(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 934 233 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
**08.02.2017 Bulletin 2017/06**

(21) Application number: **13715501.6**

(22) Date of filing: **18.03.2013**

(51) Int Cl.:
***A46B 15/00*** *(2006.01)*

(86) International application number:
**PCT/US2013/032763**

(87) International publication number:
**WO 2014/098949 (26.06.2014 Gazette 2014/26)**

(54) **ORAL CARE IMPLEMENT AND METHOD OF MANUFACTURING AN ORAL CARE IMPLEMENT**

MUNDPFLEGEVORRICHTUNG UND VERFAHREN ZUR HERSTELLUNG EINER MUNDPFLEGEVORRICHTUNG

INSTRUMENT DE SOINS BUCCAUX ET PROCÉDÉ DE FABRICATION D'UN INSTRUMENT DE SOINS BUCCAUX

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(30) Priority: **21.12.2012 CN 201210599108**

(43) Date of publication of application:
**28.10.2015 Bulletin 2015/44**

(73) Proprietor: **Colgate-Palmolive Company**
**New York, NY 10022 (US)**

(72) Inventors:
- **BLOCH, Brian**
  **Hillsborough, New Jersey 08844 (US)**
- **LIEBERWIRTH, Lars Ralf Rainer**
  **61479 Glashuetten (DE)**

(74) Representative: **Thum, Bernhard et al**
**Wuesthoff & Wuesthoff**
**Patentanwälte PartG mbB**
**Schweigerstraße 2**
**81541 München (DE)**

(56) References cited:
**EP-A1- 2 218 559**
**WO-A1-2009/142643**
**FR-A1- 2 642 282**



EP 2 934 233 B1

## Description

### BACKGROUND OF THE INVENTION

**[0001]** Oral care implements, especially toothbrushes, are used by many people on a daily basis. Typical oral care implements comprise an elongate handle and a head connected to one end of the handle. The handle provides a structure by which a user grips and manipulates the oral care implement during use. The head typically comprises one or more elements designed to perform their intended function, such as teeth cleaning elements, soft tissue cleaning elements, and/or oral care agents.

**[0002]** The effectiveness of an oral care implement at cleaning teeth, soft: tissue surfaces, or performing its other intended function(s) typically depends upon the duration for which it is used during an oral care session. A user of an oral care implements may not register for how long they have been using the oral care implement during an oral care session, or they may not know an advisable, recommended or suitable duration for which the oral care implement should be used during any one oral care session in order to achieve a desired result or effect.

**[0003]** Over the years, efforts have been made to provide oral care implements with systems for indicating to a user for how long they have been using the implement during an oral care session or for how long they should continue to use the implement during an oral care session. Such efforts have included the development of a toothbrush having a clear handle with an internal chamber that houses an illumination member, illumination of which is controlled by a timing circuit. A flexible grip housing the timing circuit, a switch for activating the timing circuit, and a power source for the timing circuit and the illumination member is connected to an end of the handle.

**[0004]** Despite these efforts, a need still exists for an oral care implement having a system for indicating elapse of time to a user, which system allows for a portion of handle of the implement that is intended to be gripped to be more compact and/or better economically designed to be gripped. A need also still exists for an oral care implement having a more robust system for indicating elapse of time to a user. A need further exists for an oral care implement having a system for indicating elapse of time to a user, which implement is more easily manufactured or assembled.

**[0005]** EP-A-2218559, on which the preamble of claim 10 is based, discloses a device having a body and an end cap, wherein the body comprises a battery which may be located inside the end of the handle and secured by the end cap or on a circuit board. FR-A-2642282 discloses a toothbrush having a modular construction, whereby a cassette comprising a battery, a buzzer, and a circuit board is inserted into a main body from a proximal end. WO-A-2009/142643 discloses an oral care implement comprising a head, a reservoir which contains at least one active agent and a powered delivery device disposed in the head.

### SUMMARY OF THE INVENTION

**[0006]** A first aspect of the present invention provides a method of manufacturing an oral care implement, comprising: (a) providing a head and a first part of a handle connected to the head, the first part having a first surface and a power source disposed in a chamber of the first part; (b) providing the head with at least one cleaning element; and (c) attaching a second part of the handle to the first part of the handle, which second part has a second surface and houses an assembly comprising a timer and a user-notification device that is configured to output a notification in dependence on a state of the timer, so that the first part is connected to the head at a distal end of the handle, the second part defines a proximal end of the handle, and the first and second surfaces together define an exterior surface of the handle, and attaching the second part of the handle comprises bringing an electrically-conductive contact of the assembly into surface contact with the power source.

**[0007]** Optionally, step (b) precedes step (c). Alternatively, step (c) precedes step (b), or steps (b) and (c) are carried out simultaneously.

**[0008]** Preferably the method comprises, prior to step (c), a step of inserting at least part of the assembly into a cavity of the second part of the handle.

**[0009]** The assembly may comprise a printed circuit board upon which the timer and the user-notification device are mounted. The step of inserting may comprise inserting the printed circuit board into the cavity of the second part of the handle so that the printed circuit board lies in a plane that is parallel to a longitudinal axis of the implement.

**[0010]** Optionally, the assembly and the cavity of the second part are shaped to prevent rotation of the assembly relative to the second part about a longitudinal axis of the implement.

**[0011]** Optionally, the assembly comprises one or more elements that prevent movement of the assembly relative to the second part in a direction with a component parallel to a longitudinal axis of the implement. The method may comprise, after the step of locating the assembly in the cavity and prior to step (c), a step of providing the one or more elements to the assembly. The step of providing the one or more elements may comprise soldering or adhering the one or more elements to a portion of the assembly.

**[0012]** According to the invention, step (c) comprises bringing one or more electrically-conductive contacts of the assembly into surface contact with one or more respective electrically-conductive contacts comprised in the first part.

**[0013]** As used herein, the term "surface contact" means that the two or more elements in contact are not adhered or otherwise fixed together, but instead are merely touching each other.

**[0014]** The method may comprise providing a motor that is connectable to the power source. Optionally, the method comprises disposing the motor in the first part. The method may comprise disposing the power source between the motor and the assembly. The method may comprise electrically connecting the motor and the assembly to the power source. The method may comprise electrically connecting the motor and the assembly in parallel to the power source. The power supply may consist of one, two or a plurality of batteries or cells.

**[0015]** Step (c) may comprise attaching the second part to the first part by one or more of: adhering, welding, and engaging respective mechanical elements of the first and second parts.

**[0016]** Step (c) may comprise detachably coupling the second part to the first part. Optionally, step (c) comprises providing a seal or gasket at an interface between the first and second parts.

**[0017]** Preferably, the second part is transparent or translucent. Optionally, the first part is opaque.

**[0018]** Optionally, the oral care implement comprises a toothbrush.

**[0019]** A second aspect of the present invention provides an oral care implement, comprising: a head carrying at least one cleaning element; and a handle having a distal end, a proximal end, a first part and a second part attached to the first part, wherein a first surface of the first part and a second surface of the second part together define an exterior surface of the handle; wherein the first part is connected to the head at a distal end of the handle and the second part defines the proximal end of the handle; and wherein the second part houses an assembly comprising a timer and a user-notification device that is configured to output a notification in dependence on a state of the timer; and wherein the assembly comprises an electrically-conductive contact in surface contact with a power source disposed in a chamber of the first part.

**[0020]** Optionally, the assembly comprises a printed circuit board upon which the timer and the user-notification device are mounted. Optionally, the printed circuit board lies in a plane that is parallel to a longitudinal axis of the implement.

**[0021]** Preferably, at least part of the assembly is located in a cavity of the second part. Further preferably, the assembly and the cavity of the second part are shaped to prevent rotation of the assembly relative to the second part about a longitudinal axis of the implement. At least part of the assembly may be located in a cavity of the second part, and the assembly may comprise one or more elements disposed relative to the cavity to prevent movement of the assembly relative to the second part in a direction with a component parallel to a longitudinal axis of the implement.

**[0022]** Preferably, the assembly comprises one or more electrically-conductive contacts in surface contact with one or more respective electrically-conductive contacts comprised in the first part.

**[0023]** Optionally, the implement comprises a power source and a motor that is connectable to the power source. At least one of the power source and the motor may be disposed in the first part. The power source may be disposed between the motor and the assembly. The motor and the assembly may be electrically connected to the power source. The motor and the assembly may be electrically connected in parallel to the power source. The power supply may consist of one, two or a plurality of batteries or cells.

**[0024]** The assembly comprises an electrically-conductive contact in surface contact with a power source disposed in a chamber of the first part.

**[0025]** The second part may be attached to the first part by one or more of: an adhesive, a welded joint, and respective engaged mechanical elements of the first and second parts.

**[0026]** The second part may be detachably coupled to the first part. A seal or gasket may be provided at an interface between the first and second parts.

**[0027]** Preferably, the second part is transparent or translucent. Optionally, the second part is made from styrene acrylonitrile resin (SAN). Optionally, the first part is opaque.

**[0028]** Optionally, the assembly comprises a controller, such as a microcontroller. The controller may have an apparatus comprising at least one processor and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to track time.

**[0029]** The timer may be configured such that a state of the timer changes over time, and the user-notification device may be configured to output a first predetermined notification when the timer is in a first state and to output a second predetermined notification when the timer is in a second state. Preferably, the second predetermined notification is of a different form to the first predetermined notification. The second predetermined notification may have a different duration, pattern or frequency to the first predetermined notification.

**[0030]** Preferably, the user-notification device comprises a device configured to output a notification, or notifications, by emitting visible light. The device may comprise at least one light emitting diode (LED).

**[0031]** Optionally, the user-notification device is configured to output a predetermined notification in dependence on a state of the power source.

**[0032]** Preferably, a majority of the exterior surface of the handle is defined by the first surface of the first part. The second part may comprise a cap attached to the first part.

**[0033]** Optionally, the oral care implement comprises a toothbrush.

**[0034]** A third aspect of the present invention provides a kit of parts for an oral care implement, the kit of parts comprising: a head carrying at least one cleaning element; a first part of a handle, which first part is connected

to the head and has a first surface; a first part of a handle, which first part is connected to the head and has a first surface; and a second part of the handle, which second part has a second surface and houses an assembly comprising a timer and a user-notification device that is configured to output a notification in dependence on a state of the timer; wherein the second part is attachable to the first part so that the first part is connected to the head at a distal end of the handle, the second part defines a proximal, end of the handle, and the first and second surfaces together define an exterior surface of the handle.

**[0035]** The second part may be detachably couplable to the first part.

**[0036]** The components of the kit may have any of the above-described optional features of the oral care implement of the second aspect of the present invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0037]**

Figure 1 is a perspective view of an oral care implement according to an embodiment of the present invention;

Figure 2 is a perspective view of a printed circuit board of the oral care implement of Figure 1 during manufacture of the implement;

Figure 3 is a perspective view of a second part of a handle of the oral care implement of Figure 1 during manufacture of the implement;

Figure 4 is a perspective view of the printed circuit board of Figure 2 inserted into the second part of the handle of Figure 3 during manufacture of the implement of Figure 1;

Figure 5 is a perspective view of a pair of electrically-conductive contacts for attachment to the printed circuit board;

Figure 6 is a cross sectional view of the components shown in Figure 4 with the pair of electrically-conductive contacts of Figure 5 attached to the printed circuit board;

Figure 7 is a perspective view of a first component of a first material, which first component forms a head and a first portion of the first part of the handle of the oral care implement of Figure 1 during manufacture of the implement;

Figure 8 is a perspective view of the components shown in Figure 7 after overmolding of a second component of a second material onto the first component;

Figure 9 is a perspective view of a plate carrying cleaning elements; and

Figure 10 is a perspective view of the components shown in Figure 8 with the plate of Figure 9 attached to the head of the first component.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0038]** The following description of the preferred embodiments is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses. The description of illustrative embodiments according to principles of the present invention is intended to be read in connection with the accompanying drawings, which are to be considered part of the entire written description. In the description of embodiments of the invention disclosed herein, any reference to direction or orientation is merely intended for convenience of description and is not intended in any way to limit the scope of the present invention. Relative terms such as "lower," "upper," "horizontal," "vertical," "above," "below," "up," "down," "top" and "bottom" as well as derivative thereof (e.g., "horizontally," "downwardly," "upwardly," etc.) should be construed to refer to the orientation as then described or as shown in the drawing under discussion. These relative terms are for convenience of description only and do not require that the apparatus be constructed or operated in a particular orientation unless explicitly indicated as such. Terms such as "attached," "affixed," "connected," " coupled," "interconnected," and similar refer to a relationship wherein structures are secured or attached to one another either directly or indirectly through intervening structures, as well as both movable or rigid attachments or relationships, unless expressly described otherwise. Moreover, the features and benefits of the invention are illustrated by reference to the preferred embodiments. Accordingly, the invention expressly should not be limited to such preferred embodiments illustrating some possible non-limiting combination of features that may exist alone or in other combinations of features.

**[0039]** In the following description, the invention is embodied in a vibratable oral care implement, more specifically a vibratable toothbrush. However, in another embodiment, the invention is embodied in a manually-operated, non-vibratable toothbrush, and in another embodiment the invention is embodied in a powered toothbrush wherein one or more cleaning elements provided to the head of the implement are drivable so as to be moved relative to the handle of the implement. In still further embodiments, the invention may be embodied in other forms of oral care implements, such as a soft-tissue cleansing implement, an inter-proximal pick, a flossing tool, a plaque scraper, or another ansate implement designed for oral care. It is to be understood that other embodiments may be utilised, and that structural and functional modifications may be made without departing from the scope of the present invention.

**[0040]** Figure 1 illustrates an oral care implement, in this case a toothbrush, according to a first embodiment of the present invention, generally designated with the reference numeral 100. The toothbrush 100 has a support 110 including a handle 120 and a head 140. A neck 130 of the handle 120 connects the handle 1.20 to the

head 140, and at least one cleaning element 200 is carried by the head 140. The head 140 is an end portion of the support 110 provided with the at least one cleaning element 200. In this embodiment, the head 140 carries a plurality of cleaning elements 200.

**[0041]** In this embodiment, the cleaning elements 200 comprise a plurality of tooth cleaning elements, more specifically a plurality of flexible, nylon bristles arranged in tufts. However, in variations to this embodiment, the cleaning elements 200 may additionally or alternatively comprise at least one of any one or more of the following, without limitation: bristles, rigid bristles, flexible bristles, filament bristles, fibre bristles, nylon bristles, spiral bristles, rubber bristles, elastomeric protrusions, elastomeric elements, flexible polymer protrusions, co-extruded filaments, flag bristles, crimped bristles, anti-bacterial bristles and combinations thereof and/or structures containing such materials or combinations.

**[0042]** The head 140 has a first, proximal end 141 and a second, distal end 142. The handle 120 has a first, proximal end 121 and a second, distal end 122. The neck 130 is located at the distal end 122 of the handle 120. The distal end 122 of the handle 120 is connected to the proximal end 141 of the head 140. The neck 130 is generally of a narrower cross sectional area than the head 140 and the rest of the handle 120.

**[0043]** The dandle 120 provides the user with a mechanism by which he/she can readily grip and manipulate the toothbrush 100, includes ergonomic features which provide a high degree of control for the user while maintaining comfort, and may be formed of many different shapes and with a variety of constructions.

**[0044]** Generally, the toothbrush 100 extends from a proximal end 101 (which is also the proximal end 121 of the handle 120) to a distal end 102 (which is also the distal end 142 of the head 140) along a longitudinal axis A-A. Although the handle 120 is a non-linear structure in the illustrated embodiment, the longitudinal axis A-A of the implement 100 is linear in the illustrated embodiment. However, the invention is not so limited, and in certain embodiments, the implement 100 may have a simple linear handle 120 that is longitudinally aligned along the linear longitudinal axis A-A of the implement 100.

**[0045]** The head 140 is connected to the handle 120 via the neck 130 of the handle 120. In this embodiment, the head 140 and a first part 123 of the handle 120 (including the neck 130) are formed as an integral structure using an injection molding process. The head 140 and the first part 123 of the handle 120 together comprise a unitary structure. however, in other embodiments, the head 140 and the first part 123 of the handle 120 may be formed as separate components which are operably connected at a later stage of the manufacturing process by any suitable technique known in the art, including without limitation thermal welding, sonic welding, a tight-fit assembly, a coupling sleeve, adhesion, fasteners, and a snap-fit connection. Whether the head 140 and the first part 123 of the handle 120 are constructed as a single piece or a multi-piece assembly (including connection techniques) is not limiting of the present invention in all embodiments. Furthermore, other manufacturing techniques may be used in place of and/or in addition to injection molding to create the first part 123 of the handle 120 and/or the head 140 (or components thereof), such as milling and/ or machining.

**[0046]** In this embodiment, the head 140 and the first part 123 of the handle 120 are together constructed of a first component 10 of polypropylene (PP) and a second component 20 of an elastomer, such as a thermoplastic elastomer (TPE), which has been overmolded onto the first component 10, as discussed in more detail bellow. However, in variations to this embodiment, the first component 10 may instead or additionally comprise one or more of the following materials: polyethylene, polyamide, polyester, cellulosics, styrene-acrylonitrile (SAN), acrylic, acrylonitrile butadiene styrene (ABS) and a thermoplastic. In variations to this embodiment, the second component 20 may instead or additionally comprise styrene-ethylene/butylene-styrene (SEBS) or one or more of the materials listed in the preceding sentence,

**[0047]** The head 140 generally comprises a front surface, on a front side 143 of the head 140, and a rear surface, on a rear side 144 of the head 140 opposite to the front side 143. The front surface and the rear surface of the head 140 can take on a wide variety of shapes and contours, none of which are limiting of the present invention. For example, the front and rear surfaces can be planar, contoured or combinations thereof. The front surface and rear surface are joined by a peripheral or lateral surface 145 of the head 140. The cleaning elements are provided on, and extend outward from, the front side 143 of the head 140 for cleaning contact with an oral surface, preferably teeth.

**[0048]** While the plural cleaning elements 200 are particularly suited for cleaning teeth, the cleaning elements 200 can be used to clean oral soft tissue, such as a tongue, gums, or cheeks instead of or in addition to teeth. As used herein, the term "cleaning element" is used in a generic sense to refer to any structure that can be used to clean, massage or polish an oral surface, such as teeth or soft tissue, through relative surface contact.

**[0049]** Indeed, in a variation to the embodiment shown in Figure 1, instead of a plurality of tooth cleaning elements 200, there is instead provided at least one soft tissue cleaning element, such as a tongue scraper comprising at least one blade. Preferably, the, or each, blade has its longitudinal length disposed so as to extend across the front side 143 of the head 140 in a direction non-parallel or perpendicular to the longitudinal axis A-A.

**[0050]** On the rear side 144 of the head 140, the head 140 comprises a soft tissue cleaning element 170. The soft tissue cleaning element 170 comprises a plurality of flexible protrusions 172. The protrusions 172 and the rest of the soft tissue cleaning element 170 are a unitary component. The soft tissue cleaning element 170 and the protrusions 172 are formed by the second component 20.

**[0051]** The handle 120 is formed of the first part 123 and a second part 124, which is a separate component in the form of a cap that has been attached to the first part 123. While the first part 123 is connected to the head 140 at the distal end 122 of the handle 120, the second part 124 defines the proximal end 121 of the handle 120, indeed the proximal end 101 of the implement 100. A first surface 123a of the first part 123 and a second surface 124a of the second part 124 together define an exterior surface 125 of the handle 120. At least the first surface 123a is to be gripped by a user's hand during an oral care session, so that the user can manipulate the toothbrush 100. As will be appreciated on consideration of Figure 1, a majority of the exterior surface 125 of the handle 120 is defined by the first surface 123a of the first part 123. In particular, the second surface 124a of the second part 124 defines less than 20%, perhaps less than 10%, of the exterior surface 125 of the handle 120.

**[0052]** The first and second components 10, 20 are shaped to provide the handle 120 with ergonomic features which provide a high degree of control for the user while maintaining comfort. Moreover, the second component 20 forms grip regions of the exterior surface 125 of the handle 120 that have a greater coefficient of friction than regions of the exterior surface 125 formed by the first component 10.

**[0053]** The first part 123 is opaque. However, the second part 124 is transparent, i.e. is formed of a transparent material. In this embodiment, the second part 124 is made from styrene acrylonitrile resin (SAN) and is attached to the first part 123 of the handle 120 by an adhesive. In other embodiments, the first and second parts 123, 124 of the handle 120 may be attached to each other by other mechanisms, such as a welded joint or respective engaged mechanical elements of the first and second parts 123, 124. In variations to these embodiments, the second part 124 is translucent, i.e. is formed of a translucent material.

**[0054]** In variations to the illustrated embodiment, the second part 124 is detachably coupled to the first part 123, as described in more detail below.

**[0055]** The second part 124 houses an assembly 300 comprising a printed circuit board 302 upon which are mounted a controller 304, such as a microcontroller, and a light emitting diode (LED) 306. The LED 306 is part of a user-notification device that is configured to output a notification in dependence on a state of a timer comprised in the controller 304. In this embodiment, the user-notification device comprises the LED 306, which is able to emit light that is visible to a user through the transparent second part 124 of the handle 120. However, in variations to this embodiment, the user-notification device may comprise an elements, other than an LED, that is configured to output notifications by emitting visible light. In still further variations, the user-notification device may comprise an element that is configured to output a notification by means other than emitting visible light, such as a buzzer or speaker configured to output notifications by emitting sound, or a vibrator configured to output notifications by vibrating.

**[0056]** The printed circuit board 302 is located in an internal cavity 124b of the second part 124 and lies in a plane that is parallel to the longitudinal axis A-A of the implement 100. The assembly 300 and the cavity 124b of the second part 124 are each shaped to prevent rotation of the assembly 300 relative to the second part 124 about the longitudinal axis A-A of the implement 100. That is, in this embodiment, the cavity 124b comprises a slot, and the printed circuit board 302 has a rectangular cross-sectional area in a plane perpendicular to the longitudinal axis A-A that is coincident with a rectangular cross-sectional area of the slot in the same plane.

**[0057]** Moreover, the assembly comprises first and second electrically-conductive contacts 310, 320 having respective proximal terminals 314, 324 soldered to respective electrically-conductive elements 308a, 308b mounted on the printed circuit board 302. The electrically-conductive elements 308a, 308b are electrically connected to the microprocessor 304. The contacts 310, 320 are disposed relative to the cavity 124b to prevent movement of the assembly 300 relative to the second part 124 in a direction with a component parallel, to the longitudinal axis A-A of the implement 100. More particularly, as shown in Figure 6, respective main bodies 312, 322 of the first and second contacts 310, 320 extend in a direction perpendicular to the longitudinal axis A-A and through respective holes 124c in a wall 124d of the second part 124. Portions of the wall 124d are disposed either side of the holes 124c in the longitudinal direction of the implement 100, so as to prevent movement of the assembly 300 relative to the second part 124 in the longitudinal direction.

**[0058]** In the assembled implement 100, respective distal terminals 316, 326 of the contacts 310, 320 are in surface contact with respective electrically-conductive contacts (of which only one is shown in Figure 7 and indicated with reference numeral 408) comprised in the first part 123. Moreover, in the assembled implement 100, a further resilient terminal 318 of the first contact 310 of the assembly 300 is in surface contact with a battery or other power source disposed in a chamber 123b of the first part 123, as described in more detail below.

**[0059]** Figure 6 illustrates the second part 124 housing the assembly 300, albeit when the second part 124 is not attached to the first part 123 of the handle 120. As shown in Figure 6, the assembly 300 comprises the controller 304. The controller 304 has an apparatus comprising at least one processor (not expressly shown) and at least one memory (not expressly shown) including computer program code, and the at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus to track time. In other words, the controller 304 comprises a timer, since the software resident on the controller 304 tracks time. Moreover, the controller 304 comprises part of the user-notification device, in order that the user-notification device

is configured to output one or more notifications in dependence on the state of the timer. The user-notification device also comprises the LED 306.

**[0060]** The timer is activated by a user closing a switch comprised in the first part 123 of the handle 120. More specifically, the user presses on a first defined region 126 of the first surface 123a of the first part 123 that is formed of the second component 20. The defined region 126 is resilient, so the user's application of a force on the defined region 126 causes the defined region 126 to deform. In turn, this deformation causes the switch at a side of the defined legion 126 interior to the first part 123 of the handle 120 to be closed, which completes an electric circuit including a motor 500 (discussed bellow), the controlled 304, the battery or other power source disposed in the internal chamber 123b of the first part 123, and wires 501-504, as described in more detail below. Thus, as a result of the switch being closed, the motor and controller 304 receive electric power, which causes the motor 500 to rotate and the timer embodied in the controller 304 to be activated to track time.

**[0061]** Although not expressly shown in the Figures, a mechanical vibratory device, such as an eccentric, is mounted on an output shaft of the motor 500 whereby, when the motor 500 rotates, the mechanical vibratory device rotates about the axis of the output shaft of the motor 500, causing the head 140 of the implement 100 to vibrate, which increases the efficiency with which the cleaning elements 200 clean an oral surface during use of the implement 100.

**[0062]** Since the timer tracks time, a state of the timer changes over time. In various different embodiments, the user-notification device is configured to output one or more notifications (such as by causing the LED 306 to emit right) in dependence on the state of the timer. For example, in the present embodiment, the controller 304 tracks time and, in accordance with commands included in the computer program code, causes the LED 306 to adopt a different lighting pattern in dependence on the length of time that has elapsed since the timer was activated. In this embodiment, for a first period of 30 seconds starting when the timer was activated, the controller 304 causes the LED 306 to emit single flashes of light with pauses of equal duration between the single flashes. For a second period of 30 seconds following the first period, the controller 304 causes the LED 306 to emit successive pairs of single flashes of light with first pauses of equal duration between the pairs and second pauses of equal duration between the single flashes of each pair, wherein each of the first pauses is longer, preferably at least two or three times as long, than each of the second pauses. In other embodiments, the first period may be of the same or a different duration to the second period. The first and/or the second period may be, for example, of any of the following durations: 10 seconds, 15 seconds, 20 seconds, 30 seconds, and 60 seconds. In other embodiments, still further lighting patterns may be employed. In any event, preferably the user-notification device is configured to output a first predetermined notification when the timer is in a first state and to output a second predetermined notification when the timer is in a second state, which second predetermined notification is of a different form to the first predetermined notification. The second predetermined notification may have a different duration, pattern and/or frequency than the first predetermined notification.

**[0063]** Accordingly, during use of the oral care implement 100, the user is notified of an elapse of time, specifically an elapse of time since the first switch was closed. When the user has completed their oral care session, they open the switch comprised in the first part 123 of the handle 120. More specifically, the user presses on a second defined region 127 of the first surface 123a of the first part 123 that is formed of the second component 20. The second defined region 127 also is resilient, so the user's application of a force on the second defined region 127 causes the second defined region 127 to deform. In turn, this deformation causes the switch to be opened, which breaks the electric circuit. In this embodiment, the controller 304 has no ability to record conditions of use of the implement 100 during the completed oral case session, so the software resident in the controller 304 resets to a default initial state once the electric circuit has been broken. Accordingly, when the switch is subsequently closed again, the controller 304 will carry out the same process as described above.

**[0064]** The motor 500 and power source (not shown) discussed above are comprised in the first part 123 of the handle 120, as shown in Figure 7. More particularly, the motor 500 is located in the neck 130 of the handle 120 of the implement 100. In the assembled implement 100, the power source is disposed between the motor 500 and the assembly 300. As discussed above, the motor 500 is connectable to the power source by way of a user dosing the switch. It is to be noted that, in this embodiment, the motor 500 and the assembly 300 are electrically connected in parallel to the power source. In particular, the motor 500 is connected to the power source by a first pair of wires 501, 502, and the assembly 300 is connected to the power source by a parallel second pair of wires 503, 504.

**[0065]** In this embodiment, the motor 500 and the assembly 300 (including the timer and the user-notification device, and thus including the controller 304 and the LED 306) are connected, in parallel, to the same shared power supply, so that the motor 500 and the assembly 300 are able to be electrically powered by the power supply. The power supply may consist of one, two or a plurality of batteries or cells, disposed in the chamber 123b of the first part 123. In another embodiment, the motor 500 and the assembly 300 (including the timer and the user-notification device, and thus including the controller 304 and the LED 306) are connected, in series, to the same shared power supply, so that the motor 500 and the assembly 300 are able to be electrically powered by the power supply.

**[0066]** In the above-mentioned variations to the illustrated embodiment, in which the second part 124 is detachably coupled to the first part 123, the second part 124 may be detachably coupled to the first part 123 by any of a tight-fit, twist-and-lock, snap-fit and threaded connection. It can be considered that an interface is provided between the first and second parts 123, 124 where the first and second parts 123,124 are connected to each other. In some embodiments, a compressible or resilient gasket or seal is provided at the interface. The gasket or seal may be formed of TPE and/or may be part of the second component 20. Preferably the gasket or seal surrounds the interface. Preferably, the gasket or seal becomes compressed during coupling of the second part 124 to the first part 123 thereby, in the assembled implement 100, the gasket or seal is in a compressed state and prevents or minimises fluid flow from an exterior of the first and second parts 123, 124 into the chamber 123b and/or into the cavity 124b. Accordingly, the gasket or seal seals the assembly 300, motor 500 and power supply from water during use of the assembled implement 100, yet the ability to detach the second part 124 from the first part 123 permits replacement of the power supply and/or maintenance of the assembly 300, if required.

**[0067]** In this embodiment, the user-notification device is configured to output a predetermined notification in dependence on a state of the power source. In this embodiment, the controller 304 monitors the state of the power source, such as the remaining charge in the power source and, when the remaining charge drops below a predetermined threshold value of charge, the user-notification device causes the LED 306 to emit light in a predetermined lighting pattern. The predetermined lighting pattern may comprise the LED 306 being caused to emit light for a relatively long duration, such as 5 seconds, 10 seconds, 20 seconds, 30 seconds, or 60 seconds, or may comprise the LED 306 being caused to emit a rapid burst of flashes of light, such as 5 or 10 distinct flashes per second. Other predetermined lighting pattern will be apparent to the skilled person.

**[0068]** Manufacture of the toothbrush 100 shown in Figure 1 will now be described with additional reference to Figures 2 to 10.

**[0069]** In a first process of the method of manufacturing the oral care implement 100, the second part 124 of the handle 120, including the wall 124d, internal cavity 124b and the holes 124c in the wall 124d, is formed, in this embodiment from transparent material by molding the transparent material. The second part 124 so formed is shown in Figure 3.

**[0070]** In a second process, which may be performed during, before or after the first process, the assembly 300 is assembled. More specifically, the printed circuit board 302 is provided and the controller 304 (e.g. a microcontroller), LED 306 and electrically-conductive elements 308a, 308b are mounted on the printed circuit board 302, as shown in Figure 2.

**[0071]** After each of the first and second processes has been completed, a third process is performed in which at least part of the assembly 300 is inserted into the cavity 124b of the second part 124 of the handle 120, in such a manner that the printed circuit board 302 lies in a plane that is parallel to the longitudinal axis A-A of the completed implement 100, as shown in Figure 4. As discussed above, the assembly 300 and the cavity 124b of the second part 124 are shaped to prevent rotation of the assembly 300 relative to the second part 124 about the longitudinal axis A-A of the implement 100.

**[0072]** Following the third process, a fourth process is performed in which the first and second contacts 310, 320 (shown in Figure 5) are provided, and the respective proximal terminals 314, 324 of the first and second contacts 310, 320 are soldered to respective ones of the electrically-conductive elements 308a, 308b mounted on the printed circuit board 302, so that the respective main bodies 312, 322 of the first and second contacts 310, 320 extend in a direction perpendicular to the longitudinal axis A-A and through respective holes 124c in the wall 124d of the second part 124, as shown in Figure 6. Accordingly, the first and second contacts 310, 320 act as elements that prevent movement of the assembly 300 relative to the second part 124 in a direction with a component parallel to the longitudinal axis A-A of the completed implement 100.

**[0073]** A fifth process, which may be performed during, before or after any or all of the first to fourth processes, comprises providing the head 140 and the first part 123 of the handle 120 that is connected to the head 140. This fifth process involves first forming the first material to form the first component 10 (as shown in Figure 7). This may be performed in accordance with any method known in the art, such as by injection molding the first material into a suitable mould in a molten state and then allowing the first material to cool and harden. Next, the motor 500 is disposed in the neck 130 of the first part 123 of the handle 120, and the first pair of wires 501, 502 having respective first ends connected to respective terminals of the motor 500 are routed so that their respective second ends, opposite to the first ends, are located within the chamber 123b of the first part 123, via a hole 129 in the first component 10, for future connection to a power source that will be located in the chamber 123b. Also, the second pair of wires 503, 504 having respective first ends connected to respective electrically-conductive contacts 408 within the chamber 123b are routed so that their respective second ends, opposite to the first ends, are located within the chamber 123b of the first part 123, via the hole 129 in the first component 10, for future connection to the power source. Finally, the second material forming the second component 20 is overmolded onto the first component 10 to encase the motor 500 and the majority of the two pairs of wires 501, 502, 503, 504. The resultant device is shown in Figure 8. It is to be noted that, in this embodiment, each of the first and second components 10,20 is opaque.

**[0074]** Optionally at this stage, the power source may

be disposed in the chamber 123b between the motor 500 and an end of the chamber 123b to which the second part 124 of the handle 120 is later attached.

**[0075]** A sixth process, which may be performed during, before or after the first to fifth processes, involves providing a cleaning element sub-assembly 600, as shown in Figure 9. The sub-assembly 600 comprises a base plate 601 and the at least one cleaning element 200 extending from the base plate 601. The one or more cleaning elements 200 may be connected to the base plate 601 by any mechanism known in the art, such as AFT, IMT, or stapling.

**[0076]** A seventh process, which may be performed after the sixth process, involves attaching the cleaning element sub-assembly 600 to the head 140, in order to provide the head 140 with the at least one cleaning element 200, as shown in Figure 10. This attaching may involve, for example, adhering the sub-assembly 600 to the head 140 or sonic welding a portion of the sub-assembly 600 to the head 140.

**[0077]** An eighth process, which may be performed before, during or after the seventh process, comprises disposing the power source in the chamber 123b (if not already done), and then attaching the second part 124 of the handle 120 to the first part 123 of the handle 120, so that the first part 123 is connected to the head 140 at the distal end 122 of the handle 120, the second part 124 defines the proximal end 121 of the handle 120, and the first and second surfaces 123a, 124a of the first and second parts 123,124 together define the exterior surface 125 of the handle 120. The attaching may comprise attaching the second part 124 to the first part 123 by one or more of: adhering, welding, and engaging respective mechanical elements of the first and second parts 123, 124. Alternatively, the attaching may comprise detachably coupling the second part 124 to the first part 123, and may optionally also comprise providing or compressing a seal or gasket between the first and second parts 123, 124 during the coupling of the second part 124 to the first part 123, whereby, in the assembled implement 100, the gasket or seal is in a compressed state and prevents or minimises fluid flow from an exterior of the first and second parts 123, 124 into the chamber 123b and/or into the cavity 124b.

**[0078]** During the eighth process, the power source becomes disposed between the motor 500 and the assembly 300. Moreover, the distal terminals 316, 326 of the contacts 310, 320 are brought into surface contact with the respective electrically-conductive contacts (of which one is shown in Figure 7 and indicated with reference numeral 408) comprised in the first part 123, and the further resilient terminal 318 of the first contact 310 of the assembly 300 is brought into surface contact with the power source disposed in the chamber 123b of the first part 123, whereby the motor 500 and the assembly 300 become electrically connected in parallel to the power source.

**[0079]** In the present invention, since the assembly 300 is housed in the second part 124 of the handle 120, the first part 123 of the handle 120, which first part 123 is intended to be gripped by a user during use of the implement 100, is able to be made compact and/or better economically designed for gripping by the user. The first part 123 also can be made of a wide variety of materials, including opaque materials. Moreover, since the assembly 300 including the user-notification device is housed in the second part 124 of the handle, protrusion of parts of the assembly 300 from the second part 124 into the first part 123 of the handle 120 can be minimised or avoided, which provides a system for indicating elapse of time to a user that is more robust, since parts of the assembly 300 are not likely to be knocked or damaged during manufacture of the implement 100.

**[0080]** Moreover, the implement 100 is more easily manufactured than known prior art devices including systems for indicating elapse of time to a user, since the majority of the implement 100 is manuiacturable independently of the system for indicating elapse of time to a user and the provision of the system for indicating elapse of time to a user requires significant modifications only to the second part 124 of the handle 120. Assembly of the implement 100 also is relatively straightforward: the first part 123 of the handle 120 can be assembled separately to the second part 124 of the handle 120, and the first and second parts 123, 124 need only be attached to each other towards or at the end of the assembly process.

**[0081]** The present invention may be embodied as a kit of parts for an oral care implement 100, the kit of parts comprising: the head 140 carrying the at least one cleaning element 200; the first part 123 of the handle 120, which first part 123 is connected to the head 140 and has the first surface 123a; and the second part 124 of the handle 120, which second part 124 has the second surface 124a and houses the assembly 300 comprising the timer and the user-notification device that is configured to output a notification in dependence on a state of the timer; wherein, the second part 124 is attachable to the first part 123 so that the first part 123 is connected to the head 140 at the distale end 122 of the handle 120, the second part 124 defines the proximal end 121 of the handle 120., and the first and second surfaces 123a, 124a together define the exterior surface 125 of the handle 120,

**[0082]** While the invention has been described with respect to specific examples including presently preferred modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described implements and techniques. It is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope of the present invention. Thus, the scope of the invention should be construed broadly as set forth in the appended claims.

## Claims

1. A method of manufacturing an oral care implement (100), comprising:

   (a) providing a head (140) and a first part (123) of a handle (120) connected to the head, the first part having a first surface (123a) and a power source disposed in a chamber (123b) of the first part;
   (b) providing the head with at least one cleaning element (200); and
   (c) attaching a second part (124) of the handle to the first part of the handle, which second part has a second surface (124a)and houses an assembly (300) comprising a timer and a user-notification device that is configured to output a notification in dependence on a state of the timer, so that the first part is connected to the head at a distal end (122) of the handle, the second part defines a proximal end (121) of the handle, the first and second surfaces together define an exterior surface (125) of the handle, and attaching the second part of the handle comprises bringing an electrically-conductive contact (310, 320) of the assembly into surface contact with the power source.

2. The method of claim 1, comprising the step of inserting at least part of the assembly (300) into a cavity (124b)of the second part (124) of the handle wherein the assembly comprises a printed circuit board (302)upon which the timer and the user-notification device are mounted, and the step of inserting comprises inserting the printed circuit board into the cavity of the second part of the handle so that the printed circuit board lies in a plane that is parallel to a longitudinal axis (A-A) of the implement (100).

3. The method of claim 1 or claim 2, wherein the assembly (300) and the cavity (124b) of the second part (124) are shaped to prevent rotation of the assembly relative to the second part about a longitudinal axis (A-A) of the implement (100).

4. The method of any one of claims 1 to 3, wherein the assembly (300) comprises one or more elements (310, 320) that prevent movement of the assembly relative to the second part (124) in a direction with a component parallel to a longitudinal axis (A-A) of the implement (100).

5. The method of claim 4, comprising, after the step of locating the assembly (300) in the cavity (124b) and prior to step (c), a step of providing the one or more elements (310,320) to the assembly.

6. The method of any preceding claim, comprising providing a motor (500) that is connectable to the power source and disposing the motor in the first part (123).

7. The method of claim 6, comprising disposing the power source between the motor (500) and the assembly (300).

8. The method of claim 6 or claim 7, comprising electrically connecting the motor (500) and the assembly (300) to the power source, optionally comprising connecting the motor and the assembly in parallel to the power source.

9. The method of any preceding claim, wherein the second part (124) is transparent or translucent.

10. An oral care implement (100), comprising:

    a head (140) carrying at least one cleaning element (200); and
    a handle (120) having a distal end (122), a proximal end (121), a first part (123) and a second part (124) attached to the first part, wherein a first surface (123a) of the first part and a second surface (124a) of the second part together define an exterior surface (125) of the handle;
    wherein the first part is connected to the head at the distal end of the handle and the second part defines the proximal end of the handle; and
    **characterised in that** the second part houses an assembly (300) comprising a timer and a user-notification device that is configured to output a notification in dependence on a state of the timer; and
    wherein the assembly comprises an electrically-conductive contact (310,320) in surface contact with a power source disposed in a chamber (123b) of the first part.

11. The oral care implement (100) of claim 10, wherein the second part (124) is made from styrene acrylonitrile resin (SAN).

12. The oral care implement (100) of any one of claims 10 or 11, wherein the timer is configured such that a state of the timer changes over time, and wherein the user-notification device is configured to output a first predetermined notification when the timer is in a first state and to output a second predetermined notification when the timer is in a second state, which second predetermined notification is of a different form to the first predetermined notification and wherein the second predetermined notification has a different duration, pattern or frequency to the first predetermined notification.

13. The oral care implement (100) of any one of claims 10 to 12, wherein the user-notification device com-

prises a device configured to output a notification, or notifications, by emitting visible light.

**14.** The oral care implement (100) of claim 13, wherein the device comprises at least one light emitting diode (306).

**15.** The oral care implement of any one of claims 10 to 14, wherein the user-notification device is configured to output a predetermined notification in dependence on a state of the power source.

**Patentansprüche**

**1.** Verfahren zum Herstellen einer Mundpflegeeinheit (100), umfassend:

(a) Bereitstellen eines Kopfs (140) und eines ersten Teils (123) eines Griffs (120), das mit dem Kopf verbunden ist, wobei das erste Teil eine erste Oberfläche (123a) und eine Stromquelle aufweist, die in einer Kammer (123b) des ersten Teils angeordnet ist;
(b) Bereitstellen des Kopfs mit wenigstens einem Reinigungselement (200); und
(c) Befestigen eines zweiten Teils (124) des Griffs an dem ersten Teil des Griffs, wobei das zweite Teil eine zweite Oberfläche (124a) aufweist und eine Anordnung (300) aufnimmt, die einen Zeitgeber und eine Benutzer-Benachrichtigungsvorrichtung umfasst, die dazu eingerichtet ist, eine Benachrichtigung in Abhängigkeit von einem Zustand des Zeitgebers auszugeben, so dass das erste Teil an einem distalen Ende (122) des Griffs mit dem Kopf verbunden ist, wobei das zweite Teil ein proximales Ende (121) des Griffs definiert, wobei die erste und die zweite Oberfläche zusammen eine äußere Oberfläche (125) des Griffs definieren, und das Befestigen des zweiten Teils des Griffs das Herstellen eines elektrisch leitenden Kontakts (310, 320) der Anordnung in Oberflächenkontakt mit der Stromquelle umfasst.

**2.** Verfahren nach Anspruch 1, das den Schritt umfasst:

Einsetzen wenigstens eines Teils der Anordnung (300) in einen Hohlraum (124b) des zweiten Teils (124) des Griffs, wobei die Anordnung eine Leiterplatte (302) umfasst, auf der der Zeitgeber und die Benutzer-Benachrichtigungsvorrichtung angebracht sind, und der Schritt des Einsetzens das Einsetzen der Leiterplatte in den Hohlraum des zweiten Teils des Griffs umfasst, so dass die Leiterplatte in einer Ebene angeordnet ist, die zu einer Längsachse (A-A) der Einheit (100) parallel ist.

**3.** Verfahren nach Anspruch 1 oder Anspruch 2, wobei die Anordnung (300) und der Hohlraum (124b) des zweiten Teils (124) ausgebildet sind, um eine Rotation der Anordnung um eine Längsachse (A-A) der Einheit (100) relativ zu dem zweiten Teil zu verhindern.

**4.** Verfahren nach einem der Ansprüche 1 bis 3, wobei die Anordnung (300) eines oder mehrere Elemente (310, 320) umfasst, die eine Bewegung der Anordnung relativ zu dem zweiten Teil (124) hinsichtlich einer Komponente parallel zu einer Längsachse (A-A) der Einheit (100) verhindern.

**5.** Verfahren nach Anspruch 4, das nach dem Schritt des Anordnens der Anordnung (300) in dem Hohlraum (124b) und vor dem Schritt (c), einen Schritt des Bereitstellens des einen oder mehrerer Elemente (310, 320) in der Anordnung umfasst.

**6.** Verfahren nach einem der vorherigen Ansprüche, das ein Bereitstellen eines Motors (500), der mit der Stromquelle verbindbar ist, und ein Anordnen des Motors in dem ersten Teil (123) umfasst.

**7.** Verfahren nach Anspruch 6, das ein Anordnen der Stromquelle zwischen dem Motor (500) und der Anordnung (300) umfasst:

**8.** Verfahren nach Anspruch 6 oder Anspruch 7, das ein elektrisches Verbinden des Motors (500) und der Anordnung (300) mit der Stromquelle umfasst, wobei optional Verbinden des Motors und der Anordnung ein Parallelschalten mit der Stromquelle umfasst.

**9.** Verfahren nach einem der vorherigen Ansprüche, wobei das zweite Teil (124) transparent oder transluzent ist.

**10.** Mundpflegeeinheit (100), umfassend:

einen Kopf (140), der wenigstens ein Reinigungselement (200) trägt; und
einen Griff (120), der ein distales Ende (122), ein proximales Ende (121), ein erstes Teil (123) und ein zweites Teil (124) aufweist, das an dem ersten Teil befestigt ist, wobei die erste Oberfläche (123a) des ersten Teils und eine zweite Oberfläche (124a) des zweiten Teils zusammen eine äußere Oberfläche (125) des Griffs definieren;
wobei das erste Teil an einem distalen Ende des Griffs mit dem Kopf verbunden ist und das zweite Teil das proximale Ende des Griffs definiert; und
**dadurch gekennzeichnet, dass**
das zweite Teil eine Anordnung (300) aufnimmt,

die einen Zeitgeber und eine Benutzer-Benachrichtigungsvorrichtung umfasst, die dazu eingerichtet ist, eine Benachrichtigung in Abhängigkeit von einem Zustand des Zeitgebers auszugeben; und
wobei die Anordnung in Oberflächenkontakt mit der Stromquelle einen elektrisch leitenden Kontakt (310, 320) umfasst, der in einer Kammer (123a) des ersten Teils angeordnet ist.

**11.** Mundpflegeeinheit (100) nach Anspruch 10, wobei das zweite Teil (124) aus einem Styrol-Acrylnitril-Harz (SAN) hergestellt ist.

**12.** Mundpflegeeinheit (100) nach einem der Ansprüche 10 oder 11, wobei der Zeitgeber derart eingerichtet ist, dass sich ein Zustand des Zeitgebers über die Zeit ändert, und wobei die Benutzer-Benachrichtigungsvorrichtung dazu eingerichtet ist, eine erste vorbeistimmte Benachrichtigung dann auszugeben, wenn der Zeitgeber in einem ersten Zustand ist, und eine zweite vorbeistimmte Benachrichtigung dann auszugeben, wenn der Zeitgeber in einem zweiten Zustand ist, wobei sich die zweite vorbeistimmte Benachrichtigung von der ersten vorbeistimmten Benachrichtigung unterscheidet, und wobei die zweite vorbeistimmte Benachrichtigung eine unterschiedliche Dauer, ein unterschiedliches Muster oder eine unterschiedliche Frequenz im Vergleich zu der ersten vorbeistimmten Benachrichtigung aufweist.

**13.** Mundpflegeeinheit (100) nach einem der Ansprüche 10 bis 12, wobei die Benutzer-Benachrichtigungsvorrichtung eine Vorrichtung umfasst, die dazu eingerichtet ist, eine Benachrichtigung oder Benachrichtigungen durch emittiertes, sichtbares Licht auszugeben.

**14.** Mundpflegeeinheit (100) nach Anspruch 13, wobei die Vorrichtung wenigstens eine lichtemittierende Diode (306) umfasst.

**15.** Mundpflegeeinheit nach einem der Ansprüche 10 bis 14, wobei die Benutzer-Benachrichtigungsvorrichtung dazu eingerichtet ist, eine vorbeistimmte Benachrichtigung in Abhängigkeit vom einem Zustand der Stromquelle auszugeben.

**Revendications**

**1.** Procédé de fabrication d'un accessoire (100) de soins buccaux-dentaires, comprenant :

(a) la prévision d'une tête (140) et d'une première partie (123) d'un manche (120) connectée à la tête, la première partie ayant une première surface (123a) et une source d'alimentation électrique disposée dans une chambre (123b) de la première partie ;
(b) la prévision de la tête avec au moins un élément (200) de nettoyage ; et
(c) la fixation d'une deuxième partie (124) du manche à la première partie du manche, laquelle deuxième partie a une deuxième surface (124a) et loge un ensemble (300) comprenant un compteur et un dispositif de notification d'utilisateur qui est configuré pour délivrer en sortie une notification dépendant d'un état du compteur, de telle sorte que la première partie est connectée à la tête à une extrémité distale (122) du manche, la deuxième partie définit une extrémité proximale (121) du manche, les première et deuxième surfaces définissent ensemble une surface extérieure (125) du manche, et la fixation de la deuxième partie du manche comprend la mise d'un contact électro-conducteur (310, 320) de l'ensemble en contact de surface avec la source d'alimentation électrique.

**2.** Procédé selon la revendication 1, comprenant l'étape d'insertion d'au moins une partie de l'ensemble (300) dans une cavité (124b) de la deuxième partie (124) du manche, dans lequel l'ensemble comprend une carte de circuit imprimé (302) sur laquelle le compteur et le dispositif de notification d'utilisateur sont montés, et l'étape d'insertion comprend l'insertion de la carte de circuit imprimé dans la cavité de la deuxième partie du manche de telle sorte que la carte de circuit imprimé repose dans un plan qui est parallèle à un axe longitudinal (A-A) de l'accessoire (100).

**3.** Procédé selon la revendication 1 ou la revendication 2, dans lequel l'ensemble (300) et la cavité (124b) de la deuxième partie (124) sont formés de façon à empêcher une rotation de l'ensemble par rapport à la deuxième partie autour d'un axe longitudinal (A-A) de l'accessoire (100).

**4.** Procédé selon l'une quelconque des revendications 1 à 3, dans lequel l'ensemble (300) comprend un ou plusieurs élément(s) (310, 320) qui empêche(nt) un mouvement de l'ensemble par rapport à la deuxième partie (124) dans une direction avec un composant parallèle à un axe longitudinal (A-A) de l'accessoire (100).

**5.** Procédé selon la revendication 4, comprenant, après l'étape de positionnement de l'ensemble (300) dans la cavité (124b) et avant l'étape (c), une étape d'apport du ou des élément(s) (310, 320) à l'ensemble.

**6.** Procédé selon une quelconque revendication précédente, comprenant la prévision d'un moteur (500)

qui est connectable à la source d'alimentation électrique et la mise en place du moteur dans la première partie (123).

**7.** Procédé selon la revendication 6, comprenant la mise en place de la source d'alimentation électrique entre le moteur (500) et l'ensemble (300).

**8.** Procédé selon la revendication 6 ou la revendication 7, comprenant la connexion électrique du moteur (500) et de l'ensemble (300) à la source d'alimentation électrique, comprenant facultativement la connexion du moteur et de l'ensemble en parallèle à la source d'alimentation électrique.

**9.** Procédé selon une quelconque revendication précédente, dans lequel la deuxième partie (124) est transparente ou translucide.

**10.** Accessoire (100) de soins buccaux-dentaires, comprenant :

une tête (140) portant au moins un élément (200) de nettoyage ; et
un manche (120) ayant une extrémité distale (122), une extrémité proximale (121), une première partie (123) et une deuxième partie (124) fixée à la première partie, dans lequel une première surface (123a) de la première partie et une deuxième surface (124a) de la deuxième partie définissent ensemble une surface extérieure (125) du manche ;
dans lequel la première partie est connectée à la tête à l'extrémité distale du manche et la deuxième partie définit l'extrémité proximale du manche ; et
**caractérisé en ce que** la deuxième partie loge un ensemble (300) comprenant un compteur et un dispositif de notification d'utilisateur qui est configuré pour délivrer en sortie une notification dépendant d'un état du compteur ; et
dans lequel l'ensemble comprend un contact électro-conducteur (310, 320) en contact de surface avec une source d'alimentation électrique disposée dans une chambre (123b) de la première partie.

**11.** Accessoire (100) de soins buccaux-dentaires selon la revendication 10, dans lequel la deuxième partie (124) est constituée d'une résine de styrène-acrylonitrile (SAN).

**12.** Accessoire (100) de soins buccaux-dentaires selon l'une quelconque des revendications 10 ou 11, dans lequel le compteur est configuré de telle manière qu'un état du compteur change avec le temps, et dans lequel le dispositif de notification d'utilisateur est configuré pour délivrer en sortie une première notification prédéterminée lorsque le compteur est dans un premier état et pour délivrer en sortie une deuxième notification prédéterminée lorsque le compteur est dans un deuxième état, laquelle deuxième notification prédéterminée est d'une forme différente par rapport à la première notification prédéterminée et dans lequel la deuxième notification prédéterminée a une durée, un motif ou une fréquence différent(e) par rapport à la première notification prédéterminée.

**13.** Accessoire (100) de soins buccaux-dentaires selon l'une quelconque des revendications 10 à 12, dans lequel le dispositif de notification d'utilisateur comprend un dispositif configuré pour délivrer en sortie une notification, ou des notifications, en émettant une lumière visible.

**14.** Accessoire (100) de soins buccaux-dentaires selon la revendication 13, dans lequel le dispositif comprend au moins une diode électroluminescente (306).

**15.** Accessoire de soins buccaux-dentaires selon l'une quelconque des revendications 10 à 14, dans lequel le dispositif de notification d'utilisateur est configuré pour délivrer en sortie une notification prédéterminée en fonction d'un état de la source d'alimentation électrique.

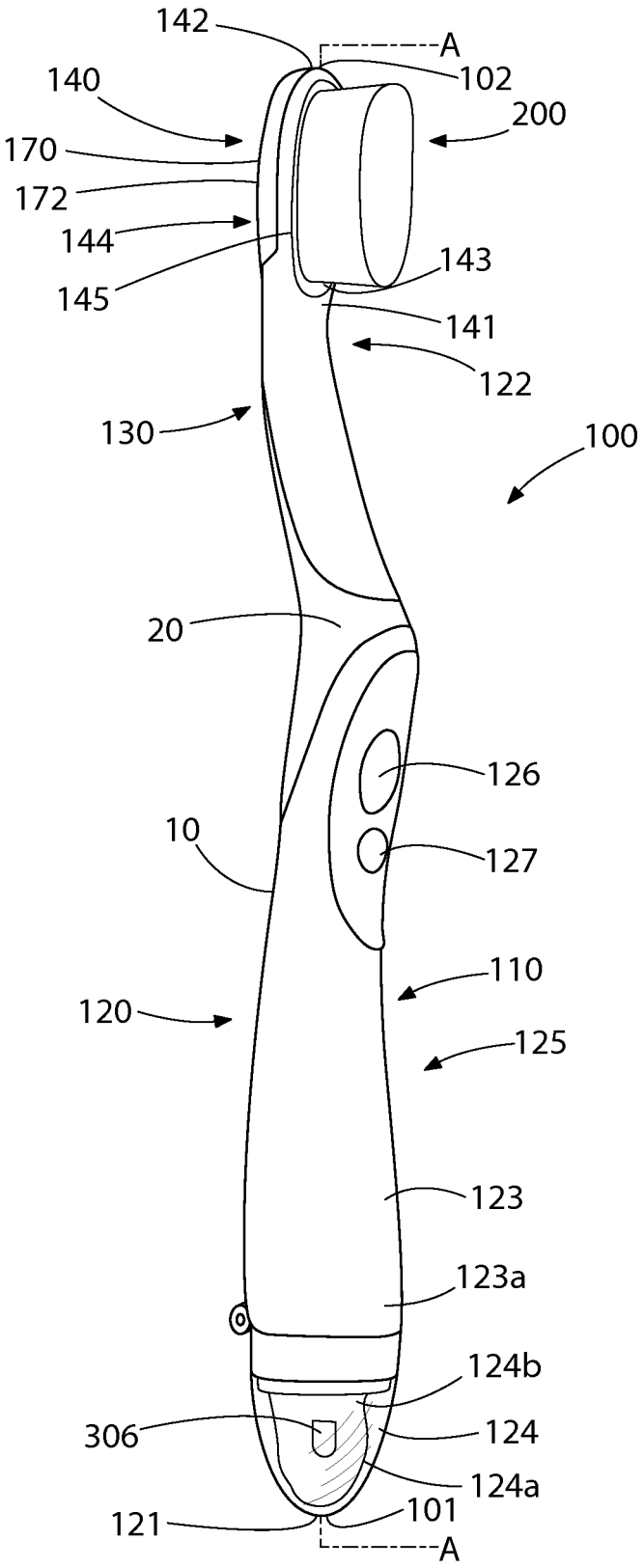
142
A
140
102
200
170
172
144
145
143
141
122
130
100
20
126
10
127
110
120
125
123
123a
124b
306
124
124a
121
101
A

FIG. 1

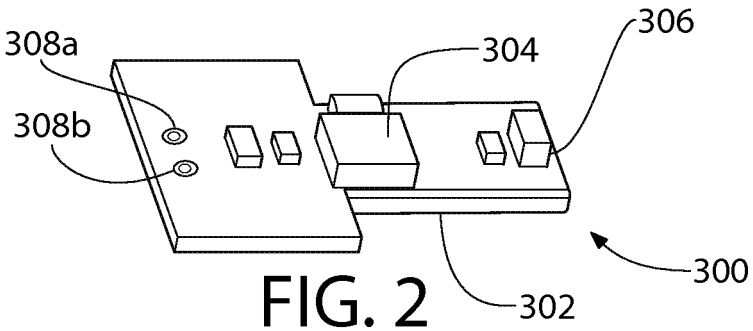


FIG. 2

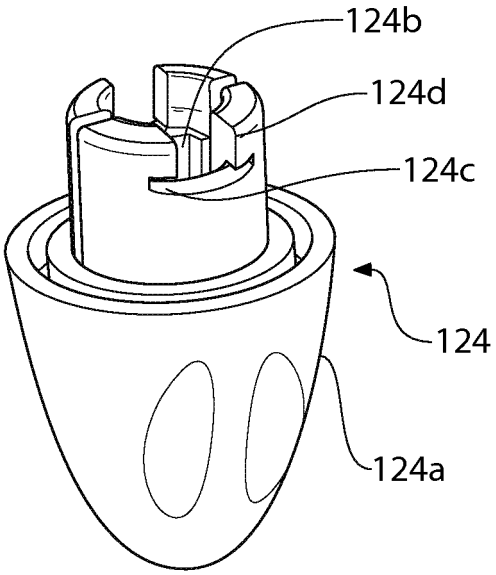


FIG. 3

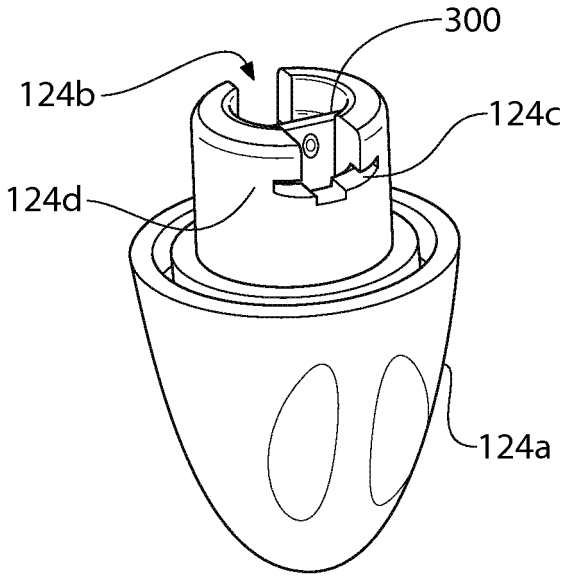


FIG. 4

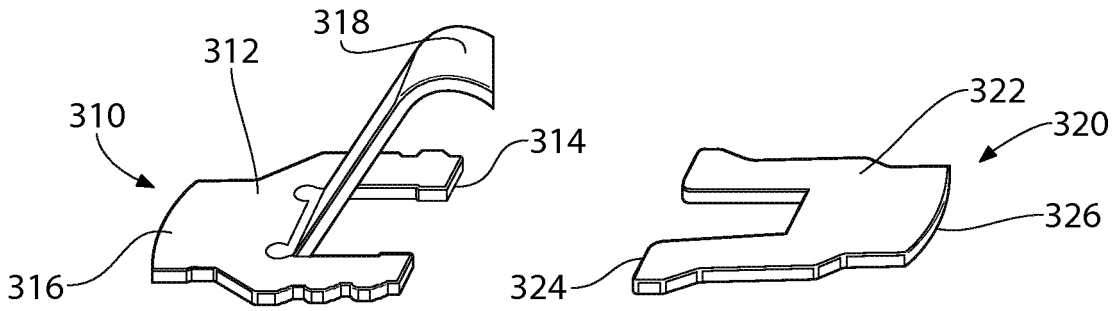
318
312
310
314
316
322
320
326
324

FIG. 5

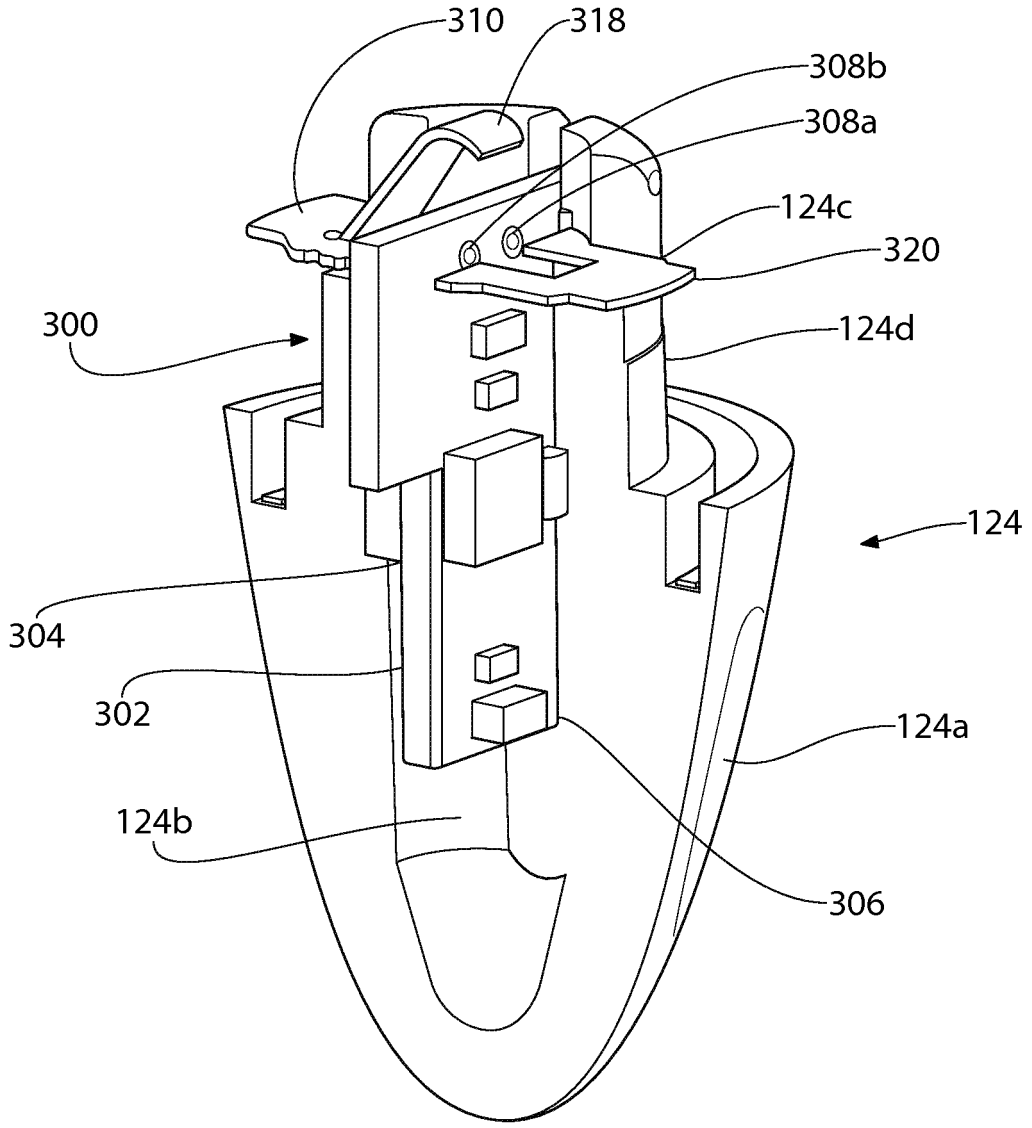
310
318
308b
308a
124c
320
300
124d
124
304
302
124a
124b
306

FIG. 6

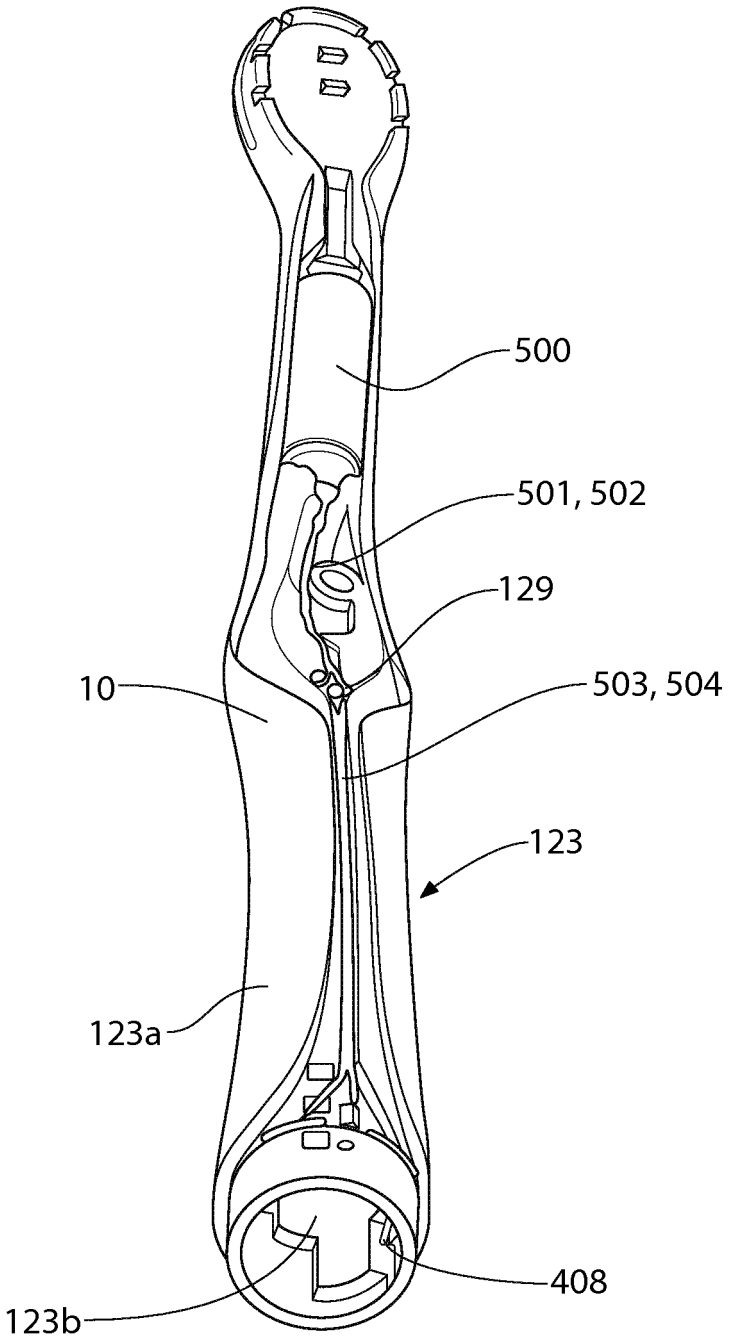


FIG. 7

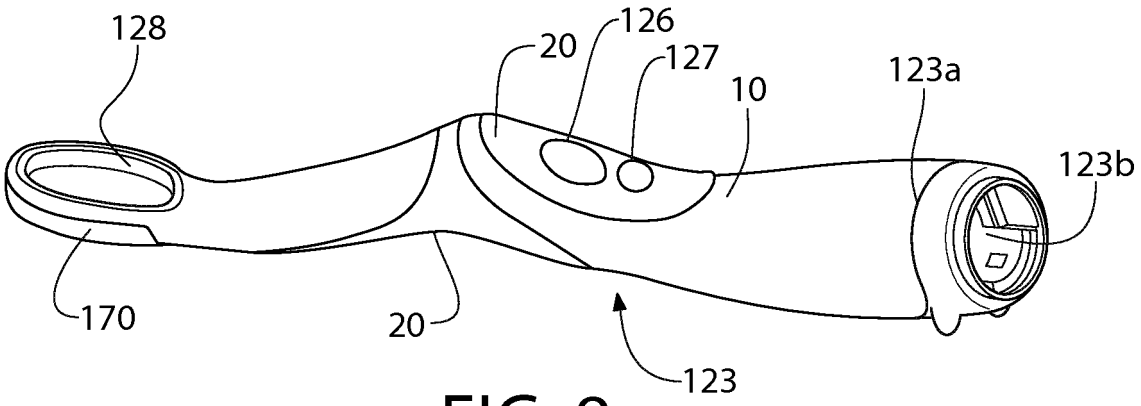


FIG. 8

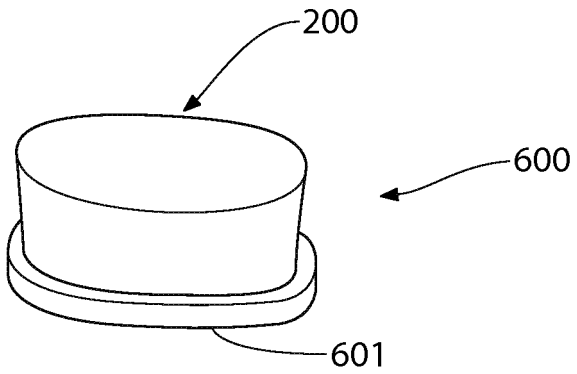


FIG. 9

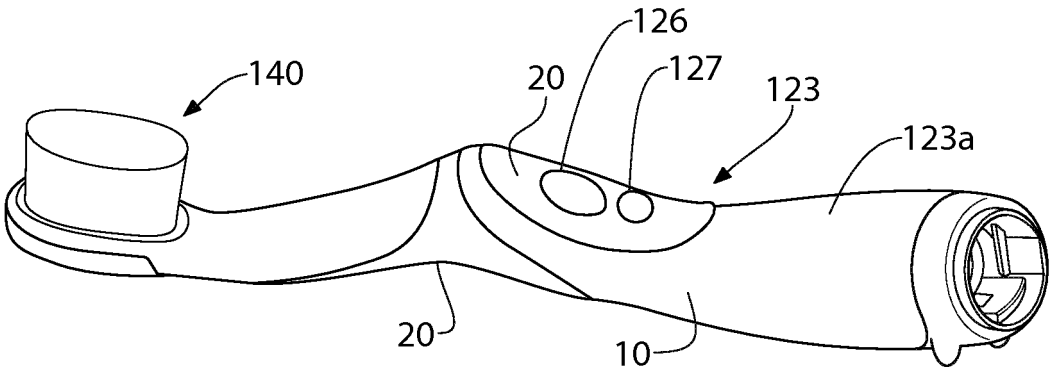


FIG. 10

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

### Patent documents cited in the description


- EP 2218559 A **[0005]**
- FR 2642282 A **[0005]**
- WO 2009142643 A **[0005]**