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(54) PRESSURE-SENSITIVE TOOTHBRUSH

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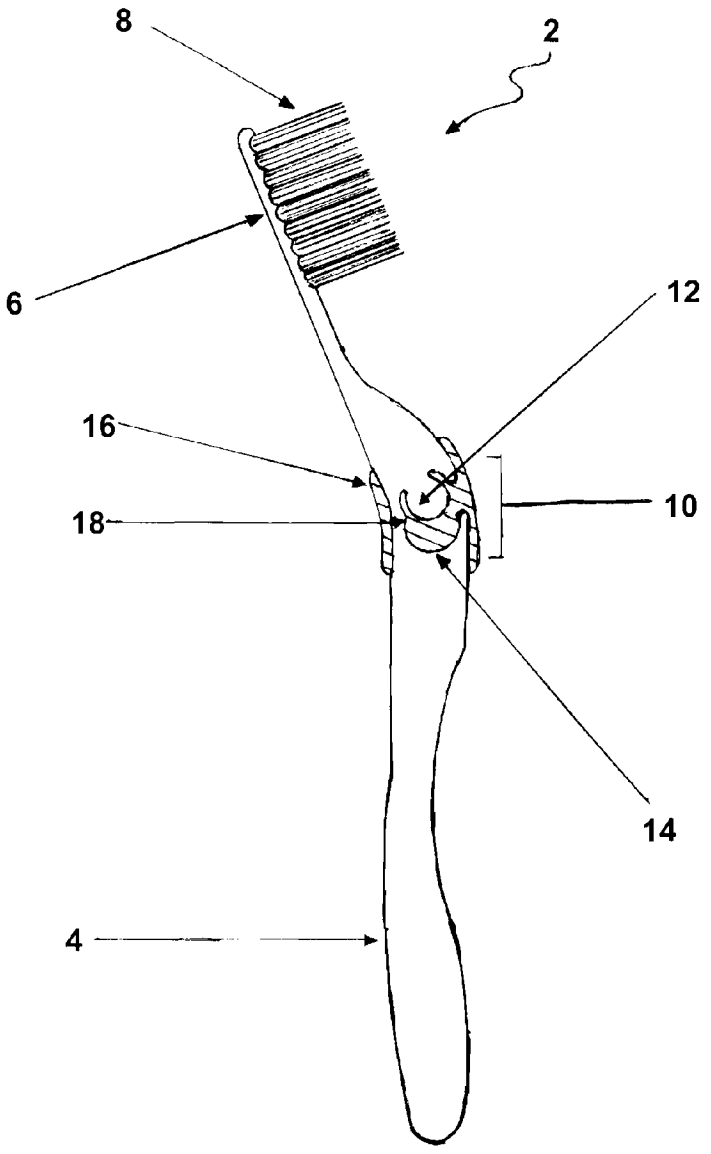
(57) **ABSTRACT**

The present invention is a pressure-sensitive toothbrush comprising a handle interrelated with a head; wherein the handle and the head are interrelated with each other by means of a ball and socket joint; further wherein the head has bristles. Optionally, the ball and socket joint is covered by a joint sheath. The ball and socket joint is hingedly connected. Alternatively, the ball and socket joint is separably connected. If a user exerts too much pressure on the toothbrush of the present invention during brushing, the ball will be disengaged from the socket and the toothbrush will become temporarily disabled and inoperable for use in tooth brushing. Over time, the user will learn to sense and exert an appropriate amount of pressure during tooth brushing.



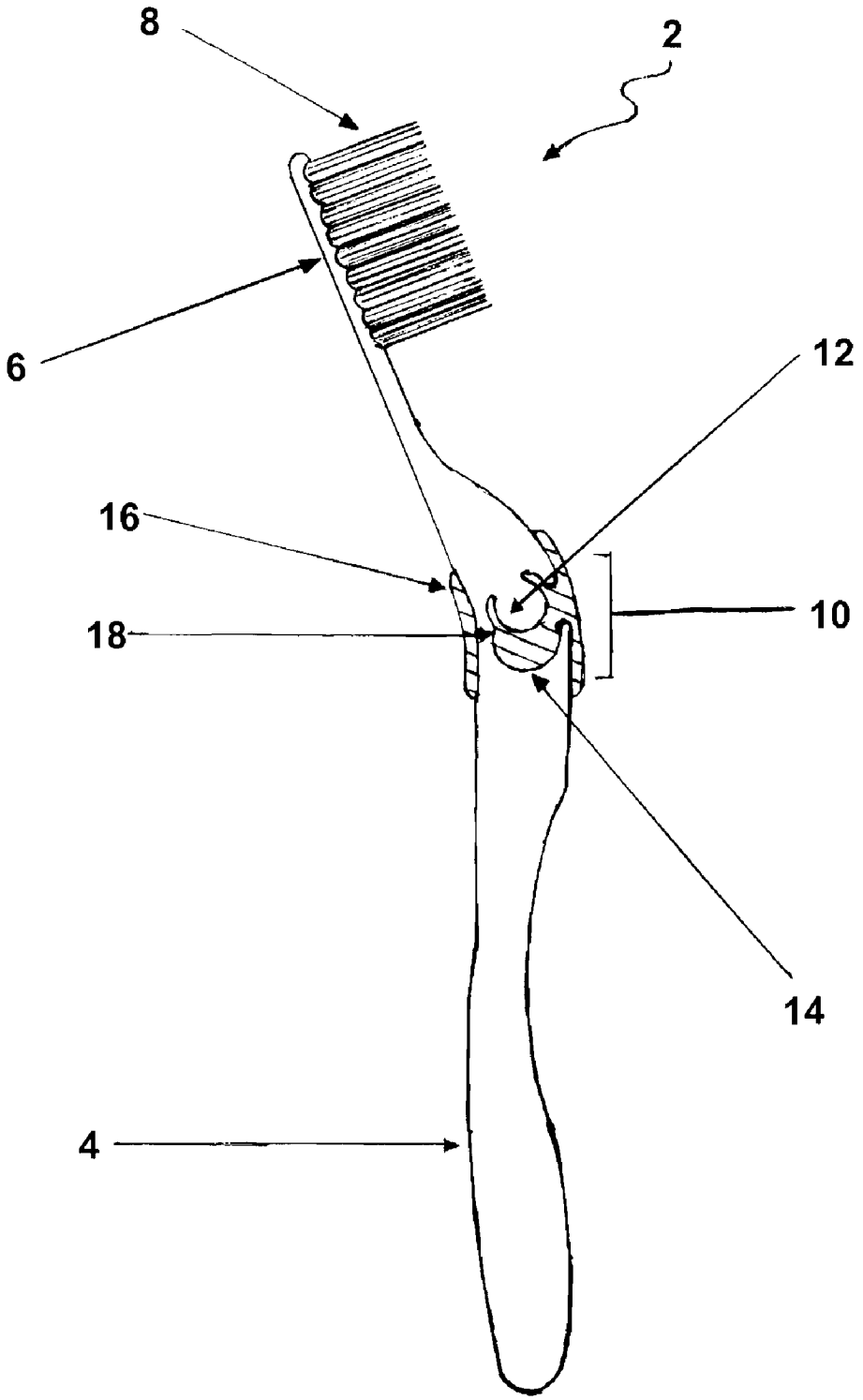


FIG. 1

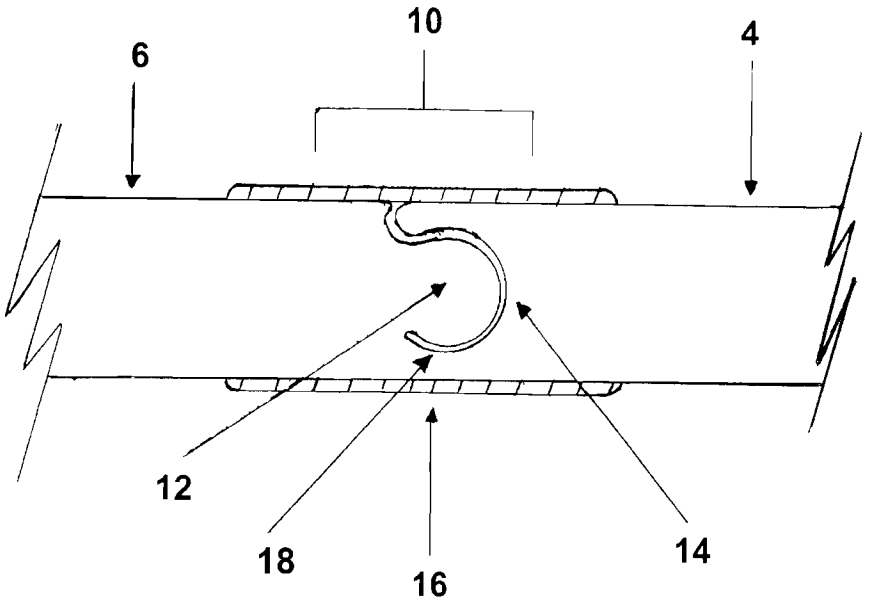


FIG. 2

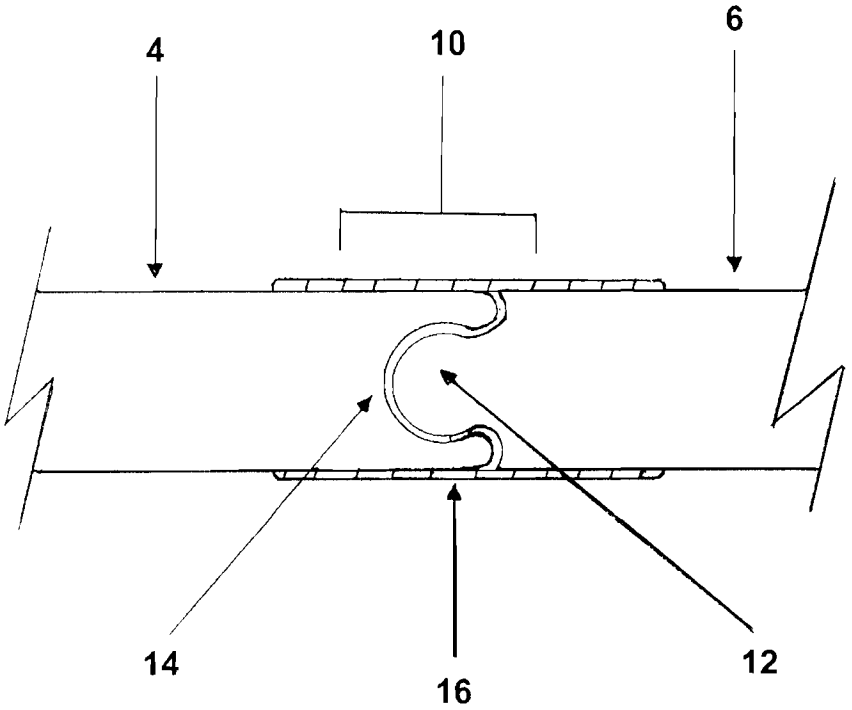


FIG. 3

PRESSURE-SENSITIVE TOOTHBRUSH

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to a toothbrush, in particular, a toothbrush that is pressure-sensitive and which will cease to function properly if a user exerts too much pressure on the toothbrush during brushing.

[0003] 2. Description of Related Art Including Information Disclosed Under 37 CFR 1.97 and 37 CFR 1.98

[0004] It is well known in the dental arts that excessive pressure applied by a user upon a toothbrush during brushing can lead to various dental health problems, such as receding gums. Receding gums in turn leave a user vulnerable to tooth decay, periodontal disease and other undesirable dental health issues. There are numerous attempts in the prior art to address this problem.

[0005] U.S. Pat. No. 5,315,732 issued May 31, 1994, by Huefner et al. for a Toothbrush Having Adjustable Brushing Pressure discloses a toothbrush with a bristle head that is moveable with respect to a handle and that contains adjustable springs to permit presetting of the brushing pressure.

[0006] U.S. Pat. No. 5,355,544 issued Oct. 18, 1994, by Dirksing for a Force-Indicating Toothbrush Using Magnetic Latching discloses a force-indicating toothbrush which uses magnetic latching to hold a movable brush member against a hollow handle. When held by the hollow handle, the bristles of the brush member are pressed against the user's teeth and gums until a predetermined force is reached. The predetermined force causes unlatching of the magnetic latch and movement of the brush member relative to the hollow handle, thereby indicating to the use that too much pressure has been exerted against the teeth and gums.

[0007] U.S. Pat. No. 5,412,827 issued May 9, 1995, by Müller et al. for a Toothbrush discloses a motorized toothbrush comprising a spring device having at least one spring which acts between a second housing section (generally, the head of the toothbrush) and the drive shaft, the second housing section being pivotable relative to the first housing section (generally, the handle of the toothbrush) about the pivot against a pressure exerted by the spring during use of the toothbrush, which spring snaps when a given pressure threshold is exceeded and which pivot is disposed in the second housing section and also forms at least a part of a mechanical coupling between the drive shaft and the second housing section.

[0008] U.S. Pat. No. 5,467,494 issued Nov. 21, 1995, by Müller et al. for a Toothbrush discloses a toothbrush comprising two parts which are pivotable relative to one another, of which a first part serves as a handle and of which a second part carries a brush-head, a spring being arranged between the parts, the spring having one end portion in contact with a portion of the brush-head and having one end portion fixedly connected to the handle, the brush-head being pivotal relative to the handle against a pressure exerted by the spring during use of the toothbrush, which spring snaps from a point of contact with the brush-head part when a given pressure threshold is exceeded and resumes said point of contact with the brush-head part when the pressure has decreased.

[0009] U.S. Pat. No. 5,707,166 issued Jan. 13, 1998, by Jeannet et al. for a Toothbrush discloses a toothbrush with a brushneck that is deflectably held, in a reversible, resilient manner, on a hollow handle by a swivel joint surrounded by a sealing element. The brushneck is provided at its coupling end facing the handle with an articulated head. The handle exhibits at its coupling end facing the brushneck an articulated fork having fork legs. The articulated head is fitted-in between the fork legs and connected to these by a swivel axle. The elastic, integral configuration of the articulated fork with the handle also allows a deflection movement in a direction which is perpendicular to the contact-pressure direction in which direction the brushneck is normally deflected when the teeth are being cleaned, such that unintentional jolts of the brushhead, caused by incorrect manipulation, against the denture or gum tissue are damped and cleaning of the teeth is made more comfortable.

[0010] U.S. Pat. No. 6,327,734 issued Dec. 11, 2001, by Meginniss, III et al. for a Force Sensing System for a Toothbrush discloses a toothbrush with a hinged member that is fixedly attached to a brushhead body. An arm member is attached at one end to said hinged member and pivots about a hinge portion. The pivoting arm member and the brushhead member nestle within the toothbrush body. The brushhead member includes a striking element portion that extends away from a rear surface of the brushhead. Mounted on the toothbrush body beneath the brushhead member is a collapsible, recoverable dome member, which provides an alarm indication by collapsing when excessive pressure is applied by the user on the brushhead against the teeth.

[0011] U.S. Pat. No. 6,408,473 issued Jun. 25, 2002, by Kessler for a Tooth Brush with Elastically Articulated Replaceable Head discloses a toothbrush with a bristle head or accessory unit that compensates for the brushing pressure and associated bending of the holder unit as well as hand movements. The toothbrush is characterized in that an O-ring or elastic shoe that is made either detached from or connected to the adjacent components is provided between the replaceable or fixed bristle unit and the holder unit. The bristle unit and holder unit are joined via a ball joint.

[0012] US Patent Application 2005/0108841 published May 26, 2005, by Edwards for a Flexible Neck Toothbrush discloses a toothbrush with a handle including an open cavity and a neck interconnected to the handle by a pivot. The neck is movable between an aligned first position and a second angled position relative to the handle. A leaf spring is bonded to the end of the neck at a first end, and the second end of the leaf spring engages the handle to provide biasing resistance. The leaf spring is configured such that if pressure to the neck exceeds a threshold limit, there is movement of the neck portion from the first position to a second position. The threshold limit is the pressure just below the pressure at the brush that may cause damage to the hard and soft tissue of the mouth. A protective sheath envelops the junction between the handle member and the neck member to prevent accumulation of unwanted material within the cavity of the handle.

[0013] It is desirable to have a low cost, easily manufactured, pressure-sensitive toothbrush that will enable a user to avoid excessive brushing pressure and undesirable dental health consequences attendant with excessive brushing pressure. The toothbrush of the present invention enables a user to learn appropriate brushing pressure and to avoid use of damaging, excessive brushing pressure.

BRIEF SUMMARY OF THE INVENTION

[0014] The present invention is a pressure-sensitive toothbrush comprising a handle interrelated with a head; wherein the handle and the head are interrelated with each other by means of a ball and socket joint; further wherein the head has

bristles. Optionally, the ball and socket joint is covered by a joint sheath. The ball and socket joint is hingedly connected. Alternatively, the ball and socket joint is separably connected.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0015] FIG. **1** is a cross-sectional view of a toothbrush of the present invention.

[0016] FIG. **2** is a cross-sectional view of a hingedly connected ball and socket joint of the toothbrush of the present invention.

[0017] FIG. **3** is a cross-sectional view of a separably connected ball and socket joint of the toothbrush of the present invention.

LIST OF REFERENCE NUMERALS

[0018] **2** toothbrush
[0019] **4** handle
[0020] **6** head
[0021] **8** bristles
[0022] **10** ball and socket joint
[0023] **12** ball of joint
[0024] **14** socket of joint
[0025] **16** joint sheath
[0026] **18** joint hinge

DETAILED DESCRIPTION OF THE INVENTION

[0027] With reference to FIG. **1**, a toothbrush **2** of the present invention is shown in cross-sectional view. The toothbrush **2** is comprised of a handle **4** which is inter-related with a head **6** by means of a ball and socket joint **10**. The head **6** has bristles **8**.

[0028] As shown in FIG. **1**, FIG. **2**, and FIG. **3**, the ball and socket joint **10** is comprised of a ball **12** integral with a medial end of the head **6** of the toothbrush **2** and a socket **14** integral with a medial end of the handle **4** of the toothbrush **2**.

[0029] As shown in FIG. **1**, FIG. **2**, and FIG. **3**, the ball and socket joint **10** optionally may be covered by a joint sheath **16**. The joint sheath **16** protects the ball and socket joint **10** from being exposed to and contaminated or interfered with by foreign particles when in use by a user. The joint sheath **16** also protects the user's lips, mouth tissues and tongue from injury as a result of being caught in or pinched by the ball and socket joint **10** as the joint may alternate between a closed position and an open position during use.

[0030] Although not depicted, the ball and socket joint **10**, either as a hingedly connected ball and socket joint (as shown in FIG. **2**), or a separably connected ball and socket joint (as shown in FIG. **3**), alternatively may be configured such that the ball **12** is integral with the medial end of the handle **4** of the toothbrush **2** and the socket **14** is integral with the medial end of the head **6** of the toothbrush **2**.

[0031] As shown in FIG. **2**, the ball and socket joint **10** is in a closed position. The ball and socket joint **10** of the toothbrush **2** is hingedly connected by means of joint hinge **18**. As shown in FIG. **1**, the joint hinge **18** allows for the handle **4** and the head **6** of the toothbrush to remain inter-related and hingedly connected even when the ball and socket joint **10** is in an open position.

[0032] As shown in FIG. **3**, the ball and socket joint **10** is in a closed position. The ball and socket joint **10** of the toothbrush **2** is separably connected; wherein the ball **12** may be completely removed from the socket **14** such that the handle **4** and the head **6** of the toothbrush **2** may be separated from each other. If the separably connected ball and socket joint **10** is enclosed within an optional joint sheath **16**, then the medial end of the handle **4** and the medial end of the head **6** of the toothbrush **2** may remain in proximal relation to each other even when separated.

[0033] The ball and socket joint **10** of the toothbrush **2** of the present invention is configured to be sensitive to pressure. In particular, the ball and socket joint **10** of the toothbrush **2** of the present invention is configured to change from a closed position to an open position upon application of a threshold pressure by the user during brushing to the bristles **8** and head **6** of the toothbrush **2** of the present invention; wherein the threshold pressure is a pressure in excess of an optimum, maximum tooth brushing pressure.

[0034] If the user applies too much pressure during tooth brushing, then the ball **12** will be forced from the socket **14**, the ball and socket joint **10** then will be in the open position and the handle **4** and the head **6** will not be in operable connection with each other. As a result, the toothbrush **2** of the present invention will be temporarily disabled and inoperable for use in tooth brushing. To resume use of the toothbrush **2** of the present invention and tooth brushing, the user need only reengage the ball **12** and the socket **14** of the ball and socket joint **10**. Over time, the user will learn to sense and exert an appropriate amount of pressure during tooth brushing, which pressure is less than the threshold pressure.

[0035] Although the present invention is described herein with reference to specific embodiments, it is understood that modifications and variations of the present invention are possible without departing from the scope of the invention, which is defined by the claims set forth below.

The invention claimed is:

1. A pressure-sensitive toothbrush comprising:
a. A handle interrelated with;
b. A head with bristles;
wherein the handle and the head are interrelated with each other by means of a ball and socket joint.

2. The pressure-sensitive toothbrush of claim **1**; further wherein the ball and socket joint is hingedly connected.

3. The pressure-sensitive toothbrush of claim **1**; further wherein the ball and socket joint is separably connected.

4. The pressure-sensitive toothbrush of claim **1**; further wherein the ball and socket joint is covered by a joint sheath.

5. A pressure-sensitive toothbrush comprising:
a. A handle interrelated with;
b. A head with bristles;
wherein the handle and the head are interrelated with each other by means of a hingedly connected ball and socket joint; and further wherein the ball and socket joint is covered by a joint sheath.

6. A pressure-sensitive toothbrush comprising:
a. A handle interrelated with;
b. A head with bristles;
wherein the handle and the head are interrelated with each other by means of a separably connected ball and socket joint; and further wherein the ball and socket joint is covered by a joint sheath.

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