US 20210186195A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0186195 A1**

Ivanovic et al. (43) **Pub. Date: Jun. 24, 2021**

(54) **TOOTHBRUSH WITH A REPLACEABLE TOOTHPASTE CARTRIDGE**

(71) Applicant: **IWITO D.O.O**, Novi Beograd (RS)

(72) Inventors: **Ivo Ivanovic**, Beograd (RS); **Marko Ivancevic**, Budva (ME)

(21) Appl. No.: **17/054,494**

(22) PCT Filed: **Sep. 25, 2018**

(86) PCT No.: **PCT/RS2018/000014**

§ 371 (c)(1),
(2) Date: **Nov. 10, 2020**

(30) **Foreign Application Priority Data**

May 17, 2018 (RS) P-2018/0580

Publication Classification

(51) **Int. Cl.**

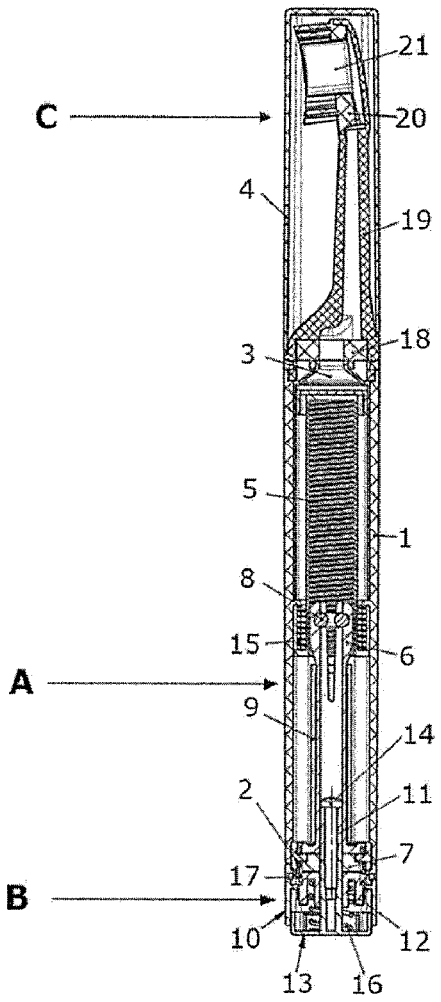
A46B 11/00	(2006.01)
A46B 9/04	(2006.01)
A46B 17/04	(2006.01)

(52) **U.S. Cl.**

CPC ***A46B 11/0065*** (2013.01); ***A46B 9/04*** (2013.01); ***A46B 11/0031*** (2013.01); ***A46B 11/0055*** (2013.01); ***A46B 17/04*** (2013.01)

(57) **ABSTRACT**

The present invention provides a reusable toothbrush with a replaceable toothpaste cartridge, which allows the replacement of the cartridge (**3**) after the entire quantity of the toothpaste has been exhausted, so that the toothbrush does not need to be disposed of. Additionally, its bristle (**20**) is protected from contamination before usage by means of a cap (**4**), while the hardening of toothpaste is prevented. The present invention has two distinct functions, namely the extraction of fluid from the replaceable toothpaste cartridge (**3**) and resetting the device before the replacement of the replaceable toothpaste cartridge (**3**). The toothbrush comprises a toothbrush handle (**1**) intended to carry said bristle (**20**) and membrane (**21**), the latter being removably attached to a hollow shank (**19**), and which houses the replaceable toothpaste cartridge (**3**) and the mechanism for extracting toothpaste from the replaceable cartridge (**3**), which can be reset in order to replace the replaceable cartridge (**3**).



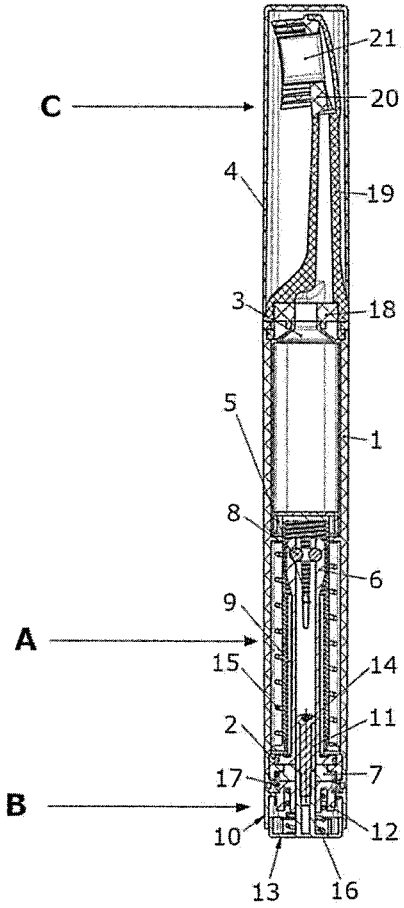


Figure 1

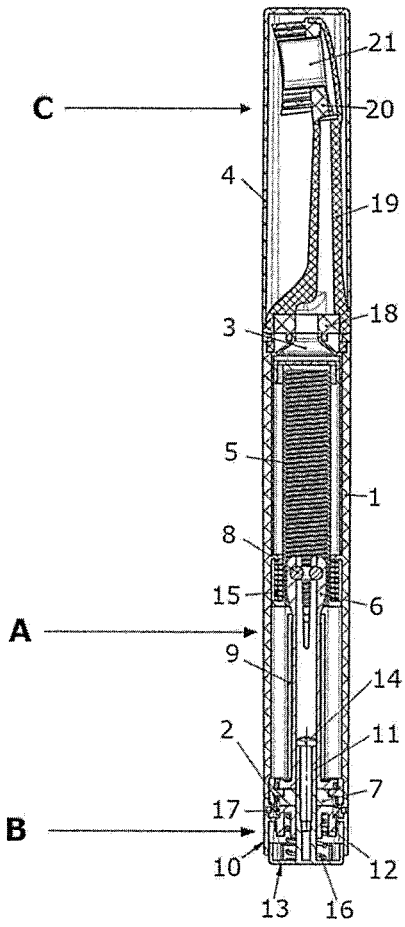


Figure 2

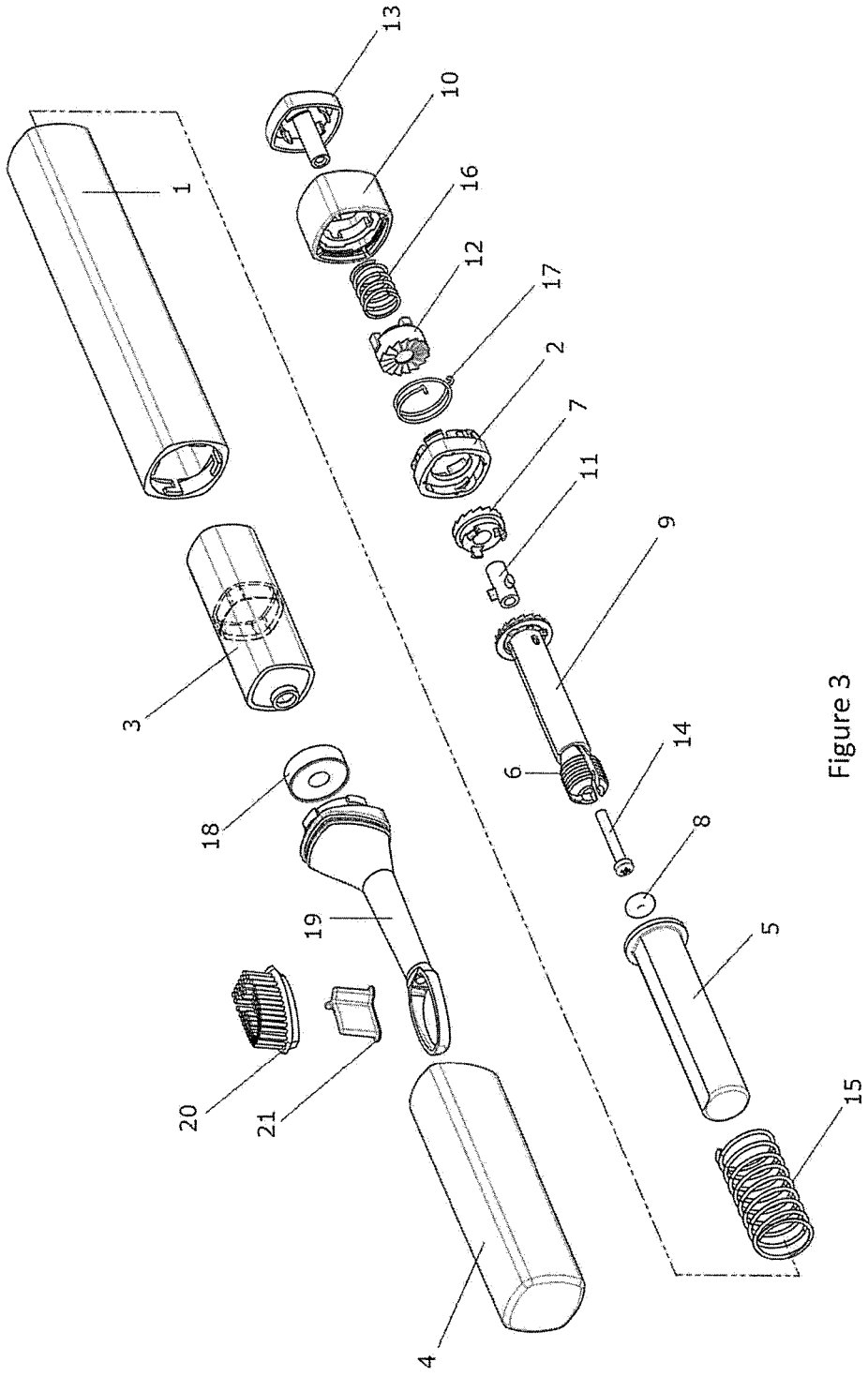


Figure 3

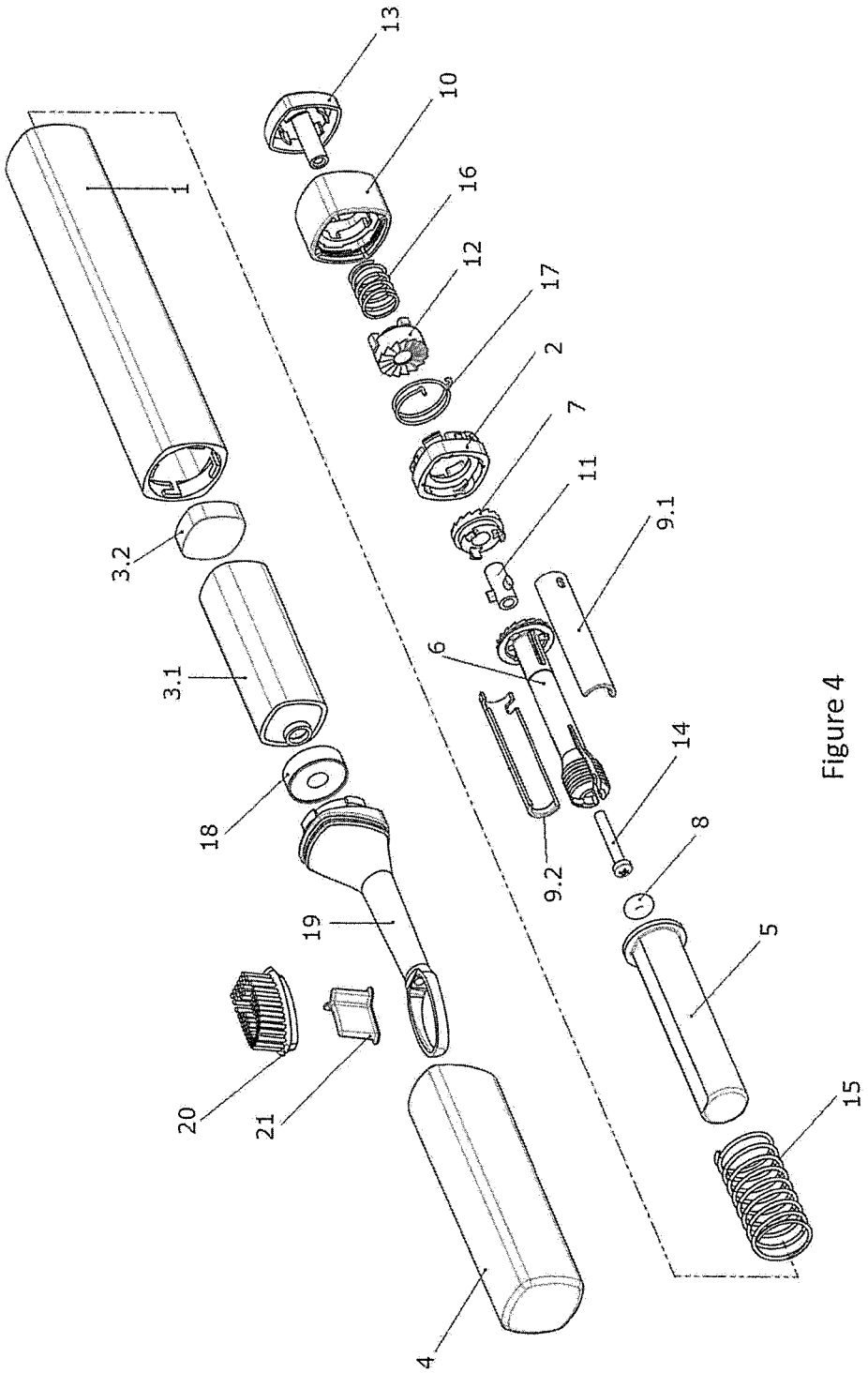


Figure 4

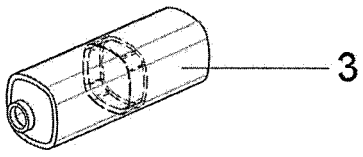


Figure 5

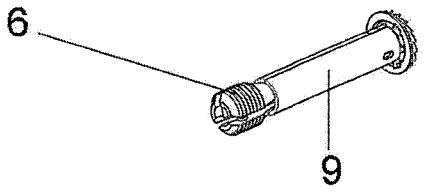


Figure 6

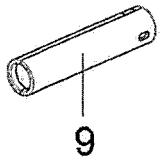


Figure 7

TOOTHBRUSH WITH A REPLACEABLE TOOTHPASTE CARTRIDGE

FIELD OF THE INVENTION

[0001] The invention concerns a toothbrush with a replaceable toothpaste cartridge. According to the International Patent Classification, this invention belongs to apparatus for brushing, polishing, rinsing and drying of teeth, oral cavity and dentures, particularly the power-driven cleaning or polishing devices whose IPC code is A61C 17/16. The invention also belongs to brushes with a reservoir or other means of applying substances, which are manually squeezed at the moment of use, whose IPC code is A46B 11/02.

Technical Problem

[0002] The technical problem being solved by this invention is how to construct a reusable toothbrush containing oral hygiene fluid such as toothpaste, so that it represents a unique entity which can be easily handled and carried by the user, whereby the toothbrush would be protected from getting dirty and the toothpaste from drying and hardening, making the toothbrush reusable. The toothbrush would contain a toothpaste cartridge which could be replaced, thus making the toothbrush reusable and more environmentally-friendly due to waste minimisation.

Prior Art

[0003] Common toothbrushes lack any reservoirs, containers or cartridges for fluids such as toothpaste. In order to maintain oral hygiene, one must apply an amount of toothpaste to a toothbrush by squeezing it out of a tube or another container. This can be particularly inconvenient while travelling, for example when the user has to find both the toothbrush and toothpaste in their luggage, or when they are spending lots of time outdoors, in hospitals or other places.

[0004] In order to overcome this problem, several prior art solutions have been presented. On of them concerns the Yugoslav patent application YU P-262/90 A, a single-use disposable toothbrush. Said toothbrush contains a flexible toothpaste reservoir which is welded at one end, while the other end is equipped with a flange to which a hollow distributing pipe is attached. The toothbrush head is mounted at the other end of the distributing pipe. The pipe and the head have matching radial openings through which toothpaste can be squeezed onto the toothbrush head.

[0005] Although such toothbrush resolves some of the abovementioned issues, it also has certain drawbacks. First, its empty reservoir cannot be replaced with a new one, which makes the toothbrush non-reusable and no longer acceptable by today's environmental standards. Its smaller-than-usual dimensions and the presence of reservoir both make for poor ergonomics, and the bristle has no protection from dirt before usage.

[0006] Another prior art solution is a reusable toothbrush with a built-in toothpaste reservoir, from the Yugoslav patent application YU P-512-95 A. This toothbrush contains a toothpaste reservoir with a sliding piston at one end, while at its other end is mounted a hollow carrier with a toothbrush shank and bristle. The hollow carrier is covered with the piston which is removably attached to the toothpaste reservoir. Prior to using the toothbrush, said piston has to be manually detached from the toothpaste reservoir and used to depress the sliding piston placed inside the opening of the reservoir, thus squeezing the toothpaste through the hollow carrier and onto the bristle.

[0007] Although this toothbrush resolves some of the issues of the previously offered solution, it has certain drawbacks too. Despite being reusable, this toothbrush cannot be used after the entire quantity of toothpaste has been exhausted from its non-replaceable reservoir, so the toothbrush needs to be disposed of. Furthermore, although the bristle is protected from dirt before usage, it is impossible to prevent the toothpaste from hardening inside its nozzle, which can prevent its further usage even though there is still remaining toothpaste in the reservoir. Certain parts of the apparatus are not protected from dirt, namely the bristle and the piston, the latter of which can contaminate the toothpaste in the reservoir.

SUMMARY OF THE INVENTION

[0008] At the beginning of this exposition, for the purpose of clarity, it should be noted that while describing the structural elements of the present invention, the side of the structural element oriented towards the bristle and the membrane will be referred to as the upper side, while the opposite side will be referred to the lower side.

[0009] The present invention comprises a toothbrush handle, a hollow toothbrush shank removably attached to the toothbrush handle, a replaceable cartridge positioned in the toothbrush handle and a mechanism for squeezing the toothpaste out of the cartridge, which can be reset upon replacing the replaceable cartridge. The bristle and the membrane are removably attached to the upper side of the shank. The bristle serves the purpose of cleaning teeth, while the membrane prevents oxidation, i.e. hardening of the fluid. While the toothbrush is not in use, the bristle and the membrane can be protected from contamination by means of a cap, which is removably attached to the toothbrush handle.

[0010] Inside the toothbrush handle, there is an axially shifting plunger shaped like a cartridge, whose closed end is oriented towards the shank, while its open end, ending in the wreath-shaped plunger base, is oriented towards the opposite side. An internal thread is defined on the inside of the plunger.

[0011] Inside the plunger there is a pressure spindle shaped like an elongated hollow cylinder in its middle part. On its upper side it ends in a head with an external thread defined to engage the internal thread of the plunger. Between the head of the cylinder and its middle, there is a tapering transitional part shaped like a truncated cone. The pressure spindle ends in a disc-shaped base on its lower side, through which the plunger coupling is attached to the pressure spindle. On its upper part, the pressure spindle has axial grooves defined, and around its upper end the spindle has an internally defined saddle which mates with a rubber spring for the radial spacing of the pressure spindle arms formed by means of said axial grooves. The external thread of the pressure spindle engages the internal thread of the plunger. At its lower end, above the disc-shaped base, the pressure spindle has defined axial slots mating with axially shifting pins of the reverser driver located in the lower part of the central cavity of the pressure spindle.

[0012] A bridge is permanently affixed to the toothbrush handle, on the side which is opposite the shank. On its opposite side, the bridge is connected to a rotary switch in a way that said switch is rotationally shifting relative to the

bridge. Between the bridge and the rotary switch, a torsion spring is positioned. Its one end is attached to the bridge, while the other end is attached to the rotary switch. The purpose of said torsion spring is to return the rotary switch to its initial position.

[0013] The rotary switch is attached to a rotary claw. The upper side of the claw has radially defined angled teeth. Opposite the radially defined angled teeth of the rotary claw there are complementarily defined angled teeth of the plunger coupling. Additionally, the rotary claw and the plunger coupling, which are set coaxially one opposite the other, each have a central opening defined.

[0014] When the rotary switch is rotated in one direction, the angled teeth of the plunger coupling and the rotary claw engage so that the rotation of the rotary switch and the rotary claw is transferred to the plunger coupling. After the release of the rotary switch, which returns to its initial position under the influence of the torsion spring's torsional force, it rotates in the opposite direction, allowing said angled teeth to slide over each other without transferring the torque of the rotary switch to the plunger coupling.

[0015] The reverser driver and the pressure spindle are housed in a reverser assembly comprising two connected parts which are axially shifting relative to the pressure spindle. The pins on the reverser driver, already mating with the axial slots defined on the pressure spindle, also mate with the slots defined on the reverser assembly, preventing the displacement of the reverser driver inside the reverser assembly.

[0016] The reverser driver goes through the central openings of the plunger coupling and the rotary claw and leans on the central ring-shaped projection of the reset button. The reset button has a cylindrical base with two coaxially defined ring-shaped projections. The outer, shorter projection is inserted in the rotary switch, while the central, longer projection leans on the reverser driver.

[0017] The reset button and the reverser driver are connected by means of a screw which passes through their central cavities.

[0018] The return spring leans against the ring-shaped projection defined in the middle of the toothbrush handle. On its lower side it leans on the plunger base with the purpose of pushing the plunger towards the reset button.

[0019] The lower end of the compression spring rests against the base of the reset button, right between its coaxial projections. The other end rests against the rotary claw.

[0020] The lower side of the toothbrush shank features a saddle defined to mate with the cartridge gasket. The gasket is ring-shaped and its purpose is to prevent the leakage of the fluid between the toothbrush handle and the shank.

[0021] As mentioned previously, the present invention possesses two distinct functions:

[0022] 1. The squeezing of the fluid out of the replaceable cartridge

[0023] 2. The resetting of the device, for example prior to replacing the cartridge

[0024] Consequently, the present invention provides a reusable toothbrush which allows the replacement of its empty cartridge with a new one, so that the entire toothbrush does not need to be disposed of, enabling its further usage. Furthermore, said toothbrush also prevents the hardening of the toothpaste as well as its contamination inside the toothpaste cartridge.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] In order to get a better understanding of the invention and to show how it can be realised in practice, the present invention will be described in more detail through an exemplary embodiment shown in the accompanying figures:

[0026] FIG. **1** is a longitudinal section of an exemplary embodiment toothbrush with a full toothpaste cartridge,

[0027] FIG. **2** is a longitudinal section of an exemplary embodiment toothbrush from FIG. **1**, with an empty toothpaste cartridge,

[0028] FIG. **3** is an axonometric view of a partially disassembled toothbrush from FIGS. **1** and **2**,

[0029] FIG. **4** is an axonometric view of a fully disassembled toothbrush from FIG. **3**,

[0030] FIG. **5** is an axonometric view of the toothpaste cartridge showing the cartridge piston inside the cartridge body,

[0031] FIG. **6** is an axonometric view of the pressure spindle together with the two parts of the reverser assembly,

[0032] FIG. **7** is an axonometric view of the two parts of the reverser assembly.

DETAILED DESCRIPTION OF THE INVENTION

[0033] As mentioned above, the exemplary embodiment toothbrush with a replaceable toothpaste cartridge, shown in FIGS. **1** to **7**, constructionally provides two basic functions: a. squeezing of the fluid (toothpaste) out of the replaceable cartridge and b. resetting of the mechanism for the toothpaste extraction (in further text: the mechanism) for the purpose of returning it to its functional position, i.e. replacing an empty cartridge with a full one. Basically, the toothbrush assembly can be divided into three sub-assemblies A, B and C, i.e. three constructional units shown in FIGS. **1** and **2**.

[0034] The toothbrush comprises: a toothbrush holder **1**, bridge **2**, replaceable cartridge **3** with a cartridge body **3.1** and a piston **3.2**, a cap **4**, plunger **5**, pressure spindle **6**, plunger coupling **7**, rubber spring **8**, reverser assembly **9**, rotary switch **10**, reverser driver **11**, rotary claw **12**, reset button **13**, screw **14**, return spring **15**, compression spring **16**, torsion spring **17**, cartridge gasket **18**, toothbrush shank **19**, bristle **20**, and membrane **21**. Within the three sub-assemblies—sub-assembly A for the fluid extraction, sub-assembly B for resetting the mechanism and sub-assembly C for brushing teeth, the toothbrush can be roughly divided into 5 functional units, respectively: toothbrush shank **19**, cap **4**, toothbrush handle **1**, replaceable cartridge **3** and the mechanism (consisting of the rest of aforementioned parts).

[0035] As stated above, the purpose of sub-assembly A is to extract (squeeze out) the fluid, i.e. toothpaste from a full toothpaste cartridge **3**. In this case, the replaceable cartridge **3** is full, while the plunger **5** is minimally inserted into the replaceable cartridge **3**, while the return spring **15** is fully compressed. This sub-assembly consists of a toothbrush handle **1**, bridge **2**, replaceable cartridge **3** with cartridge body **3.1** and a piston **3.2**, plunger **5**, pressure spindle **6**, plunger coupling **7**, rotary switch **10**, rotary claw **12** and torsion spring **17**.

[0036] The purpose of sub-assembly B is to reset the mechanism, i.e. to revert the mechanism from the position in which the cartridge **3** is empty to the position where a new, full cartridge **3** can be inserted, in other words from the

position shown in FIG. **2** into the position shown in FIG. **1**. This sub-assembly consists of a replaceable cartridge **3**, plunger **5**, pressure spindle **6**, rubber spring **8**, reverser assembly **9**, reverser driver **11**, reset button **13**, screw **14**, return spring **15** and compression spring **16**. In this case the replaceable cartridge **3** is empty, for the entire quantity of the fluid (toothpaste) has been exhausted, the plunger **5** is fully inserted into the replaceable cartridge **3**, and the return spring **15** is assuming its resting position.

[0037] The purpose of sub-assembly C to maintain oral hygiene and brush teeth. It comprises a toothbrush shank **19** and bristle **20** with a membrane **21**. The shank **19** can be covered with a cap **4** for hygienic reasons.

[0038] The toothbrush handle **1** represents the basic part of the present invention and carries the rest of its constructional elements. As can be seen in FIGS. **3** and **4**, it is essentially a hollow, elongated body. In the presented exemplary embodiment, the outer contour of the toothbrush handle's **1** cross-section is squircular, while the inner contour of the cross-section is circular.

[0039] The upper end of the toothbrush handle **1**, on which the hollow toothbrush shank **19** is mounted, has circumferentially arranged L-shaped pins intended to mate with counterpart pins circumferentially defined at the end of the toothbrush shank **19** opposite to the end which the bristle **20** is mounted on. The shank **19** is mounted on the toothbrush handle **1** by axially shifting the shank **19** towards the handle **1** in a way that the pins defined on the shank **19** slide into the gaps between the circumferentially arranged L-shaped pins defined on the toothbrush handle **1**, and then by rotating the shank **19** relative to the toothbrush handle **1**, said pins interlock. Alternatively, the shank **19** can be mounted on the handle **1** of the toothbrush by any other suitable means of creating a non-permanent joint, such as screw thread mounting or elastic deformation of one of the two structural elements, etc.

[0040] On the lower side of the shank **19**, a saddle is defined to mate with the cartridge gasket **18**. The cartridge gasket **18** is ring-shaped, having a central opening intended to allow the passage of fluid towards a predominantly axial passage inside the shank **19**, stretching from the cartridge gasket **18** at one end to the bristle **20** at the other end. The purpose of the cartridge gasket **18** is to prevent the leakage of fluid between the toothbrush handle **1** and the shank **19**.

[0041] On the lower side of the toothbrush handle **1**, the side opposite the shank **19**, there is a permanently affixed bridge **2**, partially extending outside the cavity of the toothbrush handle **1**. On its other side, opposite the shank **19**, the bridge **2** is connected to the rotary switch **10** by means of clasps, and rotationally shifting relative to the switch **10**. A torsion spring **17** is positioned between the bridge **2** and the rotary switch. One end of the torsion spring **17** is attached to the bridge **2**, while the other end is attached to the rotary switch **10**, allowing the rotary switch **10** to rotate relative to the fixed position of the toothbrush handle **1**, for instance, while the toothbrush handle **1** is held in hand. It rotates in a plane perpendicular to the axis of symmetry of the cartridge gasket **18**.

[0042] The rotary claw **12** is affixed to the rotary switch **10**. The claw **12**, at its end facing the toothbrush handle **1**, has radially defined angled teeth. Opposite said radially defined angled teeth of the rotary claw **12** there are complementarily defined angled teeth of the plunger coupling **7**. Additionally, the rotary claw **12** and the plunger coupling **7**, which are set coaxially one against the other, both have a central opening defined, whose purpose will be explained later.

[0043] The very plunger coupling **7** is affixed to the pressure spindle **6** by means of clasps, and it passes through the torsion spring **17** and the bridge **2**. Said angled teeth of the plunger coupling **7** mesh with the angled teeth of the rotary claw **12**.

[0044] The purpose of the torsion spring **17** is to return the rotary switch **10** to its initial position. Because the torsion spring is affixed to the rotary switch **10** at one end, while the other end is attached to the bridge **2**, the rotation of the rotary switch creates a torsional force acting to return the rotary switch **10** to its original position.

[0045] The angled teeth on the plunger coupling **7** and the rotary claw **12** are defined in such a way that when the rotary switch **10** is rotated in one direction, the angled teeth of the plunger coupling **7** and the rotary claw **12** mesh together so that the rotation of the rotary switch **10** (for example, by hand) and the rotary claw **12** is transferred to the plunger coupling **7**. After the release of the rotary switch **10**, which returns to its initial position by rotating in the opposite direction under the influence of the torsion spring's **17** torsional force, said angled teeth slide over each other without transferring the torque of the rotary switch **10** to the plunger coupling **7**.

[0046] Inside the toothbrush handle **1** is an axially shifting plunger **5** shaped like a cartridge, whose closed front end, intended to push the cartridge piston **3.2**, is oriented towards the shank **19**, while its open end, ending in the wreath-shaped base of the plunger **5**, is oriented towards the reset button **13**. An internal thread is defined on the inside of the plunger **5**.

[0047] The pressure spindle **6** is positioned inside the plunger **5**. The middle part of the pressure spindle **6** is an elongated cylinder ending with a wide head at its upper end. An external thread is defined on the head and its purpose is to mesh with the internal thread of the plunger **5**. Between the head and the middle of the pressure spindle **6**, there is a tapering transitional part shaped like a truncated cone. The lower part of the pressure spindle **6** ends in a disk-shaped base through which the plunger coupling **7** is affixed to the pressure spindle **6** by means of clasps. At its upper end, the pressure spindle **6** has axial grooves defined. Also, around its upper end the pressure spindle **6** has an internally defined saddle which mates with the rubber spring **8** for the radial spacing of the pressure spindle **8** arms formed by said axial grooves. The external thread of the pressure spindle **6** engages the internal thread of the plunger **5**. At its lower end, above the disc-shaped base, the pressure spindle **6** has axial slots defined. Inside these slots, the pins of the reverser driver **11** shift axially. The reverser driver is positioned in the lower part of the pressure spindle's **6** central cavity.

[0048] The reverser driver **11** and the pressure spindle **6** are housed by the reverser assembly **9**, which comprises two mutually connected parts **9.1**, **9.2** axially shifting along the pressure spindle **6**. The pins on the reverser driver **11** mate with the axial slots defined on the pressure spindle **6**, and also mate with the slots on the reverser assembly **9** defined on its parts **9.1** and **9.2**, preventing its displacement inside the reverser assembly **9**.

[0049] The reverser driver **11** is a hollow cylinder with said pins projecting radially outward. The lower part of the reverser driver **11** passes through the central holes of the

plunger coupling **7** and the rotary claw **12** and leans on the central ring-shaped projection of the reset button **13**.

[0050] Said reset button **13** has a circular base with two coaxially arranged ring-shaped projections. The outer, shorter projection is inserted in the rotary switch **10**, while the central, longer projection leans on the reverser driver **11** which has a central cavity.

[0051] The reset button **13** and the reverser driver **11** are connected by means of a screw **14**, which passes through their central cavities.

[0052] The upper end of the return spring **15** leans against a ring-shaped projection defined in the middle of the toothbrush handle **1**, while its lower end leans on the plunger **5** base. It pushes the plunger **5** towards the reset button **13**. FIG. **2** shows the plunger **5** fully inserted into an empty replaceable cartridge **3** with all the fluid (such as toothpaste) having previously been squeezed out. FIG. **1** shows the plunger **5** outside of a full replaceable cartridge **2**.

[0053] One end of the compression spring **16** rests against the base of the reset button **13**, right between its coaxial projections. The other end of the compression spring **16** rests against a matching ring-shaped surface defined on the lower side of the rotary claw **12**.

[0054] The bristle **20** and the membrane **21** are mounted the upper side of the shank **19**. The bristle **20** serves the purpose of cleaning teeth, while the membrane **21** prevents oxidation, i.e. hardening of the fluid. During the compression of the fluid (such as toothpaste), the membrane expands under the fluid's pressure and allows the fluid to flow. When the fluid is no longer being compressed, the pressure on the membrane **21** drops, and it contracts once again.

[0055] While the toothbrush is not in use, for instance while it is being transported or stored, the bristle **20** and the membrane **21** can be protected from contamination by means of a cap **4**, which can be attached to the toothbrush handle **1**.

[0056] As mentioned above, the toothbrush with a replaceable toothpaste cartridge has two distinct functions:

[0057] 1. The extraction of the fluid (such as toothpaste) out of the replaceable cartridge **3** and

[0058] 2. The resetting of the device (prior to replacing the cartridge **3**).

[0059] The fluid (such as toothpaste) is squeezed out by turning the rotary switch **10**. It engages the rotary claw **12**, which further engages the plunger coupling **7** by mutual meshing of their complementarily angled teeth. Since the plunger coupling **7** is affixed to the pressure spindle **6**, turning the plunger coupling **7** rotates the pressure spindle **6** as well. Upon rotating the pressure spindle **6**, the outer thread of the pressure spindle **6**, engaging the inner thread of the plunger **5**, raises the plunger **5** axially. The elevation of the plunger **5** exerts pressure on the piston **3.2** which slides inside the body **3.1** of the replaceable cartridge **3**, thus squeezing the fluid out of the replaceable cartridge **3** towards the passage extending axially through the toothbrush shank **19** and further towards the bristle and the membrane **21**.

[0060] The purpose of resetting the device is to replace the empty cartridge **3**. When the reset button **13** is pressed, it engages the reverser driver **11** via the screw **14**. The reverser driver **11** engages the pressure spindle **6** via the reverser assembly **9**. Upon engaging the reverser driver **11**, its pins, mating the slots on the reverser assembly **9**, elevate the reverser assembly **9** axially along the pressure spindle **6**. The sliding of the reverser assembly **9** over the tapered part of the pressure spindle **6** brings the arms of the pressure spindle **6** closer and compresses the rubber spring **8**, while simultaneously compacting the head of the pressure spindle **6**.

[0061] Once the return spring **15** is fully compressed, and the head of the pressure spindle **6** is compacted, allowing itself to disengage the internal thread of the plunger **5** and the external thread of the pressure spindle **6**, the plunger **5** is released and returned to its original position (shown in FIG. **1**) due to the force exerted by the return spring **15**.

[0062] Now, by twisting the shank **19** relative to the toothbrush handle **1** and pulling it away, the two structural elements can be detached, while the replaceable cartridge **3** can be removed from the toothbrush handle **1**, and replaced with a full replaceable cartridge **3**. Before a new cartridge **3** is inserted into the toothbrush handle **1**, a protective foil seal is removed from the nozzle of the body **3.1** of the replaceable cartridge **3**. Finally, the shank **19** is mounted on the toothbrush handle **1** and reattached by twisting relative to it, after which the toothbrush can be used again.

[0063] It is important to emphasize that the exemplary embodiment toothbrush comprises a compact and aesthetically pleasing entity which ensures proper extraction of the toothpaste onto the bristle. The volume of extracted toothpaste corresponds to the angle of rotation of the rotary switch **10**.

[0064] It is to be understood that the above description is intended for the purposes of illustrating a preferred exemplary embodiment, rather than limiting the scope of the invention. Based on the considerations above, a person skilled in the art will envision numerous variations and modifications of the present invention, which would still be covered by the scope of the invention as defined by the appended claims.

DRAWING REFERENCE NUMERALS

[0065] **1** toothbrush handle
[0066] **2** bridge
[0067] **3** replaceable cartridge
[0068] **3.1** cartridge body
[0069] **3.2** piston
[0070] **4** cap
[0071] **5** plunger
[0072] **6** pressure spindle
[0073] **7** plunger coupling
[0074] **8** rubber spring
[0075] **9** reverser assembly
[0076] **9.1** part of reverser assembly
[0077] **9.2** part of reverser assembly
[0078] **10** rotary switch
[0079] **11** reverser driver
[0080] **12** rotary claw
[0081] **13** reset button
[0082] **14** screw
[0083] **15** return spring
[0084] **16** compression spring
[0085] **17** torsion spring
[0086] **18** cartridge gasket
[0087] **19** shank
[0088] **20** bristle
[0089] **21** membrane

1. A toothbrush with a replaceable toothpaste cartridge, comprising a toothbrush handle (**1**), a hollow shank (**19**) removable attached to toothbrush handle (**1**) on whose upper part are removable attached a bristle (**20**) and a membrane

(**21**), which can together be covered with a cap (**4**); a replaceable cartridge (**3**) housed by toothbrush handle (**1**) and a mechanism for the extraction of toothpaste from a replaceable cartridge (**3**), which can be reset in order to replace said replaceable cartridge (**3**).

2. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that inside a toothbrush handle (**1**) houses an axially shifting plunger (**5**), shaped like a cartridge, whose closed end faces shank (**19**), while its open end, ending in a wreath-shaped base of plunger (**5**) faces the opposite side, having an internal thread defined on the inside of plunger (**5**).

3. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that inside plunger (**5**) houses a pressure spindle (**6**) shaped like an elongated hollow cylinder in the middle and ending in a head with an external thread defined, intended to mesh with the internal thread of plunger (**5**), also with a transitional part shaped like a truncated cone between the head and the middle of pressure spindle (**6**), while the pressure spindle (**6**) has a disc-shaped base at its lower end, by means of which a plunger coupling (**7**) is attached to pressure spindle (**6**), which at its upper end has defined axial grooves, as well as a saddle in its upper region, intended to mate with a rubber spring (**8**) for a radial spacing of pressure spindle (**6**) arms formed by the axial grooves, while the external thread of said pressure spindle (**6**) engages the internal thread of plunger (**5**), and at its lower end, above the disc-shaped base, pressure spindle (**6**) has axial slots intended to mate with axially-shifting pins of a reverser driver (**11**) positioned in the lower part of the central cavity of pressure spindle (**6**).

4. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a toothbrush handle (**1**), on the opposite the shank (**19**), is permanently attached to a bridge (**2**), which is connected to a rotary switch (**10**) at its other end, in a way that it is rotationally shifting relative to the bridge (**2**), while between bridge (**2**) and rotary switch (**10**) a torsion spring (**17**) is positioned, having its one end attached to bridge (**2**), and the other to rotary switch (**10**).

5. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a rotary switch (**10**) is attached to a rotary claw (**12**) with radially defined angled teeth at the end facing toothbrush handle (**1**), while opposite the radially defined angled teeth of rotary claw (**12**) there are complementarily defined angled teeth of the plunger coupling (**7**), while plunger coupling (**7**) and rotary claw (**12**), positioned coaxially one relative to the other, each have one centrally defined opening.

6. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a reverser driver (**11**) and pressure spindle (**6**) are housed in a reverser assembly (**9**) composed of two mutually connected parts (**9.1**, **9.2**), which are axially shifting along pressure spindle (**6**), while the pins defined on reverser driver (**11**), already mating with the axial grooves defined on pressure spindle (**6**), also mate with the slots of reverser assembly (**9**) defined on its parts (**9.1**, **9.2**).

7. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a reverser driver (**11**) passes through the central openings of plunger coupling (**7**) and rotary claw (**12**), while leaning against the central ring-shaped projection of a reset button (**13**), which has a circular base from which two coaxially arranged ring-shaped projections: an outer, shorter projection inserted inside rotary switch (**10**), and an inner, longer projection leaning against reverser driver, while reset button (**13**) and reverser driver (**11**) are mutually connected via a screw (**14**).

8. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a return spring (**15**) rests on a ring-shaped projection in the middle of a toothbrush handle (**1**), while on the lower side it leans against the base of plunger (**5**), in order to push plunger (**5**) towards reset button (**13**).

9. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that a compression spring (**16**) is positioned in such manner that at one end it leans against reset button (**13**), and at the other end against rotary claw (**12**).

10. The toothbrush with a replaceable toothpaste cartridge according to claim **1**, characterized in that the lower side of shank (**19**) has a saddle defined, for the purpose of accepting a cartridge gasket (**18**).

* * * * *