duct or discharge manifold **300** made of hard material according to an embodiment of the present invention.

[0053] The discharge manifold **300** is made of hard

material such as a suitable plastic polymer (*e.g.*, again calcium carbonate-filled polypropylene) and comprises a first hollow portion **305a** preferably formed with a substantially cylindrical shape, and a second hollow portion **305b** preferably having a substantially frustoconical shape (although further portions or alternative portions featuring other shapes are not excluded). The second hollow portion **305b** is fluidly connected, through its smallest base, substantially transversal to the first hollow portion **305a** at an end thereof. Both the first hollow portion **305a** and the second hollow portion **305b** may be formed in a single piece (*e.g.,* may be produced in a single mould) or the discharge manifold **300** may be formed by an interconnection of separated first hollow portion **305a** and second hollow portion **305b.**

[0054] At an opposite free end of the first hollow portion **305a** a preferably circular pump-side aperture **310** is provided, which is adapted to engage a pump assembly (described in the following) for draining waste liquid from the discharge manifold **300** and, possibly, the tub **200** of the laundry machine **100.** One or more receptacle members **312** are advantageously provided along the border of pump-side aperture **310** in order to allow the connection (as will be discussed in the following) with a drain pump **505** (shown in **Figure 5**). The receptacle members **312** may also be preferably internally threaded or self-threading for engaging with threaded fastening elements. In addition, substantially at the pump-side aperture **310**, an exhaust port **314** is provided, preferably, protruding laterally on the discharge manifold **300** (*i.e.,* the exhaust port **314** is substantially transversal with respect to the pump-side aperture **310**).

[0055] At a free end of the second hollow portion **305b**, a preferably circular tub-side aperture **315** is provided. Advantageously, the tub-side aperture **315** may be associated to a valve member **320** that may be provided for separating the cool waste liquid collected in the discharge manifold **300** from the warm washing liquid contained in the tub **200** during the laundry machine **100** operation. For example, the tub-side aperture **315** may comprise a tub-side wall **315a** and a holding rib **315b**, which may be adapted to encompass and hold, respectively, valve member **320.**

[0056] The valve member **320** may comprise a substantially ring-shaped sealing gasket **325** and a buoyant element such as a cap or other closing element **330.**

[0057] Preferably, the cap or other closing element is hinged to the gasket **325.**

[0058] Advantageously, although not limitatively, such sealing gasket **325** is made of a resilient material; advantageously the sealing gasket **325** is designed to fit, in a watertight manner, the space defined by the tub-side wall **315a** and the tub-side holding rib **315b** (to which the sealing gasket **325** may possibly be glued or attached in any other suitable way). The sealing gasket **325** preferably comprises a tab or appendage or wing **325a** protruding downwards (*i.e.,* towards the inside of the second hollow portion **305b** when the valve member **320** is mounted in the discharge manifold **300**) from a lower portion of the sealing gasket **325.** The sealing gasket **325** advantageously comprises a substantially circular gasket aperture **325b** adapted to be watertight closed by the cap or other closing element **330.**

[0059] In the example at issue, the cap **330** is preferably, although not limitatively, made of hard material (such as a plastic polymer). The cap **330** is preferably substantially cylindrically shaped with a substantially hemispherical top **330a**, which is encircled by a flat abutment border **330b.** The abutment border **330b** is adapted to abut a lower rim of the gasket aperture **325b** achieving the watertight closure of the tub-side aperture **315.**

[0060] The cap **330** preferably comprises an eyelet **330c** protruding laterally from the cap **330**, for example at mid-height of a side of the cap **330.** The tab **325a** of the sealing gasket **325** is adapted to be inserted into the eyelet **330c**, thus allowing the cap **330** to pivot about the tab **325a**, during operation, from a closed position, in which the abutment border **330b** abuts the gasket aperture **325b**, to an open position, in which the cap **330** is substantially transversal to the gasket aperture **325b.**

[0061] Anyway, it should be noted that embodiments according to the present invention might be implemented in laundry machines exploiting types of valve member other than the one herein described or, ultimately, implementing a discharge duct **300** lacking of such valve member.

[0062] According to the invention, the discharge manifold **300** further comprises a plurality of matching portions or wings formed along the tub-side wall **315a** and protruding therefrom, each advantageously having a trough-hole; in the example at issue, three matching portions or wings **335a**, **335b** and **335c** are provided. In addition, along the periphery of the pump-side aperture **310** a further matching portion or wing **335d** is provided. It should be noted that, since the pump-side aperture **310** is transversal to the tub-side aperture **315**, the wing **335d** has an axis that is transversal, preferably orthogonal, with respect to the ones of the wings **335a**, **335b** and **335c.**

[0063] In alternative embodiments the matching portion may be formed on a border of the tub-side aperture, instead protruding from its wall.

[0064] Turning jointly to **Figures 4A** and **4B**, which show the discharge manifold **300** while being mounted to the tub **200** and the discharge manifold **300** mounted to the tub **200**, respectively, the mounting of the discharge manifold **300** to the tub **200** is now described.

[0065] In the example at issue, the drain collar **245** is inserted into the tub-side aperture **315**, since the former has a diameter smaller than the diameter of the latter (although other embodiments in which the drain collar **245** has a diameter larger than, or substantially equal to, the tub-side aperture **315** are not excluded). Advantageously, the drain collar **245** is inserted into the tub-side aperture **315** until the free end of the drain collar **245** abuts an upper portion of the sealing gasket **325.**

[0066] According to the invention, each matching por-

tion or wing **335a**, **335b**, **335c** and **335d** of the discharge manifold **300** is designed to match a corresponding drain-connection element provided on the tub **200**, such as the corresponding hollow appendage **250a**, **250b**, **250c** and **250d**, as the drain collar **245** is inserted into the tub-side aperture **315.** Alternatively, the wings **335a**, **335b**, **335c** and **335d** on the discharge manifold **300** may be in a different number with respect to the hollow appendages **250a**, **250b**, **250c** and **250d** provided on the tub **200** - in order to be adapted to the connection with other tubs (not shown) having a different number or disposition of hollow appendages -, in which case only part of the wings **335a**, **335b**, **335c** and **335d** matches corresponding hollow appendages **250a**, **250b**, **250c** and **250d.**

[0067] According to the invention, suitable fastening elements, such as screws **405**, are inserted, each one into the through hole of the corresponding wings **335a**, **335b**, **335c** and **335d** and engaged with the corresponding hollow appendage **250a**, **250b**, **250c** and **250d**, once the discharge manifold **300** is coupled to the drain collar **245.** In some embodiments according to the present invention, only a part of the hollow appendages **250a**, **250b**, **250c** and **250d** may be engaged with screws **405** while the remaining part of the hollow appendages **250a**, **250b**, **250c** and **250d** may be left unengaged. For example, the tub **200** may be connected to a tub (not shown) having a lower number of matching portions than the hollow appendages **250a**, **250b**, **250c** and **250d** provided on the tub **200.**

[0068] The matching pair of wing **335d** - hollow appendage **260d**, which is transversal, preferably orthogonal, with respect to the other pairs of wings **335a**, **335b** and **335c** - hollow appendages **250a**, **250b** and **250c** ensures a greater robustness in the coupling between the discharge manifold **300** and the drain collar **245** than having all the pairs parallel one to another, since the fastening elements provided (e.g., the screws **405**) act in two distinct fastening directions.

[0069] Once the screws **405** have been fastened, the discharge manifold **300** results firmly connected to the drain collar **245** and thus to the whole tub **200.** Thanks to the tightening strength provided by the fastened screws **405**, the free end of the drain collar **245** advantageously abuts an upper portion of the sealing gasket **325** in a watertight manner, thus ensuring a leakage-less fluid communication between the discharge manifold **300** and the tub **200.** Preferably, the pump-side aperture **310** may be fluidly connected to a pump assembly (not shown in the figures) an outlet of which is fluidly connected to a discharge hose for disposing the waste liquid in a house draining pipe system.

[0070] The laundry machine **100** may advantageously comprise a recirculation system (not shown in the figures) adapted to reuse part of drained waste liquid, during the laundry machine **100** operation in order to reduce liquid consumption (particularly, water consumption). In this case, a recirculation duct may be selectively connected to the filter-pump assembly outlet (for example, in parallel with the draining hose) for receiving part of the waste liquid to be fed to the recirculation system.

[0071] Turning now jointly to **Figures 5** and **6**, they show the discharge manifold **300** and a pump assembly **500** according to the present invention comprising the drain pump **505** and a filter **510** of such pump assembly **500**, respectively.

[0072] Advantageously, according to an embodiment of the present invention the filter **510** is adapted to be housed within the first hollow portion **305a** of the discharge manifold **300.**

[0073] The filter **510** is adapted to prevent fluff and/or small foreign bodies incoming from the tub **200** (not shown, for example buttons detached from laundry being washed, small coins *etc*.) reaching the drain pump **505** positioned downstream (which may experience malfunctions due to such fluff and/or foreign bodies) and/or remaining inside the draining system (which may lead to a clogging of the draining system). The filter **510** comprises a (first) filter front part **510a** and (second) rear filter part **510b.**

[0074] The filter front part **510a** actively blocks said fluff and/or foreign bodies while allowing the passage of waste liquid. The filter front part **510a** is advantageously shaped in such a way to be inserted according to a predetermined position inside the first hollow portion **305a.** In the example at issue (as best shown in **Figure 6**), the filter front part **510a** comprises a head portion **515** having a shape preferably adapted to reach and fit the end of the first hollow portion **305a** that is fluidly connected to the second hollow portion **305b.** The head portion **515** is interconnected to the rear filter part **510b** by means of two side arms **520.** Between the two side arms **520**, substantially transversal to the same, a blocking member such as a baffle **525** is provided. The baffle **525** may be substantially a plate positioned transversal to the flow of liquid, during operation; thus, any foreign body drained from the tub **200** will impact the baffle **525** and become trapped between the head portion **515** and the baffle **525** (without any harm for the drain pump **505** positioned downstream).

[0075] The rear filter part **510b** is fluidly connected with the filter front part **510a** and preferably, although not necessarily, formed integral with the same. Such rear filter part **510b** is preferably substantially a hollow half-cylinder having a wall **530** provided with a passage **530a** allowing fluid communication between the front filter part **510a** and the rear filter part **510b.** It should be noted that advantageously the passage **530b** may be provided with a net or a membrane (not shown in the drawings) adapted to prevent fluff or lint from passing into the rear filter part **510b.** Opposite to the wall **530**, the rear filter part **510b** comprises an impeller aperture **535**, while substantially transversal to both the wall **530** and the impeller aperture **535**, an exhaust slot **540** is provided in such a way to match with the exhaust port **314** once the filter **510** is inserted into the first hollow portion **305a** of the discharge manifold **300** (as can be seen in **Figure 7A**). Advanta-

geously, a filter gasket **545** may be provided at the intersection between the front filter part **510a** and the rear filter part **510b** thus preventing liquid from leaking into the rear filter part **510b** through a periphery of the wall **530.**

[0076] The drain pump **505** preferably comprises an impeller **550** rotatably connected to an actuator **555** (*e.g.,* an electric motor), the latter being adapted to rotate the former. Between the impeller **550** and the actuator **555,** a closure wall **560** is interposed. On such closure wall **560** may be preferably, although not limitatively, provided a circular pump-sealing gasket **565.** The closure wall **560** comprises one or more through-holes **570** each of which adapted to be aligned with a corresponding of the one or more receptacle members **312** provided on the discharge manifold **300.**

[0077] Turning jointly to **Figure 7A** and **7B**, they are a partial cross-sectional and across-sectional enlarged views of the discharge manifold of **Figure 5** associated with the tub of **Figure 2A.**

[0078] According to embodiments of the present invention, during a manufacturing phase, the discharge manifold **300**, the filter **510**, and the pump assembly **500** are connected together in a single arrangement and then are simply mounted to the tub **200**, optionally with the valve member **320** and sealing gasket **325** placed between the manifold **300** and the tub **200.**

[0079] The filter **510** is inserted in the first hollow portion **305a** with the filter front part **510a** that substantially tightly fits the same, while the filter rear part **510b** tightly fits the tub-side aperture **515**, while the exhaust slot **540** results aligned with the exhaust port **314** (thanks to the filter **510** shape as above described).

[0080] Subsequently, the closure wall **560** is coupled with the pump-side aperture **510** and then fastened thereto. In the example at issues, each through hole **570** on the closure wall **560** matches a corresponding receptacle member **312**, and the drain pump **505** is fastened to the first hollow portion **305a** by means of pump fastening elements, such as pump screws **705**, each of which is inserted into the respective through hole **570** and screwed to the corresponding receptacle member **312.**

[0081] Therefore, the closure wall **560** of the drain pump **505** closes the pump-side aperture **310** of the discharge manifold **300.** The closure wall **560** and the filter rear part **510b** result connected, and thanks to the pump-sealing gasket **565** the impeller aperture **535** of the filter **510** define with the closure wall **560** a watertight impeller chamber **710** housing the impeller **550** of the drain pump **505.**

[0082] Finally, a drain hose (not shown in the figures) is connected to the exhaust port **314** (in any known manner) for the connection with the rest of the draining system.

[0083] In operation, waste liquid drained from the tub **200** is collected in the second hollow portion **305b** of the discharge manifold **300**, passes into the first hollow portion **305a** where it is filtered by the filter **510** and passed in the impeller chamber **710.** Hence, the waste liquid is propelled by the rotation of the impeller **550** into the exhaust port **314** and therefrom into the drain hose for being discharged or recirculated.

[0084] Thanks to the solution according to an embodiment of the present invention, the mounting of the draining system results easier since the arrangement comprising the discharge manifold **300** and the pump assembly **500** (comprising the filter **510**) is compact thus reduce the number of connection to be performed, thus improving the manufacturing yield while lowering the manufacturing costs. Nonetheless, the arrangement comprising the discharge manifold **300** and the pump assembly **500** provide for a more robust and wear resistant draining system.

Claims

1. A laundry machine (**100**) for treating laundry comprising a tub (**200**), said tub comprising:

a discharge hole (**240**) for draining liquid out of the tub (**200**),
a discharge manifold (**300**) adapted to be fluidly connected to the discharge hole (**240**) for collecting liquid drained from the tub (**200**),
a filter element (**510**) adapted to at least partly block fluff and or foreign bodies reaching the discharge manifold (**300**) from the tub (**200**),
a drain pump (**505**) adapted to drain liquid from the discharge manifold (**300**), the drain pump (**505**) comprising an impeller member (**550**) adapted to impel a liquid,
wherein the discharge manifold (**300**) houses the filter element (**540**) and is connect with the drain pump (**505**) by forming an impeller chamber (**710**) operatively housing the impeller member (**550**) of the drain pump (**505**),
characterized in that the discharge hole (240) is surrounded by a cylindrical wall forming a discharge hole collar (245), which protrudes outwards from the tub (200) at a periphery of the discharge hole (245) and is provided with hollow appendages (250a, 250b, 250c, 250d) that protrude from the tub (200) around the drain collar (245) and are adapted to the connection of the discharge manifold (300) to the tub (200), the discharge manifold (**300**) comprises a plurality of matching portions (335a, 335b, 335c, 335d), at least part of which is designed to match the hollow appendages (250a, 250b, 250c, 250d), and fastening elements (405) are inserted into through holes of corresponding matching portions (335a,335b,335c,335d) and are engaged with the corresponding hollow appendages (250a,250b,250c,250d), once the discharge manifold (300) is coupled to the drain collar

(245).

2. The laundry machine (**100**) according to claim 1, wherein the discharge manifold comprises a first hollow portion (**305a**) adapted to house the filter element (**510**), and a second hollow portion (**305b**) adapted to collect liquid from the tub (**200**), the first hollow portion (**305a**) being fluidly connected to the second hollow portion (**305b**).

3. The laundry machine (**100**) according to claim 2, wherein the first hollow portion **(305a)** comprises:

a pump aperture (**310**) adapted to connect the first hollow portion **(305a)** with the drain pump (**505**) and to receive the impeller member (**550**) inside the first hollow portion (**305a**),
an exhaust port (**314**, **310**) adapted to allow outflow of liquid from the discharge manifold (**300**).

4. The laundry machine (**100**) according to claim 2 or 3, wherein the filter element (**510**) is adapted to be inserted into the first hollow portion (**305a**) through the pump aperture (**310**) and fit said first hollow portion (**305a**).

5. The laundry machine (**100**) according to claim 4, wherein the filter element (**510**) comprises a first filter part (**510a**) adapted to block foreign bodies carried by liquid drained from the tub (**200**), and a second filter part (**510b**) adapted to fit the pump aperture (**310**) of the discharge manifold (**300**), the first filter part (**510a**) being fluidly connected with the second filter part (**510b**).

6. The laundry machine (**100**) according to claim 5, wherein the first filter part (**510a**) of the filter element (**510**) comprises a blocking member (**525**) adapted to prevent foreign bodies from reaching the second filter part (**510b**) of the filter element (**510**).

7. The laundry machine (**100**) according to claim 5 or 6, wherein the second filter part (**510b**) of the filter element (**510**) comprises an impeller aperture (**535**) adapted to match the pump aperture (**310**) of the first hollow portion (**305a**) when the filter element (**510**) is inserted in the first hollow portion (**305a**) and an exhaust slot (**540**) adapted to match the exhaust port (**314**) of the first hollow portion (**305a**) when the filter element (**510**) is inserted in the first hollow portion (**305a**).

8. The laundry machine (**100**) according to any one of the preceding claims 1 to 7, wherein the drain pump (**505**) further comprises an actuator (**555**) adapted to impart rotation to the impeller member (**550**), and a wall (**560**) interposed between said impeller member (**550**) and said actuator (**555**), the impeller member (**550**) being rotatably connected to the actuator (**555**) through said wall (**560**) in a watertight manner.

9. The laundry machine (**100**) according to claim 8, wherein the wall (**560**) is adapted to seal the impeller aperture (**535**) and the pump aperture (**310**) of the first hollow portion (**305a**) in a watertight manner, the second filter part (**510a**) of the filter element (**510**) and the wall (**560**) defining the impeller chamber (**710**) adapted to house the impeller member (**550**).

10. The laundry machine (**100**) according to any one of the preceding claims 2 to 9, wherein the first hollow portion (**305a**) further comprises at least one receptacle member (**312**) along a periphery of the pump aperture (**310**) adapted to engage with fastening members (**705**).

11. The laundry machine (**100**) according to claim 10, wherein the wall (**560**) of the drain pump (**505**) comprises at least one matching element (**570**) adapted to match the at least one receptacle member (**312**) while allowing the latter being engaged with the corresponding fastening element (**705**).

12. The laundry machine (**100**) according to any one of the preceding claims 8 to 11, wherein the wall (**560**) of the drain pump (**505**) further comprises a sealing gasket (**565**) adapted to seal the filter aperture (**535**).

13. The laundry machine (**100**) according to any one of the preceding claims 3 to 12, wherein the exhaust port (**314**) of the first hollow portion (**305a**) is adapted to be connected to a drain duct fluidly coupled to a house draining pipe system for disposing the liquid.

14. The laundry machine (**100**) according to any one of the preceding claims 2 to 13, wherein the second hollow portion (**305b**) comprises a tub aperture (**315**) adapted to be fluidly connected to a discharge hole (**240**) provided on the tub (**200**).

15. The laundry machine (**100**) according to any one of the preceding claims 1 to 14, wherein the discharge manifold (**300**) and the filter element (**510**) are made of a hard polymer.

Patentansprüche

1. Waschmaschine (100) zum Behandeln von Wäsche, umfassend eine Wanne (200), wobei die Wanne Folgendes umfasst:

eine Ablassöffnung (240) zum Ablassen von Flüssigkeit aus der Wanne (200),
einen Ablassverteiler (300), dazu angepasst, fluidisch mit der Ablassöffnung (240) verbunden

zu werden, zum Sammeln von Flüssigkeit, die aus der Wanne (200) abgelassen wird,
ein Filterelement (510), dazu angepasst, zumindest teilweise Flusen oder Fremdkörper zu blockieren, die den Ablassverteiler (300) von der Wanne (200) aus erreichen, eine Ablasspumpe (505), dazu angepasst, Flüssigkeit aus dem Ablassverteiler (300) abzulassen, wobei die Ablasspumpe (505) ein Flügelradelement (550) umfasst, dazu angepasst, eine Flüssigkeit voranzutreiben,
wobei der Ablassverteiler (300) das Filterelement (540) beherbergt und mit der Ablasspumpe (505) verbunden ist, indem er eine Flügelradkammer (710) bildet, die operativ das Flügelradelement (550) der Ablasspumpe (505) beherbergt,
dadurch gekennzeichnet, dass
die Ablassöffnung (240) von einer zylindrischen Wand umgeben ist, die einen Ablassöffnungskragen (245) bildet, der aus der Wanne (200) an einem Umfang der Ablassöffnung (245) nach außen ragt und mit hohlen Fortsätzen (250a, 250b, 250c, 250d) versehen ist, die aus der Wanne (200) rund um den Ablasskragen (245) herausragen und an die Verbindung des Ablassverteilers (300) mit der Wanne (200) angepasst sind,
der Ablassverteiler (300) mehrere passende Teile (335a, 335b, 335c, 335d) umfasst, von denen zumindest ein Teil dazu ausgestaltet ist, mit den hohlen Fortsätzen (250a, 250b, 250c, 250d) zusammenzupassen, und
Befestigungselemente (405) durch die Löcher der entsprechenden zusammenpassenden Teile (335a, 335b, 335c, 335d) eingesetzt und mit den entsprechenden hohlen Fortsätzen (250a, 250b, 250c, 250d) in Eingriff gebracht werden, sobald der Ablassverteiler (300) mit dem Ablasskragen (245) gekoppelt ist.

2. Waschmaschine (100) nach Anspruch 1, wobei der Ablassverteiler einen ersten hohlen Teil (305a), dazu angepasst, das Filterelement (510) zu beherbergen, und einen zweiten hohlen Teil (305b), dazu angepasst, Flüssigkeit aus der Wanne (200) zu sammeln, umfasst, wobei der erste hohle Teil (305a) fluidisch mit dem zweiten hohlen Teil (305b) verbunden ist.

3. Waschmaschine (100) nach Anspruch 2, wobei der erste hohle Teil (305a) Folgendes umfasst:

eine Pumpenöffnung (310), dazu angepasst, den ersten hohlen Teil (305a) mit der Ablasspumpe (505) zu verbinden und das Flügelradelement (550) innerhalb des ersten hohlen Teils (305a) aufzunehmen,

eine Auslassöffnung (314, 310), dazu angepasst, Ausströmen der Flüssigkeit aus dem Ablassverteiler (300) zu ermöglichen.

4. Waschmaschine (100) nach Anspruch 2 oder 3, wobei das Filterelement (510) dazu angepasst ist, durch die Pumpenöffnung (310) in den ersten hohlen Teil (305a) eingesetzt zu werden und in den ersten hohlen Teil (305a) zu passen.

5. Waschmaschine (100) nach Anspruch 4, wobei das Filterelement (510) einen ersten Filterteil (510a), dazu angepasst, Fremdkörper zu blockieren, die durch aus der Wanne (200) abgelassene Flüssigkeit mitgetragen werden, und einen zweiten Filterteil (510b), dazu angepasst, in die Pumpenöffnung (310) des Ablassverteilers (300) zu passen, umfasst, wobei der erste Filterteil (510a) fluidisch mit dem zweiten Filterteil (510b) verbunden ist.

6. Waschmaschine (100) nach Anspruch 5, wobei der erste Filterteil (510a) des Filterelements (510) ein Blockierelement (525) umfasst, dazu ausgelegt zu verhindern, dass Fremdkörper den zweiten Filterteil (510b) des Filterelements (510) erreichen.

7. Waschmaschine (100) nach Anspruch 5 oder 6, wobei der zweite Filterteil (510b) des Filterelements (510) eine Flügelradöffnung (535) umfasst, dazu angepasst, mit der Pumpenöffnung (310) des ersten hohlen Teils (305a) zusammenzupassen, wenn das Filterelement (510) in den ersten hohlen Teil (305a) eingesetzt wird, und einen Auslassschlitz (540), dazu angepasst, mit der Auslassöffnung (314) des ersten hohlen Teils (305a) zusammenzupassen, wenn das Filterelement (510) in den ersten hohlen Teil (305a) eingesetzt wird.

8. Waschmaschine (100) nach einem der vorhergehenden Ansprüche 1 bis 7, wobei die Ablasspumpe (505) ferner einen Aktuator (555), dazu angepasst, dem Flügelradelement (550) eine Drehung aufzuerlegen, und eine Wand (560) zwischen dem Flügelradelement (550) und dem Aktuator (555) umfasst, wobei das Flügelradelement (550) durch die Wand (560) in einer wasserdichten Weise drehbar mit dem Aktuator (555) verbunden ist.

9. Waschmaschine (100) nach Anspruch 8, wobei die Wand (560) dazu angepasst ist, die Flügelradöffnung (535) und die Pumpenöffnung (310) des ersten hohlen Teils (305a) in einer wasserdichten Weise abzudichten, wobei der zweite Filterteil (510a) des Filterelements (510) und die Wand (560) die Flügelradkammer (710) definieren, die dazu angepasst ist, das Flügelradelement (550) zu beherbergen.

10. Waschmaschine (100) nach einem der vorherge-

henden Ansprüche 2 bis 9, wobei der erste hohle Teil (305a) ferner zumindest ein Aufnahmeelement (312) entlang eines Umfangs der Pumpenöffnung (310) umfasst, dazu angepasst, in die Befestigungselemente (705) einzugreifen.

11. Waschmaschine (100) nach Anspruch 10, wobei die Wand (560) der Ablasspumpe (505) zumindest ein passendes Element (570) umfasst, dazu angepasst, mit dem zumindest einen Aufnahmeelement (312) zusammenzupassen, dabei ermöglichend, dass letzteres mit dem entsprechenden Befestigungselement (705) in Eingriff gebracht wird.

12. Waschmaschine (100) nach einem der vorhergehenden Ansprüche 8 bis 11, wobei die Wand (560) der Ablasspumpe (505) ferner eine Abdichtung (565) umfasst, die dazu angepasst ist, die Filteröffnung (535) abzudichten.

13. Waschmaschine (100) nach einem der vorhergehenden Ansprüche 3 bis 12, wobei die Auslassöffnung (314) des ersten hohlen Teils (305a) dazu angepasst ist, mit einer Ablassleitung verbunden zu werden, die fluidisch mit einem Gehäuseablassleitungssystem zum Entsorgen der Flüssigkeit gekoppelt ist.

14. Waschmaschine (100) nach einem der vorhergehenden Ansprüche 2 bis 13, wobei der zweite hohle Teil (305b) eine Wannenöffnung (315) umfasst, die dazu angepasst ist, fluidisch mit einer Ablassöffnung (240) verbunden zu werden, die an der Wanne (200) bereitgestellt ist.

15. Waschmaschine (100) nach einem der vorhergehenden Ansprüche 1 bis 14, wobei der Ablassverteiler (300) und das Filterelement (510) aus einem harten Polymer gefertigt sind.

Revendications

1. Machine à laver le linge (100) pour traiter le linge comprenant une cuve (200), ladite cuve comprenant :

un trou d'évacuation (240) pour vidanger le liquide hors de la cuve (200),
un collecteur d'évacuation (300) conçu pour être en communication fluidique avec le trou d'évacuation (240) pour collecter le liquide vidangé de la cuve (200),
un élément filtre (510) conçu pour bloquer au moins partiellement les peluches et/ou les corps étrangers atteignant le collecteur d'évacuation (300) en provenance de la cuve (200),
une pompe de vidange (505) conçue pour vidanger le liquide en provenance du collecteur d'évacuation (300), la pompe de vidange (505) comprenant un élément roue (550) conçu pour faire circuler un liquide,
le collecteur d'évacuation (300) logeant l'élément filtre (540) et étant raccordé à la pompe de vidange (505) en formant une chambre à roue (710) logeant fonctionnellement l'élément roue (550) de la pompe de vidange (505),
caractérisé en ce que
le trou d'évacuation (240) est entouré par une paroi cylindrique formant une collerette de trou d'évacuation (245) qui fait saillie vers l'extérieur de la cuve (200) au niveau d'une périphérie du trou d'évacuation (245) et est munie d'appendices creux (250a, 250b, 250c, 250d) qui font saillie de la cuve (200) autour de la collerette de vidange (245) et sont conçus pour le raccordement du collecteur d'évacuation (300) à la cuve (200),
le collecteur d'évacuation (300) comprenant une pluralité de parties de mise en correspondance (335a, 335b, 335c, 335d), dont au moins une partie est conçue pour correspondre aux appendices creux (250a, 250b, 250c, 250d), et
des éléments de fixation (405) sont insérés dans les trous traversants de parties de mise en correspondance (335a, 335b, 335c, 335d) correspondantes et sont en prise avec les appendices creux (250a, 250b, 250c, 250d) correspondants, lorsque le collecteur d'évacuation (300) est accouplé à la collerette de vidange (245).

2. Machine à laver le linge (100) selon la revendication 1, le collecteur d'évacuation comprenant une première partie creuse (305a) conçue pour loger l'élément filtre (510), et une seconde partie creuse (305b) conçue pour collecter le liquide provenant de la cuve (200), la première partie creuse (305a) étant en communication fluidique avec la seconde partie creuse (305b).

3. Machine à laver le linge (100) selon la revendication 2, la première partie creuse (305a) comprenant :

une ouverture de pompe (310) conçue pour relier la première partie creuse (305a) à la pompe de vidange (505) et pour recevoir l'élément roue (550) dans la première partie creuse (305a),
un orifice de sortie (314, 310) conçu pour permettre l'écoulement sortant de liquide à partir du collecteur d'évacuation (300).

4. Machine à laver le linge (100) selon la revendication 2 ou 3, l'élément filtre (510) étant conçu pour être inséré dans la première partie creuse (305a) à travers l'ouverture de pompe (310) et s'adapter à ladite première partie creuse (305a).

5. Machine à laver le linge (100) selon la revendication 4, l'élément filtre (510) comprenant une première partie de filtre (510a) conçue pour bloquer les corps étrangers transportés par le liquide vidangé provenant de la cuve (200), et une seconde partie de filtre (510b) conçue pour s'adapter à l'ouverture de pompe (310) du collecteur d'évacuation (300), la première partie de filtre (510a) étant en communication fluidique avec la seconde partie de filtre (510b).

6. Machine à laver le linge (100) selon la revendication 5, la première partie de filtre (510a) de l'élément filtre (510) comprenant un élément de blocage (525) conçu pour empêcher des corps étrangers d'atteindre la seconde partie de filtre (510b) de l'élément filtre (510).

7. Machine à laver le linge (100) selon la revendication 5 ou 6, la seconde partie de filtre (510b) de l'élément filtre (510) comprenant une ouverture de roue (535) conçue pour correspondre à l'ouverture de pompe (310) de la première partie creuse (305a) lorsque l'élément filtre (510) est inséré dans la première partie creuse (305a) et une fente de sortie (540) conçue pour correspondre à l'orifice de sortie (314) de la première partie creuse (305a) lorsque l'élément filtre (510) est inséré dans la première partie creuse (305a).

8. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 1 à 7, la pompe de vidange (505) comprenant en outre un actionneur (555) conçu pour impartir une rotation à l'élément roue (550), et une paroi (560) interposée entre ledit élément roue (550) et ledit actionneur (555), l'élément roue (550) étant relié de façon rotative à l'actionneur (555) à travers ladite paroi (560) d'une manière étanche à l'eau.

9. Machine à laver le linge (100) selon la revendication 8, la paroi (560) étant conçue pour rendre étanche à l'eau l'ouverture de roue (535) et l'ouverture de pompe (310) de la première partie creuse (305a), la seconde partie de filtre (510a) de l'élément filtre (510) et la paroi (560) définissant la chambre à roue (710) conçue pour recevoir l'élément roue (550).

10. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 2 à 9, la première partie creuse (305a) comprenant en outre au moins un élément réceptacle (312) le long d'une périphérie de l'ouverture de pompe (310) conçu pour venir en prise avec des éléments de fixation (705).

11. Machine à laver le linge (100) selon la revendication 10, la paroi (560) de la pompe de vidange (505) comprenant au moins un élément de mise en correspondance (570) conçu pour s'adapter à l'au moins un élément réceptacle (312) tout en permettant à ce dernier de venir en prise avec l'élément de fixation (705) correspondant.

12. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 8 à 11, la paroi (560) de la pompe de vidange (505) comprenant en outre un joint d'étanchéité (565) conçu pour rendre étanche l'ouverture de filtre (535).

13. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 3 à 12, l'orifice de sortie (314) de la première partie creuse (305a) étant conçu pour être raccordé à un conduit de vidange en communication fluidique avec un système de tuyaux de vidange domestique pour évacuer le liquide.

14. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 2 à 13, la seconde partie creuse (305b) comprenant une ouverture de cuve (315) conçue pour être en communication fluidique avec un trou d'évacuation (240) situé sur la cuve (200).

15. Machine à laver le linge (100) selon l'une quelconque des revendications précédentes 1 à 14, le collecteur d'évacuation (300) et l'élément filtre (510) étant en un polymère dur.

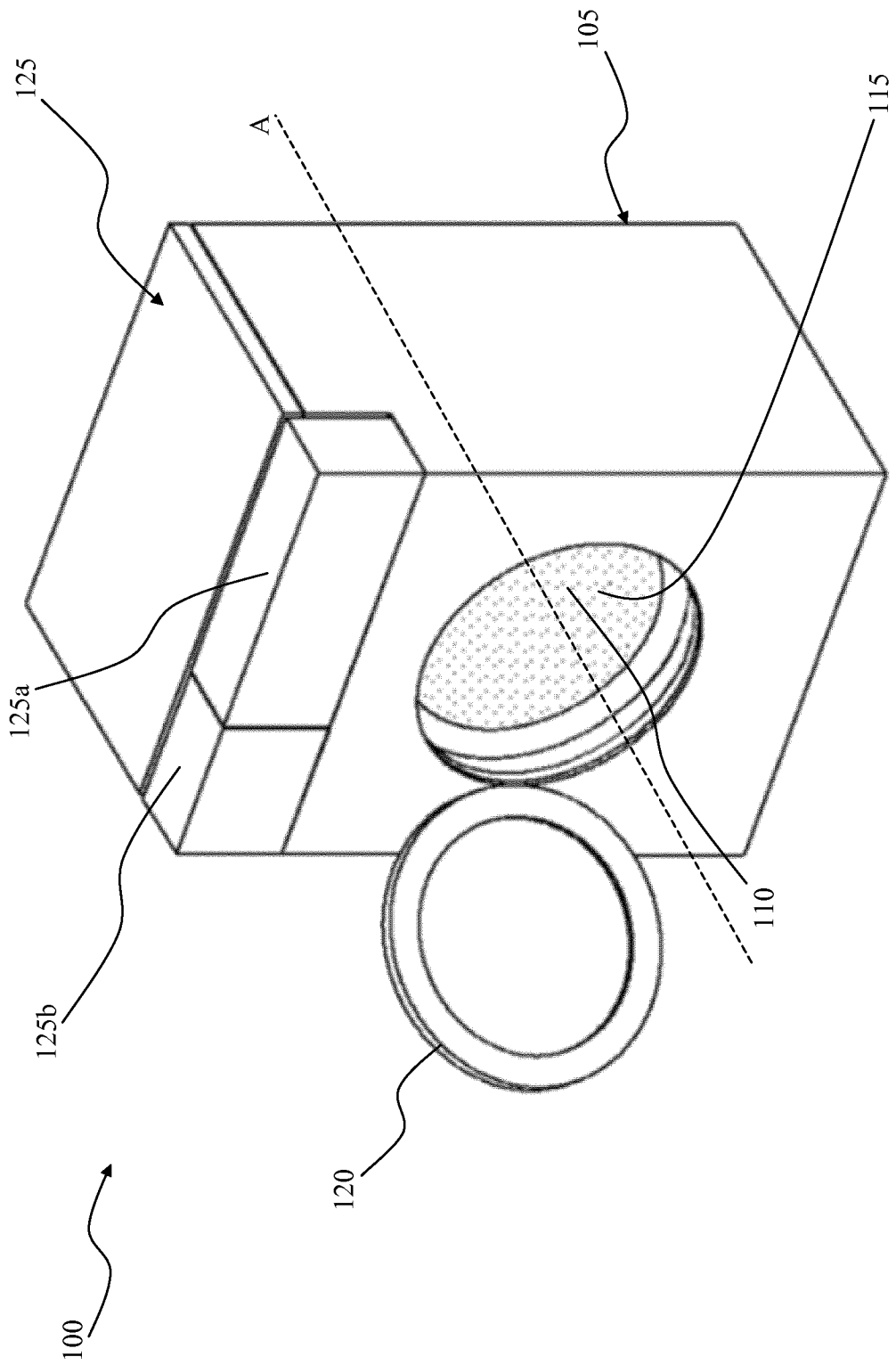


FIG.1

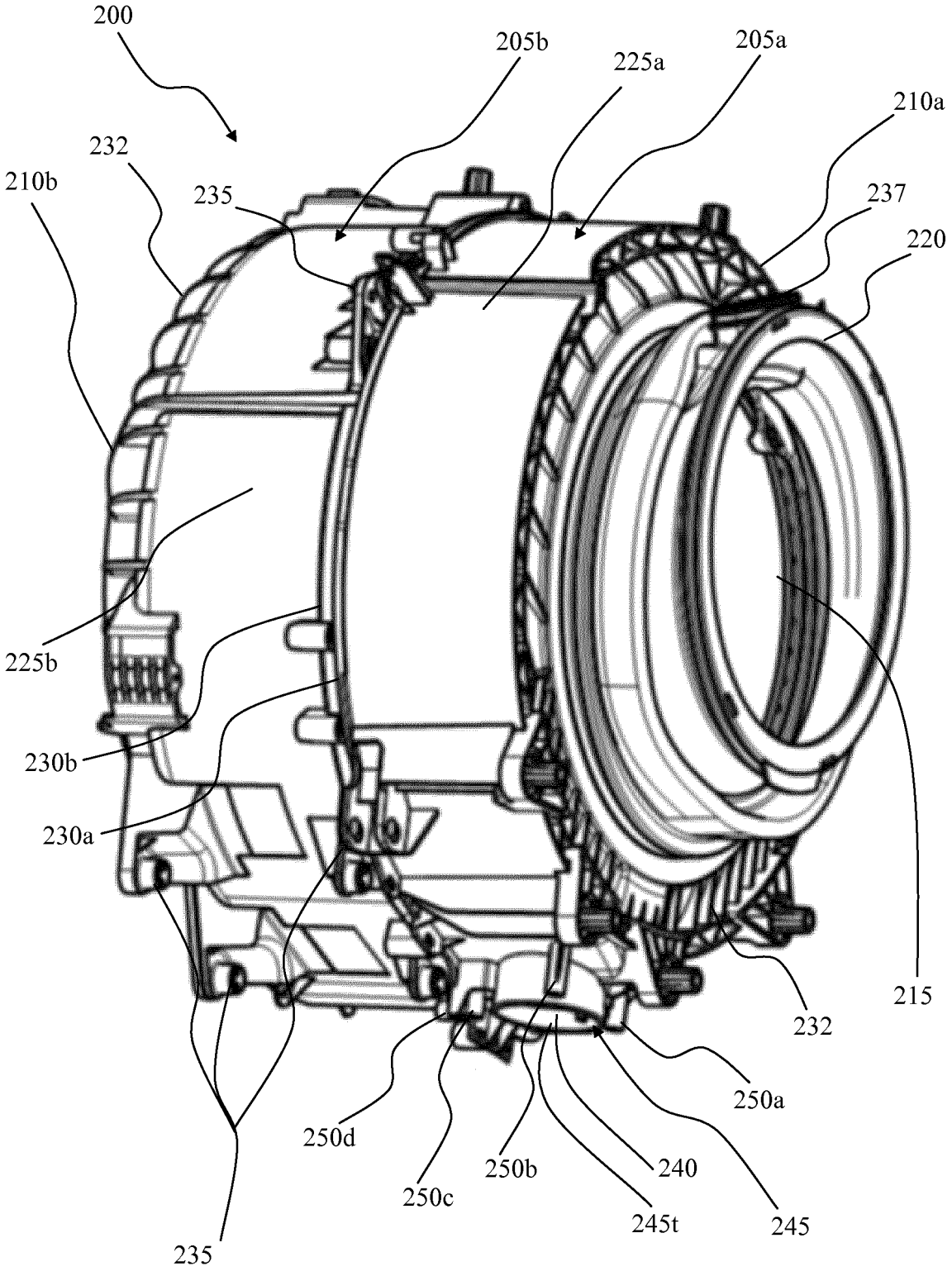

200
205b
225a
205a
210a
232
210b
235
237
220
225b
230b
230a
215
232
250a
250d
250b
240
250c
245t
245
235

FIG.2A

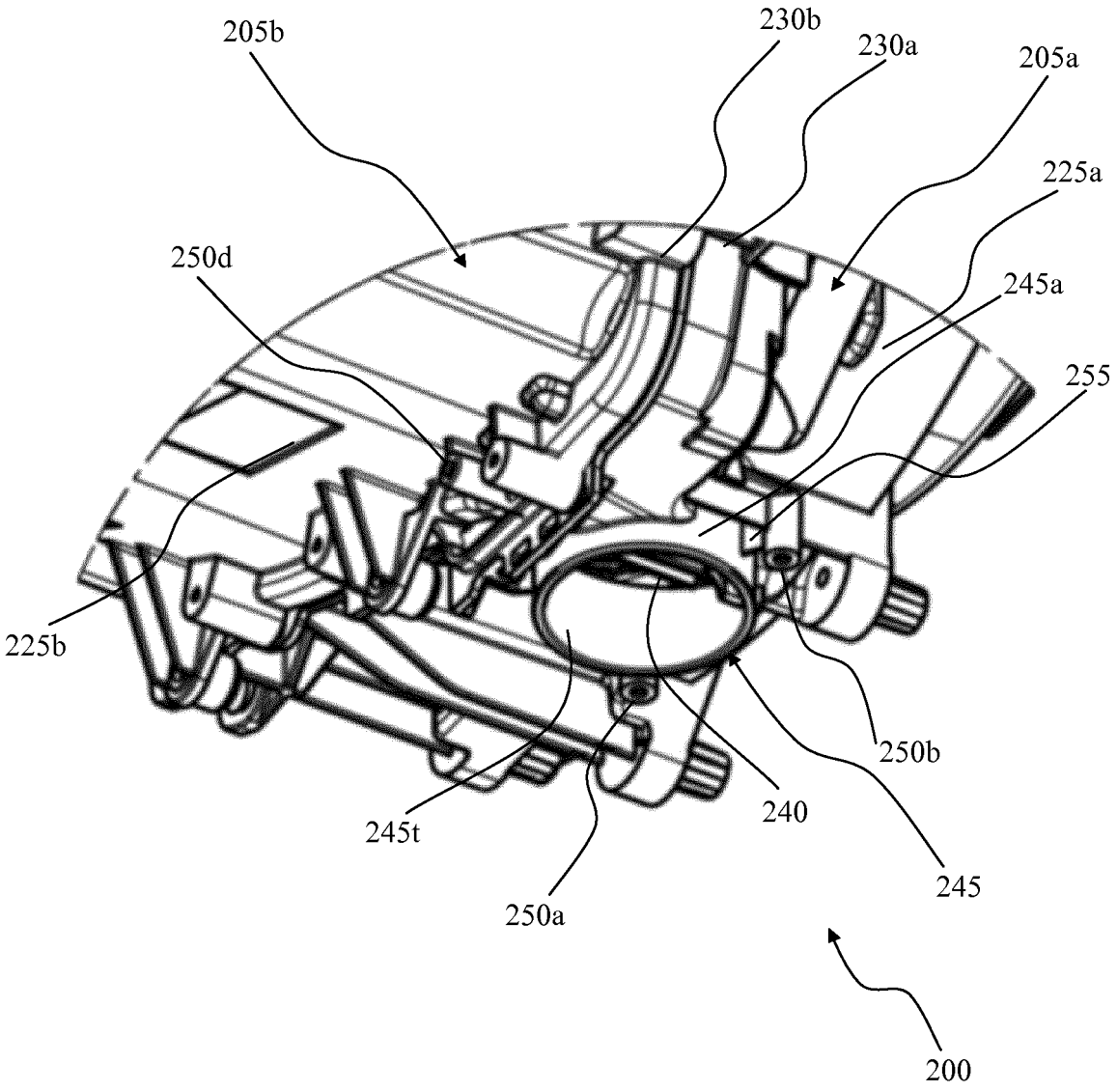

205b
230b
230a
205a
225a
250d
245a
255
225b
250b
240
245t
245
250a
200

FIG.2B

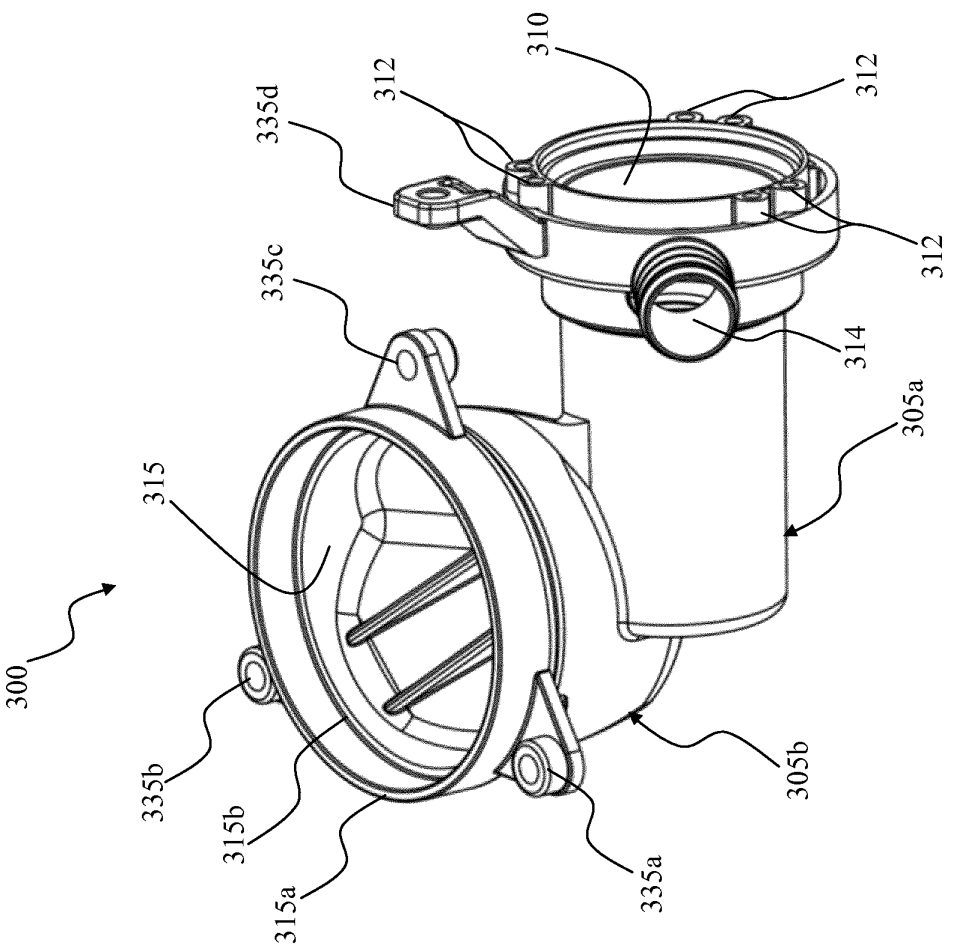

300
315
335b
315b
315a
335c
335d
312
310
312
312
314
305a
305b
335a

FIG.3B

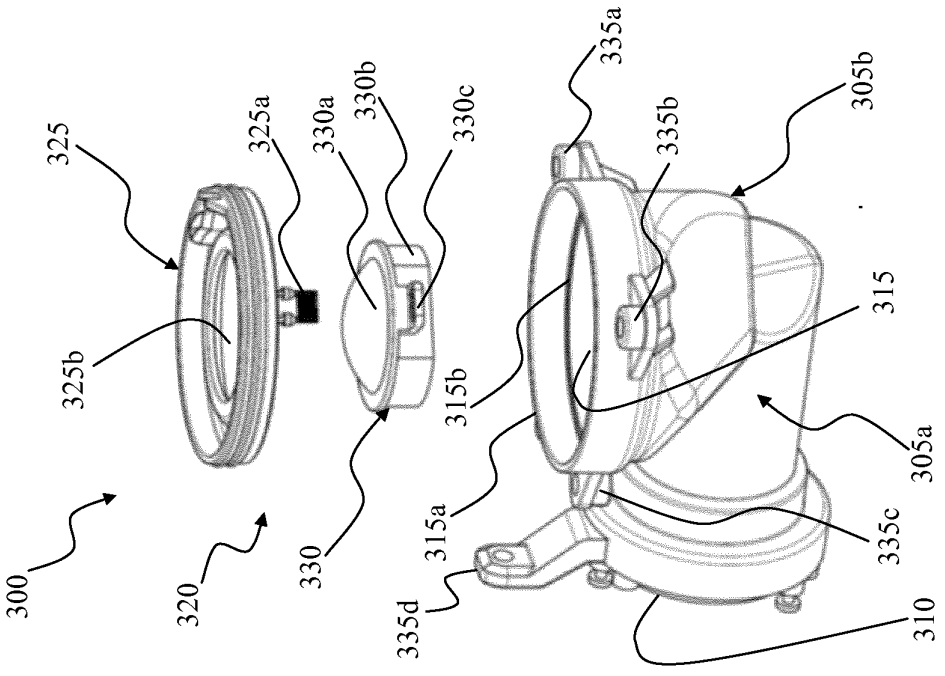

300
320
330
325
325b
325a
330a
330b
330c
335d
315a
315b
335a
335b
305b
315
305a
335c
310

FIG.3A

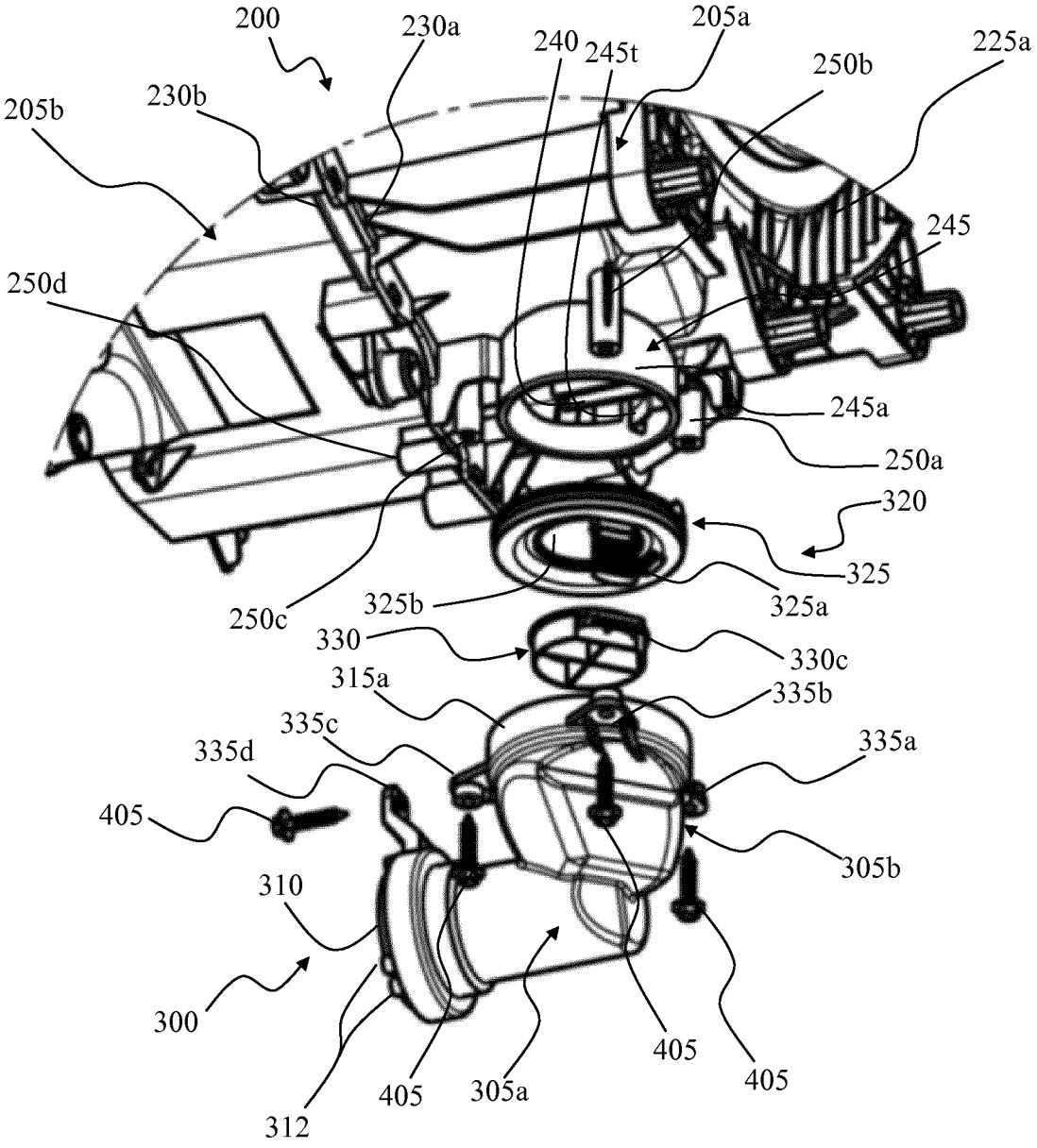

200
230a
240
245t
205a
225a
250b
205b
230b
245
250d
245a
250a
320
325
325b
325a
250c
330
330c
315a
335b
335c
335d
335a
405
305b
310
300
405
405
405
305a
312

FIG.4A

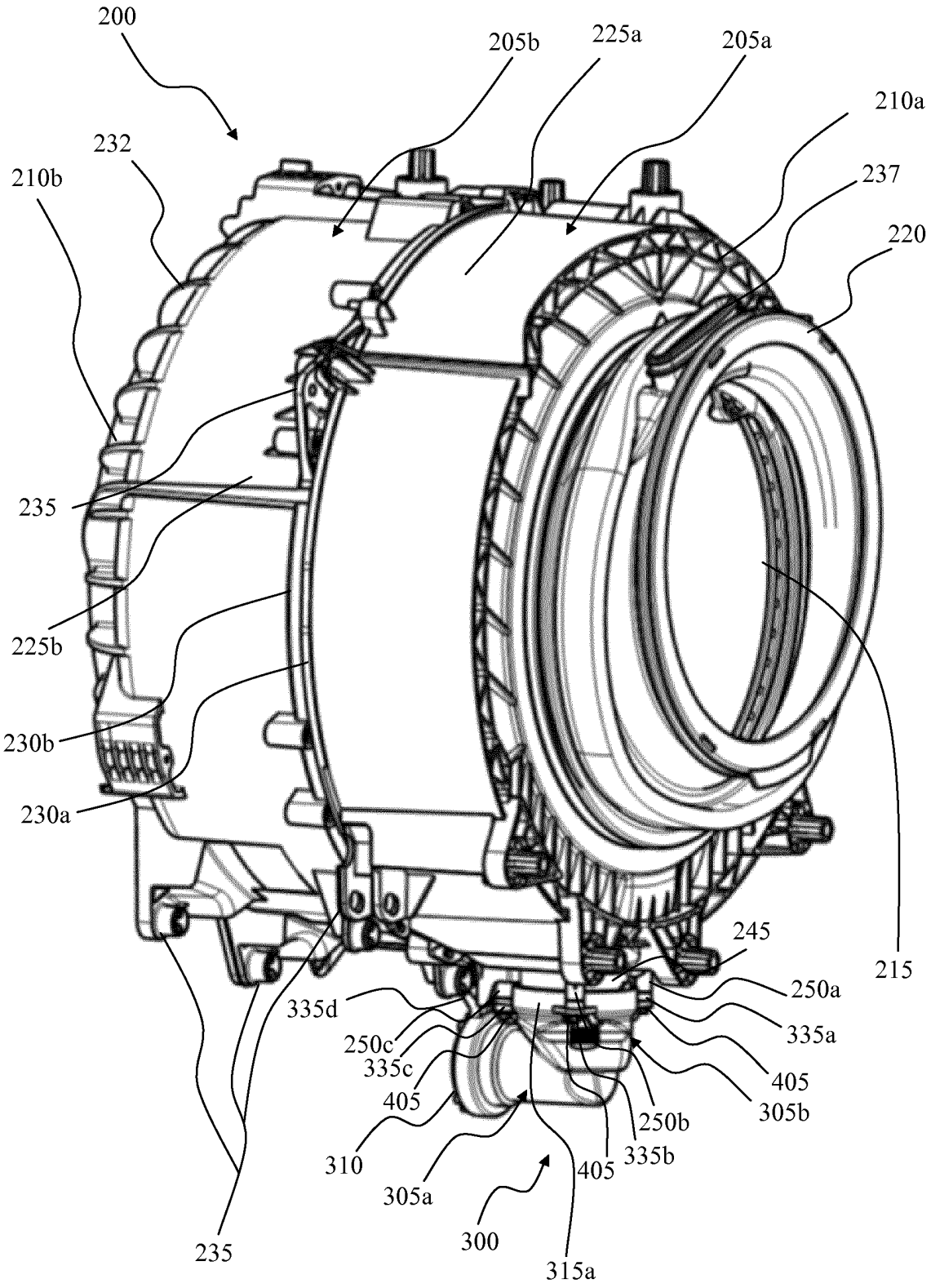

200
205b
225a
205a
210a
232
210b
237
220
235
225b
230b
230a
215
245
250a
335d
335a
250c
335c
405
305b
405
250b
310
335b
405
305a
300
315a
235

FIG.4B

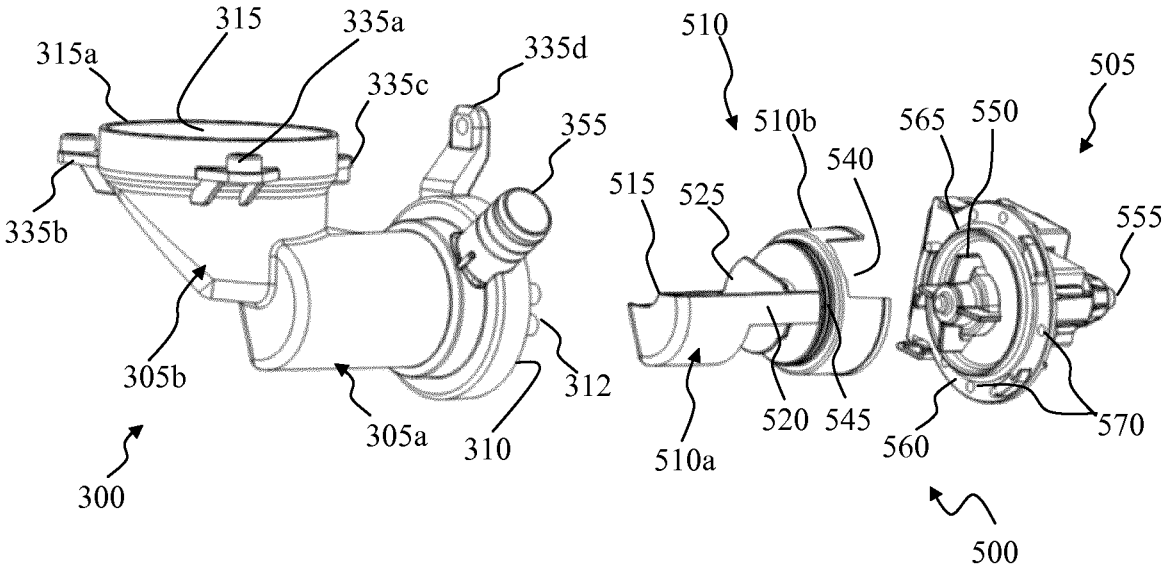

315
335a
315a
335d
335c
355
335b
305b
312
305a
310
300
510
505
510b
565
550
540
515
525
555
520
545
560
570
510a
500

FIG.5

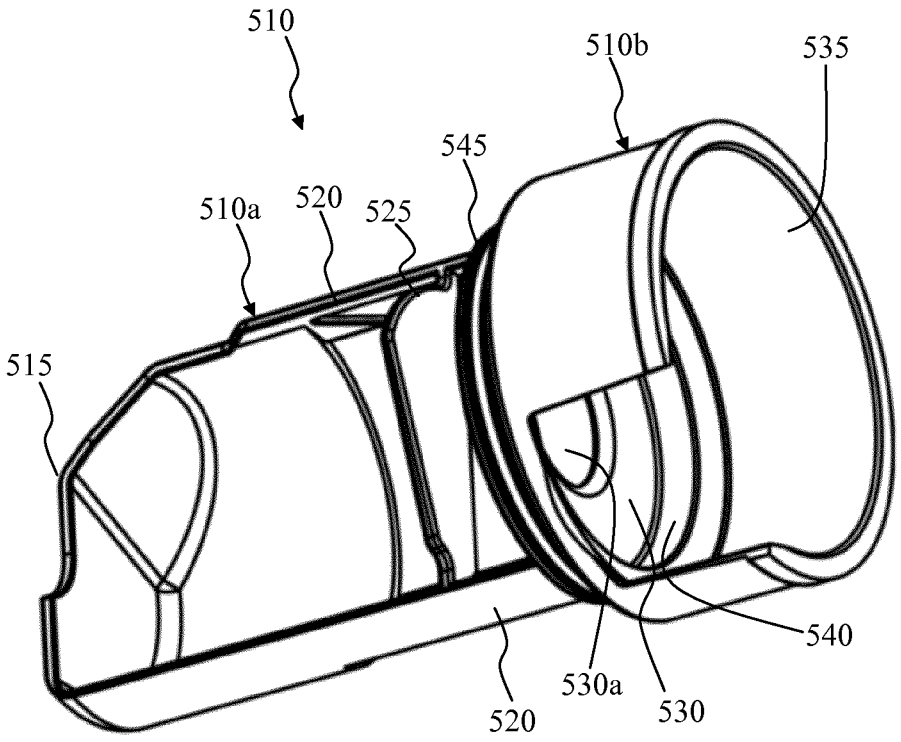

510
510b
535
545
510a
520
525
515
540
530a
530
520

FIG.6

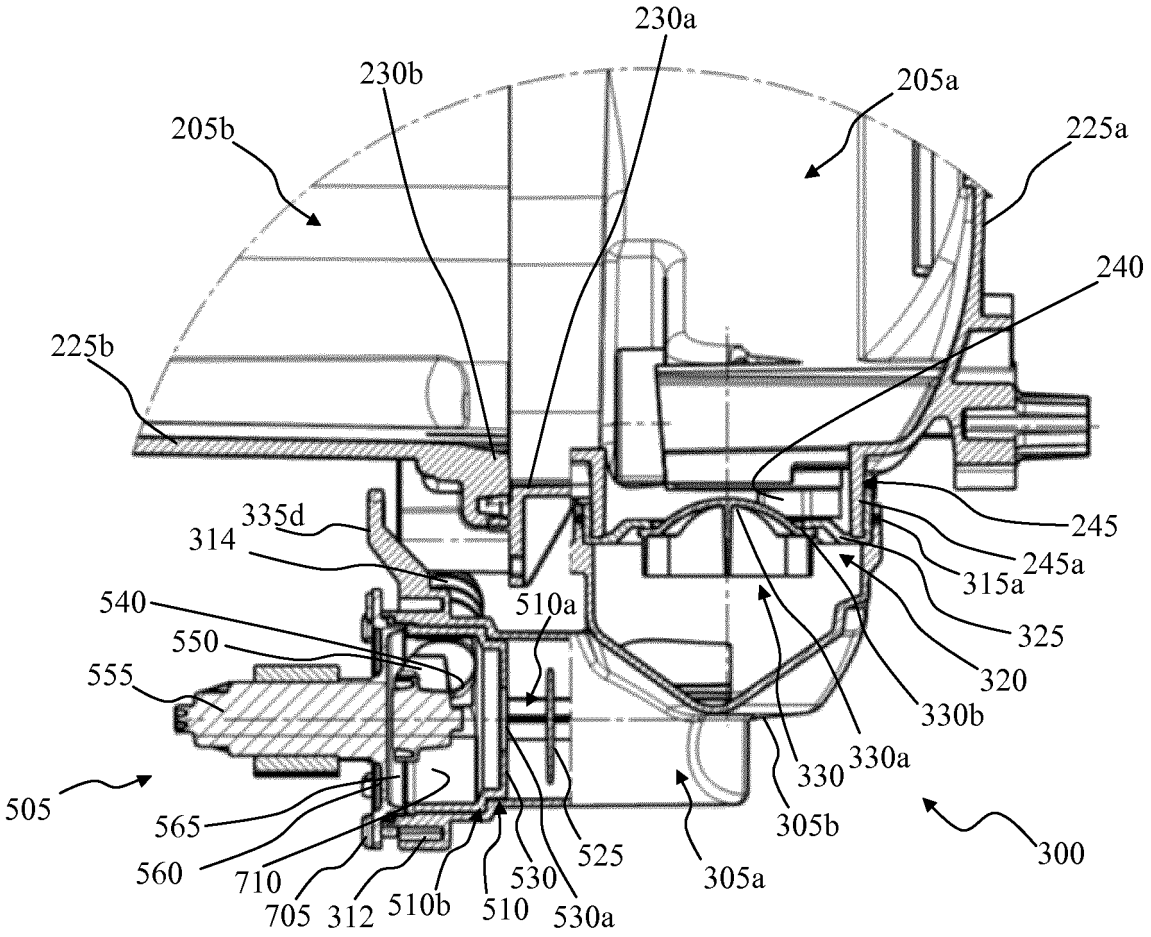

230a
230b
205a
205b
225a
240
225b
335d
314
245
245a
315a
540
510a
325
550
555
320
330b
330a
330
505
565
305b
300
560
710
525
305a
530
705
312
510b
510
530a

FIG.7A

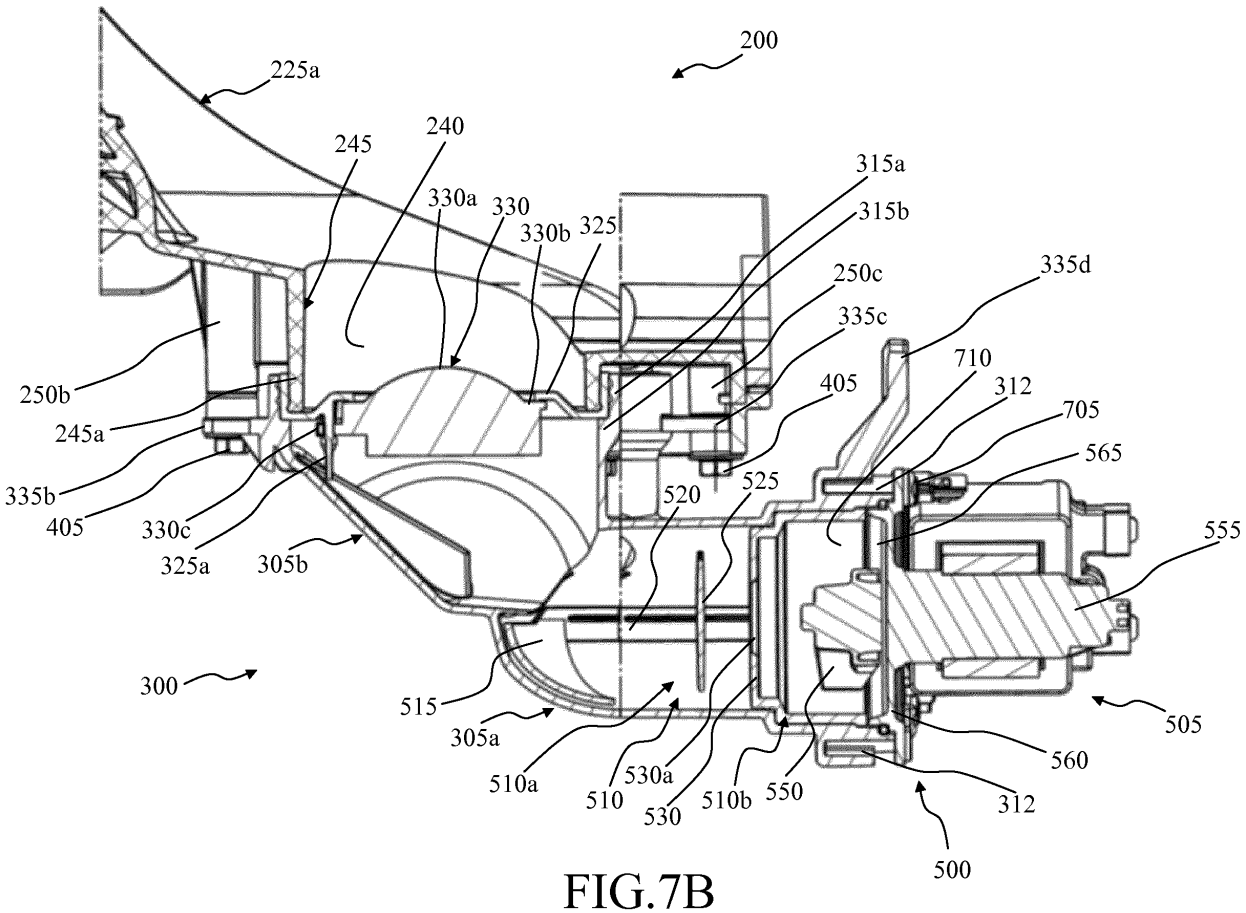

200
225a
245
240
315a
315b
330a
330
330b
325
250c
335d
335c
250b
710
312
405
705
245a
565
335b
525
520
555
405
330c
325a
305b
300
515
505
305a
560
510a
530a
510
510b
550
312
530
500

FIG.7B

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0736626 A2 **[0009]**