US 20220192357A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0192357 A1**

Berhane (43) **Pub. Date: Jun. 23, 2022**

(54) **ALL-IN-ONE TOOTHBRUSH**

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(21) Appl. No.: **17/498,051**

(22) Filed: **Oct. 11, 2021**

Related U.S. Application Data

(60) Provisional application No. 63/127,176, filed on Dec. 18, 2020.

Publication Classification

(51) **Int. Cl.**

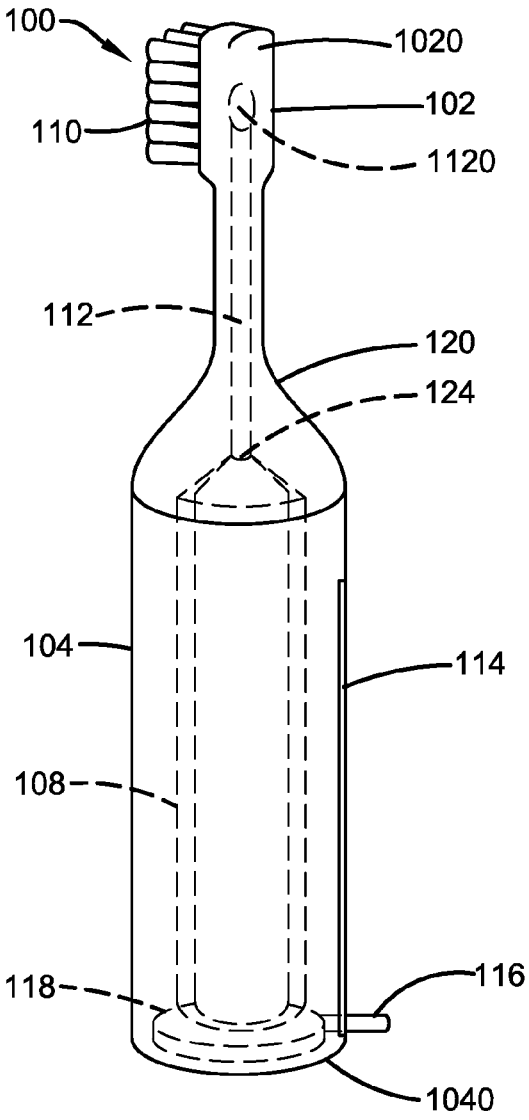
A46B 11/00	(2006.01)
A46B 9/04	(2006.01)
A46B 5/00	(2006.01)

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

CPC ***A46B 11/0037*** (2013.01); ***A46B 11/0062*** (2013.01); *A46B 2200/1066* (2013.01); ***A46B 5/0095*** (2013.01); ***A46B 11/0065*** (2013.01); ***A46B 9/04*** (2013.01)

(57) **ABSTRACT**

The present invention relates to a toothbrush which stores and dispenses toothpaste. The toothbrush is available in four different designs. A first design features a slider mechanism for moving toothpaste onto the bristles. A second design features a plunger disposed at the bottom of housing/handle for applying toothpaste to the bristles. A third and fourth design features a vacuum release mechanism which pulls toothpaste from the housing onto the bristles. Each design features a hollow body in the form of a reservoir or a cartridge which stores toothpaste. The toothbrush which stores and dispenses toothpaste is more economical and space-saving than conventional independent toothbrushes and toothpaste tubes.



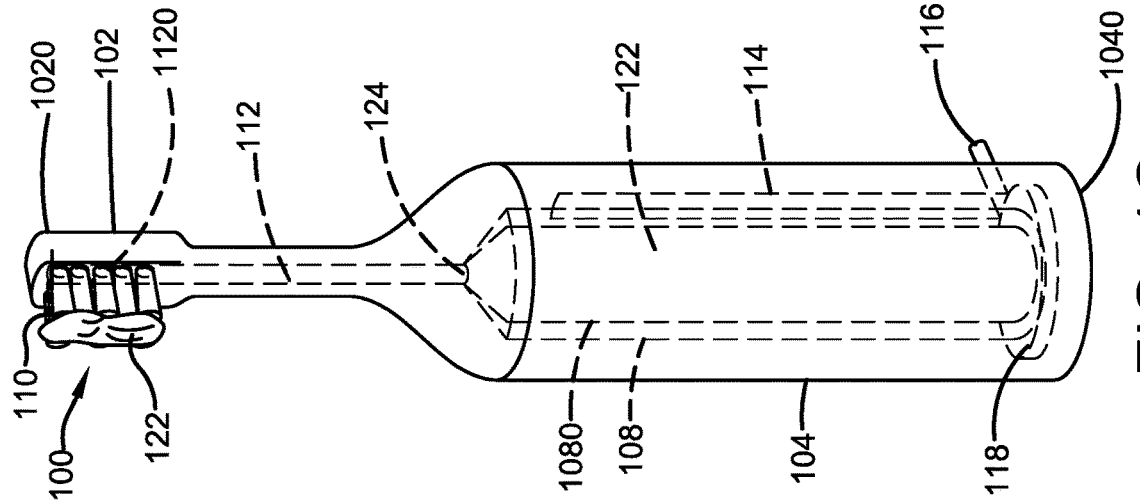


FIG. 1C

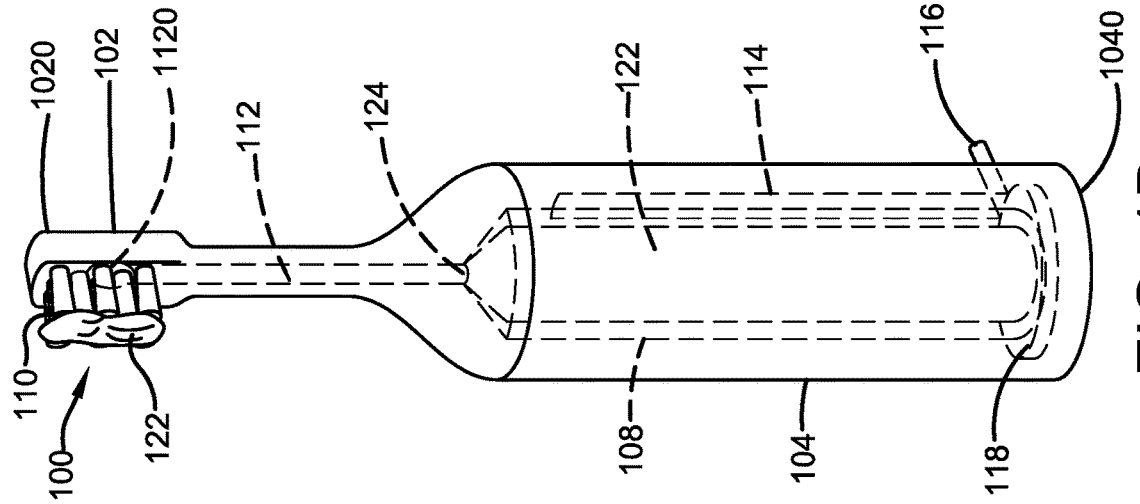


FIG. 1B

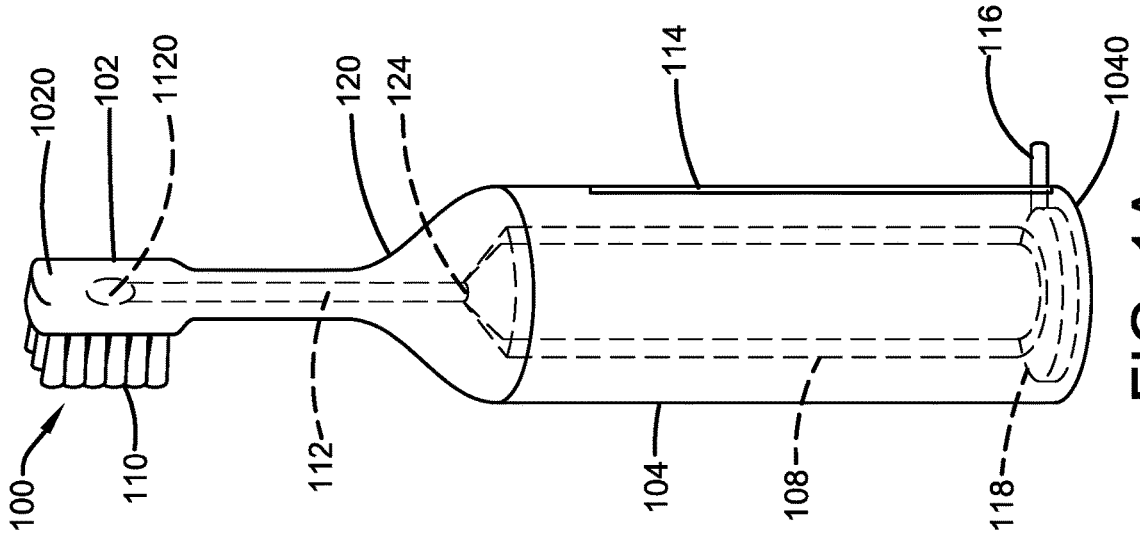


FIG. 1A

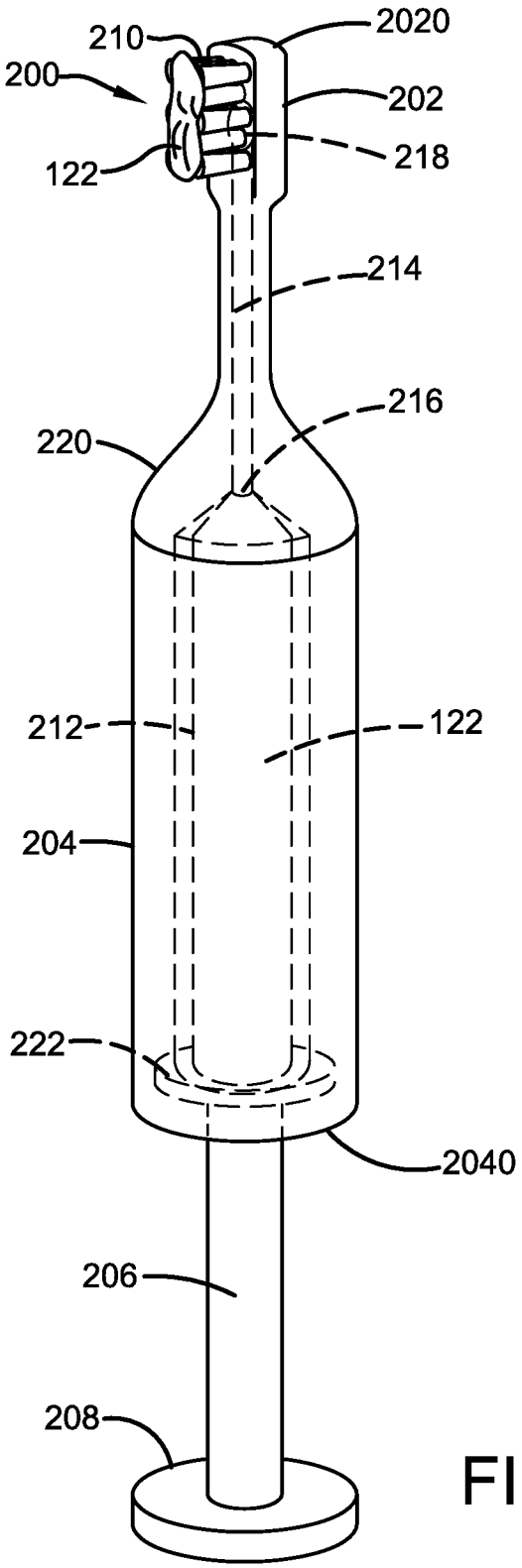

210
2020
200
202
122
218
214
216
220
212
122
204
222
2040
206
208

FIG. 2

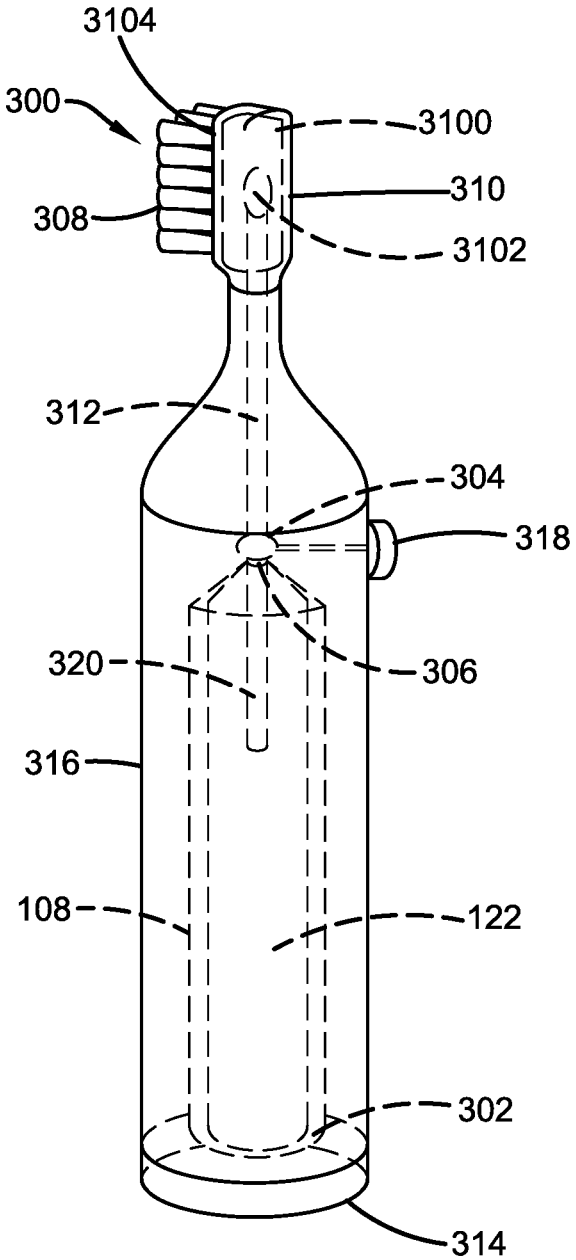

3104
300
3100
310
308
3102
312
304
318
320
306
316
108
122
302
314

FIG. 3

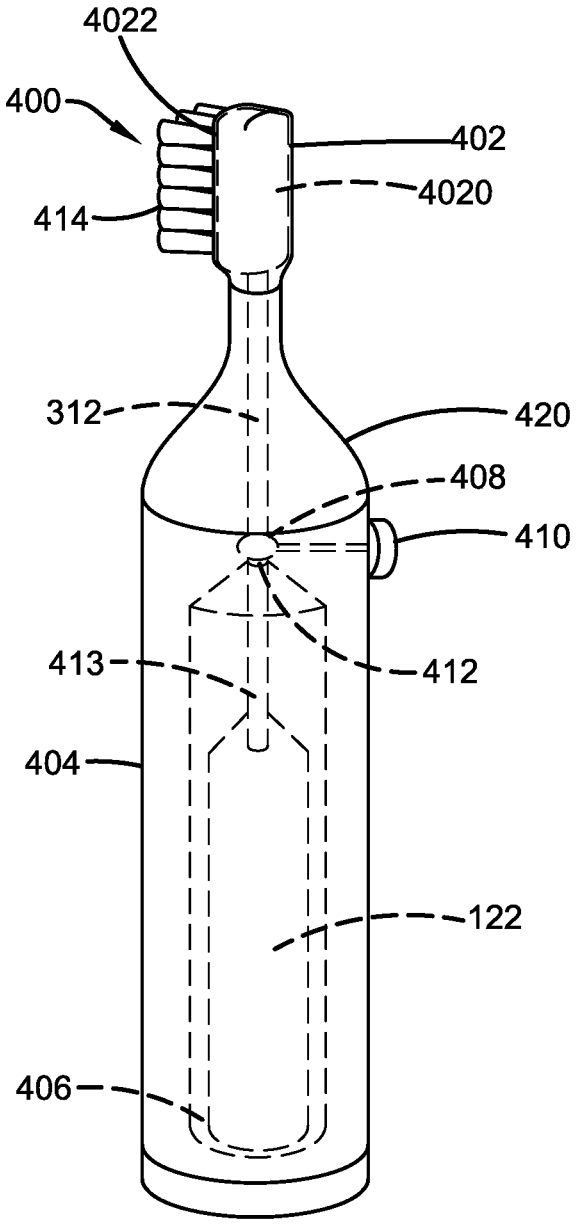


FIG. 4

ALL-IN-ONE TOOTHBRUSH

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority to, and the benefit of, U.S. Provisional Application No. 63/127,176, which was filed on Dec. 18, 2020 and is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to the field of toothbrushes. More specifically, the present invention relates to a uniquely designed all-in-one toothbrush device that dispenses toothpaste as per a user's wants and/or needs. The all-in-one toothbrush device comprises a hollow handle for storing a toothpaste cartridge and/or toothpaste and wherein the handle is connected to a brush head having bristles for brushing a user's teeth. The all-in-one toothbrush device features different mechanisms such as a sliding button, syringe and vacuum release button in order to dispense toothpaste stored in the hollow handle to the bristles of the brush head. The improved toothbrush of the present invention offers a way to store toothpaste and a toothbrush in a compact manner, thereby effectively saving space in a bathroom or luggage bag. Accordingly, the present disclosure makes specific reference thereto. Nonetheless, it is to be appreciated that aspects of the present invention are also equally applicable to other like applications, devices and methods of manufacture.

BACKGROUND OF THE INVENTION

[0003] By way of background, oral care routines typically consist of brushing and flossing teeth to maintain a healthy lifestyle. For teeth brushing, users require a toothbrush and a tube of toothpaste. However, it may be difficult to always remember to carry toothpaste while traveling. Further, if a user forgets toothpaste they may be unable to brush their teeth. Additionally, toothbrushes and toothpaste can take up considerable space in a bathroom drawer, sink top, or in a luggage bag while traveling.

[0004] Conventional toothbrushes comprise a handle connected to a brush head having bristles, wherein toothpaste is typically dispensed/applied to the bristles for brushing a user's teeth. To dispense or apply toothpaste on the bristles, a user generally squeezes the toothpaste tube while positioning the tube opening over the bristles. However, it may be difficult for children or other users with limited strength/dexterity to squeeze a toothpaste tube themselves and they may need assistance from others.

[0005] Devices such as toothpaste dispensers are available in the market and can be used for automatically dispensing toothpaste over the bristles of the toothbrush. Typically, the toothpaste dispensers are mounted on a bathroom wall or other similar place, wherein a user can place the bristles of their toothbrush under the dispenser to receive a predetermined amount of toothpaste on their toothbrush. However, toothbrush dispensers are not portable and cannot be carried along with users while traveling. Thus, some users desire a portable solution for automatically dispensing toothpaste on a toothbrush.

[0006] Therefore, there exists a long-felt need in the art for a uniquely designed toothbrush device that eliminates the need to keep or carry toothpaste tubes along with a toothbrush. There is also a long-felt need in the art for an improved toothbrush device that allows users to easily dispense and use toothpaste without keeping separate toothpaste tubes in every bathroom. Additionally, there is a long-felt need in the art for a toothpaste dispensing mechanism that saves drawer space, sink top space, or space within a luggage bag. Additionally, there is a long-felt need in the art for a uniquely designed toothbrush device that offers a way to store both a toothbrush and a toothpaste tube in a compact manner and effectively saves space in bathrooms/luggage bags. Finally, there is a long-felt need in the art for a toothpaste dispensing solution that can be easily used by children and users with limited strength/dexterity and prevents said users from needing assistance from others.

[0007] The subject matter disclosed and claimed herein, in one embodiment thereof, comprises a refillable toothbrush device that is configured to store and dispense toothpaste. The stored toothpaste is dispensed on the bristles of the device using a sliding mechanism, syringe mechanism, or vacuum release mechanism. The refillable toothbrush device generally comprises a head portion having a plurality of bristles for cleaning a user's teeth and a housing having an integrated reservoir for storing toothpaste. The housing comprises a sliding mechanism that further has a slide tab configured to slide along a channel disposed on the housing to push toothpaste towards the head portion and into the bristles. Alternatively, the housing may feature a syringe-based mechanism or a vacuum-pump-based mechanism to move the toothpaste from the reservoir to a conduit which connects to the head portion to dispense the stored toothpaste into the bristles of the toothbrush.

[0008] In this manner, the novel refillable toothbrush device of the present invention accomplishes all of the forgoing objectives, and provides a relatively easy, convenient and portable solution to storing and dispensing toothpaste. The refillable toothbrush device of the present invention is also user friendly, as it does not require users to maintain a separate toothbrush and toothpaste tube. Additionally, the device is compact and portable for traveling. Further, a variety of different mechanisms such as a sliding button, a syringe, a vacuum release button, etc., are easy to use for dispensing toothpaste and can be conveniently used by all users regardless of age, strength, and dexterity.

SUMMARY OF THE INVENTION

[0009] The following presents a simplified summary in order to provide a basic understanding of some aspects of the disclosed innovation. This summary is not an extensive overview, and it is not intended to identify key/critical elements or to delineate the scope thereof. Its sole purpose is to present some general concepts in a simplified form as a prelude to the more detailed description that is presented later.

[0010] The subject matter disclosed and claimed herein, in one embodiment thereof, comprises a refillable toothbrush device. The toothbrush device is configured to dispense toothpaste onto the bristles using a sliding mechanism. The refillable toothbrush device comprises a head portion having a plurality of bristles for cleaning teeth, a housing having an integrated reservoir for storing toothpaste, and a sliding mechanism for dispensing the toothpaste onto the bristles. The sliding mechanism comprises a slider component with an associated abutment plate, wherein the slider component is configured to slide along a sliding channel which is

disposed on the housing. The abutment plate moves the toothpaste from the reservoir and pushes the toothpaste towards an opening at the top of the reservoir. A conduit tube extends from the reservoir opening to one or more apertures in the head portion between the bristles. The abutment plate continues to move the toothpaste through the conduit tube, wherein the conduit tube then dispenses the toothpaste from the one or more apertures onto the bristles for cleaning a user's teeth.

[0011] In a further embodiment of the present invention, a toothbrush with integrated toothpaste dispenser is disclosed. The toothbrush with integrated toothpaste dispenser is configured to dispense toothpaste using a plunger mechanism. The device comprises a head portion, a housing connected to said head portion, a reservoir included within the housing that stores toothpaste, and a plunger mechanism for dispensing the toothpaste onto the bristles. The plunger mechanism comprises a plunger disposed at the bottom of the housing, wherein the plunger comprises a plunger flange for pushing a plunger tip into said reservoir. The plunger tip pushes toothpaste towards a reservoir hole positioned at the top of the reservoir and into a conduit tube. The conduit tube extends from the reservoir hole to one or more apertures positioned in the head portion between the bristles. The conduit tube then dispenses toothpaste from said one or more apertures onto the bristles for cleaning a user's teeth. In a further embodiment of the present invention, the reservoir can have a replaceable cartridge containing toothpaste and connected to a reservoir opening. The head portion and the housing can also be integrated as a single component or can be separate components removably attached to each other.

[0012] In yet a further embodiment of the present invention, a toothbrush device with vacuum release toothpaste dispenser is disclosed. The device comprises a vacuum actuator connected to a vacuum pump, the vacuum pump having a piston configured to move into an integrated cartridge which stores the toothpaste. The vacuum pump is activated by the vacuum actuator such that the piston moves into the cartridge to pump the stored toothpaste to an orifice. Then, a pipe extending from the orifice to the plurality of bristles positioned on the head portion of the toothbrush dispenses the toothpaste. The vacuum actuator may also be disposed on the housing of the toothbrush, wherein the housing is integrated with the head portion of the toothbrush. Alternatively, the housing is removably attached to the head portion to allow for replacement of the cartridge.

[0013] To the accomplishment of the foregoing and related ends, certain illustrative aspects of the disclosed innovation are described herein in connection with the following description and the annexed drawings. These aspects are indicative, however, of but a few of the various ways in which the principles disclosed herein can be employed and are intended to include all such aspects and their equivalents. Other advantages and novel features will become apparent from the following detailed description when considered in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The description refers to provided drawings in which similar reference characters refer to similar parts throughout the different views, and in which:

[0015] FIG. **1**A illustrates a side perspective view of one potential embodiment of a toothbrush device of the present invention which utilizes a sliding mechanism to dispense toothpaste in accordance with the disclosed architecture;

[0016] FIG. **1**B illustrates a perspective view disclosing how the toothpaste is dispensed from the brush head onto the bristles of one potential embodiment of a toothbrush device of the present invention in accordance with the disclosed architecture;

[0017] FIG. **1**C illustrates a perspective view disclosing how the toothpaste is dispensed from the brush head onto the bristles of one potential embodiment of a toothbrush device of the present invention that is further comprised of a pressurized toothpaste tube in accordance with the disclosed architecture;

[0018] FIG. **2** illustrates a perspective view of another potential embodiment of a toothbrush device of the present invention which utilizes a plunger mechanism to dispense toothpaste in accordance with the disclosed architecture;

[0019] FIG. **3** illustrates a perspective view of another potential embodiment of a toothbrush device of the present invention which utilizes a vacuum pump to dispense toothpaste in accordance with the disclosed architecture; and

[0020] FIG. **4** illustrates a perspective view of another potential embodiment of a toothbrush device of the present invention which comprises a replaceable toothpaste cartridge in accordance with the disclosed architecture.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0021] The innovation is now described with reference to the drawings, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding thereof. It may be evident, however, that the innovation can be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to facilitate a description thereof. Various embodiments are discussed hereinafter. It should be noted that the figures are described only to facilitate the description of the embodiments. They are not intended as an exhaustive description of the invention and do not limit the scope of the invention. Additionally, an illustrated embodiment need not have all the aspects or advantages shown. Thus, in other embodiments, any of the features described herein from different embodiments may be combined.

[0022] As noted above, there exists a long-felt need in the art for a uniquely designed toothbrush device that eliminates the need to keep or carry toothpaste tubes along with a toothbrush. There is also a long-felt need in the art for an improved toothbrush device that allows users to easily dispense and use toothpaste without keeping separate toothpaste tubes in every bathroom and that saves drawer space, sink top space, or space within a luggage bag. Additionally, there is a long-felt need in the art for a uniquely designed toothbrush device that offers a way to store both a toothbrush and a toothpaste tube in a compact manner and effectively saves space in bathrooms/luggage bags. Finally, there is a long-felt need in the art for a toothpaste dispensing solution that can be easily used by children and users with limited strength/dexterity and prevents said users from needing assistance from others.

[0023] The present invention, in one exemplary embodiment, comprises a refillable toothbrush device that is con-

figured to store and dispense toothpaste onto its bristles using a sliding mechanism, a syringe mechanism, or a vacuum release mechanism. The toothbrush device comprises a head portion having a plurality of bristles for cleaning a user's teeth and a hollow handle housing having an integrated reservoir for storing toothpaste. In differing embodiments, the housing can feature a slide mechanism, a syringe plunger mechanism, or a vacuum pump mechanism which moves the toothpaste from inside the reservoir to a conduit connecting the reservoir to the head portion, in order to dispense the toothpaste onto the bristles of the toothbrush.

[0024] Referring initially to the drawings, FIG. **1**A illustrates a side perspective view of one potential embodiment of the toothbrush device **100** of the present invention wherein a slider mechanism is used to dispense toothpaste **122**. Specifically, the toothbrush device **100** is configured to dispense toothpaste onto the plurality of bristles **110**. The toothbrush device **100** can be a reusable item which allows users to refill the toothpaste reservoir **108** or the toothbrush device **100** can be a disposable item wherein users must purchase a new toothbrush device **100** when the toothpaste stored in the reservoir **108** is exhausted.

[0025] The toothbrush device **100** comprises a head portion **102** having a plurality of bristles **110** for cleaning a user's teeth. The plurality of bristles **110** are teeth engaging elements. For example, the plurality of bristles **110** may include nylon or elastomeric wiping elements that assist in removing stains from teeth and/or assist with forcing toothpaste **122** into the tubules of the teeth. The plurality of bristles **110** may be manufactured from any other suitable material as is known in the art. Moreover, while the toothbrush device **100** is exemplified as a manual toothbrush, the toothbrush device **100** can also be an electrical-powered toothbrush in other embodiments of the invention. The preferred length of the head portion **102** and the housing **104** is approximately 6 inches. The preferred dimensions of the plurality of bristles **110** is approximately 1 inch long by approximately ¼ to ⅓ inches wide. The preferred length of the tube **112** is approximately 2 inches.

[0026] Further, the head portion **102** comprises a cavity **1020** and a tube **112** extending up to an aperture **1120** in the head portion **102**, which allows toothpaste **122** stored in the reservoir **108** of the housing **104** to be moved into the cavity **1020**. Specifically, tube **112** is coupled to the reservoir **108** and is used as a conduit to carry toothpaste **122** from the reservoir **108** to the cavity **1020** of the head portion **102**, and wherein toothpaste **122** is then dispensed through the aperture **1120** onto the plurality of bristles **110**. In an alternative embodiment, the reservoir **108** may contain a pre-filled, pressurized tube **1080** of toothpaste **122** that can be placed inside the reservoir **108**. It is also contemplated that in this embodiment, the head portion **102** and housing **104** are hollow such that they can receive the tube **1080**, wherein the tube **1080** can be replaced by another tube **1080** when it runs out of toothpaste **122** or can be reused and refilled. Further, the housing **104** may have a button **1040** that allows a user to dispense the toothpaste **122** from the tube **1080** and to the head portion **102**, as seen in FIG. **1**C.

[0027] The head portion **102** may include multiple apertures **1120** to allow the toothpaste to be dispensed evenly onto the plurality of bristles **110** of the toothbrush device **100**. To push toothpaste from the reservoir **108** to the tube **112**, a slider **116** with an associated abutment plate **118** is configured to be manually moved across a slider channel **114** disposed on the housing **104** of the toothbrush device **100**. In the initial stage, the abutment plate **118** is positioned at the base **1040** of the housing **104**.

[0028] In the present embodiment, the head portion **102** is also detachable from the housing **104** and when the head portion **102** is connected to the housing **104**, they are connected to each other through a rubber fastener **120** that can be screwed and unscrewed to detach the head portion **102** from the housing **104**. The rubber fastener **120** acts as a tight-fit assembly, a coupling sleeve, a threaded engagement, or a fastener, etc., wherein any other suitable fastener can be used as is known in the art. Alternatively, the head portion **102** and the housing **104** can be manufactured as a single unitary structure using a molding, milling, machining or other suitable process as is known in the art. Additionally, in an alternate embodiment, the base portion **1040** of the toothbrush device **100** can be removably attached to allow a user to refill the toothpaste reservoir **108**, or the base portion **1040** can be permanently attached to the housing **104** which requires a user to purchase a new toothbrush device **100** when the toothpaste reservoir **108** is empty.

[0029] It should be appreciated that the toothbrush device **100** is a compact readily portable self-contained user-friendly system that includes all of the components necessary for a user to perform a desired oral care treatment routine. Because the toothpaste reservoir **108** is located within the housing **104** of the toothbrush device **100** itself, the toothbrush device **100** is portable for travel, easy to use, and reduces the amount of required storage space.

[0030] FIG. **1**B illustrates a perspective view disclosing how the toothpaste is dispensed from the brush head onto the bristles of one potential embodiment of a toothbrush device of the present invention. As shown in FIG. **1**B, toothpaste **122** is filled in reservoir **108** to allow the toothbrush device **100** to dispense toothpaste **122** onto the plurality of bristles **110** through the aperture **1120** on the head portion **102**. When dispensing toothpaste **122** from the reservoir **108**, the slider button **116** is manually moved along the sliding channel **114** in an upward direction. As the slider button **116** is moved in an upward direction, the abutment plate **118** which is linearly connected to the slider button **116** also moves in an upward direction. As the abutment plate **114** moves, it contacts the toothpaste **122** within the reservoir **108** and moves the toothpaste **122** in an upward direction towards a continuous opening **124** in the reservoir **108** and into a conduit pipe **112**. The reservoir **108** is coupled to the cavity **1020** in the head portion **102** via the conduit pipe **112** which is connected to the opening **124**. The toothpaste **122** is then forced through the conduit pipe **112** and into the cavity **1020** of the head portion **102**, where a portion of the toothpaste **122** flows through aperture **1120** and is dispensed onto the plurality of bristles **110** for use.

[0031] A portion of the housing **104** can be transparent or translucent allowing a user to determine the amount of toothpaste **122** present within the reservoir **108** and accordingly refill the reservoir **108** as needed. Further, the sliding channel **114** would be positioned along the non-transparent or non-translucent portion of the housing **104**.

[0032] FIG. **2** illustrates a perspective view of another embodiment of the toothbrush device **100** of the present invention. In the present embodiment, a syringe-based toothbrush device **200** comprises a housing **204** integrated with a toothpaste reservoir **212** and having a plunger **206** positioned at the bottom **2040** of the housing **204**. The plunger

206 utilizes a plunger flange 208 and a plunger tip 222 that is configured to move within the reservoir 212. The reservoir 212 acts a barrel for the plunger 206 and stores the toothpaste 122. The reservoir 212 is disposed within the housing 204 and comprises a hollow space to store toothpaste 122. The reservoir 212 is connected to the head portion 202 via a conduit tube 214. Thus, when the plunger flange 208 of plunger 206 is dispensed, plunger tip 222 contacts the toothpaste 122 within the reservoir 212 and pushes the toothpaste 122 through a continuous reservoir opening 216 to the conduit tube 214.

[0033] Specifically, when the plunger flange 208 is pushed, the plunger 206 moves inside the reservoir 212 through the bottom surface 2040 of the housing 204 and activates the plunger tip 222. The plunger tip 222 then contacts the toothpaste 122 within the reservoir 212 and pushes the toothpaste 122 upwards toward the conduit tube 214 through the reservoir opening 216. The toothpaste 122 then moves through the conduit tube 214 and into the head cavity 2020. A portion of the toothpaste 122 then flows through aperture or hole 218 present in the head portion 202 and is dispensed onto the plurality of bristles 210 for use. The head portion 202 comprises one aperture 218, but may include a plurality of tiny apertures to dispense the toothpaste 122 from the head cavity 2020 onto the plurality of bristles 210 of the toothbrush device 200.

[0034] In operation, moving the plunger tip 222 in the reservoir 212 creates excessive air pressure within the reservoir 212 which increases as the plunger tip 222 moves. This build-up of air pressure acts to forcibly squeeze the toothpaste 122 out from the reservoir 212, through the conduit tube 214, into the aperture/hole 218, and then onto the plurality of bristles 210. Thus, a user can adjust the amount of toothpaste 122 that is dispensed onto the plurality of bristles 210 by pushing more or less air into the reservoir 212 via the plunger tip 222.

[0035] When refilling the reservoir 212 in the present embodiment, the head portion 202 and the housing 204 are removably attached through connector 220. The connector 220 acts as a tight-fit assembly, a coupling sleeve, a threaded engagement, or a fastener, etc., or any other suitable fastening device as is known in the art. Alternatively, the head portion 202 and the housing 204 of the toothbrush device 200 of the present embodiment are manufactured as a single unitary structure using a molding, milling, machining or any other suitable process as is known in the art.

[0036] It should be appreciated that since the toothbrush device 100 of the present invention comprises an integrated toothpaste reservoir 108, 212 and dispensing means, the user is less likely to misplace the toothpaste 122 and will be more inclined to maintain their oral treatment routine. Further, the reservoir 108, 212 or the toothpaste chamber can be filled directly via any conventional toothpaste 122 tube known in the art, or the consumer can utilize a toothpaste cartridge in the reservoir 108, 122 or the toothpaste chamber.

[0037] FIG. 3 illustrates a perspective view of another potential embodiment of a toothbrush device 300 of the present invention. In the present embodiment, the toothbrush device 300 comprises an integrated toothpaste cartridge 302 which has a vacuum pump 304 that allows the toothpaste 122 within the toothpaste cartridge 302 to be pumped up from the cartridge 302 to an orifice 306 and then dispensed onto the plurality of bristles 308 of the head portion 310. The head portion 310 typically comprises a cavity 3100 that is filled with toothpaste 122 from a conduit tube 312. The conduit tube 312 connects the cavity 3100 to the orifice 306 and cartridge 302. Toothpaste 122 pumped up from the cartridge 302 via the vacuum pump 304 enters the orifice 306 and travels through the conduit tube 312 to the cavity 3100 of the head portion 310. Once the cavity 3100 is filled with toothpaste 122, the toothpaste 122 is dispensed into the plurality of bristles 308 of the toothbrush device 300 through an aperture/hole 3102 on the bristle base 3104. Further, the bristle base 3104 may include one or more tiny apertures 3102 to evenly dispense toothpaste 122 from the cavity 3100 into the plurality of bristles 308 of the toothbrush device 300.

[0038] Furthermore, the toothbrush device 300 comprises a hollow handle housing 316 with a removable base 314 that allows a user to refill or replace the cartridge 302 when empty by removing the base 314 from the housing 316. Specifically, once the installed cartridge 302 is completely depleted, the base 314 is removed to replace the empty cartridge with a new cartridge containing toothpaste 122. The base 314 is then resecured and the housing 316 is integrated with the head portion 310 such that toothpaste 122 easily moves up to the orifice 306.

[0039] When a vacuum actuator 318 is pushed, the vacuum pump 304 pushes a piston 320 within the cartridge 302 forcing the toothpaste 122 to pump and dispense through the orifice 306 up the conduit tube 312 and onto the plurality of bristles 308 of the head portion 310. When the vacuum actuator 318 is released, the piston 320 is removed from the cartridge 302 allowing the remaining toothpaste 122 to remain within the cartridge 302 and not be pumped out. Specifically, the vacuum actuator 318 is coupled to the vacuum pump 304 and is configured to operate the pump 304 to dispense the toothpaste 122. The vacuum pump 304 is in the form of a reciprocating piston pump, or any other suitable pump as is known in the art.

[0040] FIG. 4 illustrates a perspective view of another potential embodiment of a toothbrush device 400 of the present invention. The present embodiment is essentially similar to the embodiment described above in FIG. 3. The toothbrush device 400 comprises a head portion 402 and a housing 404 wherein both the head portion 402 and the housing 404 are removably secured to each other. The head portion 402 and the housing 404 in the present embodiment are detachable and are connected to each other through a rubber fastener 420 that can be screwed and unscrewed to detach the head portion 402 and the housing 404. The rubber fastener 420 acts as a tight-fit assembly, a coupling sleeve, a threaded engagement, or a fastener, etc., or any other suitable fastening device as is known in the art.

[0041] The housing 404 further comprises a toothpaste cartridge 406 that can be refilled or replaced by detaching the housing 404 from the head portion 402. Once the housing 404 is removed from the head portion 402, the installed cartridge 406 can be replaced with a new cartridge containing toothpaste 122. The housing 404 further comprises a vacuum pump 408 that is actuated using a vacuum actuator 410. The vacuum pump 408 is connected to a piston 413 that allows the toothpaste 122 in the cartridge 406 to be pumped up from the cartridge 406, enter the orifice 412, travel through a conduit tube 312 to the cavity 4020 of the head portion 402, and then be dispensed onto the bristles 414.

[0042] When a vacuum actuator **410** is pushed, the vacuum pump **408** actuates the piston **413** within the cartridge **406** forcing the toothpaste **122** to pump and be dispensed through the orifice **412** towards the head cavity **4020**, and onto the plurality of bristles **414** through an aperture **4024** on the bristle base **4022** of the head portion **402**. When the vacuum actuator **410** is released, the piston **413** is removed from the cartridge **406** allowing the remaining toothpaste **122** to remain within the cartridge **406**. The vacuum actuator **410** is coupled to the vacuum pump **408** and is configured to actuate the pump **408** to dispense the toothpaste **122**. The vacuum pump **408** is in the form of a reciprocating piston pump, but can be any suitable pump as is known in the art.

[0043] Certain terms are used throughout the following description and claims to refer to particular features or components. As one skilled in the art will appreciate, different persons may refer to the same feature or component by different names. This document does not intend to distinguish between components or features that differ in name but not structure or function. As used "toothbrush with integrated toothpaste dispenser", "refillable toothbrush device", "toothbrush device", and "device" are interchangeable and refer to the toothbrush device **100**, **200**, **300**, **400** of the present invention.

[0044] Notwithstanding the forgoing, the toothbrush device **100**, **200**, **300**, **400** of the present invention can be of any suitable size and configuration as is known in the art without affecting the overall concept of the invention, provided that it accomplishes the above stated objectives. One of ordinary skill in the art will appreciate that the size, configuration, and material of the toothbrush device **100**, **200**, **300**, **400** as shown in FIGS. **1-4** is for illustrative purposes only, and that many other sizes and shapes of the toothbrush device **100**, **200**, **300**, **400** are well within the scope of the present disclosure. Although the dimensions of the toothbrush device **100**, **200**, **300**, **400** are important design parameters for user convenience, the toothbrush device **100**, **200**, **300**, **400** may be of any size that ensures optimal performance during use and/or that suits the user's needs and/or preferences.

[0045] Various modifications and additions can be made to the exemplary embodiments discussed without departing from the scope of the present invention. While the embodiments described above refer to particular features, the scope of this invention also includes embodiments having different combinations of features and embodiments that do not include all of the described features. Accordingly, the scope of the present invention is intended to embrace all such alternatives, modifications, and variations as fall within the scope of the claims, together with all equivalents thereof.

[0046] What has been described above includes examples of the claimed subject matter. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the claimed subject matter, but one of ordinary skill in the art may recognize that many further combinations and permutations of the claimed subject matter are possible. Accordingly, the claimed subject matter is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims. Furthermore, to the extent that the term "includes" is used in either the detailed description or the claims, such term is intended to be inclusive in a manner similar to the term "comprising" as "comprising" is interpreted when employed as a transitional word in a claim.

What is claimed is:

1. A toothbrush device configured to store and dispense a toothpaste onto a plurality of bristles, the toothbrush device comprising:
- a head portion comprising the plurality of bristles and a cavity;
- a housing comprising a reservoir; and
- a conduit tube connecting the cavity to the reservoir, wherein toothpaste is stored within the reservoir and dispensed from the reservoir through the conduit tube to the cavity and then onto the plurality of bristles.

2. The toothbrush device of claim **1**, wherein toothpaste is dispensed from the reservoir via a slider mechanism.

3. The toothbrush device of claim **2**, wherein the slider mechanism comprises a slider with an associated abutment plate and a slider channel disposed on the housing.

4. The toothbrush device of claim **3**, wherein the slider is configured to be manually moved across the slider channel.

5. The toothbrush device of claim **4**, wherein the abutment plate moves in an upward direction within the reservoir and contacts the toothpaste in the reservoir pushing it upwards toward the conduit tube.

6. The toothbrush device of claim **1** further comprising an aperture in each of the plurality of bristles for dispensing toothpaste onto the plurality of bristles.

7. The toothbrush device of claim **1**, wherein the head portion is detachable from the housing.

8. The toothbrush device of claim **7**, wherein the head portion is secured to the housing via a rubber fastener.

9. The toothbrush device of claim **1**, wherein the head portion and the housing are manufactured as a single structure.

10. A toothbrush device configured to store and dispense a toothpaste onto a plurality of bristles, the toothbrush device comprising:
- a head portion comprising a plurality of bristles and a cavity;
- a housing comprising a reservoir with a plunger positioned at a bottom of the housing; and
- a conduit tube connecting the cavity to the reservoir, wherein toothpaste is stored within the reservoir and dispensed from the reservoir through the conduit tube to the cavity and then onto the plurality of bristles.

11. The toothbrush device of claim **10**, wherein the plunger utilizes a plunger flange and a plunger tip.

12. The toothbrush device of claim **11**, wherein the reservoir acts as a barrel for the plunger.

13. The toothbrush device of claim **12**, wherein when the plunger flange of the plunger is dispensed the plunger tip contacts the toothpaste within the reservoir.

14. The toothbrush device of claim **13**, wherein when the plunger tip contacts the toothpaste the plunger tip pushes the toothpaste through a reservoir opening to the conduit tube.

15. The toothbrush device of claim **10** further comprising an aperture in each of the plurality of bristles for dispensing toothpaste onto the plurality of bristles.

16. A toothbrush device configured to store and dispense a toothpaste onto a plurality of bristles, the toothbrush comprising:
- a head portion comprising a plurality of bristles and a cavity;

a housing comprising a toothpaste cartridge with a vacuum pump; and

a conduit tube connecting the cavity to the toothpaste cartridge, wherein toothpaste is dispensed via the vacuum pump from the toothpaste cartridge through the conduit tube to the cavity and then onto the plurality of bristles.

17. The toothbrush device of claim **16**, wherein a vacuum actuator engages the vacuum pump which pushes a piston within the toothpaste cartridge.

18. The toothbrush device of claim **17**, wherein when the vacuum actuator is pushed the piston within the toothpaste cartridge forces the toothpaste to be pushed up the conduit tube to the cavity and onto the plurality of bristles.

19. The toothbrush device of claim **18**, wherein when the vacuum actuator is released the piston is removed from the toothpaste cartridge allowing remaining toothpaste to remain within the toothbrush cartridge and not be pumped out.

20. The toothbrush device of claim **19**, wherein the housing comprises a removable base that allows a user to replace the toothpaste cartridge when empty.

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