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(54) **WASTE STORAGE DEVICE WITH SMELL PROTECTION**

(57) The invention relates to a waste storage device (1), comprising a container (2, 3) with a container opening (8) and a driver ring (12), which is rotatably mounted to the container (2, 3) in the region of the container opening (8). The driver ring (12) is also designed to catch a waste storage bag or waste storage hose (13) guided through a center opening of the driver ring (12). The waste storage device (1) also comprises a gear rod (25), which is movably guided in the container (2, 3) at its first end, which is coupled to the driver ring (17) and which faces the lid (9) respectively cooperates with the lid (9) on its free second end. Furthermore, the invention relates to a waste storage system (20), comprising a waste storage device (1) of said kind and a storage cassette (17) containing the waste storage bag or waste storage hose (13).

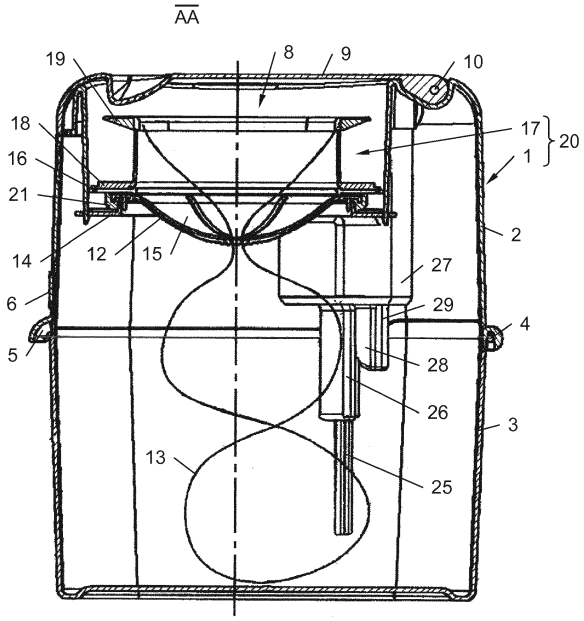

Fig. 1

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Description

[0001] The invention relates to a waste storage device, comprising a container with a container opening and a lid pivotably mounted to the container to open and close the container opening. Furthermore, the waste storage device comprises a driver ring, which is rotatably mounted to the container in the region of the container opening and which is designed to catch a waste storage bag or waste storage hose guided through a center opening of the driver ring. Additionally, the waste storage device comprises a gear rod, which is movably guided in the container at its first end and which is coupled to the driver ring. Moreover, the invention relates to a waste storage system, comprising a waste storage device of said kind and a storage cassette containing a waste storage bag or waste storage hose.

[0002] A waste storage device of the kind above is generally known and used for disposal of all kind of waste, particularly also for disposal of baby and/or adult diaper and/or other personal waste material. Some waste causes unwanted smell and every time the waste storage device is opened for disposal of new waste, smell of waste, which is already disposed in the waste storage device, leaks from said device what is quite unpleasant for most users.

[0003] For example, US 2002/0162304 A1 discloses a waste storage device with an arc shaped gear rod, which is fixed to a lid of a container. When the lid is actuated, a plastic hose receiving waste is twisted automatically so as to keep unwanted smell inside. However, if the twisting is not sufficient for satisfactory sealing, the user cannot twist the hose for some additional turns. The only thing he can do is to move the lid upwards and downwards to further twist the hose what is quite inconvenient. Even worse, the movement of the lid causes an air stream distributing the unwanted smell in the room.

[0004] US 8,215,089 B2 and US 2010/0005762 form further prior art showing an automatically operated waste storage device having the same drawbacks.

[0005] US 9,102,467 B2 shows a further example of a waste storage container, which comprises means for twisting the waste storage hose. Concretely, a driver ring catching and twisting the hose is operated by a foot pedal. Disadvantageously, the waste storage container does not twist the hose automatically when waste is disposed, but the foot pedal has to be pressed as a separate action what is inconvenient as well. Moreover, smell may leave the hose unhindered, if the foot pedal is not pressed immediately after disposing waste.

[0006] DE 20 2005 015 117 U1 and DE 20 2006 004 159 U1 disclose similar solutions having the same drawbacks like US 9,102,467 B2. Instead of a foot pedal DE 20 2005 015 117 U1 and DE 20 2006 004 159 U1 disclose a push rod to cause a twisting and closing of the hose.

[0007] Accordingly, a problem of the invention is to provide a waste storage device and a waste storage system, which improves the sealing of a waste storage hose and better avoids leaking of unwanted smells. In particular, the waste storage device shall provide automatic operation on opening and/or closing of the lid, but also allow for proper spontaneous operation on request.

[0008] The problem of the invention is solved by a waste storage device as defined in the opening paragraph, wherein the gear rod faces the lid respectively cooperates with the lid on the free second end of the gear rod.

[0009] A movement of the lid causes a movement of the gear rod and of the driver ring so that the waste storage hose is twisted and closed. Accordingly, a movement of the lid causes a movement of the gear rod and of the driver ring and also causes a twisting and closing of the waste storage hose.

[0010] Furthermore, the problem of the invention is solved by a waste storage system, comprising a waste storage device of the above kind and a storage cassette containing a waste storage bag or waste storage hose.

[0011] Advantageously, the waste storage hose or waste storage bag is twisted and thereby closed automatically by a rotational movement of the driver ring when the lid is opened and/or closed. On the one hand, the lid provides a smell protection by closing the container opening. On the other hand, smell protection is provided by twisting the waste storage hose or waste storage bag when the gear rod is pushed downwards by the lid. In this way, unwanted smell is kept inside the waste storage hose respectively waste storage bag. In addition, the user can spontaneously actuate the gear rod by pushing it on its free second end and in turn the driver ring without moving the lid if - for example - he considers the automatic twist by the lid as insufficient in particular cases.

[0012] Generally, the driver ring may be actuated respectively rotated without the need to touch it or the waste storage hose / waste storage bag, which is guided through the center opening of the driver ring.

[0013] Further advantageous embodiments are disclosed in the claims and in the description as well as in the Figures.

[0014] In a beneficial embodiment of the invention, the driver ring comprises a toothing respectively a gear ring coupled to the gear rod. In this way, the movement of the gear rod is converted into a rotation.

[0015] It is particularly advantageous if the driver ring comprises a toothing respectively a gear ring cooperating with a bevel gear wheel, which is coupled to a gear wheel cooperating with the gear rod. A movement of the lid then causes a movement of the gear rod, the gear wheel, the beveled gear wheel and of the driver ring so that the waste storage hose is twisted and closed. By the proposed measures, the moving direction of the gear rod may be oriented parallel to the rotational axis of the driver ring. Accordingly, the gear rod may be actuated from the top side if said moving direction respectively said axis is oriented vertically.

[0016] In yet another beneficial embodiment, the gear rod is coupled to a freewheel unit. Particularly, the bevel

gear of the above embodiment may comprise a freewheel unit. However, a freewheel unit may be used in any other wheel of a driving mechanism as well. By means of the freewheel unit, twisting and following untwisting of the waste storage hose or waste storage bag is avoided if, for example, the gear rod is moved forth and back respectively up and down. The freewheel unit may comprise a ratchet mechanism to perform the above function. However, it is particularly advantageous if the freewheel unit is friction based. Such a friction based freewheel unit usually comprises spring-loaded rollers, which are arranged between an inner, driven shaft and an outer sleeve. Concretely, the rollers are arranged in wedged respectively tapered notches of the shaft and are hindered to fall out of the notches by the inner cylindrical surface of the sleeve. Rotating in one direction, the rollers get jammed in the tapered space between said notches and inner cylindrical surface of the sleeve, making the shaft and the sleeve rotate in unison. When the shaft is rotated in the other direction, the rollers just slip over the inner cylindrical surface of the sleeve. In this case the sleeve stands still, even if the shaft is rotated. A particular advantage of the friction based freewheel unit is that it works very silently and is almost inaudible. In this way, a user of the waste storage device, and in particular a (sleeping) baby, is not bothered by the sound of the waste storage device.

[0017] It should be noted at this point, that the application of a friction based freewheel unit in a waste storage device may also be useful without the limitations of claim 1, that means without the gear rod cooperating with the lid on its free second end. Accordingly, the application of a friction based freewheel unit in a waste storage device may form the base of an independent invention. The drive for the driver ring may be designed differently then. For example, the gear rod may be fixed to the lid or may be pivotally mounted to the lid. The gear rod may also be arranged at a distance from the lid. The gear rod may also be oriented differently, for example horizontally, and extend through a side wall of the waste storage device. Finally, there is no gear rod necessary at all, and the friction based freewheel unit may also be used in combination with a crank to drive the driver ring. The independent invention may be defined as follows:

[0018] Waste storage device, comprising

- a container with a container opening,
- a driver ring, which is rotatably mounted to the container in the region of the container opening and which is designed to catch a waste storage bag or waste storage hose guided through a center opening of the driver ring, and
- a drive for the driver ring comprising a friction based freewheel unit.

[0019] In a beneficial embodiment of the invention(s), the gear rod is linear/straight. Accordingly, pushing the gear rod is done by a linear movement, which can be performed easily by humans. Furthermore, manufacturing of a linear/straight gear rod is comparably easy. That is why the proposed waste storage device can be put into practice with simple technical means.

[0020] In yet another beneficial embodiment, the gear rod is oriented vertically. Accordingly, the gear rod is pushed downwards for actuating the twisting mechanism. A downward movement can be performed easily by humans as well.

[0021] Moreover, the gear rod is arranged vis-à-vis of a hinge mounting the lid to the container in a beneficial embodiment of the waste storage device. In this way, the moving distance of the gear rod is comparably long. That is why just low forces are necessary for operation, and the twisting mechanism may be operated easily.

[0022] The gear rod may be spring loaded in yet another beneficial embodiment so that it automatically moves into its idle position after actuation. Accordingly, no movement back and forth is necessary for actuating the twisting mechanism, but just a pushing or pulling movement.

[0023] Beneficially, the driver ring is manually driven during operation, either directly or indirectly. In this way, the need for an energy source or a connector to a power grid may be omitted. Nevertheless, the driver ring may also be driven by an (electric) motor, again either directly or indirectly.

[0024] Advantageously, the driver ring comprises a funnel with elastic flaps/lids. Accordingly, putting waste into the waste storage hose or waste storage bag is eased. Moreover, the elastic flaps/lids rebound to their idle position after waste is disposed and thus close the waste storage hose or waste storage bag even before the driver ring is rotated.

[0025] In a further advantageous embodiment, the waste storage device comprises a fastener, which is mounted to the container and which is designed to fix the waste storage bag or waste storage hose. In this way, closing of the waste storage hose or waste storage bag by twisting the same is improved.

[0026] In yet another particular advantageous embodiment, the waste storage device comprises at least one tying device for holding the hose when knotting the same, which tying device comprises two pin-like portions with a slit in-between. By these measures, the hose may be knotted easily. To tie a knot, the hose is wound around the two pins and then threaded between said pins and through the generated loop. This movement may easily be performed by one hand. Accordingly, the proposed waste deposition device enables most users to knot the hose by use of just one hand in the first place respectively for the first time. In contrast, one normally needs two free hands for tying or making a knot. So the waste deposition device for example allows for carrying a baby in one hand and for disposing a diaper and tie the plastic hose into a knot with the other hand.

[0027] It is advantageous if the distance between axes of the two pin-like portions increases towards the ends

of the two pin-like portions and if an angle between said axes measured in the region of the two opening pin-like portions is equal to or less than 60°. That also means that the ends of the two pin-like portions point in basically the same direction (and not in opposed directions). By means of said measures, the loop of the hose is well held on the tying device during making the knot, and the knot in the hose can slipped off the tying device easily. The bigger the angle the lower is the risk that the knot slips off unintentionally. However, angles above 60° may cause catching the knot on the tying device.

[0028] It is also advantageous if the axes of the two pin-like portions are substantially parallel and if the ends of the two pin-like portions point in basically the same direction (and not in opposed directions). "Substantially parallel" in this context in particular means that an angle between the axes of the two pin-like portions is equal to or less than 10°. In other words, the distance between axes of the two pin-like portions does not substantially increase towards the ends of the two pin-like portions, and an angle between said axes measured in the region of the two opening pin-like portions is equal to or less than 10°. For this reason, the knot in the hose can slipped off the tying device even more easily.

[0029] Advantageously, the slit is V-shaped and opens towards the ends of the two pin-like portions. For this reason, the hose may be thread through the loop easily. However, the slit may also be bordered by parallel walls.

[0030] Advantageously, a blade is arranged in the slit. Hence, the hose may be cut easily. Because of the blade, a combined tying/cutting device is provided.

[0031] In yet another advantageous embodiment, a stopper is arranged at a distance from the free end of the pin-like portions. Particularly, the stopper is arranged at the end of the slit or before the end of the slit. By these measures, an undesired slipping of the hose into an unslit portion of the tying device what would hinder guiding the hose between the pins and through the loop of the hose is avoided.

[0032] In yet another advantageous embodiment, the tying device comprises a depression arranged on and running along the pin-like portions. In this way, the one making the knot can even more easily put a finger, in particular his thumb, through the loop formed by the hose wound around the two pins. Accordingly, it is even more easy to finish the knot by threading the free end of the rope-like or tube-like item through the loop.

[0033] In yet another particular advantageous embodiment of the waste storage device, one of the pin-like portions is formed by a gear rod guiding for the gear rod. In this way, said pin performs a double function, and the waste storage device may have a very compact design then. In this context, it is also beneficial if the first pin-like portion is formed by the gear rod guiding, and the second pin-like portion is formed by the fastener.

[0034] In another advantageous embodiment, the waste storage device comprises a holder for receiving a ring-shaped storage cassette containing the waste storage bag or waste storage hose. Accordingly, waste can be disposed many times without the need of changing the storage cassette.

[0035] Beneficially, the holder is mounted to the container. In a preferred embodiment, the storage cassette is simply laid onto the holder. It may freely turn so as to follow the movement of the driver ring, or it may be fixed to the holder so that a co-rotation with the driver ring is avoided.

[0036] In a further beneficial embodiment, the holder is mounted to the driver ring or comprised thereof for co-rotation. In a preferred embodiment, the storage cassette is simply laid onto the driver ring. Generally, the storage cassette synchronously rotates with the driver ring then. That is why an unwanted twisting of the waste storage hose or waste storage bag in the storage cassette is avoided.

[0037] In a further beneficial embodiment, the waste storage device comprises a crank handle coupled to the driver ring. Thus, alternative means are provided to actuate respectively turn the driver ring without the need to touch it.

[0038] For better understanding the invention, Figures showing embodiments of the invention are presented hereinafter. The Figures schematically show:

Fig. 1 a cross section of the waste storage device;

Fig. 2 a cross section of the upper part of the waste storage device;

Fig. 3 a cross section of the waste storage device at a different angle;

Fig. 4 an oblique view onto the waste storage system with open lid;

Fig. 5 an oblique view onto the waste storage system with open housing;

Fig. 6 an exploded view of the gear rod mechanism of the drive of the waste storage device;

Fig. 7 a detailed cross sectional side view of the freewheel unit of the drive of the waste storage device;

Fig. 8 a cross sectional front view of an exemplary freewheel unit and

Fig. 9 a detailed oblique view of an exemplary tying device from the top side.

[0039] Generally, same parts or similar parts are denoted with the same/similar names and reference signs. The features disclosed in the description apply to parts with the same/similar names respectively reference signs. Indicating the orientation and relative position (up,

down, sideward, etc.) is related to the associated Figure, and indication of the orientation and/or relative position has to be amended in different Figures accordingly as the case may be.

[0040] Figures 1 to 5 show an example of a waste storage device respectively a waste storage system. Fig. 1 shows a cross section AA of the waste storage device, Fig. 2 a cross section of the upper part of the waste storage device, Fig. 3 a cross section BB of the waste storage device, Fig. 4 an oblique view onto the waste storage system with open lid and Fig. 5 an oblique view onto the waste storage system with open housing. Fig. 4 moreover shows the orientation of the section planes for Figs. 1 to 3.

[0041] The waste storage device 1 comprises a container with an upper container part 2 and a lower container part 3, both preferably made of plastic. Both parts 2 and 3 are linked together by means of a first hinge 4 so that the upper container part 2 can be swiveled in relation to the lower container part 3 making the interior space of the container accessible. A handle 5 eases opening of the container. In normal operation the upper container part 2 is fixed to the lower container part 3 by means of a button 6, which latches into a recess 7. By pressing the button 6, said locking may be released.

[0042] On top of the container 2, 3 there is a container opening 8, which is be closed by a lid 9. The lid 9 is mounted to the upper container part 2 by means of a second hinge 10 so that the lid 9 can be swiveled in relation to the upper container part 2 making the container opening 8 accessible. There may also be an optional spring 11 for automatic opening of the lid 9.

[0043] The waste storage device 1 furthermore comprises a driver ring 12, which is rotatably mounted to the container in the region of the container opening 8 and which is designed to catch a waste storage bag or waste storage hose/tube 13 guided through a center opening of the driver ring 12. In this example, the driver ring 12 is mounted on top a support 14 and comprises an optional funnel with elastic flaps/lids 15. Preferably, the waste storage bag or waste storage hose/tube 13 is made of a plastic film, and preferable the flaps/lids 15 are made of an elastomer.

[0044] In addition, the waste storage device 1 comprises a holder 16 for receiving a ring-shaped storage cassette 17 containing the waste storage bag or waste storage hose 13. In this example, the storage cassette 17 comprises a lower ring 18 and a top ring 19. In this example, furthermore the storage cassette 17 is simply placed onto the holder 16, which is part of the upper container part 2. Accordingly, the waste storage cassette 17 may freely turn. However, the storage cassette 17 may also be fixed to the holder 16 (so as to avoid rotation), or the holder 16 may also be mounted to the driver ring 12 or comprised thereof for co-rotation. One can easily imagine that the storage cassette 17 will lay on top of the driver ring 12, if the holder 16 is omitted respectively is part of the driver ring 12.

[0045] The waste storage device 1 together with the storage cassette 17 form a waste storage system 20.

[0046] The driver ring 12 may comprise a toothing as this is shown in the Figures. Concretely, the driver ring 12 is attached to respectively comprises a gear ring 21 cooperating with a gear wheel 22 rotatably mounted to the container by means of an axle 23. In this example, the gear ring 21 comprises a beveled toothing cooperating with the bevel gear wheel 22. The bevel gear wheel 22 is coupled to a gear wheel 24 cooperating with a gear rod 25.

[0047] Alternatively, the gear rod 25 may also directly cooperate with the gear ring 21. The gear rod 25 is oriented horizontally then. However, it can also be oriented vertically if the container opening 8 is oriented vertically.

[0048] In a further alternative, a crank handle may be coupled to the driver ring 12. For example, the axle 23 can be made longer as shown and reach out of the container. The crank handle may be mounted to the axle 23 on the outside of the container then (in Fig. 3 on the left side).

[0049] The gear rod 25 is guided in the container 2, 3 at its first end by means of a guiding 26 and may be spring loaded so that it moves to its idle position after actuation. The gear is enclosed by a gear box 27. Furthermore, the container may comprise a fastener 28, which mounted to the gear box 27 and which is designed to fix the waste storage bag or waste storage hose 13 (but see also Fig. 9 in this context). An optional blade 29 may be mounted in the region of the guiding 26 or the fastener 28. The bevel gear wheel 22 and/or gear wheel 24 (or any other wheel of the driving mechanism) may furthermore comprise a freewheel unit (see also Figs. 6 to 8 in this context). In addition, the gear rod 25 may have an optional thickening respectively push button 30 on its top end as this is shown in Fig. 3.

[0050] The function of the waste storage device 1 respectively a waste storage system 20 now is as follows:

[0051] In a first step, the storage cassette 17 is attached to the holder 16, the waste storage hose 13 is pulled upwards and then fed through the driver ring 12. A knot 31 closes the end of the waste storage hose 13. The waste storage system 20 is ready for use now.

[0052] In a next step, waste such as baby or adult diaper or other personal waste material can be put into the storage hose 13 and disposed therein. For this reason, the pop-up lid 9 is automatically opened by the spring 11 when a corresponding button at the front side of the container is pressed. In turn, also the gear rod 25 moves upwards caused by a spring (not shown in Figures 1 to 5 but in Fig. 6).

[0053] Because the lid 9 opens by simply pushing the button by only one hand of user, the other hand is free to carry a baby for example at the same time. However, the spring 11 may also be omitted. The lid 9 is opened then by a simple lifting movement.

[0054] When waste is thrown through the rotating funnel, the elastic flaps/lids 15 rebound back to their idle

position and close the waste storage hose 13. When the lid 9 is closed now, it pushes down the gear rod 25. Accordingly, the lid 9 closes the container opening 8 and cooperates with the gear rod 25. The movement of the gear rod 25 causes a rotation of the gear wheel 24, the beveled gear wheel 22 and finally of the driver ring 12. Thereby, the waste storage hose 13 is twisted and closed.

[0055] By means of the rebound movement of the elastic flaps/lids 15 and the twisting movement of the same, smell is kept inside the waste storage hose 13. The protection against smell may even be improved if the gear rod 25 is spontaneously operated on request in addition to said automatic operation by the lid 9. The driver ring 12 may be operated spontaneously, for example by pushing the push button 30 on the free second end of the gear rod 25 or - if existing - by turning a crank handle coupled to the driver ring 12. In this context, one should also note that the gear rod 25 may directly cooperate with the gear ring 21 and may be oriented horizontally. In this case, the push button 30 may be arranged at the side of the container.

[0056] In the example above, the driver ring 12 is driven manually, e.g. by closing the lid 9 or by pushing the push button 30 by hand. However, motorized operation is imaginable as well. For example, a switch, which is actuated when the lid 9 is closed respectively when the rod 25 is pushed, can start a timer and a motor coupled to the driver ring 12. In this way, the driver ring 12 automatically turns for some (defined) time.

[0057] In the example disclosed above, the storage cassette 17 is simply placed onto the holder 16 and freely turns when the driver ring 12 is operated. The holder 16 and the storage cassette 17 may also synchronously move with the driver ring 12 when the holder is fixed to the driver ring 12. However, the storage cassette 17 may also be fixed to the holder 16 (so as to avoid co-rotation with the driver ring 12).

[0058] In the example above, moreover a free wheel unit avoids moving the driver ring 12 back and forth thus twisting and de-twisting the waste storage hose 13 when the gear rod 25 is pushed and released. However, instead or alternatively the elastic flaps/lids 15 may be shaped asymmetrically (e.g. like saw teeth) for that reason. Furthermore, the fastener 28 may be used to improve the twisting function. After disposal of waste, the container is opened by pushing the button 6 and by lifting the upper container part 2 by use of the handle 5. Then the twisted portion of the waste storage hose 13 is clamped by means of the fastener 28 (see Fig. 5).

[0059] In a preferred embodiment, a blade 29 is arranged in the region of the fastener 28 respectively in the region of the guiding 26. In this way, a piece may be cut off the waste storage hose 13. In this context, it should also be noted that the use of the waste storage device 1 is not limited to the use of a waste storage hose 13. Alternatively, also waste storage bags may be used. Simply speaking, the knot 31 may be omitted then. The functions disclosed hereinbefore apply to a waste storage bag in an equivalent way, anyway.

[0060] In the example above, the gear rod 25 is linear/straight. However, this is no necessary condition, and the gear rod 25 may also be arc shaped. Moreover, the gear rod 25 may be oriented inclined or horizontally in contrast to the example shown in the Figures. In this case, the free second end of the push rod 25 may face a wedge of a lid 9, which wedge transforms the vertical or swiveling movement of the lid 9 into a horizontal movement of the push rod 25.

[0061] In the example shown in the Figures, the gear rod 25 is arranged near to the hinge 10. This allows for short moving distances of the gear rod 25. However, the gear rod 25 may also be arranged vis-à-vis of the hinge 10 and thus at a larger distance from hinge 10 than shown what allows for low actuating forces.

[0062] Concluding, a waste storage device 1 and a waste storage system 20 are provided, which keep unwanted smell inside a waste storage hose 13 respectively a waste storage bag. The waste storage device 1 comprises a gear rod 25, which is movably guided in the container 2, 3 at its first end (here on its lower end), which is coupled to the driver ring 17 and which faces the lid 9 respectively cooperates with the lid 9 on its free second end (here on its upper end). The waste storage device 1 provides automatic operation on opening and/or closing of the lid 9, but also allows for proper spontaneous operation on request by means of the push button 30 on the free second end of the gear rod 25.

[0063] Fig. 6 now shows an exploded view of the gear rod mechanism respectively the drive of the waste storage device 1. Concretely, Fig. 6 shows two parts 27a, 27b of the gear box 27, the beveled gear wheel 22, the axle 23, the gear wheel 24, a freewheel unit 32, the gear rod 25 with the thickening / push button 30 and a gear rod spring 33. As already explained above, pushing the gear rod 25 causes the gear wheel 24 to turn. When moving the gear rod 25 downwards, the freewheel unit 32, which may have a ratchet mechanism or may be friction based, blocks or jams so that the gear wheel 24 and the beveled gear wheel 22 turn in unison / synchronously. The beveled gear wheel 22 protrudes through the recess 24 and engages with the driver ring 12 (not shown in Fig. 6) thus turning the driver ring 12.

[0064] When the gear rod 25 is released, the gear rod spring 33 causes an upward movement of the gear rod 25 and brings the gear rod 25 to its idle position. When the gear rod 25 moves upwards, the freewheel unit 32 does not block or jam so that beveled gear wheel 22 stands still while the gear wheel 24 is turned by the moving gear rod 25.

[0065] In the example above, the freewheel unit 32 blocks/jams upon a downward movement of the gear rod 25 and releases upon an upward movement of the gear rod 25. This is a beneficial variant but no necessary condition. The freewheel unit 32 may also block/jam upon an upward movement of the gear rod 25 and release

upon a downward movement of the gear rod 25. In this case, the gear rod spring 33 drives the beveled gear wheel 22 and thus the driver ring 12.

[0066] Figures 7 and 8 show an example of a drive for the waste storage device 1, which is very similar to the drive shown in Fig. 6. In contrast, the freewheel unit 32 is embodied as a friction based freewheel unit. Fig. 7 shows a detailed cross sectional side view of said drive, and Fig. 8 shows a cross sectional front view of said friction based freewheel unit. One should note, that freewheel unit of Figures 7 and 8 does not comprise a dedicated housing and is not embodied as a stand-alone device, but parts of the freewheel unit are formed by the beveled gear wheel 22 and gear wheel 24 itself.

[0067] Concretely, the freewheel unit comprises rollers 35, which are arranged between the gear wheel 24, which forms an inner, driven shaft, and the beveled gear wheel 22, which forms an outer sleeve. The rollers 35 are arranged in wedged respectively tapered notches 36 of the gear wheel 24 and are hindered to fall out of the notches 36 by the inner cylindrical surface of the beveled gear wheel 22. The rollers 35 are spring-loaded by roller springs 37. Optional pressing plates 38 may be used to transmit the spring force onto the rollers 35.

[0068] When the gear wheel 22 rotates counterclockwise, the rollers 35 get jammed in the tapered space between said notches 36 and inner cylindrical surface of the beveled gear wheel 22, making the gear wheel 24 and the beveled gear wheel 22 rotate in unison. When the gear wheel 24 is rotated clockwise, the rollers 35 just slip over the inner cylindrical surface of the beveled gear wheel 22. In this case the beveled gear wheel 22 stands still, even if the gear wheel 24 is rotated.

[0069] A particular advantage of the friction based freewheel unit is that it works very silently and is almost inaudible. In this way, a user of the waste storage device 1, and in particular a (sleeping) baby, is not bothered by the sound of the waste storage device 1.

[0070] In the examples shown in Figs. 6 to 8, the freewheel unit 32 is arranged between the gear wheel 24 and the beveled gear wheel 22. While this is a beneficial solution, this is no necessary condition, and the freewheel unit 32 may also be arranged at another position in the drive for the waste storage device 1.

[0071] Fig. 9 now shows an oblique view of an exemplary tying device/cutting device 39 from the top side. The tying/cutting device 39 comprises two pin-like portions 40, 41 with a slit 42 in-between. By these measures, the hose 13 may be tied into a knot 31 easily. For that reason, the hose 13 is wound around the two pins 40, 41 and then threaded between said pins 40, 41 and through the generated loop of the hose 13 (see the movement path shown in Fig. 9). The final downward movement does not just finish the knot 31 but also slips the finished knot 31 off the tying/cutting device 39.

[0072] This movement may easily be performed by one hand. In contrast, one normally needs two free hands for tying a knot 31. So the waste storage device 1 for example allows for carrying a baby in one hand and for disposing a diaper and tying the plastic hose 13 into a knot 31 with the other hand. Of course, the movement path starting on the left side as shown in Fig. 9 is just exemplary, and the movement can also start from other directions, for example from the front side, from the right side, from the back side or from another direction in-between.

[0073] One should note that the tying/cutting device 39 of Fig. 9 is embodied as separate device, which may be mounted to the body of the waste storage device 1 by means of a snap fit connection or a frictional connection, when it is designed to be removable. The waste storage device 1 may comprise multiple mounting or receiving positions for arbitrarily and in particular removably mounting the tying/cutting device 39. It is also possible to mount multiple tying/cutting devices 39 at the mounting/receiving positions. For example, two tying/cutting devices 39 can be mounted at two of three mounting/receiving positions.

[0074] However, the tying/cutting device(s) 39 may also be permanently mounted to the body of the waste storage device 1 by means of an adhesive or by means of welding, for example. Of course, the tying/cutting device(s) 39 may also be a part of the waste storage device 1.

[0075] In this context, it is particularly advantageous if one of the pin-like portions 40, 41 is formed by the gear rod guiding 26. That means, that the gear rod guiding 26 and the holder 28 shown in Figs. 1 to 7 form the pin-like portions 40, 41 of the tying/cutting device 39 shown in Fig. 9. Furthermore, this means that the gear rod guiding 26 and the holder 28 are not just for clamping the hose 31 in-between as shown in Fig. 5, but may also be intended to tie a knot 31 into the hose 31. By integrating the gear rod guiding 26 into the tying/cutting device 39 (respectively tying/cutting device 26, 28), the waste storage device 1 may have a very compact design. According to what is disclosed above, the technical teaching disclosed in the context of the tying/cutting device 39 shown in Fig. 9 equally relates the tying/cutting device 26, 28 shown in Figs. 1 to 7. Thus, "tying/cutting device 39" may be changed to "tying/cutting device 26, 28" and vice versa in said disclosure if just one alternative is used for the sake of brevity. It should be noted that gear rod guiding 26 may be one part or comprised of more gear rod guiding parts 26a, 26b as it is shown in Figs. 6 and 7.

[0076] In the example shown in Fig. 9 the tying/cutting device 39 comprises a blade 29 arranged in the slit 42. In this case, the plastic hose 13 may be cut easily. One should note that the blade 29 is optional. If there is no blade 29, the device 39 shown in the Fig. 9 is just a tying device. Of course, the waste storage device 1 may comprise any number of separate tying devices and cutting devices for providing a tying function and cutting function.

[0077] In the example shown in Fig 9, furthermore the axes of the two pin-like portions 40, 41 are substantially parallel and the ends of the two pin-like portions 40, 41 point in basically the same direction (and not in opposed

directions). In Fig. 9 both ends point downwards (and not downwards and upwards). "Substantially parallel" in this context in particular means that an angle α between the axes of the two pin-like portions 40, 41 is equal to or less than 10°. For this reason, the loop for the knot 31 is well held on the tying/cutting device 39 during making the knot 31, and the knot 31 in the hose 13 can slipped off the tying/cutting device 39 very easily. However, the angle α between the axes of the two pin-like portions 40, 41 may be up to 60° (see also the stylized two pin-like portions 40, 41 shown as "vectors" in the right region of Fig. 9). If so, the loop of the hose 13 is better held on the tying/cutting device 39 during making the knot 31. The bigger the angle the lower is the risk that the knot 31 slips off the tying/cutting device 39 unintentionally. However, angles above 60° may cause catching the knot 31 on the tying/cutting device 39.

[0078] In this example, the slit 42 is bordered by parallel walls. However, the slit 42 may also be V-shaped and open towards the ends of the two pin-like portions 40, 41. For this reason the hose 13 may be thread through the loop even more easily then.

[0079] Furthermore, the tying/cutting device 39 may comprise an optional stopper 43 arranged at a distance from the free end of the pins 40, 41. Particularly, the stopper 43 is arranged at the end of the slit 42 or before the end of the slit 42. By these measures, an undesired slipping of the plastic hose 13 into an unslit portion of the tying/cutting device 39 when wounding the plastic hose 13 around the pins 40, 41, in particular during an upward movement, is avoided. Such an undesired slipping would hinder guiding the hose 13 between the pins 40, 41 and through the loop of the hose 13. Of course, stoppers 43 may be arranged on both pin-like portions 40, 41.

[0080] In the example shown in Fig. 9, the tying/cutting device 39 comprises a depression 44 arranged on and running along the pin-like portions 40, 41. By these measures, one making the knot 31 can even more easily put a finger, in particular his thumb, through the loop formed plastic hose 13 wound around the two pins 40, 41. Accordingly, it is even more easy to finish the knot 31 by threading the free end of the plastic hose 13 through the loop.

[0081] It is noted that the invention is not limited to the embodiments disclosed hereinbefore, but combinations of the different variants are possible. In reality, the waste storage device 1 respectively the waste storage system 20 may have more or less parts than shown in the Figures. The waste storage device 1 respectively the waste storage system 20 and parts thereof may also be shown in different scales and may be bigger or smaller than depicted. Finally, the description may comprise subject matter of further independent inventions.

List of reference numerals

[0082]

1	waste storage device
2	upper container part
3	lower container part
4	first hinge
5	handle
6	button
7	recess
8	container opening
9	lid
10	second hinge
11	spring
12	driver ring
13	waste storage hose/tube
14	support
15	elastic lid/flap
16	holder
17	storage cassette
18	lower ring
19	top ring
20	waste storage system
21	gear ring / toothing
22	beveled gear wheel
23	axle
24	gear wheel
25	gear rod
26, 26a, 26b	gear rod guiding
27, 27a, 27b	gear box
28	fastener
29	blade
30	thickening / push button
31	knot
32	freewheel unit
33	gear rod spring
34	recess
35	roller
36	wedged/tapered notch
37	roller spring
38	pressing plate
39	tying/cutting device
40	first pin-like portion
41	second pin-like portion
42	slit
43	stopper
44	depression

Claims

1. Waste storage device (1), comprising

- a container (2, 3) with a container opening (8),
- a lid (9), pivotably mounted to the container (2,

3) to open and close the container opening (8),
- a driver ring (12), which is rotatably mounted to the container (2, 3) in the region of the container opening (8) and which is designed to catch a waste storage bag or waste storage hose (13) guided through a center opening of the driver ring (12), and
- a gear rod (25), which is movably guided in the container (2, 3) at its first end and which is coupled to the driver ring (17),

characterized in that
the gear rod (25) cooperates with the lid (9) on the free second end of the gear rod (25).

2. Waste storage device (1) according to claim 1, **characterized in that** a movement of the lid (9) causes a movement of the gear rod (25) and of the driver ring (17) and also causes a twisting and closing of the waste storage hose (13).

3. Waste storage device (1) according to claim 1 or 2, **characterized in that** the driver ring (17) comprises a toothing respectively a gear ring (21) coupled to the gear rod (25).

4. Waste storage device (1) according to claim 3, **characterized in that** the driver ring (17) comprises a toothing respectively a gear ring (21) cooperating with a bevel gear wheel (22), which is coupled to a gear wheel (24) cooperating with the gear rod (25).

5. Waste storage device (1) according to claim 4, **characterized in that** a movement of the lid (9) causes a movement of the gear rod (25), the gear wheel (24), the beveled gear wheel (22) and of the driver ring (17) and also causes a twisting and closing of the waste storage hose (13).

6. Waste storage device (1) according to any one of claims 1 to 5, **characterized in that** the gear rod (25) is arranged vis-à-vis of a hinge (10) pivotably mounting the lid (9) to the container (2, 3).

7. Waste storage device (1) according to any one of claims 1 to 6, **characterized in that** the gear rod (25) respectively the driver ring (12) is manually driven during operation.

8. Waste storage device (1) according to any one of claims 1 to 7, **characterized in that** the driver ring (12) comprises a funnel with elastic flaps/lids (15).

9. Waste storage device (1) according to any one of claims 1 to 8, **characterized in** a fastener (28), which is mounted to the container (2, 3) and which is designed to fix the waste storage bag or waste storage hose (13).

10. Waste storage device (1) according to any one of claims 1 to 9, **characterized in** at least one tying device (39) for holding the hose (13) when knotting the same, which tying device (39) comprises two pin-like portions (40, 41) with a slit (42) in-between.

11. Waste deposition device (1) as claimed in claim 10, **characterized in that** a distance between axes of the two pin-like portions (40, 41) increases towards the ends of the two pin-like portions (40, 41) and an angle (α) between said axes measured in the region of the two opening pin-like portions (40, 41) is equal to or less than 60°.

12. Waste deposition device (1) as claimed in claim 10, **characterized in that** the axes of the two pin-like portions (40, 41) are substantially parallel, wherein the ends of the two pin-like portions (40, 41) point in basically the same direction.

13. Waste deposition device (1) as claimed in any one of claims 10 to 12, **characterized in that** the slit (42) is V-shaped and opens towards the ends of the two pin-like portions (40, 41).

14. Waste deposition device (1) as claimed in any one of claims 10 to 13, **characterized in** a blade (29) arranged in the slit (42).

15. Waste deposition device (1) as claimed in any one of claims 10 to 14, **characterized in** a stopper (43) arranged at a distance from the free end of the pin-like portion (41).

16. Tying device (4) as claimed in any one of claims 10 to 15, **characterized in** a depression (44) arranged on and running along the pin-like portions (40, 41).

17. Waste storage device (1) according to any one of claims 1 to 16, **characterized in** a holder (16) for receiving a ring-shaped storage cassette (17) containing the waste storage bag or waste storage hose (13).

18. Waste storage device (1) according to claim 17, **characterized in that** the holder (16) is mounted to the driver ring (17) or comprised thereof for co-rotation.

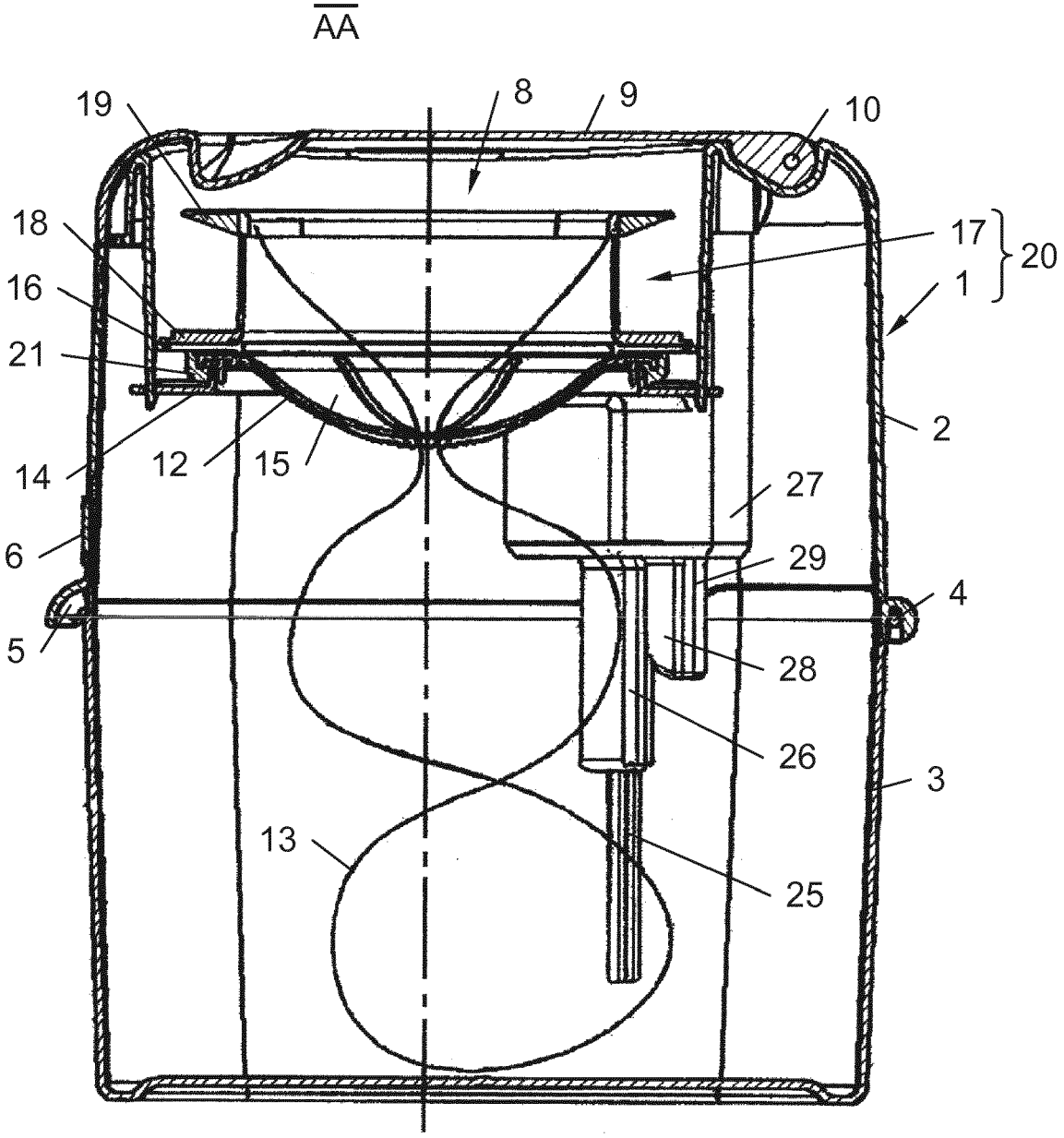

Fig. 1

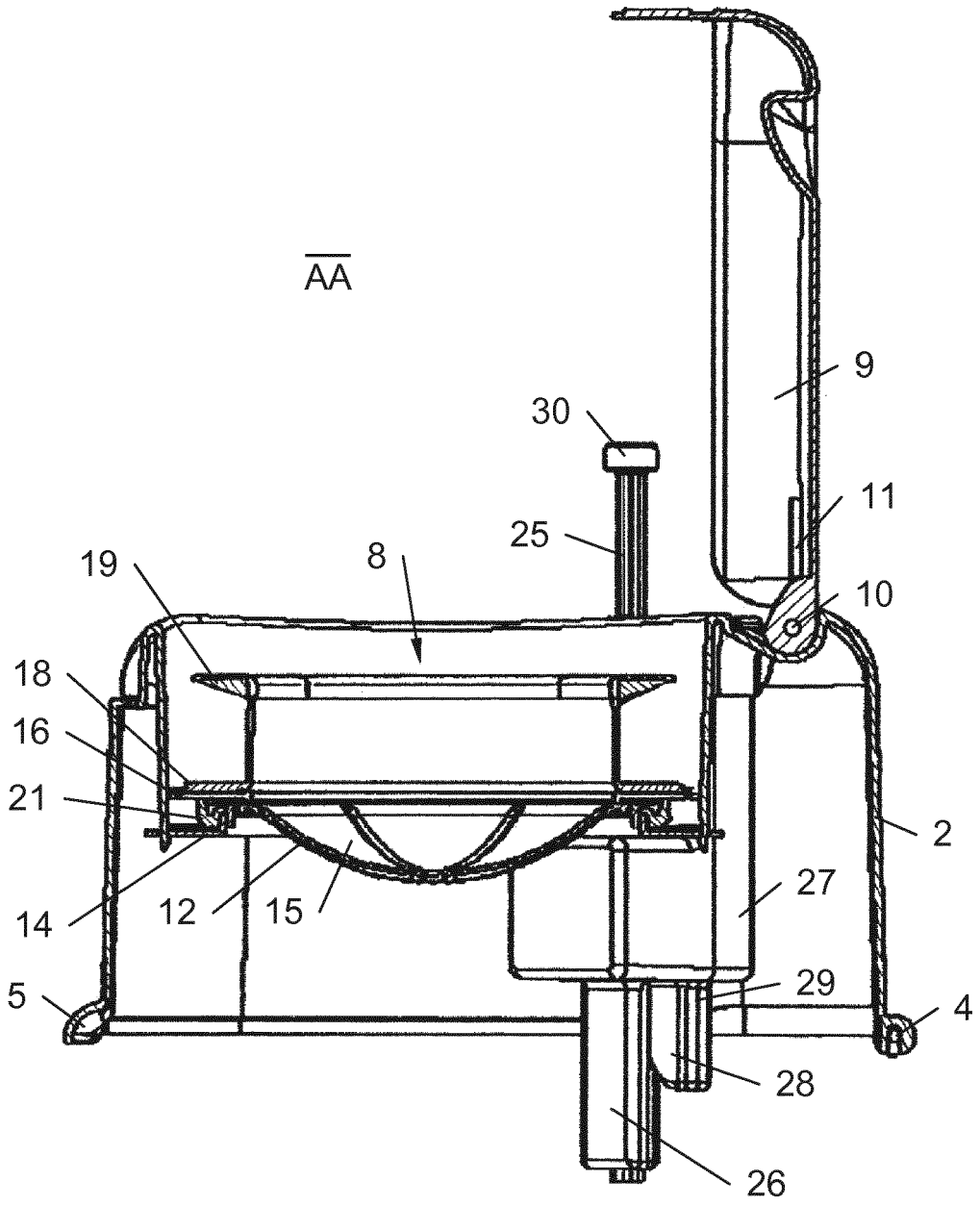

Fig. 2

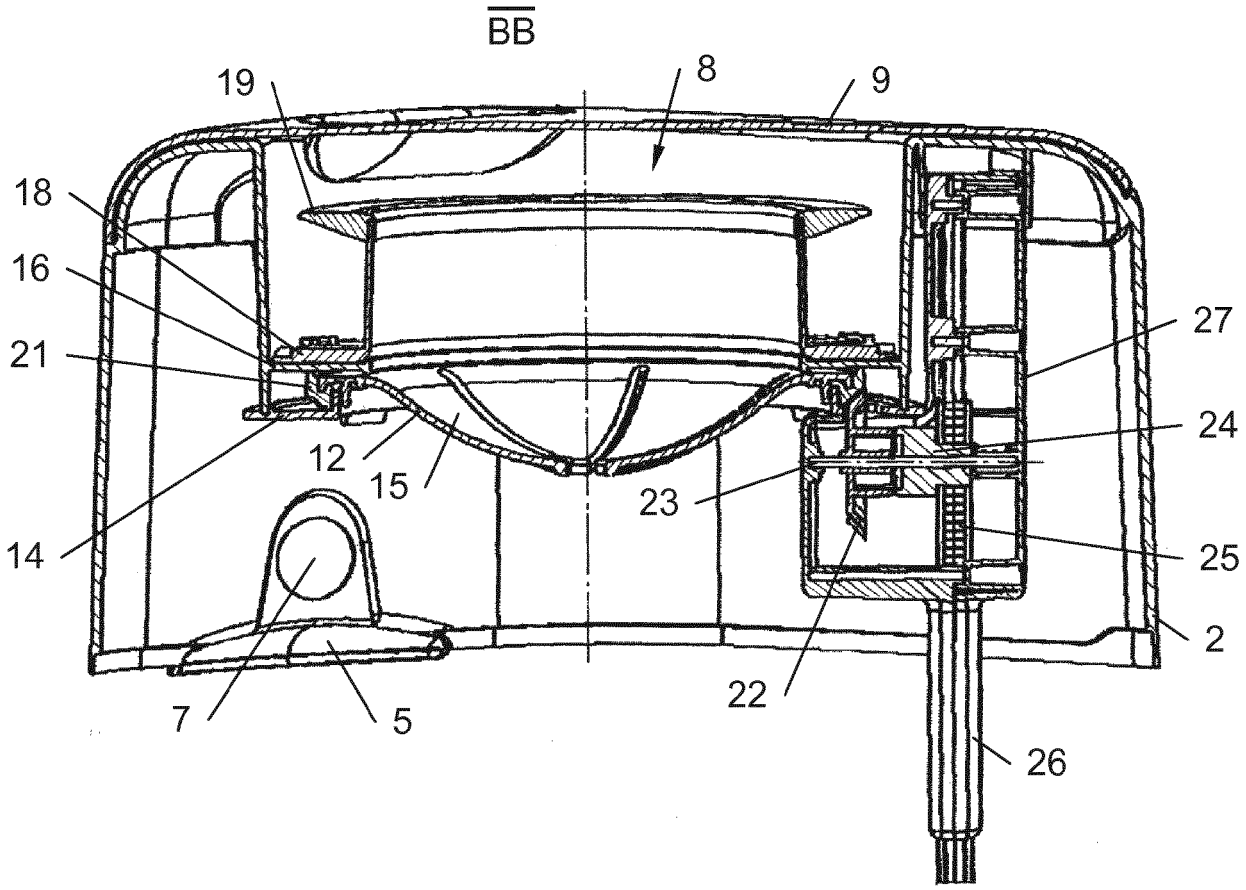

Fig. 3

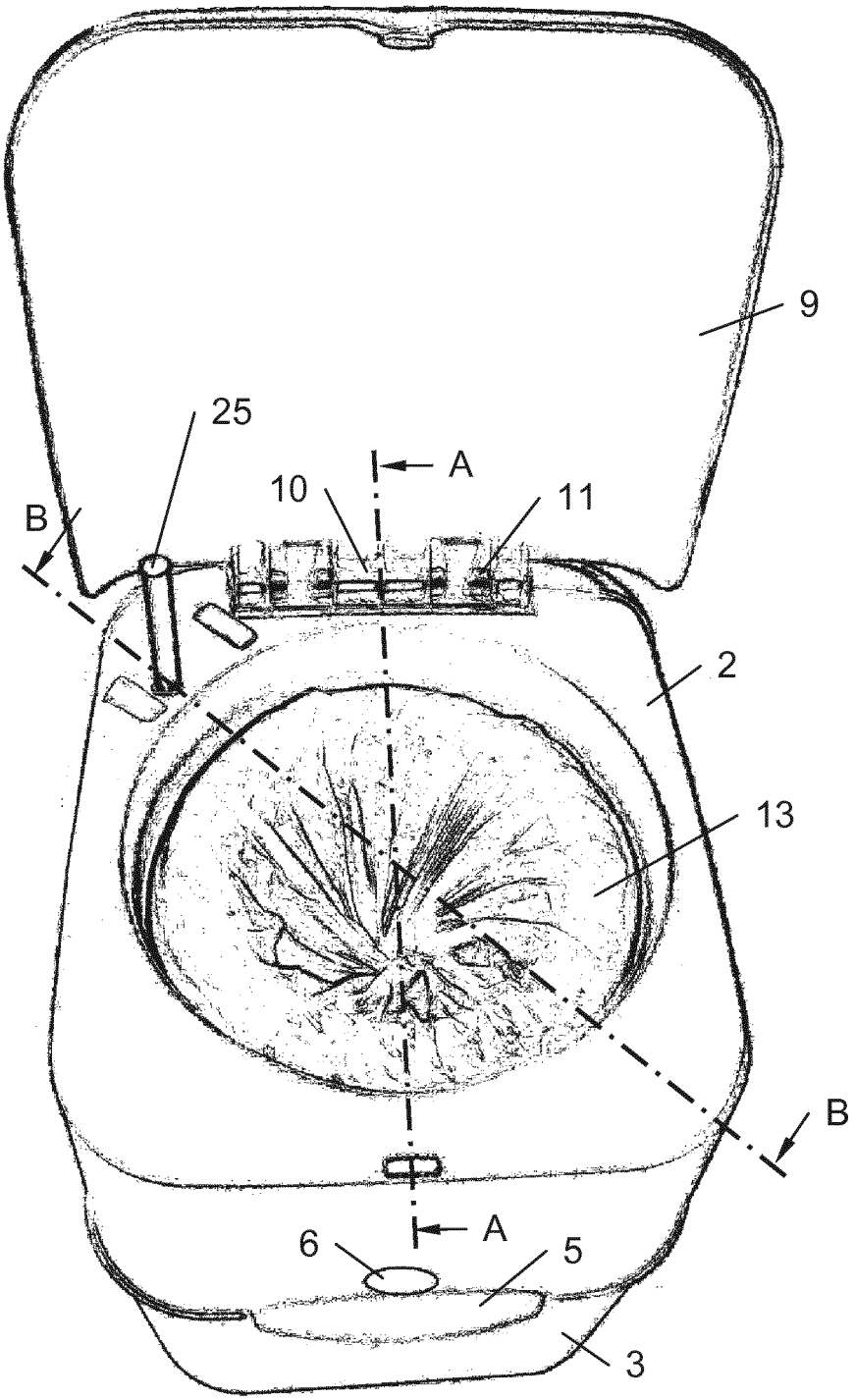

Fig. 4

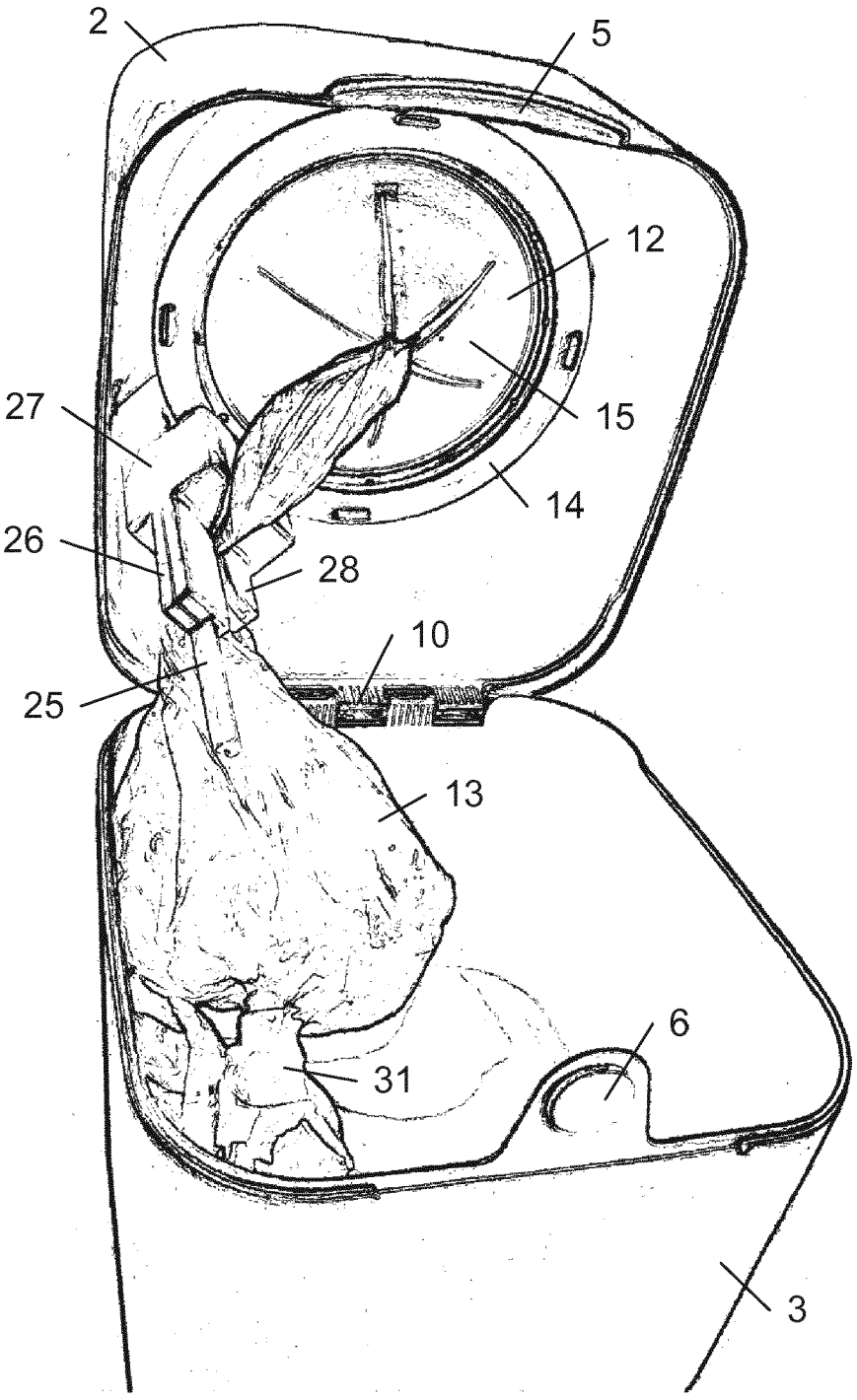

Fig. 5

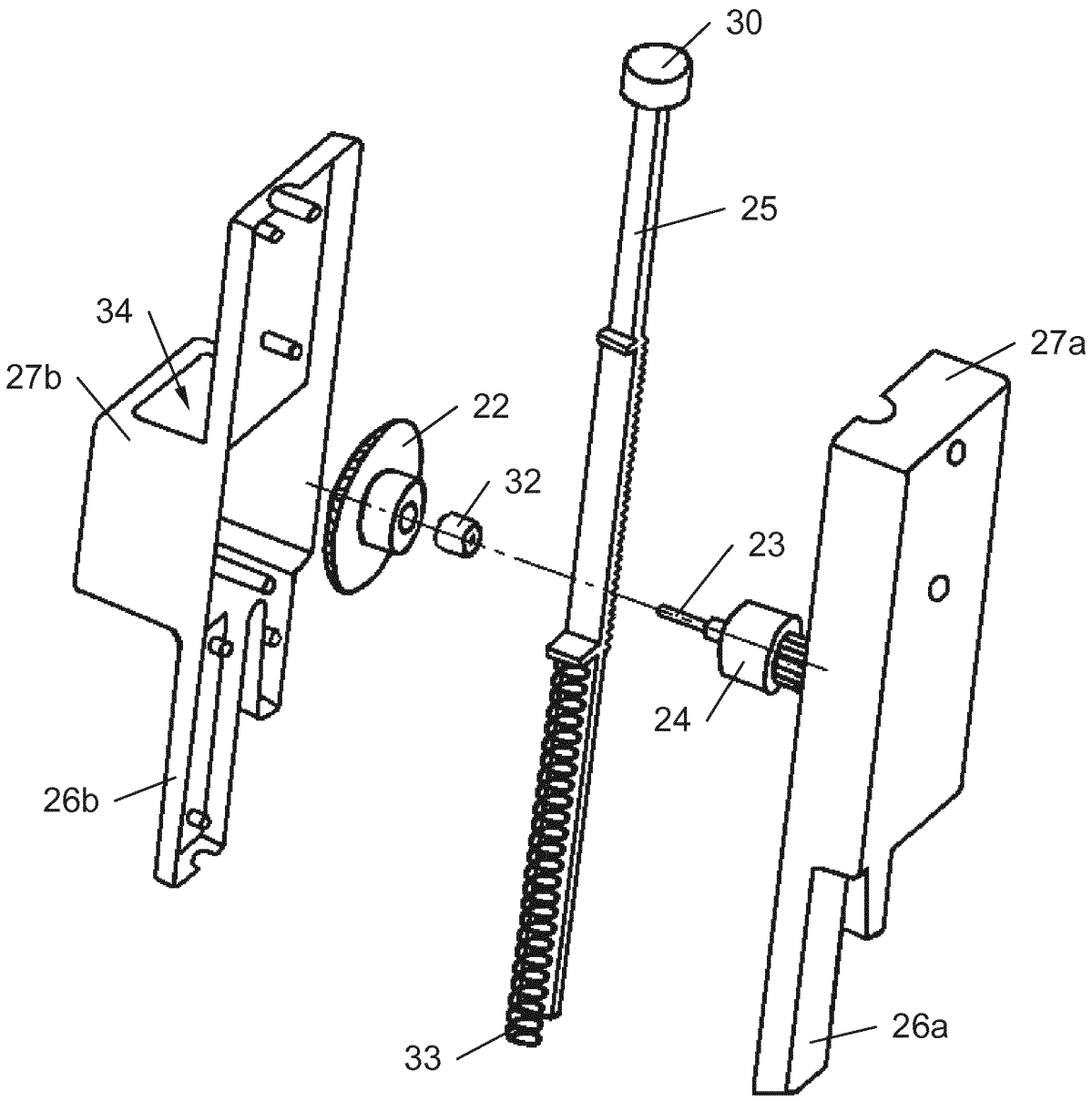

Fig. 6

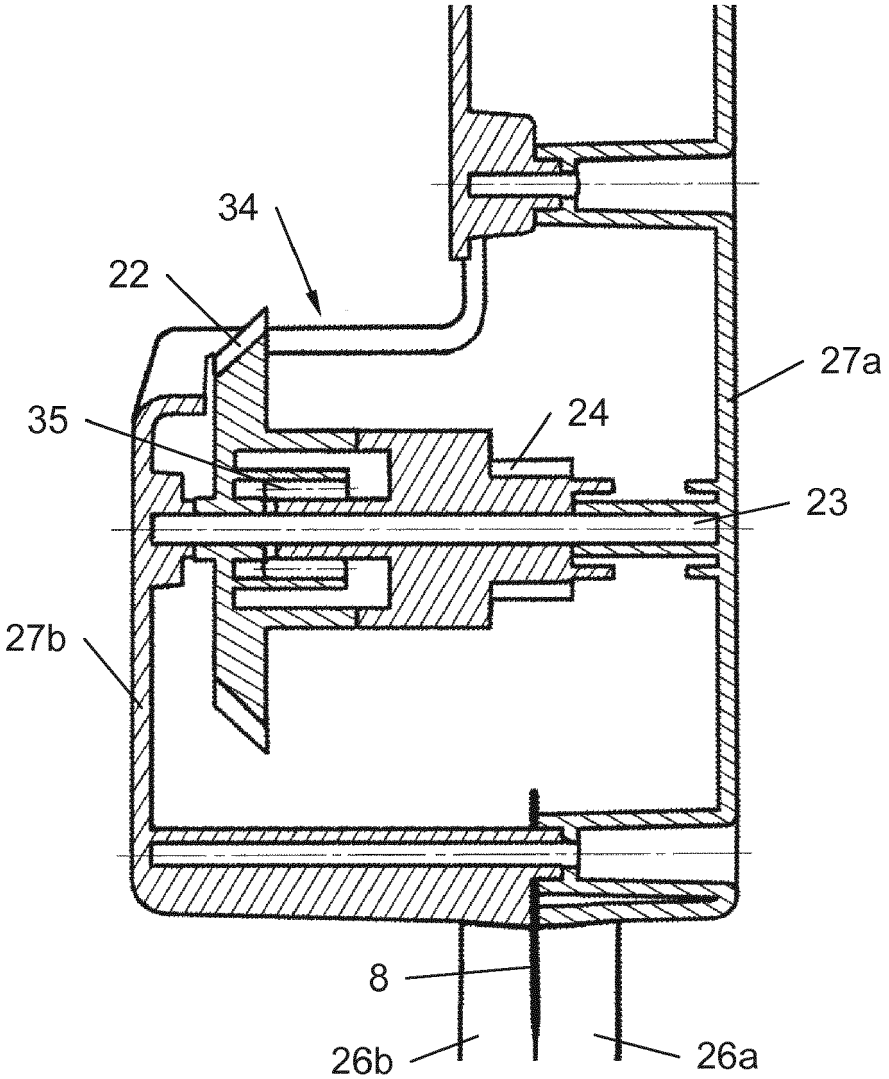

Fig. 7

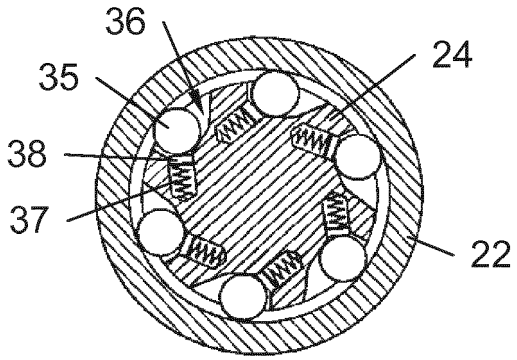

Fig. 8

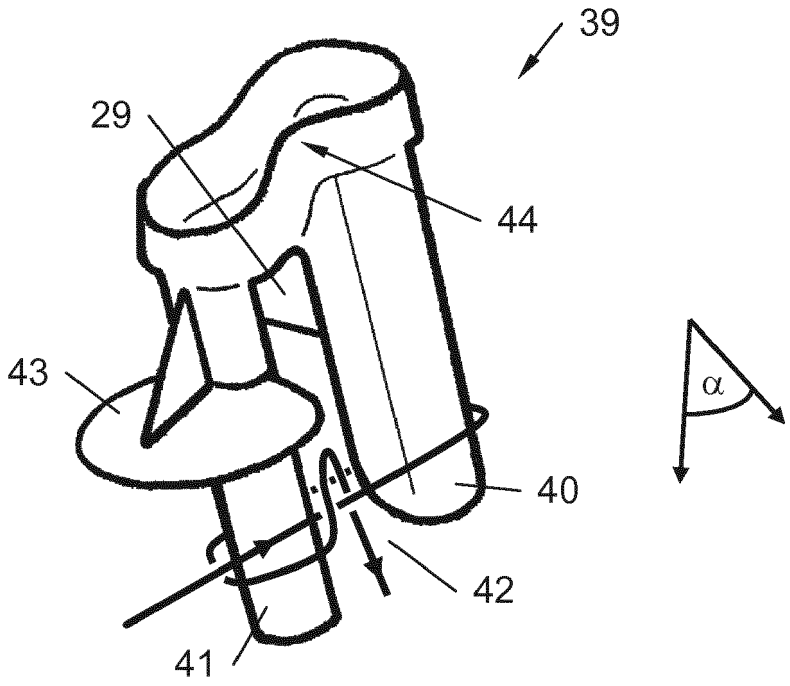

Fig. 9

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Application Number
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