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(54) **PORTABLE ELECTRICAL BIDET DEVICE**

(57) Described is a portable electrical bidet device (700) (Figure 1), comprising inter alia, a housing (710, 711) enclosing an electrical liquid pump (770) and a voltage source (780) both controlled by an electronic control system (750), a general-purpose adapter (760) for securing bottles or containers of all types to the device for supplying water or other cleaning liquid, and a nozzle (730) for creating and targeting an adjustable jet of liquid to the user's skin area to be cleaned. The device provides an innovative design of the general-purpose adapter (760) to ensure the ability to use all types of bottles and containers without the need to use another adapter or spare part. At the same time, the device introduces innovations in the adapter (760) and the nozzle (730) that creates the liquid jet for more efficient operation, ease of manufacturing and cleaning of the device, as well as in the reduction of manufacturing costs and the increase of durability and in the reduction of wear of the device during use.

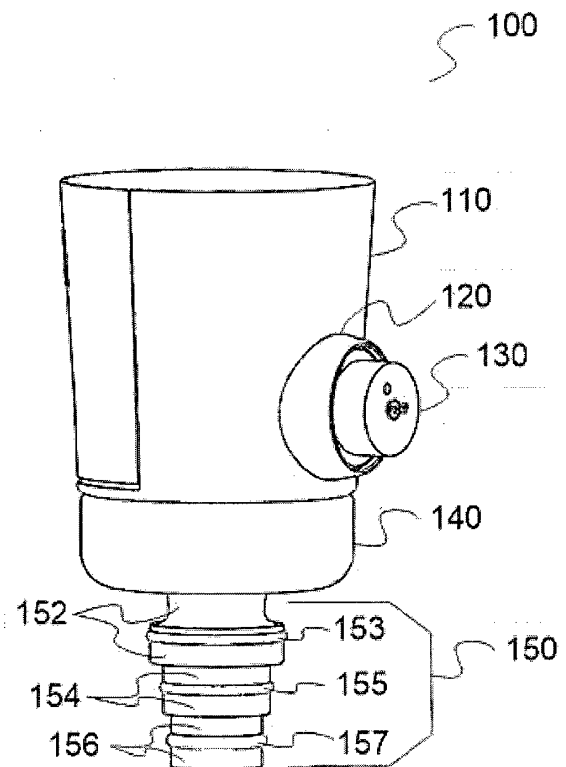


Figure 1

Description

[0001] State of the Art: A variety of personal hygiene systems, devices and accessories are known in the literature for use in the personal hygiene of men, women and infants. Toilet paper and wet wipes, which are simple to produce and use, bidet systems, and portable bidet devices have been proposed and patented.

[0002] Their goal is the cleanliness of sensitive areas, especially after using the toilet, to avoid unpleasant odors, infections, etc. and the feeling of freshness. Depending on the article/device used, a different level of hygiene and comfort is provided, as well as a different ecological footprint. For example, the use of paper products creates waste that require corresponding management while, at the same time, entail destroying trees or other plant resources for their manufacture.

[0003] More environmentally friendly methods are bidet devices that consume water instead of paper. Traditionally, bidet devices were placed next to the toilet bowl and used after using the bowl. In other cases, e.g. in Arab countries, a bidet device is installed inside the toilet bowl so that the user of the bowl can activate and use the bidet device without having to get up from the bowl, thus achieving ease of use and possibly an additional advantage in terms of hygiene. There are modern bidet devices in the relevant literature which use the fresh water supply of the toilet bowl and which are often expensive. The disadvantage of such devices is that they are not installed everywhere in public or private toilets (to be precise, they are extremely rare, with the possible exception of Arab countries). As a result, their potential user is often frustrated by the absence of such devices and is forced to use paper products etc. with the disadvantages they have.

[0004] The only alternative, are portable bidet devices, which the user can bring with him and use in any public or private toilet after using the toilet bowl, either in the toilet bowl itself, or elsewhere. There are a variety of portable bidet devices in the literature and one can choose between two basic types: mechanical and electrical portable bidet devices.

[0005] Mechanical portable bidet devices usually consist of a nozzle mounted on a special base through a tubular member. The base is usually in the form of an adapter-cap through which the nozzle is connected to a plastic flexible bottle. In some cases, the bottle is a bottle of specific type and size for the sale of commercial liquids, while in other cases it is a special bottle which is a removable part of the device. In the first case, the user pushes the bottle to increase the water pressure inside the bottle and to create a jet of water which is ejected from the nozzle of the device to the target area for cleaning it. This very simple layout of the device allows its economical manufacture, small dimensions for ease of transport and ease of cleaning but, at the same time, it does not facilitate the adaptation of the jet to the user's preferences and the needs of the area to be cleaned.

[0006] In the second case, the use of a special bottle may have similar characteristics to the first case and consequently similar restrictions, while there are examples where the angle of the nozzle with the longitudinal axis of the device can be adjusted for easier aiming (practically the longitudinal axis with the nozzle are designed so as to be able to perform a limited flip motion about an axis passing through the end of the longitudinal axis which is in contact with the main body of the device, away from the nozzle. In this case, issues of sealing of the rotating member arise with consequent increase in complexity and manufacturing costs. In some cases, the special bottle may have additional features such as non-return type valve so that, while the bottle is empty of content, to allow air into the bottle in order to facilitate maintaining sufficient pressure for efficient generation of the liquid jet from the nozzle. In a few cases, an air pump embodiment in the remote edge, from the nozzle of the bottle, is used to create sufficient pressure for the efficient generation of the liquid jet from the nozzle, in order to make the handling of the device easier. In any case, however, the restriction of the use of a special bottle and the impossibility of satisfactory control of the pressure of the jet coming out of the nozzle remains.

[0007] Problem Definition: In portable bidet devices known from the literature there is the problem, of the user being unable to sufficiently control the pressure of the jet coming out of the nozzle of the device. A further problem is that the user is unable to use any bottle whatsoever, as the supply source of the liquid, used to clean the targeted area.

Proposed Solution: Presented is a portable bidet device with pressure accuracy control of the jet coming out of the nozzle of the devices and allowing the use of any bottle for supplying the liquid used for cleaning the targeted area.

[0008] According to the invention, the portable bidet device comprises, inter alia, electrical liquid pump for pumping liquid from a flask or other container which is attached to the device and the creation of sufficient pressure so that the pumped liquid creates a jet after exiting the nozzle which is also included in the device, voltage source for supplying electricity to the liquid pump, electronic system for the control of the voltage source and the liquid pump, general-purpose adapter for secure attachment of any type and size of bottle or container to the device in order to supply liquid to the device, and an adjustable nozzle.

[0009] The novelty of the present invention lies in the following features and their combination: (a) a general-purpose adapter for securing and using any liquid bottle or container; (b) ability to use the device at a wide range of angles for better targeting of the liquid jet; (c) targeting the liquid jet without the use of moving parts (arm with nozzle) in order to reduce manufacturing costs and attain a greater durability of the device; and (d) ability to adjust the pressure (or even the range) of the liquid jet.

Brief description of the drawings

[0010]

Figure 1 illustrates a front-lateral view of the inventive portable bidet device.

Figure 2 illustrates an example connection of the inventive portable bidet device to a liquid bottle.

Figure 3 illustrates the appropriate way to use the inventive portable bidet device.

Figure 4 illustrates an embodiment example of the anterior face of the inventive portable bidet device.

Figure 5 illustrates an embodiment example of the rear face of the inventive portable bidet device.

Figure 6 illustrates a sectional view along the general-purpose adapter for the secure attachment of the liquid bottle to the innovative portable bidet device.

Figure 7 illustrates a simplified exploded side view of the inventive portable bidet device.

Figure 8 illustrates views of the nozzle adjustments.

Figure 9 illustrates views of the charging device of the voltage source.

DETAILED DESCRIPTION OF THE INVENTION

The portable bidet device and its use

[0011] Figure 1 shows a front-lateral view of the innovative portable bidet device. The portable bidet device (100) comprises a housing (110) enclosing the inner part of the device, electrical, electronic and mechanical components (not shown in Figure 1) and a general-purpose adapter (140) for bottles, containers etc. The housing (110) (which is an optional component and in alternative embodiments can be omitted with the provision that the enclosed components have a suitable design allowing their outer surfaces to provide protection to the respective components on the one hand and ergonomics on the other hand) and the adapter (140) are made of plastic material selected so as to have at least one of the following properties: drop resistance, non-slip surface so that it is easy to hold firmly in the user's hand even when the device is wet on the outside, a surface that can be coated with paint or that has a texture of the manufacturer's choice and a possibility of manufacturing by casting or other method suitable for plastic materials. Such plastic materials are known in the literature. For greater strength, the housing (110) may optionally include grooves and ribs for ergonomics and durability. In another embodi-

ment example, the housing (110) and/or the adapter (140) are made of metallic material or alloy, or environment friendly materials (e.g. wood, plastic imitation of natural materials such as materials of vegetable origin etc.).

[0012] The housing (110) comprises, on its outer surface, a protrusion (120) in which is fitted a nozzle (130) which is rotatable about an axis perpendicular to and intersecting the center of the nozzle. The nozzle is made of plastic or other similar material, and in different embodiments, it may be made of metal, metal alloy or other material.

[0013] The adapter (140) is dimensioned and with such a corresponding shape and cross-section that it fits to the dimensions and to the shape of the housing (110) in which it secures with a rotary movement (it is screwed) around the longitudinal axis of the housing (100). In an alternative embodiment the adapter (140) secures to the housing (110) with a suitable locking mechanism (e.g. hooks and recesses, mechanism with knobs and recesses of type "L", etc.).

The adapter (140) comprises a plurality of ring-shaped parts (150) whose diameter decreases as the distance from the main body (140) of the adapter increases. These rings (150), in one embodiment example, are 3, (152), (154), (156) and each bears an elastic ring or projection (153), (155), (157) so that they can fit securely on any container or bottle nozzle for supplying the portable bidet device (100) with water or other liquid for the cleaning of the sensitive area of infants, children and adults. In other embodiment examples, fewer or more rings of the same or different width may be used without departing from the scope and intended protection of the present invention.

[0014] The rings (150) and the adapter (140) are a single body which is made by the same casting process (or by another method suitable for forming plastic or metal materials). In a different embodiment example, the rings (150) and the adapter (140) are made as independent components which are then joined into a single body either by welding (e.g., thermal welding or by using a suitable adhesive), or by assembling (e.g. by wedging or screwing the rings (150) first to the adapter (140) and then one ring to the other in descending diameter.

[0015] The elastic rings or protrusions (153), (155), (157) which the rings (152), (154), (156) bear may be shaped with a substantially round cross-section and made during the casting of the rings (152), (154), (156) (or of the adapter (140) if molded together with the rings (152), (154), (156) as a single body) depositing natural or artificial elastic material or other material having similar properties with those of rubber. When manufacturing the adapter (140) and/or the rings (152), (154), (156) with a method different to casting, the elastic rings (153), (155), (157) are applied to the respective rings (152), (154), (156) which each bears a groove on its surface, preferably (but not necessarily) parallel to its diameter and of a width substantially equal to the cross-sectional diameter and a depth less than the diameter of the cross-

section of the corresponding elastic ring (153), (155), (157).

[0016] In case of forming the elastic rings (153), (155), (157) with a cross-section different from the substantially round cross-section, then the groove on the surface of the corresponding ring (152), (154), (156) is shaped and dimensioned with a width substantially equal to the maximum width and a depth less than the minimum height of the corresponding elastic ring (153), (155), (157).

The application of the elastic rings (153), (155), (157) is done in the grooves of the rings (152), (154), (156) so that the elastic rings (153), (155), (157) cannot be moved during normal use of the device (100), thereby ensuring secure attachment of the flask or container of water or other liquid to the device (100) through the adapter (140) and specifically one of the rings (152), (154), (156) which has a smaller outside diameter than the inside diameter of the cap of the bottle or container to be connected. The bottle or container is secured in the ring (152), (154), (156) by the corresponding elastic ring (153), (155), (157) which deforms and fills in a watertight and airtight manner the gap between the ring (152), (154), (156) and the corresponding elastic ring (153), (155), (157).

[0017] The choice of the outer diameter of the rings (152), (154), (156) and the elastic rings (153), (155), (157), as well as their number, are such as to ensure the safe and watertight and airtight connection of the bottle or container of the user's choice (e.g. special bottle sold together with the device (100), bottle or container of water or other commercially available liquid, etc.). Therefore, any bottle or container of water or other liquid with a round cross-section can be used with the device (100). In an alternative embodiment example, the rings (152), (154), (156) and the elastic rings (153), (155), (157) of the adapter (140) can be replaced with corresponding parts of different cross-section (e.g. hexagonal, triangular, square, etc.) to be suitable for supporting and securing containers with unusual (non-round cross-section) nozzles.

[0018] Figure 2 illustrates an example of connecting the innovative portable bidet device to a liquid bottle. The illustration of the example connection (200) shows the housing (210) of the portable bidet device carrying a nozzle (230) adapted to a protrusion (220) and an adapter (240) which includes (or bears) a ring (252) with a fitted or integrated elastic ring (253) as described in Figure 1.

[0019] A water bottle (e.g. 150ml-2lt) (270) is connected in a watertight and airtight manner through the ring with the inserted or integrated elastic ring (not shown in Figure 2 as they are covered by the nozzle (260) of the water tank (270)) of smaller diameter of the ring (252) and the elastic ring (253). The bottle (270) is depicted carrying optional grooves-recesses (280) of various shapes and profile dimensions to enhance its resistance against deformation, to better maintain its shape, or also to provide a non-slip handle to its user.

[0020] The use of the ring and the integrated elastic ring to support and secure the bottle (270) allows any bottle with a round cross-section to be secured as op-

posed to adapters which, instead of rings (150), they have a thread on the inside of the main body of the adapter (140) in which the thread of the outer surface of the cap is screwed (260). The reason is that, with the proposed design, they can secure in the portable bidet device bottles or containers of liquid with any type of thread (e.g. thick, narrow, dense, sparse, etc. thread).

[0021] Figure 3 illustrates the appropriate use of the innovative portable bidet device. The portable bidet device consists of a housing (310) bearing on its front face a protrusion (320) with an adjustable nozzle (330), adapter (340) carrying a ring (352) with a fitted or integrated elastic ring (353), an operation control knob (395) (which is part of the electronic control system) on the lateral view of the housing (310) and a covered charging hole (390) (which is part of the voltage source) on the rear (or lateral in an alternative embodiment) face of the housing (310).

[0022] On the casing (310) of the portable bidet device, a water bottle (370) is connected in a watertight and airtight manner through a ring to an inserted or integrated elastic ring (not shown in Figure 3 as they are covered by the nozzle (360) of the water tank (370)). The user of the portable bidet device can use the device by placing it at an angle of -80° to $+80^\circ$ with the vertical plane (301), where this angle is defined between the vertical plane (301) and the longitudinal axis (302), (303) of the device, respectively, which axis (301), (302) substantially coincides with the longitudinal axis of the bottle (370) when said bottle is connected to the adapter (340) of the portable bidet device. The horizontal axis is the axis (305). Angles are not scaled in the figure.

[0023] This design and the possibility of using the portable bidet device at an angle (-80° - $+80^\circ$) is another novelty of the present invention as the allowable angle can be much larger or at least substantially equal to the corresponding devices known in the literature, while eliminating the need for moving parts (e.g. arm with a nozzle) resulting in reduced complexity and manufacturing costs, easier and more effective disinfection, and durability of the device and all its components.

[0024] The parts of the portable bidet device illustrated in Figures 1-3 may be modified as to their shape as their dimensions and their relative position in the portable bidet device as these modifications are obvious to the average person of relevant knowledge of the state of the art relating to the present invention, without such modifications being deemed to deviate from the scope and intended protection of the present invention.

External Details of the Portable Bidet Device

[0025] Figure 4 illustrates an example of implementing the front view of the innovative portable bidet device. The portable bidet device (400) is shown to include a housing (410) which encloses electrical, electronic and mechanical components (not shown) inside the device, and which is connected to a general-purpose adapter (440) for bottles, containers, etc.

[0026] The housing (410) includes a protrusion (420) to which a nozzle (430) is fitted which can be rotated about an axis perpendicular and intersecting the center of the nozzle. The adapter (440) has a plurality of ring-shaped parts (450) whose diameter decreases as their distance from the main body (440) of the adapter increases. These rings (450) in this particular embodiment example are 3, (452), (454), (456) and each have an elastic ring or protrusion (453), (455), (457) so that they can fit with safety at the mouth of any container or bottle for supplying the portable bidet device (400) with water or other liquid for cleaning the sensitive area of infants, children and adults.

[0027] In other exemplary embodiments, fewer or more rings of the same or different widths may be used without departing from the scope and intended protection of the present invention. The nozzle (430) is shown with a hole for creating a water (or other cleaning liquid) jet of low (432) and high (433) pressure and a closed position "STOP" (431) without a hole in order to avoid creating a jet and to protect the interior of the portable bidet device from the penetration of dust and the ingress of liquids that could either damage or contaminate the internal parts of the device. Finally, an operation control knob (495) of the device is displayed on the right side.

[0028] In a variation of the present embodiment example in Figure 4, the parts of the portable bidet device may be positioned in different relative positions and the nozzle 430 may include more or less holes for creating a jet of water or other liquid, the holes (432), (433) can be designed so as to create a narrow and wide cross-section jet respectively, while additional elements can be added so that the user can have more options in terms of jet pressure and range. Also, both the shape and the dimensions of the protrusion (420) and the nozzle (430) can be modified with the only restriction that the protrusion (420) allows the free rotation of the nozzle (430).

[0029] Figure 5 shows an example of implementing the rear side of the innovative portable bidet device. The rear (or the lateral, in an alternative embodiment) side of the portable bidet device is shown as having a housing (510) with a light bulb (597) (which may be part of an electronic control system) to provide the user with a low voltage visual indication of the voltage source (e.g. rechargeable battery to supply voltage to an electrical pump and electronic control system) of the device (500), elastic cover (598) which protects (seals in a watertight manner) the opening for charging the device (not shown), an adapter (540) comprising or incorporating parts (500) consisting of 3 rings (552), (554), (556) of reduced diameter with inserted or integrated elastic rings (553), (555), (557), respectively, and an operation control knob (595) (on the side view of the housing (510)). The light bulb (597) and the elastic cover (598) are (optionally) mounted in a depression (596) which allows the light bulb (597) and elastic cover (598) profile not to protrude from the outer surface of the housing (510), thus offering them protection and comfort and attractive aesthetic result to the user of

the portable bidet device.

[0030] The elastic cover (598) is mounted above the charging hole (390) and optionally includes a retaining mechanism consisting of a retaining member which connects the elastic cover (598) to the housing (510) and allows the elastic cover (598) to be held in a position that seals or reveals the charging hole (390).

Details of the General-Purpose Adapter

[0031] Figure 6 shows a sectional view along the general-purpose adapter for securely attaching a liquid bottle to the innovative portable bidet device. The adapter (600) is shown consisting of a main body (640), rings (652), (654), (656) of reduced outer diameter, fitted with integrated elastic rings (653), (655), (657) respectively, a locking mechanism with "L" type elements (642), (644) and a valve (660).

[0032] The rings (652), (654), (656) enable the attachment of any bottle or container of water or other cleaning liquid having a nozzle of round cross-section on the adapter (600).

The elastic rings (653), (655), (657) are made of a suitable elastic material to allow through their deformation and increased friction (capable of retaining the adapter (600) locked to the attached liquid bottle or container filled with liquid) that provide, during and after placing the bottle or container, securing the bottle or container to the rings (652), (654), (656). The choice of the elastic material for the manufacture of the elastic rings (653), (655), (657) is made among materials known from the relevant literature and which provide, in addition to the above characteristics of elastic deformation and friction, durability and almost zero wear during the normal use of the adapter (600).

[0033] The locking mechanism (642), (644) with "L" type elements allows the adapter (600) to be secured to the lower end of the portable bidet device housing via protrusions inside the housing. These protrusions are equal in number to the number of elements of type "L" (642), (644) and are dimensioned and shaped to match the elements of type "L" (642), (644). The number, dimension and shape of the protrusions and the elements of type "L" (642), (644) can be modified between different embodiments in a manner obvious to the average person with a relevant knowledge of the state of the art related to the present invention, without such modifications being deemed to deviate from the scope and intended protection of the present invention. For example, 1, 2, or more protrusions and elements of type "L" (642), (644) may be used, where the protrusions may have different cross-sectional shapes (e.g. round, square, triangle, ellipsoid, etc.) with their maximum cross-sectional dimension being substantially the same as the profile 647 of the corresponding element of type "L" (642), (644) so that the protrusions can only slide into the elements of type "L" (642), (644). These protrusions and the "L" type elements (642), (644) create enough friction to lock after the rotary

motion applied by the user of the portable bidet device and not be able to unlock when using the device. Unlocking them requires a rotational movement in the opposite direction from their locking direction and great force from the user to overcome the frictions between them.

[0034] For additional safety in alternative embodiment examples, the profile (647) may include additional mechanical safety details, such as slightly smaller internal dimensions of the "L" type elements (642), (644) at the far end of the locking path of the housing protrusions of the portable bidet device in order to increase the corresponding frictions. Other additional mechanical safety details may be used in alternative embodiment examples, the detailed reference of which is not necessary as these modifications can be made in an obvious manner by the average person with a relevant knowledge of the state of the art of the present invention without such modifications being deemed to deviate from the scope and intended protection of the present invention.

[0035] The valve (660) is a non-return type and allows air to enter inside the main body (640) of the adapter (600) and through the main body (640) into the connected bottle or container. The purpose of the valve (660) is to fill the bottle or container with a volume of air substantially equal to the volume of water or cleaning liquid that the portable bidet device removes from the bottle or container in order to create a jet from the nozzle of the device. Filling the bottle with air allows the bottle to retain its shape so that the bottle is easy to hold firmly in the user's hand, without the risk of unlocking by the locking ring (653), (655), (657), and maintain a sufficient pressure inside the bottle or container so that it is easy and unobstructed to pump water or cleaning liquid using an electrical pump contained in the portable bidet device inside its housing.

[0036] It is highlighted that the mouth of the bottle or container secures to a single ring (652), (654), (656) by means of the corresponding elastic ring (653), (655), (657) and the specific ring with the corresponding elastic ring which ensure locking depend on the internal dimension (the inner diameter in the specific embodiment example) of the mouth of the bottle or container they are securing. To make locking feasible, the inner dimension of the mouth of the bottle or container must be substantially larger than the outer dimension (diameter in this example) of the ring and substantially equal to or less than the outer dimension of the corresponding elastic ring so that the elastic ring can provide the necessary friction to secure the bottle or container to the adapter (600).

The valve (660) is applied to a hole (665) in the main body (640) of the adapter (600) and is fixed there by friction, screwing, welding, or securing with a locking element (666).

Exploded Diagram of the Portable Bidet Device

[0037] Figure 7 illustrates a simplified exploded side

view of the innovative portable bidet device. The portable bidet device 700 consists of a main body which includes a housing with a front (710) and a rear (711) part of the housing. The parts (710), (711) of the housing are designed to fit perfectly, to form a cylinder (or other shape) and to provide absolute protection against dust, liquids, vibrations, drops, etc. hazards at least under normal conditions of temperature and pressure.

[0038] The front part of the housing (710) is shaped to incorporate a protrusion (720) on its outer surface to which are fitted a nozzle adapter (736), an elastic ring (735) for sealing and a nozzle (730) with holes for creating a jet of liquid of different pressure or range. The nozzle (730) can, in its assembled position, rotate about an axis passing through its center so that the user chooses to use the appropriate hole through which the liquid that will create the jet will be channeled.

[0039] The lower end of the front part of the housing (710) has a built-in (or is fitted in a different exemplary embodiment with) cylindrical member (760) to which an elastic sealing ring (762) is fitted, and an elastic ring (764) is fitted between the cylindrical member (760) and liquid deflector (766).

[0040] The rear part of the housing (711) includes a hole (712) for charging a voltage source (rechargeable battery) (780). The hole (712) is sealed in a watertight and airtight manner by an elastic cap (790) of substantially the same shape and dimensions. The cap (790) allows the display of a light bulb (792) (e.g., Light Emitting Diode (LED)) to indicate low power or battery charge (780). Inside the hole (712) rests a plug for the supply of electricity to charge the battery (780). Depending on the embodiment example, different types of plugs can be used, such as USB type B, USB type C, audio jack, etc.

[0041] After assembling the portable bidet device, the front (710) and rear (711) part of the housing accommodate the rechargeable battery 780 which (optionally) rests on a mat (775) of foamy material to absorb vibrations that may arise from the operation of an electrical liquid pump 770 which rests under the mat (775). The pump (770) comprises a suction port (772) of liquid through the seal (773) from the bottle or container connected to the cylindrical member (760) via the elastic sealing ring (762), and an outlet port (771) of liquid towards the nozzle (730) via the protrusion (720), the nozzle adapter (736) and the elastic ring (735).

[0042] The upper side of the assembled housing is sealed in a watertight and airtight manner with a disc-shaped part (713) (which can be manufactured either as part of the housing or as a stand-alone component) on the lower side of which an electronic control system is attached, e.g. an electronic board (circuit board) (750) which consists of a number of electronic components (751) with printed wiring (752) between them and additional wiring to connect the circuit board (750) to the plug, the light bulb (792), the pump (770), the battery (780) and the operation control knob. The circuit board (750) is designed to control the charge and the voltage level

of the battery (780), the indicator light (792), the operation of the pump (770) for satisfactory liquid absorption and the creation of sufficient pressure to create a low- and high-pressure jet on the nozzle (730) and to receive signals from the knob on the side view of the housing in order to start and stop the portable bidet device and more specifically the pump (770) and the light bulb (792).

[0043] The design of the portable bidet device allows the selection and use between a number of available pumps (770) and rechargeable batteries (780) so that different power values can be selected for the pump (770), the battery (780) and, consequently, the jet of liquid generated in the nozzle (730). Therefore, different needs of users can be met effectively.

[0044] The operation of the pump (770) is controlled by the electronic control system (750) for starting and shutting down the pump (770). The electronic control system (750) can be optionally adjusted to control (e.g., by adjusting the supplied voltage or by sending an electrical signal or control code to the pump (770)) the pressure of the liquid supplied by the pump (770) at its outlet and which liquid is fed to the adjustable nozzle (730). With this adjustment of the pressure of the liquid provided by the pump (770) and in combination with the appropriate adjustment of the nozzle (730) (i.e., the selection of the appropriate hole) it becomes possible to choose from a very large number of pressure (or range) adjustments of the jet of liquid produced by the nozzle (730). As a result, in addition to precisely adjusting the jet pressure, the range of possible values that the jet pressure can take in order to meet every need and preference of the user of the portable bidet device (700) increases significantly.

[0045] The electronic control system (750) runs software that contains commands in one of the known programming languages in order to perform one or more control operations of the device (700). More specifically, the control operations include the regulation of the voltage supplied to the pump (770), the sending of an electrical signal to the pump (770), the sending of a control code to the pump (770), the control of the voltage source (780), the operation control of the light bulb (597) and the control of signal reception by the operation control knob (395).

[0046] In an alternative embodiment, part or all of the device control operations are performed by Application Specific Integrated Circuits (ASICs) which are designed to perform the specific device control operations.

[0047] The rechargeable battery (780) can be replaced with a smart rechargeable battery which has a built-in charge and usage control circuit that sends data to the circuit board (750) for further actions such as activating and controlling the light bulb 792 (e.g. red indication for low voltage, green indication for fully charged battery or for operating mode, flashing green indication for ongoing charging process, no indication for switched off device).

[0048] The design of the circuit board (750) and the choice of the pump (770) and the light bulb (792) are obvious to the average person with a relevant knowledge

of the state of the art related to the present invention, and for this reason no further details are provided.

Liquid Jet Pressure Adjustment

[0049] Figure 8 illustrates views of the nozzle adjustments. Examples of nozzle adjustments (800) are presented for 3 cases. In alternative examples, more adjustment cases may occur.

[0050] In the non-jet creation example (812) the nozzle (830) is rotated into the protrusion (820) of the front part of the housing (810) over the cylindrical member (760) in order to select the "STOP" position (813). In this position the nozzle (830) has a blocked hole so that no jet can be created, and any liquid leakage can be avoided.

[0051] In the example of creating a high-pressure jet (814) the nozzle (830) is rotated counterclockwise relative to the example (812) into the protrusion (820) of the front part of the housing (810) over the cylindrical member (760) in order to select the high-pressure hole (815).

[0052] In the example of creating a low-pressure jet (816) the nozzle (830) is rotated counterclockwise relative to the example (814) into the protrusion (820) of the front part of the housing (810) over the cylindrical member (760) in order to select the low-pressure hole (817).

Battery charging

[0053] Figure 9 shows views of the voltage source charging mechanism. The example of the charging process 900 consists of three steps. In the first step (901) the housing (911) contains a hole which is sealed by an elastic cap (990) in the shape and dimensions of the hole, which allows the light bulb (992) to be viewed. The elastic cap (990) and the light bulb (992) are located in an optional recess (991) which ensures that the elastic cap profile (990) and the light bulb profile (992) do not protrude from the outer surface of the housing (911).

[0054] In the second step (902) the elastic cap (990) is unlocked from the recess (991) of the housing (911) and held by an elongate member (995) giving access to the plug (998) for connecting a charging plug.

[0055] In the third step (903), when the charging plug is connected to the plug (998) (the charging plug is not shown) the area (997) is illuminated with a red ambient light during charging, and with a green ambient light when charging is complete. An optional multi-color LED light bulb (not shown) can be used to illuminate the area (997) behind the area 997 or a first green LED light bulb and a second red LED light bulb. This light bulb (or the red and the green light bulb) allow the atmospheric illumination of the area (997) based on the fact that, since the area (997) is a recess in the surface of the recess (991), the area (997) has a smaller material thickness from its surrounding areas and therefore provides partial light transmission to the light bulb (or the 2 light bulbs) so that a sense of ambient light can be achieved in the area (997) when the light bulb (or light bulbs) in the back of the area

(997) is on. In the embodiment example that includes the light bulb (or light bulbs) behind the area (997), the light bulb (992) is used only to indicate the operating status of the portable bidet device and the level of the voltage source and not to indicate the charge.

[0056] The examples used above for the description of the present innovative solution should not be construed as limiting the scope of the present innovative solution. The present innovative solution can be applied to other scenarios and adjustments other than those described in the examples presented above. The present innovative solution should be considered applicable to any portable bidet device that uses an electrical pump and can accept any container of water or other cleaning liquid.

[0057] The average person of relevant knowledge of the state of the art understands that the shape and dimensions of the parts of the present invention, as shown in the embodiment examples, can be modified without departing from the scope and the intended protection of the present invention.

[0058] The above descriptions of embodiment examples are simplified and do not include portions used in the embodiment but are not part of the present invention, they are not necessary for understanding the invention and are apparent to the average person with a relevant knowledge of state of the art. In addition, variations of the embodiment examples are possible where, for example, some elements of the embodiment examples may be rearranged, omitted and replaced with equivalents or new ones may be added. Similarly, the modification of the shape and dimensions of the presented parts is considered to fall within the scope of protection of this innovative solution to the extent that these modifications are apparent to those skilled in the relevant art and to the extent that these modifications are equivalent to embodiment examples presented or they do not add tangible and unexpected or obvious improvements to the technical result they offer. Thus, the present text is not intended to be limited only to the embodiment examples of the invention presented but should be given the widest possible scope in accordance with the principles and new features it discloses.

[0059] Unless otherwise specified, the inventor intends to give to the words and phrases referred to in the description of the invention and the claims the common and generally accepted meanings given by the average person with relevant knowledge of the state of the art relating to the present invention.

[0060] The foregoing description of a preferred embodiment and the best way to implement the invention known to the applicant at the time of filing the application has been presented and is intended for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the exact form disclosed and many modifications and variations are possible in the light of the above teachings. The embodiment was selected and described to better explain the principles of

the invention and its practical application and to allow others skilled in the state of the art to make better use of the invention in various application scenarios and ways of use and with various modifications as they are appropriate to the particular use in question. It is therefore intended that the invention is not limited to the specific details disclosed for carrying out the invention, but that the invention includes everything within the scope of the appended claims.

Claims

1. Portable electrical bidet device (100) comprising:

a housing (110, 310) with a protrusion (120) on its outer surface;
 an adjustable nozzle (130) for creating a jet of liquid with adjustable pressure, which adapts to the protrusion (120) and is able to rotate about an axis perpendicular to and intersecting the center of the nozzle (130);
 an electrical liquid pump (770) which is connected (a) to a bottle or container of liquid for pumping liquid and (b) to the nozzle (130) for supplying liquid under adjustable pressure to the nozzle (130);
 a voltage source (780) connected to the electrical liquid pump (770);
 an electronic control system (750) connected (c) to a voltage source (780) and (d) to a liquid pump (770); and
 a general-purpose adapter (140, 600) configured to secure (e) through the first end of the general-purpose adapter (140, 600) to the housing (110, 310) and (f) through the second end of the general-purpose adapter (140, 600) to the liquid bottle or container, wherein the second end of the general-purpose adapter (140, 600) is shaped and sized to fit and secure to a plurality of nozzles of a liquid bottle or container.

2. The portable electrical bidet device (100) of claim 1, wherein the housing (110, 310) further comprises:

a charging hole (390, 712); and
 an elastic cover (598) shaped and dimensioned to seal the charging hole (390, 712) in a water-tight manner, and optionally attached to the housing (110, 310) with a retaining member.

3. The portable electrical bidet device (100) of claim 1, wherein the adjustable nozzle (130) comprises a plurality of adjustments and wherein the plurality of adjustments comprises at least (a) a low-pressure hole, (b) a high-pressure hole and (c) a blocked hole.

4. The portable electrical bidet device (100) of claim 1,

wherein the general-purpose adapter (140, 600) comprises:

- a main body (640);
 - a plurality of ring-shaped parts (150), (652), (654), (656) whose diameter decreases as the distance of the parts (150), (652), (654), (656) increases from the main body of the adapter (140, 600);
 - a plurality of elastic rings (653), (655), (657), where each of the plurality of elastic rings (653), (655), (657) fits into one of a plurality of ring-shaped parts (150), (652), (654), (656);
 - a locking mechanism (642), (644) with the device (100); and
 - a non-return type air valve (660) which allows air to enter the bottle or container which is secured to general-purpose adapter (140, 600).
5. The portable electrical bidet device (100) of claim 4, wherein the plurality of elastic rings (653), (655), (657) are made of an elastic material with characteristics of (a) elastic deformation, (b) friction capable of retaining the adapter (140, 600) secured to the attached bottle or container filled with liquid, and (c) substantially zero damage during normal use of the adapter (140, 600).
6. The portable electrical bidet device (100) of claim 4, wherein the locking mechanism (642), (644) with the device (100) consists of "L" type elements, which secure in a corresponding number of suitably shaped and sized recesses in the housing (110, 310).
7. The portable electrical bidet device (100) of claim 1, wherein the electronic control system (750) controls the liquid pressure at the outlet of the electrical liquid pump (770) by means of one of:
- adjustment of the voltage supplied to the pump (770);
 - sending an electrical signal to the pump (770);
 - sending a control code to the pump (770).
8. The portable electrical bidet device (100) of claim 1 or 7, wherein the electronic control system (750) comprises:
- an operation control knob (395) mounted on the housing (110, 310); and
 - a light bulb (597) to provide a visual indication of the operation of the device (100), low voltage and charging of the voltage source (780), where the light bulb (597) is placed in a hole (390, 712) in the housing (110, 310).
9. The portable electrical bidet device (100) of claim 1, wherein the voltage source (780) comprises a charg-

ing plug (998) mounted in a hole (390, 712) in the housing (110, 310).

10. Method of manufacturing a portable electrical bidet device (100) according to claims 1-9, wherein:

the housing (110, 310) comprises a front part (710) and a rear part (711);

the front part (710) of the housing (110, 310) is shaped to incorporate (a) a protrusion (720) on its outer surface to which are adapted a nozzle adapter (736), an elastic ring (735) for sealing and a nozzle (730) with holes for the formation of a jet of liquid of different pressure or width, and (b) at a lower end of the front part of the housing (710), a cylindrical member (760) to which an elastic ring (762) is applied, and an elastic ring (764) between the cylindrical member (760) and the liquid deflector (766); and

in the rear part (711) of the housing (110, 310) (c) a hole (712) is formed to charge the voltage source (780), (d) an elastic cap (790) is connected to the hole (712) substantially of the same shape and dimensions as the hole (712), (e) a light bulb (792) is inserted into the hole (712) for (i) indication of the operation of the device (100), (ii) low power or (iii) charging of the voltage source (780), and (f) into the hole (712) a plug (998) is inserted to supply electricity to charge the voltage source (780);

an operation control knob (495) is mounted on the front part (710) or rear part (711) of the housing (110, 310);

the housing (110, 310) is assembled from (g) the front part (710), (h) the rear part (711), (i) a disc-shaped part (713) at an upper part of the housing (110, 310), and (j) the general-purpose adapter (140, 600) at a bottom part of the housing (110, 310);

where inside the housing (110, 310) are placed and connected the electrical liquid pump (770), the voltage source (780), and the electronic control system (750).

11. The method of manufacturing a portable electrical bidet device (100) of claim 10, wherein in the manufacture of the general-purpose adapter (140, 600):

the plurality of rings (150), (652), (654), (656) are designed (a) as a single body, or (b) as independent components which are then joined into a single body; and

the plurality of elastic rings (153), (155), (157) are manufactured either (c) by depositing elastic material on the rings (152), (154), (156), or (d) by applying the elastic rings (153), (155), (157) to the corresponding rings (152), (154), (156).

12. The method of manufacturing a portable electrical bidet device (100) of claim 10, further comprising creating a screw-type locking mechanism of corresponding shape and cross-section on the general-purpose adapter (140, 600) and the housing (110, 310). 5
13. The method of manufacturing a portable electrical bidet device (100) of claim 10, further comprising creating a locking mechanism with protrusions and recesses of type "L" having a corresponding shape and cross-section on the general-purpose adapter (140, 600) and the housing (110, 310), respectively. 10
14. Computer program product according to claims 1, 7, or 8, which product is executed by the electronic control system (750) and comprises at least one of the following: 15
- commands to adjust the voltage supplied to the pump (770); 20
 - commands to send an electrical signal to the pump (770);
 - commands to send a control code to the pump (770); 25
 - commands to control the voltage source (780);
 - commands to control the operation of the light bulb (597); and
 - commands to control the signal reception from the operation control knob (395). 30
15. The use of the portable electrical bidet device (100) according to claims 1-14 for the hygiene of the sensitive area of infants, children and adults, wherein: 35
- the device (100) is connected to a bottle or container of liquid via the general-purpose adapter (140, 600);
 - the user activates the device (100) via the operation control knob (395); and 40
 - the user adjusts the jet of liquid via the adjustable nozzle (130).

Amended claims in accordance with Rule 137(2) EPC. 45

1. A portable electrical bidet device (100) comprising a housing (110, 310) with a protrusion (120) on its outer surface, an adjustable nozzle (130) for creating a jet of liquid, which adapts to the protrusion (120), an electrical liquid pump (770) which is connected (a) to a bottle or container of liquid for pumping liquid and (b) to the nozzle (130) for supplying liquid under adjustable pressure to the nozzle (130), a voltage source (780) connected to the electrical liquid pump (770), an electronic control system (750) connected (c) to a voltage source (780) and (d) to the liquid 50
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pump (770), and a general-purpose adapter (140, 600) configured to secure (e) through a first end of the general-purpose adapter (140, 600) to the housing (110, 310) and (f) through a second end of the general-purpose adapter (140, 600) to the liquid bottle or container, **characterized in that:**

the portable electrical bidet device (100) is configured (i) as a handheld electrical bidet device and (ii) for use by placing it at an angle of -80° to $+80^\circ$ with the vertical plane (301), wherein the angle is defined between the vertical plane (301) and the longitudinal axis (302), (303) of the device;

the adjustable nozzle (130) is (iii) non-extendable and (iv) configured for rotating about an axis perpendicular to and intersecting the center of the nozzle (130) for adjusting the pressure of the jet of liquid;

the electrical liquid pump (770) is connected to the bottle or container of liquid via a suction port (772) non-extending into the bottle or container beyond the general-purpose adapter (140, 600) and configured for pumping liquid out of the bottle or container; and

the second end of the general-purpose adapter (140, 600) comprises (v) at least two ring-shaped parts (150), (652), (654), (656) whose outer diameter decreases as the distance of the parts (150), (652), (654), (656) increases from the main body of the adapter (140, 600), and (vi) at least two elastic rings (653), (655), (657), where each of the at least two elastic rings (653), (655), (657) fits into one of the at least two ring-shaped parts (150), (652), (654), (656). 35

2. The portable electrical bidet device (100) of claim 1, wherein the housing (110, 310) further comprises:

- a charging hole (390, 712); and
- an elastic cover (598) shaped and dimensioned to seal the charging hole (390, 712) in a water-tight manner, and optionally attached to the housing (110, 310) with a retaining member.

3. The portable electrical bidet device (100) of claim 1, wherein the adjustable nozzle (130) comprises a plurality of adjustments and wherein the plurality of adjustments comprises at least (a) a low-pressure hole, (b) a high-pressure hole and (c) a blocked hole.

4. The portable electrical bidet device (100) of claim 1, wherein the general-purpose adapter (140, 600) comprises:

- a main body (640);
- a locking mechanism (642), (644) with the device (100); and

a non-return type air valve (660) which allows air to enter the bottle or container which is secured to general-purpose adapter (140, 600).

5. The portable electrical bidet device (100) of claim 4, wherein the plurality of elastic rings (653), (655), (657) are made of an elastic material with characteristics of (a) elastic deformation, (b) friction capable of retaining the adapter (140, 600) secured to the attached bottle or container filled with liquid, and (c) substantially zero damage during normal use of the adapter (140, 600).
6. The portable electrical bidet device (100) of claim 4, wherein the locking mechanism (642), (644) with the device (100) consists of "L" type elements, which secure in a corresponding number of suitably shaped and sized recesses in the housing (110, 310).
7. The portable electrical bidet device (100) of claim 1, wherein the electronic control system (750) controls the liquid pressure at the outlet of the electrical liquid pump (770) by means of one of:
 - adjustment of the voltage supplied to the pump (770);
 - sending an electrical signal to the pump (770);
 - sending a control code to the pump (770).
8. The portable electrical bidet device (100) of claim 1 or 7, wherein the electronic control system (750) comprises:
 - an operation control knob (395) mounted on the housing (110, 310); and
 - a light bulb (597) to provide a visual indication of the operation of the device (100), low voltage and charging of the voltage source (780), where the light bulb (597) is placed in a hole (390, 712) in the housing (110, 310).
9. The portable electrical bidet device (100) of claim 1, wherein the voltage source (780) comprises a charging plug (998) mounted in a hole (390, 712) in the housing (110, 310).
10. Method of manufacturing a portable electrical bidet device (100) according to claims 1-9, wherein:
 - the housing (110, 310) comprises a front part (710) and a rear part (711);
 - the front part (710) of the housing (110, 310) is shaped to incorporate (a) a protrusion (720) on its outer surface to which are adapted a nozzle adapter (736), an elastic ring (735) for sealing and a nozzle (730) with holes for the formation of a jet of liquid of different pressure or width, and (b) at a lower end of the front part of the

housing (710), a cylindrical member (760) to which an elastic ring (762) is applied, and an elastic ring (764) between the cylindrical member (760) and the liquid deflector (766); and in the rear part (711) of the housing (110, 310) (c) a hole (712) is formed to charge the voltage source (780), (d) an elastic cap (790) is connected to the hole (712) substantially of the same shape and dimensions as the hole (712), (e) a light bulb (792) is inserted into the hole (712) for (i) indication of the operation of the device (100), (ii) low power or (iii) charging of the voltage source (780), and (f) into the hole (712) a plug (998) is inserted to supply electricity to charge the voltage source (780); an operation control knob (495) is mounted on the front part (710) or rear part (711) of the housing (110, 310); the housing (110, 310) is assembled from (g) the front part (710), (h) the rear part (711), (i) a disc-shaped part (713) at an upper part of the housing (110, 310), and (j) the general-purpose adapter (140, 600) at a bottom part of the housing (110, 310);

where inside the housing (110, 310) are placed and connected the electrical liquid pump (770), the voltage source (780), and the electronic control system (750).

11. The method of manufacturing a portable electrical bidet device (100) of claim 10, wherein in the manufacture of the general-purpose adapter (140, 600):
 - the plurality of rings (150), (652), (654), (656) are designed (a) as a single body, or (b) as independent components which are then joined into a single body; and
 - the plurality of elastic rings (153), (155), (157) are manufactured either (c) by depositing elastic material on the rings (152), (154), (156), or (d) by applying the elastic rings (153), (155), (157) to the corresponding rings (152), (154), (156).
12. The method of manufacturing a portable electrical bidet device (100) of claim 10, further comprising creating a screw-type locking mechanism of corresponding shape and cross-section on the general-purpose adapter (140, 600) and the housing (110, 310).
13. The method of manufacturing a portable electrical bidet device (100) of claim 10, further comprising creating a locking mechanism with protrusions and recesses of type "L" having a corresponding shape and cross-section on the general-purpose adapter (140, 600) and the housing (110, 310), respectively.

14. A computer program product comprising instructions to cause the electronic control system (750) of the portable bidet device of claims 1, 7, or 8 to execute at least one of the following steps:

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 commands to adjust the voltage supplied to the pump (770);
 commands to send an electrical signal to the pump (770);
 commands to send a control code to the pump (770); 10
 commands to control the voltage source (780);
 commands to control the operation of the light bulb (597); and
 commands to control the signal reception from the operation control knob (395). 15

15. The use of the portable electrical bidet device (100) according to claims 1-14 for the hygiene of the sensitive area of infants, children and adults, wherein: 20

the device (100) is connected to a bottle or container of liquid via the general-purpose adapter (140, 600);
 the user places the portable electrical bidet device (100) at an angle of - 80° to +80° with the vertical plane (301), wherein the angle is defined between the vertical plane (301) and the longitudinal axis (302), (303) of the device; 25
 the user activates the device (100) via the operation control knob (395); 30
 and
 the user adjusts the jet of liquid via the adjustable nozzle (130). 35

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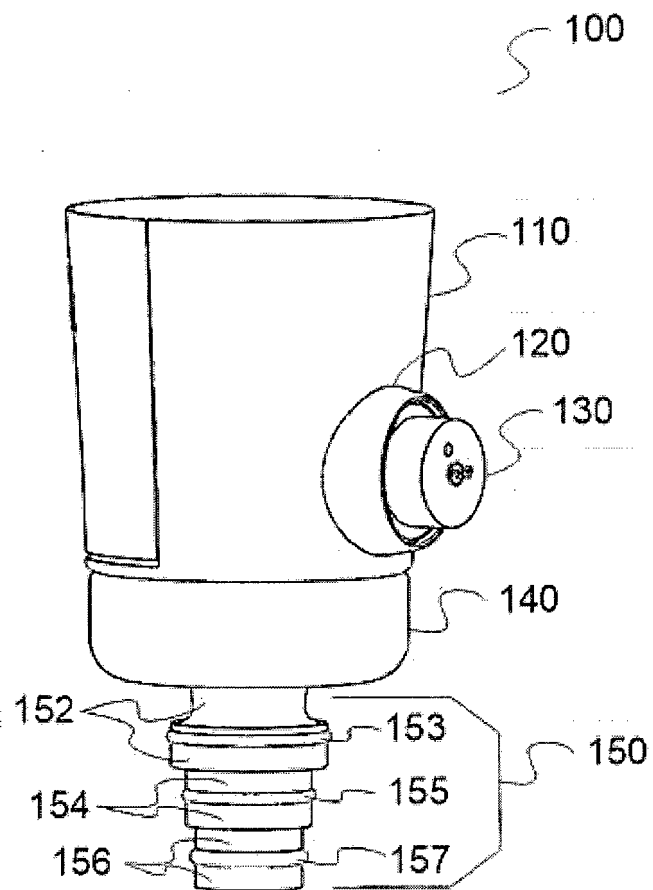


Figure 1

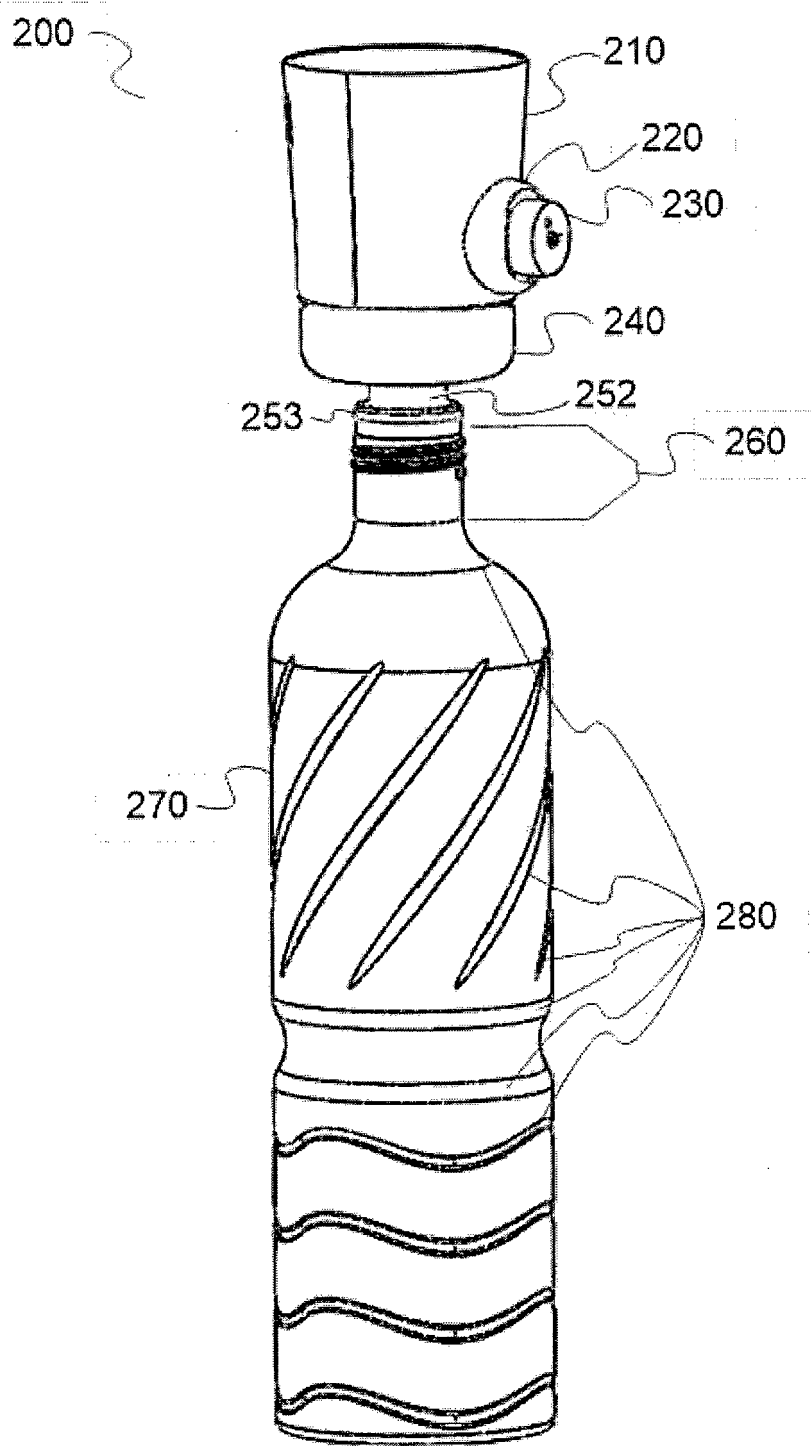


Figure 2

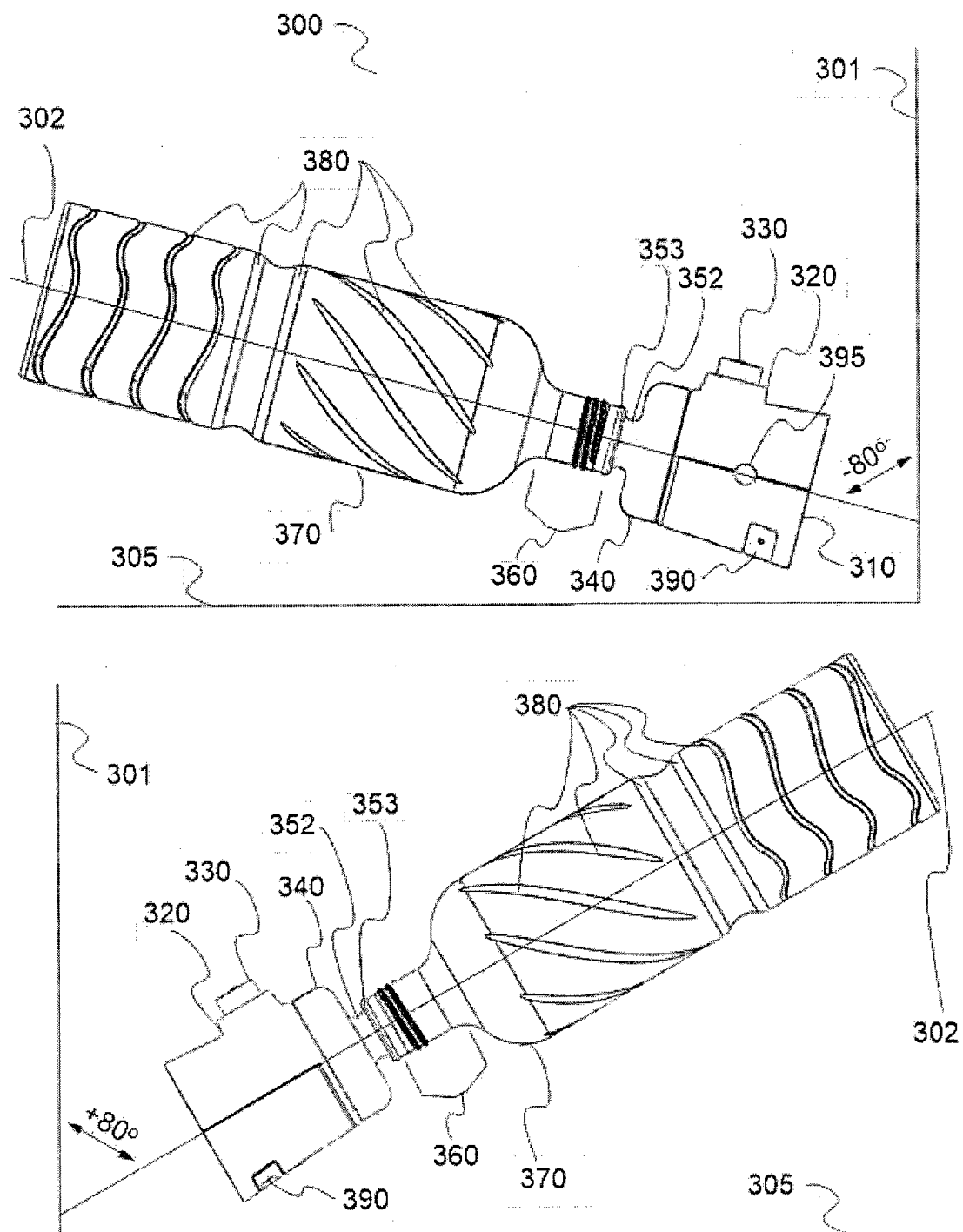


Figure 3

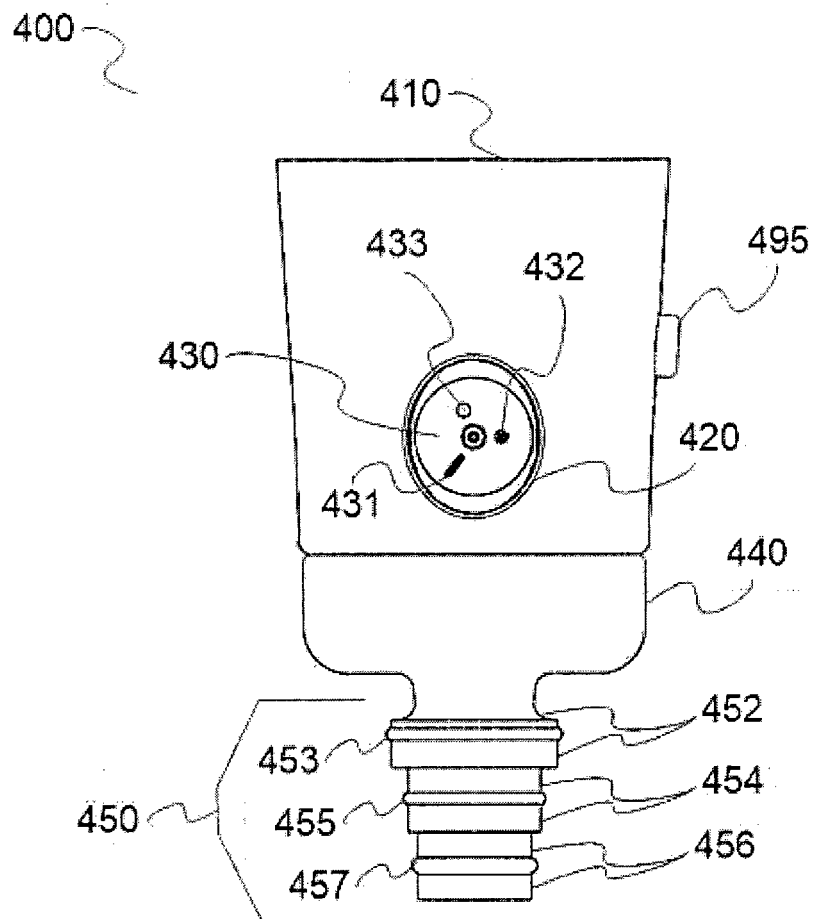


Figure 4

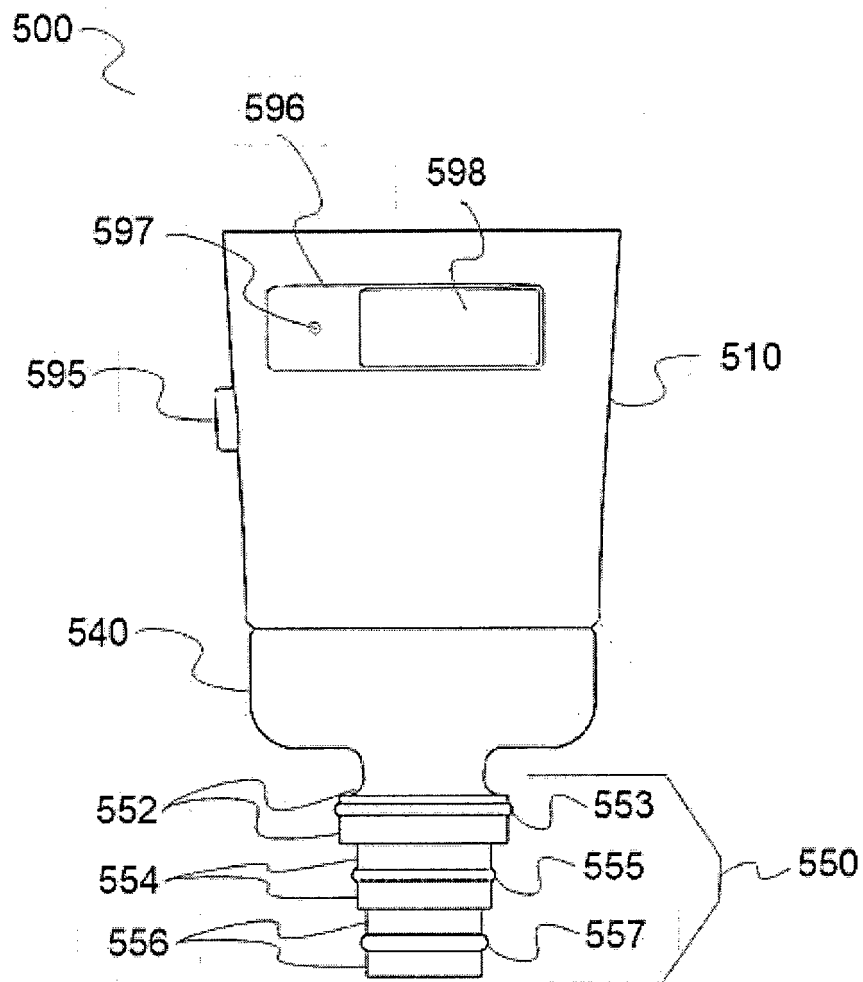


Figure 5

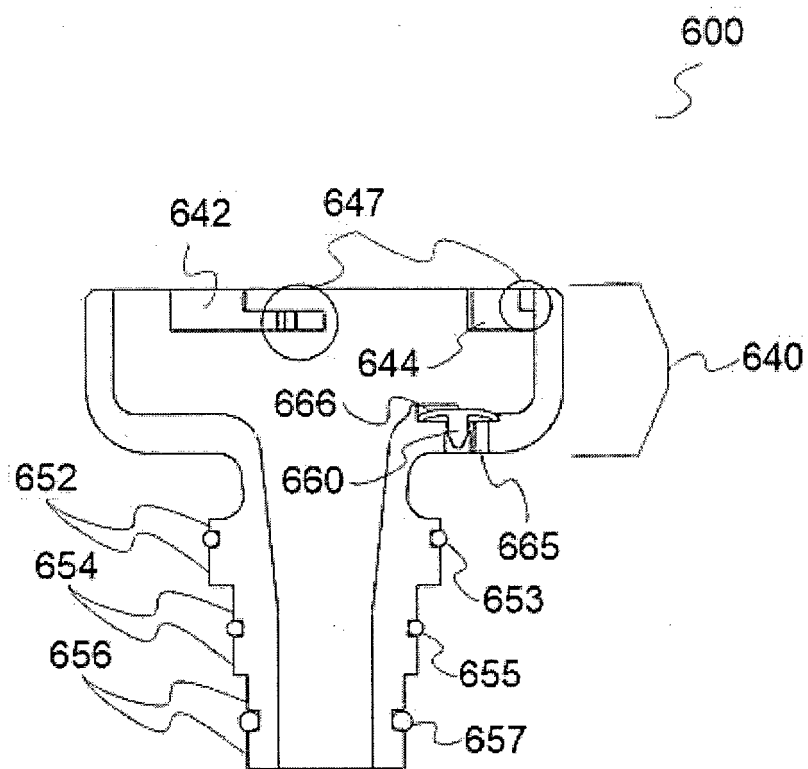


Figure 6

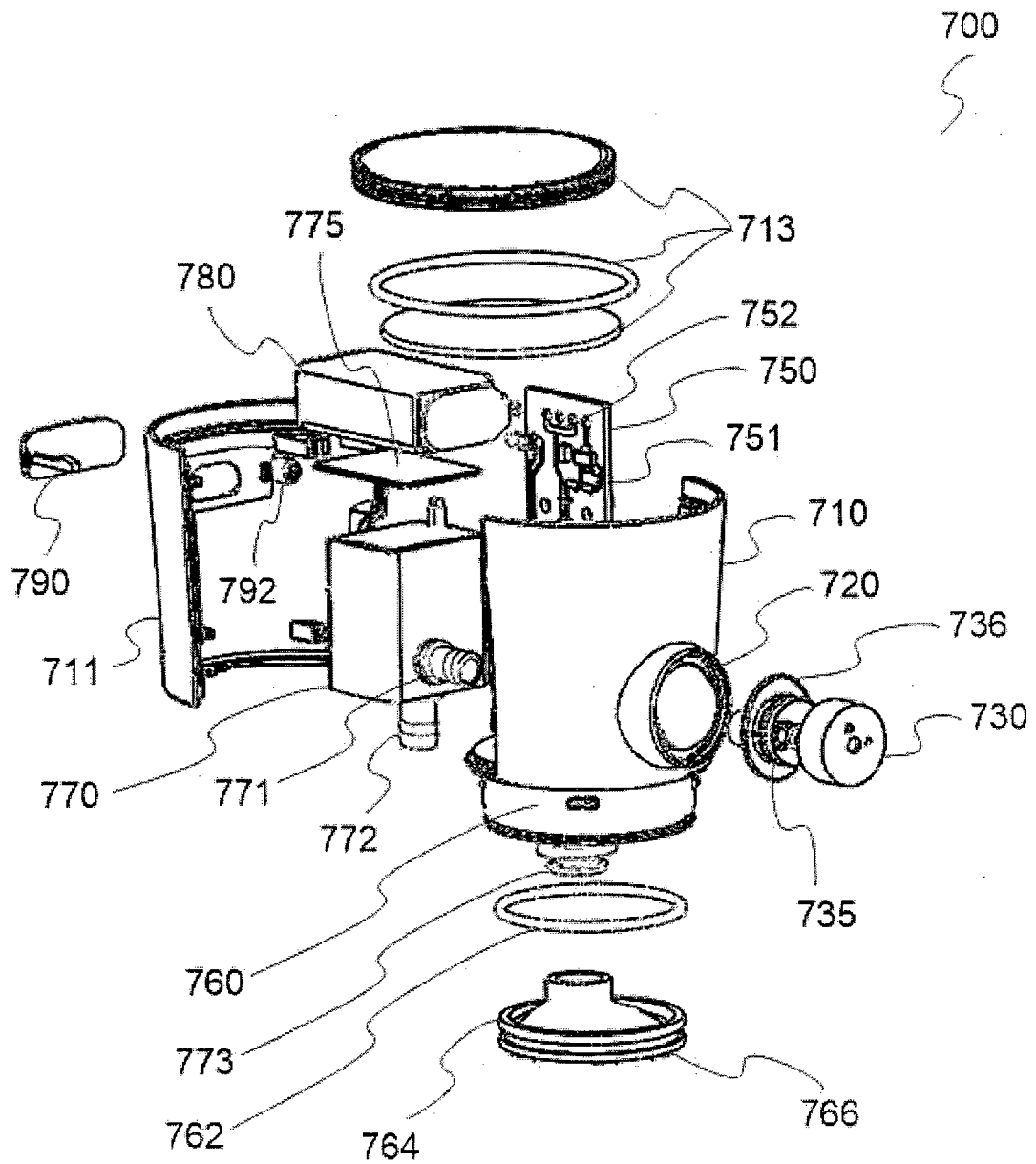


Figure 7

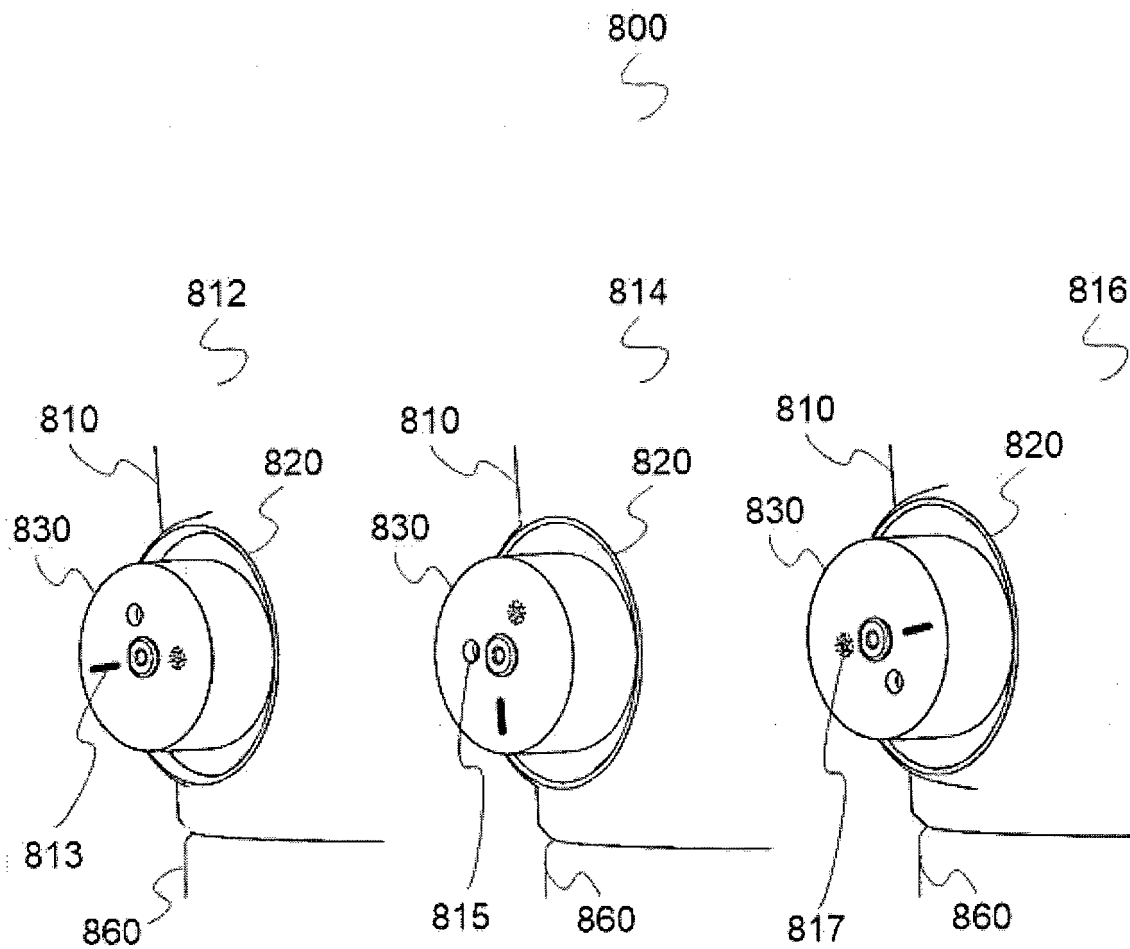


Figure 8

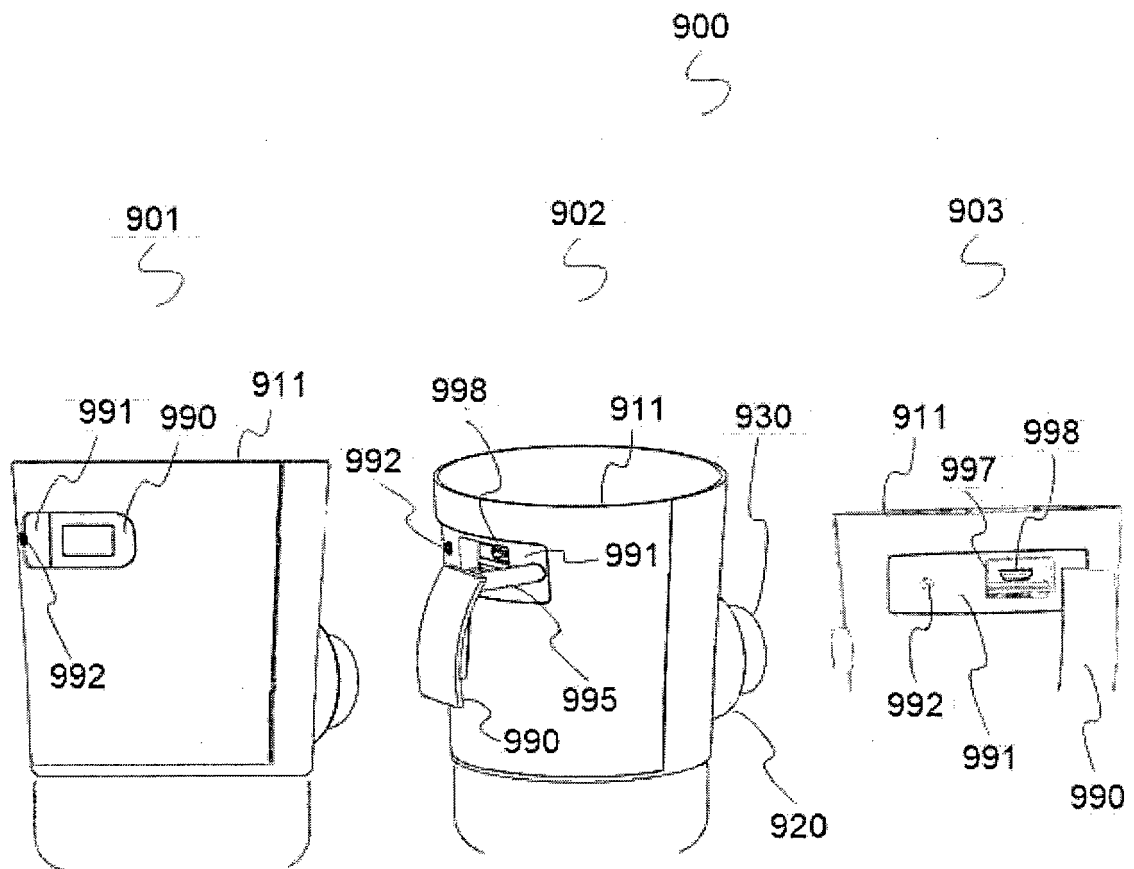


Figure 9



EUROPEAN SEARCH REPORT

Application Number
EP 21 38 6002

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	US 5 409 167 A (BOROD MURRAY [US]) 25 April 1995 (1995-04-25) * figures 1-3 *	1-15	
A	US 2016/037975 A1 (RICE RUSSELL M [US] ET AL) 11 February 2016 (2016-02-11) * figure 5 * -----	4,5,11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47K B65D E03D E03C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 May 2021	Examiner Boyer, Olivier
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EP 21 38 6002

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The members are as contained in the European Patent Office EDP file on
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27-05-2021

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US 5409167 A	25-04-1995	NONE	
US 2016037975 A1	11-02-2016	NONE	

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