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(54) DOSING UNIT, AND WATER-BEARING HOUSEHOLD APPLIANCE

DOSIERGERÄT, UND WASSERFÜHRENDES HAUSHALTSGERÄT

UNITÉ DE DOSAGE, ET APPAREIL ÉLECTROMÉNAGER À CIRCULATION D'EAU

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Description

[0001] The present invention relates to a dosing unit for use in an automatic dosing system of a water-bearing household appliance, and a respective water-bearing household appliance with an automatic dosing system.

[0002] Known water-bearing household appliances, for example dishwashers, typically have a dosing system, which consists of a chamber for storing a single dose of detergent. The user of the dishwasher has to fill the chamber with the detergent each time before starting a washing cycle. This is inconvenient for the user. Furthermore, such systems bear the risk that the user does not fill in the correct amount of detergent or forgets to fill in detergent at all. This can lead to bad or undesirable cleaning results. It is desired that an automatic dosing system is available, which automatically doses the correct amount of detergent at the correct timings during a washing cycle.

[0003] US 2019/133411 describes a metering device for dispensing shaped cleaning-agent bodies into a washing chamber of a domestic dishwasher, comprising a reservoir, which is designed to hold a filling of the shaped cleaning-agent bodies and has a transfer opening in a region of the bottom of the reservoir, and a transport device for actively transporting the shaped cleaning-agent bodies from the transfer opening of the reservoir into the washing chamber.

[0004] DE 10 2017 208013 describes a dosing device for dispensing cleaning agent shaped bodies into a washing chamber of a dishwasher, with a storage container which is designed to hold a bed of cleaning agent shaped bodies and has a transfer opening in one area of its base, and a transport device for actively transporting the cleaning agent shaped bodies from the transfer opening of the storage container into the washing compartment.

[0005] US 2007/163968 describes a dispenser that includes a flexible pouch filled with treatment chemicals and an osmotic membrane. The dispenser is placed in the process water system. Water passing through the membrane increases internal pressure, which forces chemical into the process water system.

[0006] It is one objective of the invention to improve the dosing of detergent in a household appliance.

[0007] According to a first aspect, a dosing unit for automatically dosing a dosing amount of a solid detergent provided by a storage cartridge for storing a bulk of the solid detergent, for use in an automatic dosing system of a water-bearing household appliance is suggested. The storage cartridge comprises a reversibly deformable container with an outlet, wherein the dosing unit is configured so that detergent of the bulk is transported towards the outlet by deforming the container according to a predefined pattern in time for a peristaltic transport of detergent. A dosing device is attached to the storage cartridge on the outlet for separating the dosing amount from the bulk and releasing the separated dosing amount. The dosing unit includes the storage cartridge and the dosing device. The container is arranged such that a bottom side of the container, when the dosing unit is oriented as intended for use, has a slope towards the outlet with respect to a horizontal direction that is in the range of -45° to 15°. The container includes at least three actuation sections distributed along the bottom side, wherein each actuation section is configured for being lifted by an external actuation member.

[0008] The dosing unit may favorably be used in a water-bearing household appliance, in particular a dishwasher or a washing machine, for providing detergent for multiple treatment cycles, without the need to fill in detergent before each cycle. Preferably, the dosing unit can be actuated automatically, for example by a control unit of the water-bearing household appliance.

[0009] The solid detergent may be any kind of detergent, that is, a chemical formulation that dissolves, at least partially, in a washing liquor for treating articles and is suitable for enhancing the treatment of the articles by the washing liquor. For example, the detergent includes enzymes, a bleaching agent, a softening agent, a rinse aid, and/or further detergents. The solid detergent may be provided in any form, that is, as powder, as tablets, as pellets, or the like.

[0010] The dosing unit comprises several elements, such as the dosing device and the storage cartridge, even if not mentioned explicitly. The elements of the dosing unit are preferably made from polymeric materials which are suitable for injection molding. Additionally, the elements may be made from metal and/or a composite material and/or the elements may be coated.

[0011] The detergent is stored in a container of the storage cartridge. The container may be a separate element or may be the interior of the storage cartridge. The container is reversibly deformable, that is, it has a variable shape and a variable volume. For example, the container has flexible walls and/or a number of stiff elements, which are joined by flexible or bendable joints with each other. Being reversibly deformable, the container is deformed by an external force acting on the container, but can restore its original shape when the external force is released and/or when a counteracting force is applied. One advantage of the reversibly deformable container is that, in the case when the detergent is provided in form of detergent tablets, a tablet cannot become stuck between a wall of the container and an agitating element or the like. Further, bridging of detergent tablets between two opposite walls is not possible, because the wall will be pushed away and deformed by the detergent tablets.

[0012] For example, the container will assume a certain shape when it is at rest, due to the gravity acting on it and on the bulk of detergent it stores. This shape is referred to undeformed shape or relaxed state in the following. By deforming the container, in particular by lifting certain sections or portions of a bottom of the container starting from the undeformed shape, local minima and maxima, or bumps, can be generated at an inner side of the container. For example, a local maximum is connected by the side wall of the container with the next local

minimum along a gradient. The shape the container assumes when being deformed is a function of at least the mechanical properties of the container and of the weight of the bulk of detergent stored therein.

[0013] The bulk of detergent forms a loose filling, such that it will rearrange when the shape of the container is changed due to such deformation. In particular, portions of the bulk resting at a local maximum in the container try to move towards a local minimum, driven by gravity, in order to minimize the potential energy. By deforming the container such that, in sequence of time steps, a local maximum "moves" towards the outlet, an effective transport of detergent inside the container is achieved. The bottom side of the container can be considered as forming a transversal wave which travels towards the outlet, wherein a wave front of the wave "pushes" detergent in its moving direction, when being deformed according to the predefined pattern in time. For example, the predefined pattern in time corresponds to a propagating transversal wave. In the following, this kind of transport is referred to as peristaltic transport of detergent.

[0014] An efficiency of the peristaltic transport depends at least on the frictional and/or geometric properties of the detergent, the mechanical properties of the container, an amplitude and wavelength of the deformations and the pattern in time of the deformations.

[0015] For example, the dosing device is attached to an opening or outlet of the storage cartridge, which is in communication with the outlet of the container. The dosing device may be snapped onto, clipped to, glued to, welded to, and/or screwed onto the storage cartridge.

[0016] The dosing device is implemented for separating a dosing amount of the detergent from the bulk. This means that the dosing device includes an element, such as a scoop, that allows for taking, from the bulk, the dosing amount. The separated dosing amount needs not be physically separated from the bulk. It is sufficient when it is arranged such that the separated dosing amount forms the part of the detergent that will be dosed the next time when the dosing unit is actuated for dosing. For example, the dosing amount includes between 0.5 g to 15 g of detergent. In particular, when the detergent is provided in form of detergent tablets, the dosing amount may be exactly one detergent tablet.

[0017] The peristaltic transport transports detergent as close to the dosing device as is necessary for the dosing device to separate the dosing amount. For example, the dosing device has a certain range and the detergent is transported into that range.

[0018] The dosing unit has the advantage that it can be manufactured at low cost, such that when the storage cartridge runs empty of detergent, the whole dosing unit can simply be replaced. A refilling of the storage cartridge may be possible, but is not necessary. It can be very convenient for a user of the water-bearing household appliance with the automatic dosing system to simply replace the whole dosing unit, which may be provided with different kinds of detergent for different applications or different treatment programs.

[0019] According to an embodiment of the dosing unit, the container has an elongated shape and the outlet is arranged at a face side of the container.

[0020] Particularly, the undeformed shape of the container is the elongated shape. For example, the container has a cylindrical or tube-like shape. Particularly, the container may have a cylindrical shape with a triangular or other polygonal cross-section. Preferably, the container's cross-section is such that it tapers towards a bottom side when the dosing unit is oriented as intended for use.

[0021] The peristaltic transport occurs in the direction of the elongation in this case.

[0022] According to the invention, the container is arranged such that a bottom side of the container, when the dosing unit is oriented as intended for use, has a slope towards the outlet with respect to a horizontal direction that is in the range of -45° to 15°.

[0023] A negative value of the slope means that the bottom side is tilted towards the outlet, such that a gravitational force acting on the detergent includes a force component directed towards the outlet, which assists in the peristaltic transport.

[0024] However, even with a small positive value of the slope, peristaltic transport as described is possible, although it will be less efficient. In this case, detergent is transported upward against gravity.

[0025] According to the invention, the container includes at least three actuation sections distributed along the bottom side, wherein each actuation section is configured for being lifted by an external actuation member.

[0026] An actuation section comprises, for example a flexible joint joining two stiff elements, or a reinforced section of a thin foil. Preferably, the dosing unit is intended to be used in an automatic dosing system of a water-bearing household appliance, such that the external actuation member may push the container upward at the actuation sections.

[0027] In embodiments, at least one of the actuation sections may include a hook or the like, such that the external actuation member may not only push the container inward, particularly against gravity, but also pull the container outward. This ensures that the container returns to the undeformed shape after actuation. Formation of wrinkles or the like, which may negatively affect the peristaltic transport, is thus avoided.

[0028] According to a further embodiment of the dosing unit, the container has a taper section which tapers towards the outlet.

[0029] The taper section may be implemented as a step with a permanent negative slope towards the outlet when the dosing unit is oriented as intended for use. Preferably, the taper section is implemented such that detergent transported to the taper section by the peristaltic transport slides further towards the outlet and into the range of the dosing device. This ensures a constant feed of detergent to the dosing device. The taper section may be considered as a buffer, which intermediately stores

an amount of detergent, preferably an amount that corresponding to a plurality of dosing amounts. Then, dosing of the dosing amount is secured for a number of dosing operations within a short period, for example one treatment cycle of a water bearing household appliance, even if peristaltic transport is slow.

[0030] According to a further embodiment of the dosing unit, the container is made from a flexible foil and/or laminate, particularly from a polymeric foil.

[0031] This embodiment has the advantage that the container can be produced easily and does not need much material. Also, a shape of the container may be selected without constraints.

[0032] According to a further embodiment of the dosing unit, the container is made from an impermeable material or comprises an impermeable membrane.

[0033] This has the advantage that the detergent stored in the container is protected from the environmental conditions, in particular humidity. Therefore, premature degradation of the detergent and/or a sticking or clumping of the detergent is prevented. This ensures reliable operation of the dosing device.

[0034] According to a further embodiment of the dosing unit, the storage cartridge includes a support structure for supporting the container.

[0035] This is particularly useful when the container is made from foil, which may form wrinkles or the like. The support structure may, for example, ensure that an elongated container has, in the relaxed state, an elongated shape.

[0036] According to a further embodiment of the dosing unit, the dosing device includes a scoop and a plug, wherein the scoop is configured to separate the dosing amount from the bulk and transport the separated dosing amount to a receiving chamber formed in the plug when the scoop is turned in a first rotational direction about an axis that is parallel to the bottom side of the container, and the plug is configured to release the dosing amount from the receiving chamber.

[0037] The dosing device comprises at least a scoop and a plug. The scoop is configured for picking up or separating at least the dosing amount from the bulk and transporting it to the receiving chamber formed in the plug or between the plug and the scoop. For this, the scoop is implemented to have certain reach, wherein detergent within the reach can be picked up by the scoop. For example, when the detergent is provided in form of tablets, the reach of the scoop is set such that a predefined number of detergent tablets, preferably exactly one detergent tablet, are picked up by the scoop. The scoop is implemented such that turning it in a certain direction about a rotational axis provides the separating and transporting functionality. Therefore, the scoop can be arranged rotatably in the dosing device, or the whole dosing device may be attached rotatably to the storage cartridge. The rotational axis is parallel to the bottom side. The term parallel as used in this case means that an angle between the bottom side and the rotational axis is less than 20°, less than 30°, or less than up to 45°.

[0038] The plug is configured for releasing the dosing amount that is intermediately stored in the receiving chamber. For example, the plug includes a sliding mechanism or a turning mechanism that opens an outlet or the like, such that the dosing amount falls out of the receiving chamber. The receiving chamber may be formed in the plug or it may be formed between the plug and the scoop and/or further elements of the dosing device.

[0039] According to a further embodiment of the dosing unit, the plug is held in the dosing device movably between a closed position and a release position, wherein, when the plug is in the closed position, the dosing amount received from the scoop is stored in the receiving chamber, and, when the plug is in the release position, an outlet in a side-wall of the dosing device is cleared such that the dosing amount stored in the receiving chamber is released.

[0040] In embodiments, when the plug is in the closed position, a sealing element is engaged such that the dosing device is sealed impermeably to fluids of all kinds.

[0041] This can significantly reduce the input of fluids, especially of humidity, into the storage cartridge. This helps to prevent the detergent from dissolving, decomposing and/or becoming sticky inside the storage cartridge. For example, the dosing device comprises specific sealing elements or sealing means for providing the seal.

[0042] Preferably, in its intended use, the dosing device is arranged such that the outlet is facing downwards when the plug is brought into the release position, such that the gravitational force pulls the dosing amount out of the receiving chamber.

[0043] According to a further embodiment of the dosing unit, the dosing device comprises engagement means for engagement with a driving device of an external driving unit for turning the dosing device in the first rotational direction and for holding the dosing device fixed.

[0044] According to a further embodiment of the dosing unit, the plug is shaped as a cylinder, wherein an engaging section for engagement with a driving element of the external driving unit is arranged on one face of the cylinder and the receiving chamber is arranged on the other face of the cylinder, wherein the plug is arranged in the dosing device such that the receiving chamber is facing towards the scoop.

[0045] According to a further embodiment of the dosing unit, the plug has an external thread that engages with an internal thread of the dosing device such that when the plug is rotated relative to the dosing device in a first rotation direction about the axis, the plug is moved from the closed position to the release position by being displaced laterally away from the scoop, and when the plug is rotated relative to the dosing device in a second rotation direction oppositely the first rotation direction about the axis, the plug is moved from the release position to the closed position by being displaced laterally towards the scoop. This embodiment allows to move the plug easily by rotating the plug relative to the dosing device. Prefer-

ably, the dosing device is kept fixed in a predefined position and then the plug is rotated.

[0046] In preferable embodiments, the detergent is provided in form of detergent tablets and the dosing device is configured for dosing at least one, preferably exactly one, detergent tablet at one time. The detergent tablets are preferably provided as formed bodies comprising a specific detergent formulation and having a specific size and geometry. The detergent tablets preferably comprise one or more active ingredients for an automatic washing process. As will be appreciated by the skilled person, the nature of the active ingredient(s) used in the detergent tablets will vary depending on the desired application. When used inside a dishwasher, the detergent tablets may, for example, comprise an active ingredient performing a dishwasher detergent, rinse aid, machine cleaner or dishwasher deodorizing function. In the context of laundry washing machines, the detergent tablets may, for example, comprise an active ingredient performing a laundry detergent or fabric softener function. Suitable active ingredients will be known to the skilled person; examples include bleach, bleach activator, bleach catalyst, enzyme, surfactant, builder, pH-adjusting agent, corrosion inhibitor, and fragrance.

[0047] For example, each detergent tablet contains a unit dose of the active ingredient, i.e. the entire amount of the active ingredient desired to be used in the washing process, such that only one detergent tablet of that active ingredient needs to be dispensed per washing process. In other embodiments, it may be an advantage for the unit dose of the active ingredient to be provided by more than one detergent tablet. For example, in some cases a single detergent tablet containing the entire unit dose may be rather large or heavy, and dosing may be more effective or reliable using multiple smaller or lighter detergent tablets. Preferably, the desired dose of the active ingredient is provided by no more than 10 detergent tablets, preferably no more than 9, 8, 7, 6, 5, or 4 detergent tablets. Preferably, the unit dose is provided by 1, 2, 3 or 4 detergent tablets. Another useful option is to provide detergent tablets each of which contains an amount of active ingredient that corresponds to no more than one unit dose of the active ingredient for at least one washing process of the automatic washing machine. For example, the dishwasher or washing machine is configured to allow selection between various different modes of operation, such as an intensive wash program and a light wash program, which require different amounts of the active ingredient. Thus, a number of detergent tablets may be dosed during one mode of operation and a different number of detergent tablets are dosed during a different mode of operation. For example, one detergent tablet may be dosed during a wash program for a certain soiling level and two detergent tablets during a wash program designed for a higher level of soiling. The detergent tablets may be of any suitable form, such as solid, gel tab, or water-soluble package / container (preferably of low deformability). Preferably, at least the exterior of the detergent tablets are solid. For example, a capsule of a dissolvable (preferably hard) shell material could enclose a powder, liquid or gel composition. Advantageously, however, the detergent tablets are formed of a compressed powder. Each detergent tablet may, for example, be single phase or multi- layered, and may be otherwise structured to ensure that each active ingredient is released from the detergent tablet at the most optimal time. The detergent tablets may be wrapped in a film of water-soluble material, but preferably they are unwrapped. They may be coated with a suitable coating, e.g. to reduce friability. The detergent tablets may be of any suitable shape, such as cylindrical, disc-shaped, spherical, spheroidal, or cuboid. In an embodiment, each detergent tablet has at least one flat face. Preferably, the detergent tablets are cylindrical or disc-shaped, since spherical detergent tablets are more difficult to manufacture whilst shapes such as cuboid are less easily dispensed. In the case of a cylindrical detergent tablet, preferably the length of the tablet is up to 5 % more or less than the diameter of the detergent tablet. When the detergent tablet has edges, preferably at least some of these edges are chamfered and/or filleted to reduce the liability to chip during manufacture and whilst the detergent tablet is in the dosing device. Preferably the chamfer has an angle of 15 to 20 degrees.

[0048] In an embodiment, each detergent tablet has a weight of: at least 0.1 g, at least 0.5 g, at least 0.7 g, at least 1 g, at least 1.2 g, at least 1 .5 g, at least 2 g, at least 3 g, at least 4 g, or at least 5 g; and/or up to 15 g, up to 14 g, up to 13 g, up to 12 g, up to 1 1 g, up to 10 g, up to 9 g, up to 8 g, up to 7 g, or up to 6 g. In an embodiment, each detergent tablet has a maximum length and/or diameter of: at least 5 mm, at least 6 mm, at least 7 mm, at least 8 mm, at least 9 mm, or at least 10 mm; and/or up to 20 mm, up to 19 mm, up to 18 mm, up to 17 mm, up to 16 mm, or up to 15 mm.

[0049] Preferably, the detergent tablets are formed such that a high storage density in the storage cartridge can be achieved and the dosing function of the dosing device is supported. Further, the detergent tablets preferably have a form that is easily produced. For example, the detergent tablets have a cylindrical shape, wherein a diameter and a height of the cylinder have similar dimensions, that is, an aspect ratio is of the order of 0.2 - 1.

[0050] According to a second aspect, which is not part of the claimed invention, a method for dosing a dosing amount of a solid detergent from a dosing unit is suggested. The dosing unit includes a storage cartridge for storing a bulk of the solid detergent. In a first step, a reversibly deformable container of the storage cartridge is deformed according to a predefined pattern in time for transporting detergent from the bulk towards an outlet of the container. In a second step, the dosing amount is separated from the bulk by a dosing device. In a third step, the separated dosing amount is released.

[0051] This method is preferably performed with a dosing unit according to the first aspect.

[0052] According to an embodiment, the step of deforming the container comprises temporarily generating a local gradient in a bottom side of the container directed towards the outlet. Due to the local gradient, transport of detergent in the direction of the gradient occurs.

[0053] According to a third aspect, a water-bearing household appliance with an automatic dosing system and a dosing unit according to the first aspect is suggested. The automatic dosing system is configured for automatically dosing a dosing amount of a solid detergent from the dosing unit by deforming the container according to the predefined pattern in time, such that detergent of the bulk is transported towards the outlet. The dosing device attached to the storage cartridge on the outlet is configured for separating the dosing amount from the bulk and releasing the separated dosing amount.

[0054] The dosing unit is implemented according to the first aspect. The automatic dosing system is specifically adapted to be used in conjunction with the dosing unit according to the first aspect, and the water-bearing household appliance is preferably implemented to control the dosing of detergent tablets from the dosing unit by controlling the automatic dosing system accordingly. For example, the water-bearing household appliance includes a control unit configured for controlling the operation of the water-bearing household appliance.

[0055] For example, the water-bearing household appliance is implemented as a dishwasher or a washing machine. The automatic dosing system with the dosing unit has the advantage that detergent for multiple treatment cycles can be provided, without the need to fill in detergent before each cycle. Preferably, the automatic dosing system is triggered automatically, for example by a control unit of the water-bearing household appliance. The detergent may be any kind of detergent, that is, a chemical formulation that dissolves, at least partially, in a washing liquor for treating articles and is suitable for enhancing the treatment of the articles by the washing liquor. For example, the detergent includes enzymes, a bleaching agent, a softening agent, a rinse aid, and/or further detergents. The solid detergent may be provided in any form, that is, as powder, as tablets, as pellets, or the like.

[0056] Particularly, the automatic dosing system includes an actuation member for actuating the container of the dosing unit according to the predefined pattern in time.

[0057] In preferred embodiments, the automatic dosing system is configured for removably receiving the dosing unit. For example, the automatic dosing system comprises a compartment for receiving the dosing unit in a predefined orientation. The predefined orientation corresponds to the orientation of the dosing unit when it is arranged as intended for use, as described with reference to the first aspect.

[0058] The automatic dosing system preferably includes an actuation member for actuating the at least three actuation sections distributed along the bottom side of the container of the dosing unit. Preferably, the actuation member is spring loaded and has a maximum actuation depth of about 50% - 90% of an inner height of the container at the respective actuation section. Then, a maximum force that is applied by the actuation member can be defined such that the container is not damaged, even if a blocking occurs.

[0059] The automatic dosing system preferably includes a driving unit with a driving device for engagement with the engagement means of the dosing device configured for turning the dosing device in the first turning direction and for holding the dosing device fixed. Furthermore, the driving unit preferably includes a driving element for engagement with the engaging section arranged on one face of the cylinder-shape plug. In particular, the driving unit corresponds to the "external driving unit" defined with reference to the respective embodiments of the dosing unit according to the first aspect.

[0060] According to a fourth aspect, which is not part of the claimed invention, a method for operating a water-bearing household appliance with an automatic dosing system is suggested. A dosing unit is arranged in the automatic dosing system. The automatic dosing system is configured for dosing a dosing amount of a solid detergent from the dosing unit. The dosing unit includes a storage cartridge for storing a bulk of the solid detergent. In a first step, a trigger for dosing a dosing amount of the detergent is received by the automatic dosing system. In second step, a reversibly deformable container of the storage cartridge is deformed according to a predefined pattern in time for transporting detergent from the bulk towards an outlet of the container. In a third step, the dosing amount is separated from the bulk by a dosing device. In a fourth step, the separated dosing amount is released into the water-bearing household appliance.

[0061] This method is preferably performed with a water-bearing household appliance according to the third aspect and a dosing unit according to the first aspect. The embodiments and features described with reference to the dosing unit, the water-bearing household appliance and the method for dosing a dosing amount of detergent apply mutatis mutandis to the suggested method for operating a water-bearing household appliance. According to an embodiment of the method, the step of deforming the container comprises temporarily generating a local gradient in a bottom side of the container directed towards the outlet.

[0062] Due to the local gradient, transport of detergent in the direction of the gradient occurs.

[0063] Further embodiments, features and advantages of the present invention will become apparent from the subsequent description and dependent claims, taken in conjunction with the accompanying drawings, in which:

Fig. 1 shows a schematic view of a first example of a dosing unit;

Fig. 2 shows a schematic view of a second example of a dosing unit;

Fig. 3 shows a schematic view of an example of dosing unit employed in a water-bearing household appliance;

Fig. 4 shows a schematic block diagram of an example of a method for dosing a dosing amount of a solid detergent, such method being not part of the claimed invention;

Fig. 5 shows a schematic perspective view of an example of a water-bearing household appliance; and

Fig. 6 shows a schematic block diagram of an example of a method for operating a water-bearing household appliance, such method being not part of the claimed invention.

[0064] In the Figures, like reference numerals designate like or functionally equivalent elements, unless otherwise indicated.

[0065] Fig. 1 shows a schematic view of a first example of a dosing unit 100. The dosing unit 100 includes a storage cartridge 110, which comprises a container 114 made from a polymeric foil, such as polyethylene, and is therefore flexible, that is, it is reversibly deformable. The storage cartridge 110 stores a bulk 112 of a solid detergent. The detergent may be provided in form of powder, pellets or tablets. As an example, the detergent is a powder in Fig. 2, which does not have a fixed form. The container 114 has an elongated shape, similar to a cylinder, a tube or a bag with one open end. The open end is defined by the outlet 116, which is arranged at a face of the container 114. The outlet 116 is formed in a solid structure, which is not deformable, to which the foil is attached.

[0066] A dosing device 120 is attached to the storage cartridge 110 on the outlet 116. The dosing device 120 is configured for separating a dosing amount 122 of detergent from the bulk 112. As is indicated in Fig. 1, the dosing device 120 has an outlet 124 through which the separated dosing amount 122 can be released.

[0067] The dosing unit 100 is shown in Fig. 1 in its orientation as intended for use with respect to gravity G. In this orientation, The bulk 112 rests inside the container 114 on the bottom side of the container 114. Thus, by locally lifting the bottom side, which is possible because the container 114 is flexible, a bump is formed on the inside of the container 114. The part of the bulk 112 residing at the position of the bump will slide off the bump, when the slope is sufficiently high and there is free space. By choosing a suitable pattern of such local lifting, both in space and in time, an effective net transport of detergent towards the outlet 116 occurs. The lifting of the bottom side is preferably performed by an external actuation member 24 (see Fig. 2 or 3) of an automatic dosing system 20 (see Fig. 3).

[0068] The dosing unit 100 is preferably used in conjunction with a water-bearing household appliance 1 (see Fig. 3 or 5) with an automatic dosing system 20 (see Fig. 3 or 5).

[0069] Fig. 2 shows a schematic view of a second example of a dosing unit 100. In this example, the storage cartridge 110 includes a support structure 111, which is implemented as an essentially not deformable case for containing the container 114, which is made from a flexible foil. On its bottom side, the support structure 111 includes holes or slits which allow an external actuation member 24 to reach into the support structure 111 for deforming the container 114. In this example, the dosing unit 100 is configured for dosing a detergent tablet 102 as the dosing amount 122. The bulk 112 includes a plurality of detergent tablets 102.

[0070] The container 114 has three actuation sections 118 on its bottom side. The actuation sections 118 are, for example, reinforced sections of the foil, which do not break easily. The actuation sections 118 are arranged on the container 114 such that the position of one actuation section 118 corresponds to one of the holes in the support structure 111. This ensures, that the actuation sections 118 make the contact with the external actuation member 24. The external actuation member 24 is implemented as a camshaft in this example, such that an actuation pattern appears when the camshaft 24 is rotated. The external actuation member 24 may include further elements, such as push rods, which are not indicated separately in Fig. 2. By reaching into the support structure 111, the external actuation member 24 temporarily lifts the container 114 at the actuation sections 118. Therefore, bumps are formed in the container 114, and detergent tablets 102 arranged in the actuation section 118 are lifted upward. The detergent tablets 102 arranged on the slope that is induced in the container 114 by the bump will slide in the direction of the gradient along the slope, if there is free space, driven by gravity G, as indicated by arrow P for one detergent tablet 102.

[0071] On the side of the outlet 116, the storage cartridge 110 includes a taper section 115, which is implemented as a geometric feature having a negative slope towards the outlet 116. Thus, detergent tablets 102 resting on the taper section 115 will slide towards the outlet 116 and the dosing device 120 arranged there, if there is some space. Note that the three actuation sections 118 shown in Fig. 2 are merely an example, and there may be more than three actuation sections 118 and/or they may be distributed different than shown here along the bottom side.

[0072] On the outlet 116, a dosing device 120 is attached to the storage cartridge 110. The dosing device 120 includes a scoop 130 and a plug 140. The scoop 130 reaches into the storage cartridge 110 or the container 114, such that it can pick up at least one detergent tablet 102 resting in front of it. The scoop 130 is implemented for separating at least one, preferably exactly one, detergent tablet 102 as the dosing amount 122. In this example, the scoop 130 is configured for being turned about the axis X in order to separate the detergent tablet 102.

[0073] The separated detergent tablet 102 is transported by the scoop 130 to a receiving chamber 142 formed in the plug 140. The detergent tablet 102 is stored in the

receiving chamber 142 and forms the dosing amount 122 of detergent in this case. The detergent tablet 102 cannot escape the receiving chamber 142 back into the storage cartridge 110. The plug 140 has, on its front face facing away from the storage cartridge 110, an engaging section 144 for engagement with a driving element of an external driving unit 22 (see Fig. 3). Further, the plug 140 has an external thread 146 that is engaged with an internal thread 126 formed in the dosing device 120, such that the plug 140 can displaced laterally by screwing. Particularly, the plug 140 is shown in Fig. 3 in a closed position, in which the dosing device 120 is sealed impermeably. By screwing the plug 140, the outlet 124 formed in the dosing device 120 is cleared and the dosing amount 122 stored in the receiving chamber 142 is released from the dosing device 120. Thus, the dosing of the dosing amount 122 from the dosing unit 100 is performed. In the example of Fig. 2, only rotational actions are needed for this.

[0074] In further embodiments, the external actuation member 24 may be implemented such that is does not only act parallel to gravity G, as is shown in Fig. 2, but with an inclination angle with respect to gravity G. In particular, actuation with a tilt towards the outlet 116 can increase the efficiency of the peristaltic transport. Also, rollers may be employed that are slid along the bottom side of the container 114, thus inducing a moving bump inside the container 114.

[0075] Fig. 3 shows an example of dosing unit 100 employed in a water-bearing household appliance 1. For example, the water-bearing household appliance 1 is implemented as a dishwasher. The dishwasher 1 has an automatic dosing system 20, configured to be operated with the dosing device 100, which may be the dosing device 100 described with reference to Fig. 1 or 2. In this example, the automatic dosing system 20 is arranged on a door of the dishwasher 1, such that a user of the dishwasher 1 may easily reach the automatic dosing system 20. Then, the user may exchange that whole dosing unit 100 when the storage cartridge 110 runs empty of detergent.

[0076] The automatic dosing system 20 has a driving unit 22 and an actuation member 24. The driving unit 22 is configured for engaging with the dosing device 120 attached to the storage cartridge 110 an operate it, such that the dosing amount 122 (see Fig. 1 or 2) is released from the dosing unit 100. The actuation member 24 is configured for actuating the container 114 (see Fig. 1 or 2) such that peristaltic transport of the detergent stored in the container 114 towards the dosing device 120 occurs. Preferably, the automatic dosing system 20 is triggered or operated by a control unit of the dishwasher 1.

[0077] Fig. 4 shows a schematic block diagram of an example of a method for dosing a dosing amount 122 (see Fig. 1 or 2) of a solid detergent from a dosing unit 100, for example the dosing unit 100 described with reference to Fig. 1 or 2. The dosing unit 100 includes a storage cartridge 110 for storing a bulk 112 of the solid detergent. In a first step S1, a reversibly deformable container 114 of the storage cartridge 110 is deformed according to a predefined pattern in time for transporting detergent from the bulk 112 towards an outlet 116 of the container 114. In a second step S2, the dosing amount 122 is separated from the bulk 112 by a dosing device 120. In a third step S3, the separated dosing amount 122 is released.

[0078] Fig. 5 shows a schematic perspective view of an example of a water-bearing household appliance 1, which is implemented as a domestic dishwasher. The domestic dishwasher 1 comprises a tub 2, which can be closed by a door 3. Preferably, the door 3 seals the tub 2 so that it is waterproof, for example by using a door seal between door 3 and the tub 2. Preferably, the tub 2 has a cuboid shape. Tub 2 and door 3 can form a washing chamber 4 for washing dishes.

[0079] In Fig. 5, door 3 is shown in the open position. By swiveling about an axis 5 at a lower edge of door 3, the door 3 can be opened or closed. With the door 3, an opening 6 of the tub 2 for inserting dishes into the washing chamber 4 can be opened or closed. Tub 2 comprises a lower cover 7, an upper cover 8 facing the lower cover 7, a rear cover 9 facing the closed door 3 and two side covers 10, 11 which face each other. For example, the lower cover 7, the upper cover 8, the rear cover 9 and the two side covers 10, 11 can be made from stainless steel sheets. Alternatively, at least one of the covers, for example the lower cover 7, can be made from a polymeric material, such as plastic.

[0080] The domestic dishwasher 1 further has at least one rack 12, 13, 14 on which dishes to be washed can be placed. Preferably, more than one rack 12, 13, 14 is used, wherein rack 12 can be lower rack, rack 13 can be an upper rack and rack 14 can be a rack specific for cutlery. As is shown in Fig. 5, the racks 12 to 14 are arranged vertically above each other in the tub 2. Each rack 12, 13, 14 can be pulled out from the tub 2 in a first, outward direction O or pushed into the tub 2 in a second, inward direction !.

[0081] Fig. 5 further shows an automatic dosing system 20 that is arranged in the door 3 of the domestic dishwasher 1. The automatic dosing system 20 comprises a dosing unit 100 that is removably fixed in the automatic dosing system 20. Preferably, the dosing unit 100 is implemented according to one of Fig. 1 or 2. The automatic dosing system 20 has a driving unit 22 (see Fig. 4) configured to actuate the dosing unit 100 for automatically dosing a dosing amount 122 (see Fig. 2 or 3) of a solid detergent stored in a storage cartridge 110 (see Fig. 2, 3 or 4) of the dosing unit 100. Preferably, the automatic dosing system 20 is controlled by a control unit (not shown), which is implemented for operating the domestic dishwasher 1 according to a washing program selected from a plurality of washing programs. Further, in preferred embodiments, the automatic dosing system 20 includes an actuation member 24 (see Fig. 3 or 4) which is configured for lifting or actuating a container 114 (see Fig. 2 or 3) of the dosing unit 100 such that peristaltic

transport of the detergent towards a dosing device 120 (see Fig. 2, 3 or 4) attached to the storage cartridge 110 occurs.

[0082] Fig. 6 shows a schematic block diagram of an example of a method for operating water-bearing household appliance 1 (see Fig. 3 or 5) with an automatic dosing system 20 (see Fig. 3 or 5) and a dosing unit 100 (see Fig. 1 - 3 or 5) arranged in the automatic dosing system 20. The automatic dosing system 20 is configured for dosing a dosing amount 122 (see Fig. 1 or 2) of a solid detergent from the dosing unit 100. The dosing unit 100 includes a storage cartridge 110 (see Fig. 1, 2 or 3) for storing a bulk 112 (see Fig. 1 or 2) of the solid detergent. In a first step S0, a trigger for dosing the dosing amount 122 of detergent is received by the automatic dosing system 20, for example from a control unit of the water-bearing household appliance 1. In second step S1, a reversibly deformable container 114 (see Fig. 1 or 2) of the storage cartridge 110 is deformed according to a predefined pattern in time for transporting detergent from the bulk 112 towards an outlet 116 (see Fig. 1 or 2) of the container 114. In a third step S2, the dosing amount 122 is separated from the bulk 112 by a dosing device 120 (see Fig. 1, 2 or 3). In a fourth step S3, the separated dosing amount 122 is released into the water-bearing household appliance 1.

[0083] Although the present invention has been described in accordance with preferred embodiments, it is obvious for the person skilled in the art that modifications are possible in all embodiments.

Reference Numerals:

[0084]

1	water-bearing household appliance
2	tub
3	door
4	washing chamber
5	axis
6	opening
7	lower cover
8	top cover
9	rear cover
10	side cover
11	side cover
12	rack
13	rack
14	rack
20	automatic dosing system
22	driving unit
24	actuation member
100	dosing unit
102	detergent tablet
110	storage cartridge
111	support structure
112	bulk
114	container
115	taper section
116	outlet
118	actuation section
120	dosing device
122	dosing amount
124	outlet
126	internal thread
130	scoop
140	plug
142	receiving chamber
144	engaging means
146	external thread
G	gravity
I	direction
O	direction
P	arrow
S0	method step
S1	method step
S2	method step
S3	method step
X	axis

Claims

1. A dosing unit (100) for automatically dosing a dosing amount (122) of a solid detergent provided by a storage cartridge (110) for storing a bulk (112) of the solid detergent, for use in an automatic dosing system (20) of a water-bearing household appliance (1), wherein the storage cartridge (110) comprises a reversibly deformable container (114) with an outlet (116), wherein a dosing device (120) is attached to the storage cartridge (110) on the outlet (116) for separating the dosing amount (122) from the bulk (112) and releasing the separated dosing amount (122);

wherein the dosing unit (100) includes the storage cartridge (110) and the dosing device (120);
wherein the container (114) is arranged such that a bottom side of the container (114), when the dosing unit (100) is oriented as intended for use, has a slope towards the outlet (116) with respect to a horizontal direction that is in the range of -45° to 15°; and
characterised in that the dosing unit is configured so that detergent of the bulk (112) is transported towards the outlet (116) by deforming the container according to a predefined pattern in time for a peristaltic transport of detergent, and that the container (114) includes at least three actuation sections (118) distributed along the bottom side, wherein each actuation section (118) is configured for being lifted by an external actuation member (24).

2. The dosing unit according to claim 1, wherein the

container (114) has an elongated shape, and the outlet (116) is arranged at a face side of the container (114).

3. The dosing unit according to one of claims 1-2, wherein the container (114) has a taper section (115) which tapers towards the outlet (116).

4. The dosing unit according to one of claims 1-3, wherein the container (114) is made from a flexible foil and/or laminate, particularly from a polymeric foil.

5. The dosing unit according to one of claims 1-4, wherein the container (114) is made from an impermeable material or comprises an impermeable membrane.

6. The dosing unit according to one of claims 1-5, wherein the storage cartridge (110) includes a support structure (111) for supporting the container (114).

7. The dosing unit according to one of claims 1-6, wherein the dosing device (120) includes a scoop (130) and a plug (140), wherein the scoop (130) is configured to separate the dosing amount (122) from the bulk (112) and transport the separated dosing amount (122) to a receiving chamber (142) formed in the plug (140) when the scoop (130) is turned in a first rotational direction about an axis (X) that is parallel to the bottom side of the container (114), and the plug (140) is configured to release the dosing amount (122) from the receiving chamber (142).

8. The dosing unit according to claim 7, wherein the plug (140) is held in the dosing device (120) movably between a closed position and a release position, wherein, when the plug (140) is in the closed position, the dosing amount (122) received from the scoop (130) is stored in the receiving chamber (142), and, when the plug (140) is in the release position, an outlet (124) in a side-wall of the dosing device (120) is cleared such that the dosing amount (122) stored in the receiving chamber (142) is released.

9. The dosing unit according to one of claims 7 - 8, wherein the dosing device (100) comprises engagement means for engagement with a driving device of an external driving unit (22) for turning the dosing device (100) in the first rotational direction and for holding the dosing device (100) fixed.

10. The dosing unit according to claim 9, wherein the plug (140) is shaped as a cylinder, wherein an engaging section (144) for engagement with a driving element of the external driving unit (22) is arranged on one face of the cylinder and the receiving chamber (142) is arranged on the other face of the cylinder, wherein the plug (140) is arranged in the dosing device (120) such that the receiving chamber (142) is facing towards the scoop (130).

11. The dosing unit according to one of claims 7- 10, wherein the plug (140) has an external thread (146) that engages with an internal thread (126) of the dosing device (120) such that when the plug (140) is rotated relative to the dosing device (120) in a first rotation direction about the axis (X), the plug (140) is moved from the closed position to the release position by being displaced laterally away from the scoop (130), and when the plug (140) is rotated relative to the dosing device (120) in a second rotation direction oppositely the first rotation direction about the axis (X), the plug (140) is moved from the release position to the closed position by being displaced laterally towards the scoop (130).

12. A water-bearing household appliance (1), in particular a dishwasher or washing machine, with an automatic dosing system (20) and a dosing unit (100) according to one of claims 1 to 11, wherein the automatic dosing system (20) is configured for automatically dosing a dosing amount (122) of a solid detergent from the dosing unit (100) by deforming the container (114) according to the predefined pattern in time, and separating the dosing amount (122) from the bulk (112) and releasing the separated dosing amount (122) by the dosing device (120).

Patentansprüche

1. Dosiereinheit (100) zum automatischen Dosieren einer Dosiermenge (122) eines festen Reinigungsmittels, das von einer Aufbewahrungskartusche (110) zum Aufbewahren einer Masse (112) des festen Reinigungsmittels bereitgestellt ist, zur Verwendung in einem automatischen Dosiersystem (20) eines wasserführenden Haushaltsgeräts (1), wobei die Aufbewahrungskartusche (110) einen reversibel verformbaren Behälter (114) mit einem Auslass (116) umfasst, wobei eine Dosiervorrichtung (120) an der Aufbewahrungskartusche (110) auf dem Auslass (116) zum Trennen der Dosiermenge (122) von der Masse (112) und zum Abgeben der getrennten Dosiermenge (122) befestigt ist;
wobei die Dosiereinheit (100) die Aufbewahrungskartusche (110) und die Dosiervorrichtung (120) beinhaltet;

wobei der Behälter (114) so angeordnet ist, dass, wenn die Dosiereinheit (100) bestimmungsgemäß für eine Verwendung ausgerichtet ist, eine Unterseite des Behälters (114) ein Gefälle in Richtung des Auslasses (116) in Bezug auf eine horizontale Richtung aufweist, das

im Bereich von -45° bis 15° liegt; und
gekennzeichnet dadurch, dass die Dosiereinheit so konfiguriert ist, dass Reinigungsmittel von der Masse (112) in Richtung des Auslasses (116) befördert wird, indem der Behälter nach einem vordefinierten zeitlichen Muster für eine peristaltische Beförderung von Reinigungsmittel deformiert wird, und dass der Behälter (114) mindestens drei Betätigungsabschnitte (118) beinhaltet, die entlang der Unterseite verteilt sind, wobei jeder Betätigungsabschnitt (118) dazu konfiguriert ist, durch ein Außenbetätigungselement (24) angehoben zu werden.

2. Dosiereinheit nach Anspruch 1, wobei der Behälter (114) eine längliche Form aufweist und der Auslass (116) an einer Stirnseite des Behälters (114) angeordnet ist.

3. Dosiereinheit nach einem der Ansprüche 1-2, wobei der Behälter (114) einen Verjüngungsabschnitt (115) aufweist, der sich in Richtung des Auslasses (116) verjüngt.

4. Dosiereinheit nach einem der Ansprüche 1-3, wobei der Behälter (114) aus einer flexiblen Folie und/oder einem flexiblen Laminat, insbesondere einer Polymerfolie hergestellt ist.

5. Dosiereinheit nach einem der Ansprüche 1-4, wobei der Behälter (114) aus einem undurchlässigen Material hergestellt ist oder eine undurchlässige Membran umfasst.

6. Dosiereinheit nach einem der Ansprüche 1-5, wobei die Aufbewahrungskartusche (110) eine Unterstützungsstruktur (111) zum Unterstützen des Behälters (114) aufweist.

7. Dosiereinheit nach einem der Ansprüche 1-6, wobei die Dosiervorrichtung (120) eine Kelle (130) und einen Stöpsel (140) beinhaltet, wobei die Kelle (130) dazu konfiguriert ist, die Dosiermenge (122) von der Masse (112) zu trennen und die getrennte Dosiermenge (122) zu einer Aufnahmekammer (142) zu befördern, die in dem Stöpsel (140) ausgebildet ist, wenn die Kelle (130) in eine erste Drehrichtung um eine Achse (X), die parallel zu der Unterseite des Behälters (114) ist, gedreht wird, und der Stöpsel (140) dazu konfiguriert ist, die Dosiermenge (122) aus der Aufnahmekammer (142) abzugeben.

8. Dosiereinheit nach Anspruch 7, wobei der Stöpsel (140) in der Dosiervorrichtung (120) beweglich zwischen einer geschlossenen Position und einer Abgabeposition gehalten wird, wobei, wenn der Stöpsel (140) in der geschlossenen Position ist, die aus der Kelle (130) aufgenommene Dosiermenge (122) in der Aufnahmekammer (142) aufbewahrt wird, und wenn der Stöpsel (140) in der Abgabeposition ist, ein Auslass (124) in einer Seitenwand der Dosiervorrichtung (120) freigegeben wird, sodass die in der Aufnahmekammer (142) aufbewahrte Dosiermenge (122) abgegeben wird.

9. Dosiereinheit nach einem der Ansprüche 7-8, wobei die Dosiervorrichtung (100) Eingriffsmittel für einen Eingriff in eine Antriebsvorrichtung einer Außenantriebseinheit (22) zum Drehen der Dosiervorrichtung (100) in die erste Drehrichtung und zum Festhalten der Dosiervorrichtung (100) umfasst.

10. Dosiereinheit nach Anspruch 9, wobei der Stöpsel (140) wie ein Zylinder geformt ist, wobei ein Eingriffsabschnitt (144) zum Eingriff in ein Antriebselement der Außenantriebseinheit (22) auf einer Fläche des Zylinders und die Aufnahmekammer (142) auf der anderen Fläche des Zylinders angeordnet ist, wobei der Stöpsel (140) in der Dosiervorrichtung (120) so angeordnet ist, dass die Aufnahmekammer (142) in Richtung der Kelle (130) weist.

11. Dosiereinheit nach einem der Ansprüche 7-10, wobei der Stöpsel (140) ein Außengewinde (146) aufweist, das mit einem Innengewinde (126) der Dosiervorrichtung (120) so im Eingriff ist, dass, wenn der Stöpsel (140) relativ zu der Dosiervorrichtung (120) in eine erste Drehrichtung um die Achse (X) gedreht wird, der Stöpsel (140) von der geschlossenen Position in die Abgabeposition gedreht wird, indem er seitlich von der Kelle (130) weg verlagert wird, und wenn der Stöpsel (140) relativ zu der Dosiervorrichtung (120) in eine zweite Drehrichtung, die entgegengesetzt zu der ersten Drehrichtung ist, um die Achse (X) gedreht wird, der Stöpsel (140) von der Abgabeposition in die geschlossene Position bewegt wird, indem er seitlich in Richtung der Kelle (130) verlagert wird.

12. Wasserführendes Haushaltsgerät (1), insbesondere ein Geschirrspüler oder eine Waschmaschine, mit einem automatischen Dosiersystem (20) und einer Dosiereinheit (100) nach einem der Ansprüche 1 bis 11, wobei das automatische Dosiersystem (20) zum automatischen Dosieren einer Dosiermenge (122) eines festen Reinigungsmittels aus der Dosiereinheit (100) konfiguriert ist, indem der Behälter (114) nach dem vordefinierten zeitlichen Muster deformiert wird, und die Dosiermenge (122) von der Masse (112) getrennt wird und die getrennte Dosiermenge (122) von der Dosiervorrichtung (120) abgegeben wird.

Revendications

1. Unité de dosage (100) destinée au dosage automatique d'une quantité de dosage (122) d'un détergent solide mis à disposition par une cartouche de stockage (110) pour le stockage d'un volume (112) du détergent solide, pour utilisation dans un système de dosage automatique (20) d'un appareil ménager à circulation d'eau (1), dans laquelle la cartouche de stockage (110) comprend un conteneur (114) déformable de manière réversible avec une sortie (116), dans laquelle un dispositif de dosage (120) est fixé à la cartouche de stockage (110) sur la sortie (116) pour la séparation de la quantité de dosage (122) du volume (112) et la libération de la quantité de dosage (122) séparée ; dans laquelle l'unité de dosage (100) inclut la cartouche de stockage (110) et le dispositif de dosage (120) ;

   dans laquelle le conteneur (114) est disposé de sorte qu'un côté inférieur du conteneur (114), lorsque l'unité de dosage (100) est orientée comme prévu pour une utilisation, présente une inclinaison vers la sortie (116) par rapport à une direction horizontale comprise entre - 45° et 15° ; et
   caractérisé en ce que l'unité de dosage est configurée de manière à ce que le détergent du volume (112) soit transporté vers la sortie (116) par déformation du conteneur selon un schéma prédéfini dans le temps pour un transport péristaltique du détergent, et **en ce que** le conteneur (114) inclut au moins trois sections d'actionnement (118) réparties le long du côté inférieur, dans lesquelles chaque section d'actionnement (118) est configurée pour être soulevée par un organe d'actionnement externe (24).

2. Unité de dosage selon la revendication 1, dans laquelle le conteneur (114) a une forme allongée, et la sortie (116) est disposée sur un côté de face du conteneur (114).

3. Unité de dosage selon l'une des revendications 1 - 2, dans laquelle le conteneur (114) comporte une section rétrécie (115) qui se rétrécit vers la sortie (116).

4. Unité de dosage selon l'une des revendications 1 - 3, dans laquelle le conteneur (114) est fabriqué à partir d'un film flexible et/ou d'un laminé, notamment d'un film polymère.

5. Unité de dosage selon l'une des revendications 1 - 4, dans laquelle le conteneur (114) est fabriqué à partir d'un matériau imperméable ou comprend une membrane imperméable.

6. Unité de dosage selon l'une des revendications 1 - 5, dans laquelle la cartouche de stockage (110) inclut une structure de support (111) pour soutenir le conteneur (114).

7. Unité de dosage selon l'une des revendications 1 - 6, dans laquelle le dispositif de dosage (120) inclut une écope (130) et un bouchon (140), dans laquelle l'écope (130) est configurée pour séparer la quantité de dosage (122) du volume (112) et transporter la quantité de dosage (122) séparée vers une chambre de réception (142) formée dans le bouchon (140) lorsque l'écope (130) est tournée dans une première direction de rotation autour d'un axe (X) parallèle au côté inférieur du conteneur (114), et le bouchon (140) est configuré pour libérer la quantité de dosage (122) de la chambre de réception (142).

8. Unité de dosage selon la revendication 7, dans laquelle le bouchon (140) est maintenu dans le dispositif de dosage (120) de manière mobile entre une position fermée et une position de libération, dans laquelle, lorsque le bouchon (140) est en position fermée, la quantité de dosage (122) reçue de l'écope (130) est stockée dans la chambre de réception (142), et, lorsque le bouchon (140) est en position de libération, une sortie (124) dans une paroi latérale du dispositif de dosage (120) est dégagée de sorte que la quantité de dosage (122) stockée dans la chambre de réception (142) soit libérée.

9. Unité de dosage selon l'une des revendications 7 - 8, dans laquelle le dispositif de dosage (100) comprend des moyens d'engagement pour l'engagement avec un dispositif d'entraînement d'une unité d'entraînement externe (22) pour faire tourner le dispositif de dosage (100) dans la première direction de rotation et pour maintenir le dispositif de dosage (100) fixe.

10. Unité de dosage selon la revendication 9, dans laquelle le bouchon (140) a la forme d'un cylindre, dans laquelle une section d'engagement (144) pour l'engagement avec un élément d'entraînement de l'unité d'entraînement externe (22) est disposée sur une face du cylindre et la chambre de réception (142) est disposé sur l'autre face du cylindre, dans laquelle le bouchon (140) est disposé dans le dispositif de dosage (120) de sorte que la chambre de réception (142) soit orientée vers l'écope (130).

11. Unité de dosage selon l'une des revendications 7 - 10, dans laquelle le bouchon (140) comporte un filetage externe (146) qui s'engage avec un filetage interne (126) du dispositif de dosage (120) de sorte que, lorsque le bouchon (140) est tourné par rapport au dispositif de dosage (120) dans une première direction de rotation autour de l'axe (X), le bouchon

(140) passe de la position fermée à la position de libération en étant déplacé latéralement à l'écart de l'écope (130), et lorsque le bouchon (140) est tourné par rapport au dispositif de dosage (120) dans une deuxième direction de rotation opposée à la première direction de rotation autour de l'axe (X), le bouchon (140) passe de la position de libération à la position fermée en étant déplacé latéralement vers l'écope (130).

12. Appareil ménager à circulation d'eau (1), en particulier lave-vaisselle ou machine à laver, avec un système de dosage automatique (20) et une unité de dosage (100) selon l'une des revendications 1 à 11, dans lequel le système de dosage automatique (20) est configuré pour le dosage automatique d'une quantité de dosage (122) d'un détergent solide provenant de l'unité de dosage (100) par déformation du conteneur (114) selon le schéma prédéfini dans le temps, et séparation de la quantité de dosage (122) du volume (112) et libération de la quantité de dosage (122) séparée via le dispositif de dosage (120).

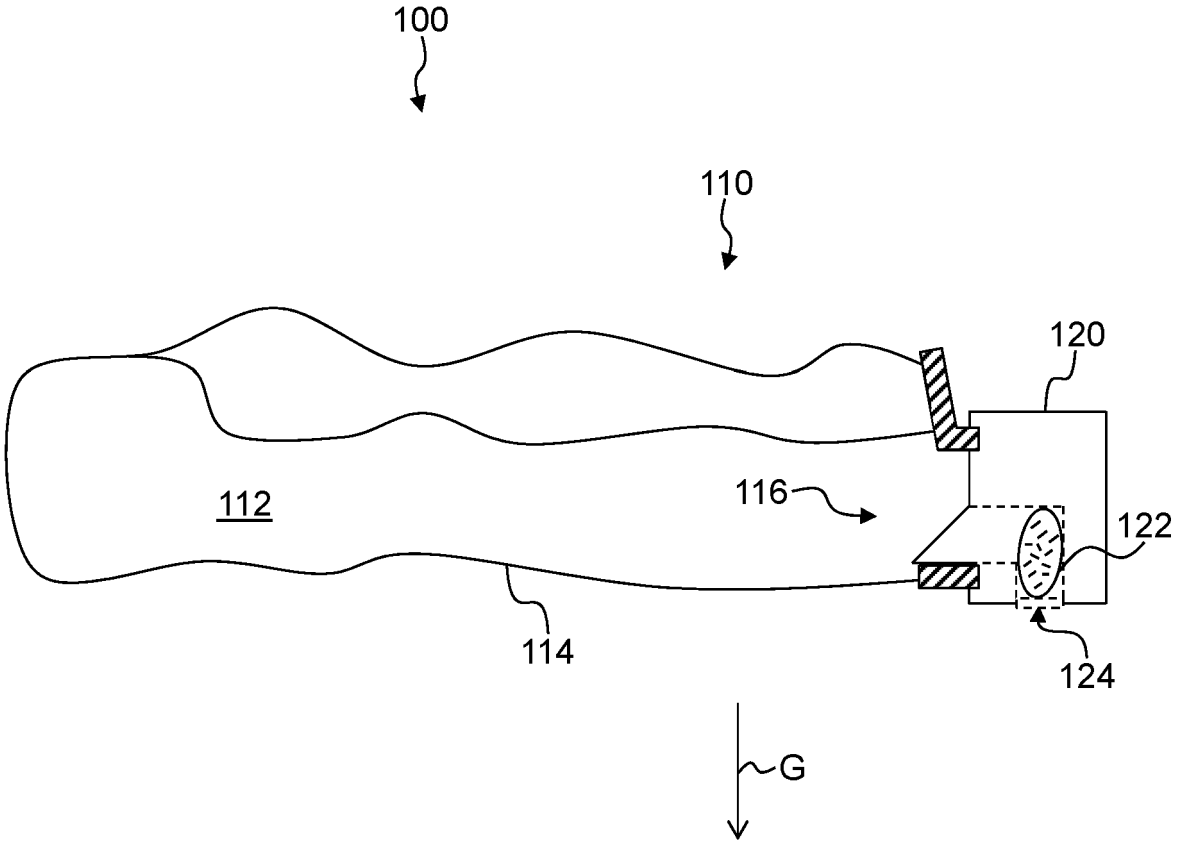
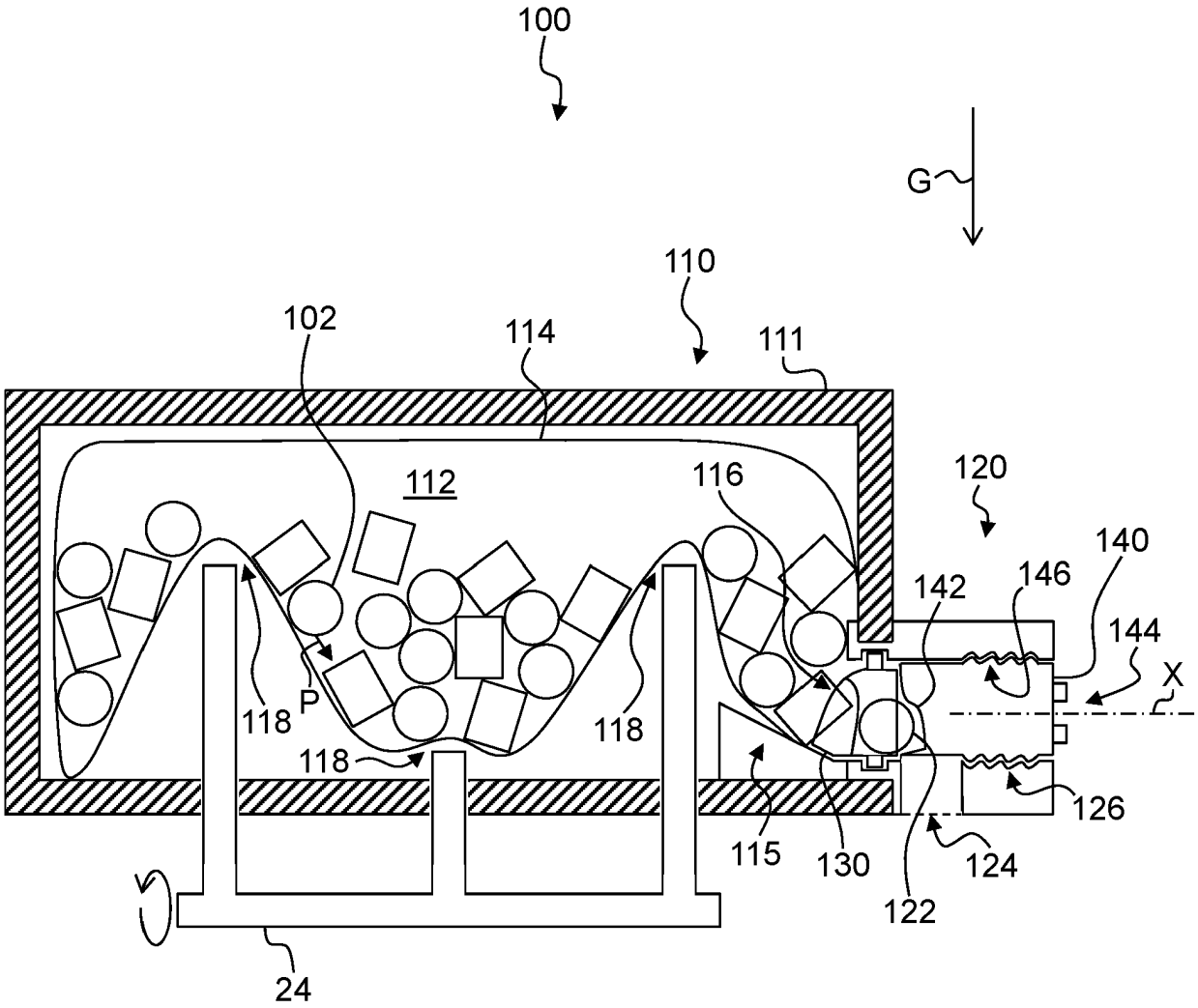


Fig. 1


100
G
110
102
114
111
112
116
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140
142
146
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118
P
118
118
126
115
130
124
122
24

Fig. 2

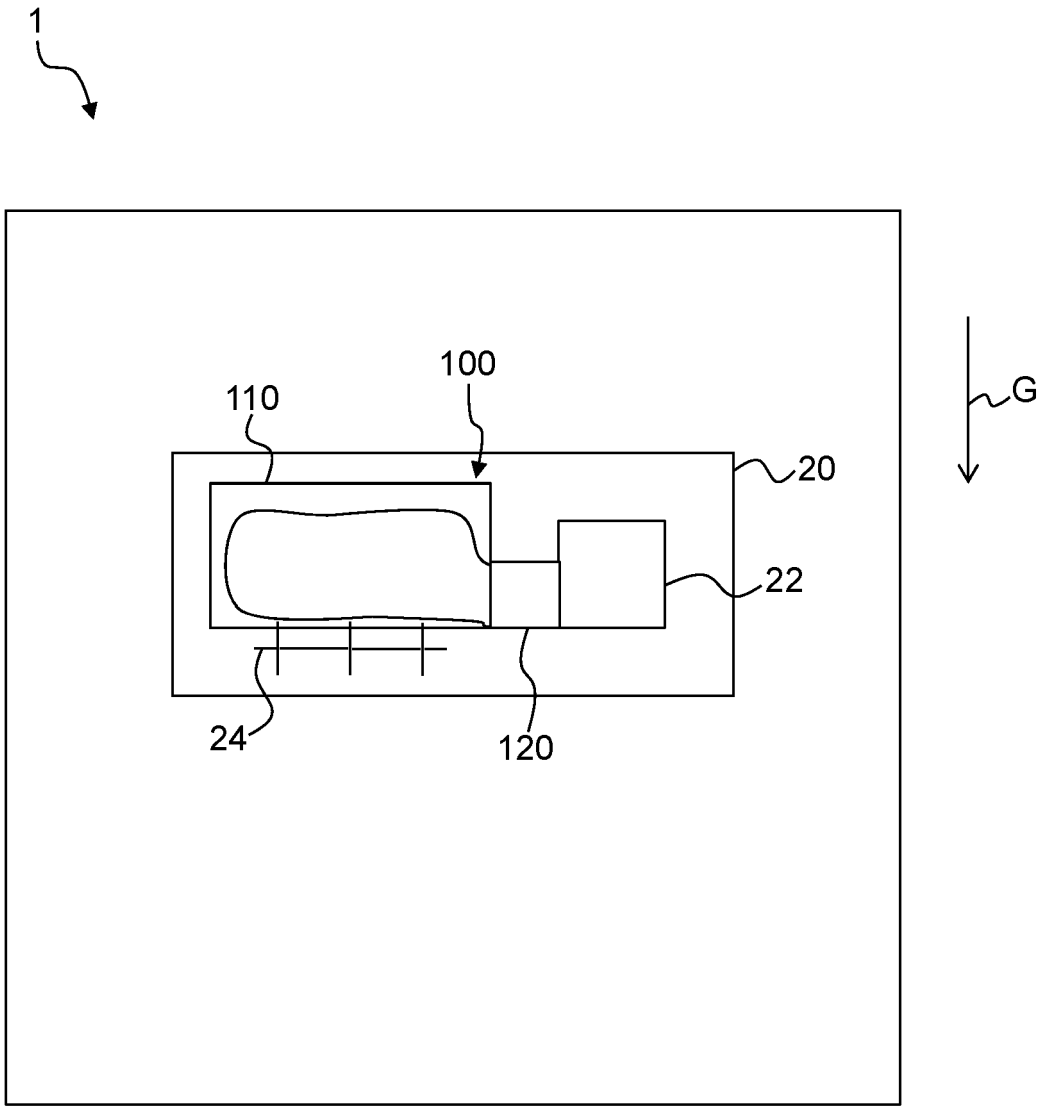

Fig. 3

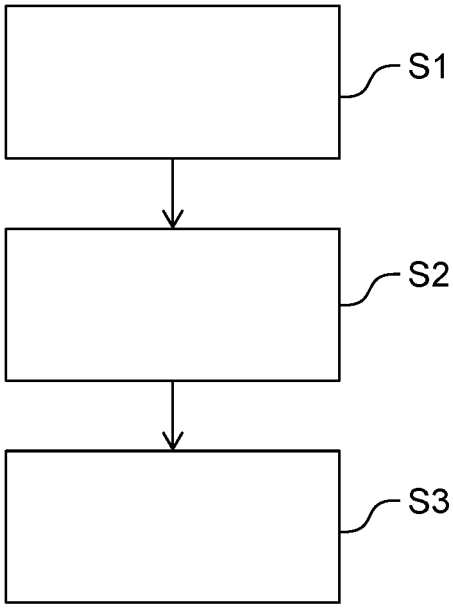

Fig. 4

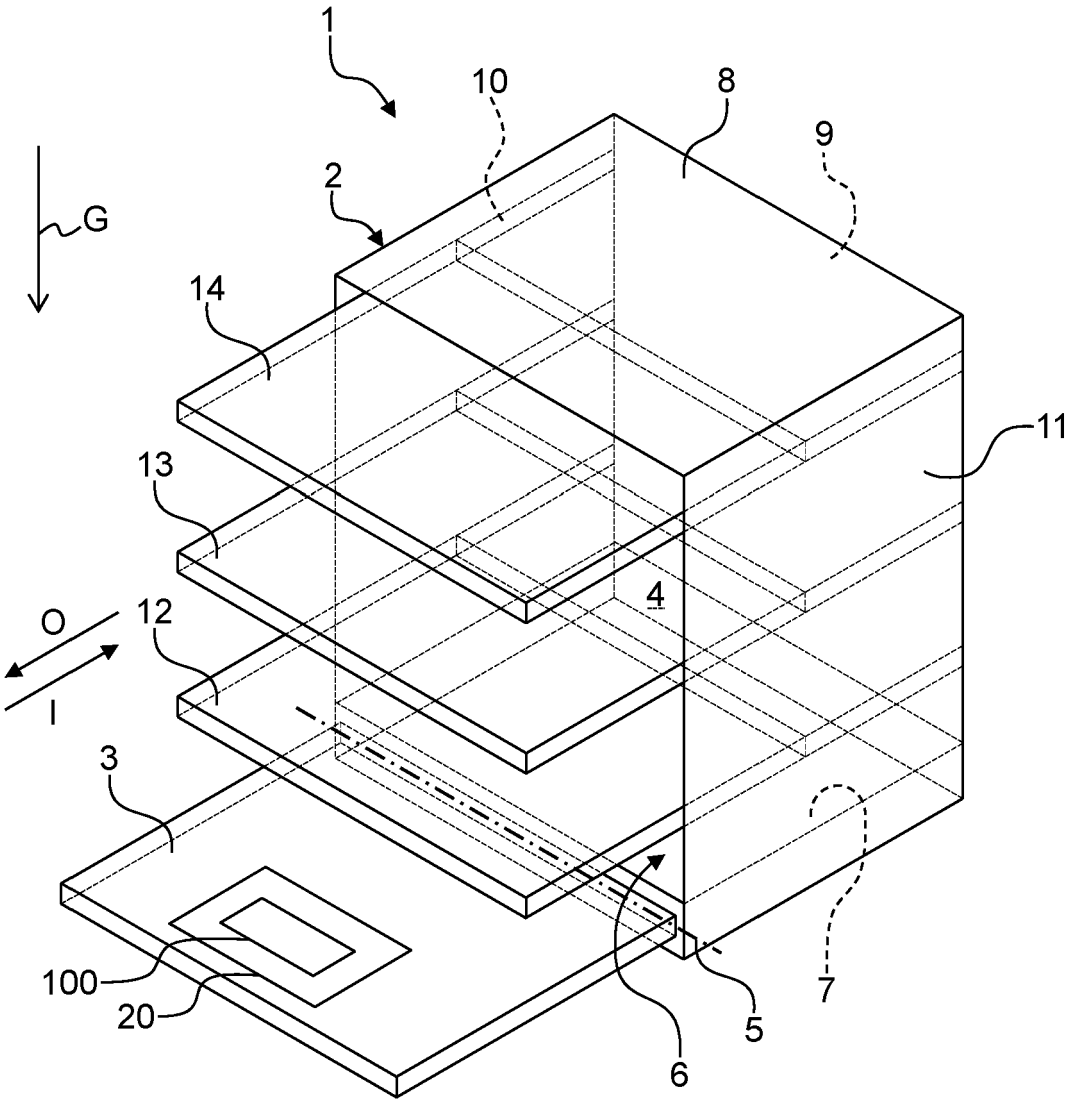

Fig. 5

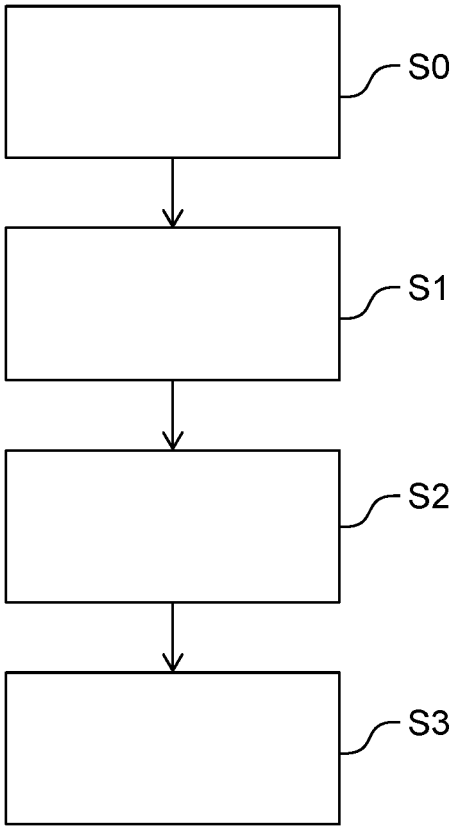

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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