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(54) **ADJUSTABLY TILTABLE INTERDENTAL TOOTHBRUSH**

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(57) **ABSTRACT**

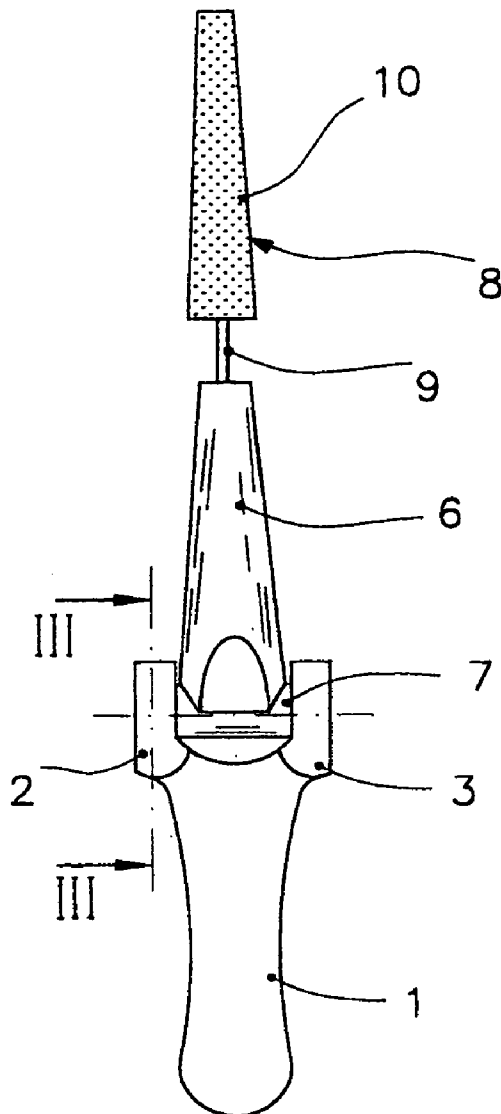
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An interdental toothbrush comprising a handle (1) and a wire brush (8) attached thereto, in which the wire brush is integral with a support (6) joined rotatably to the handle, so that the tilting of the wire brush with respect to the axis of the handle may be adjusted, means (11, 12) being provided for locking said support at the desired angle with respect to the handle.

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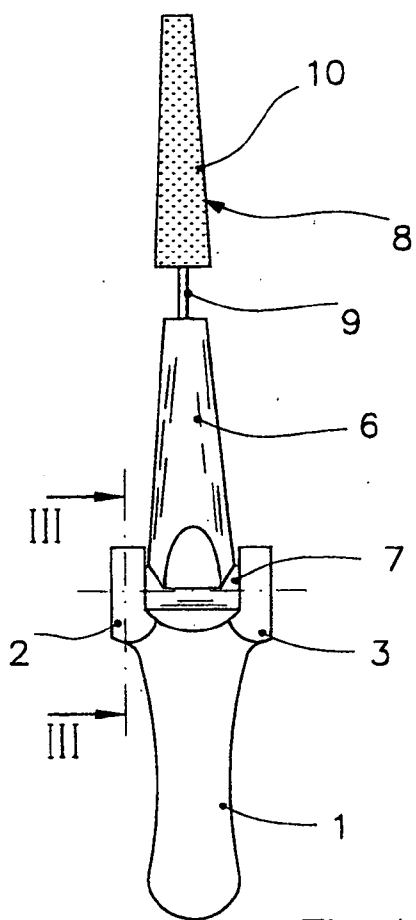


Fig. 1

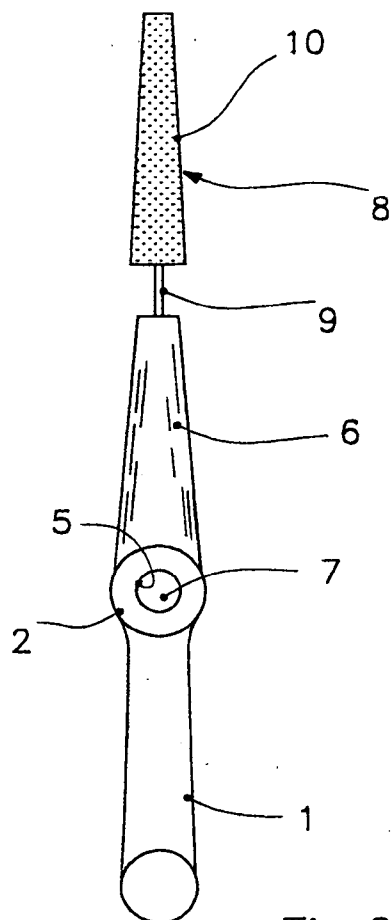


Fig. 2

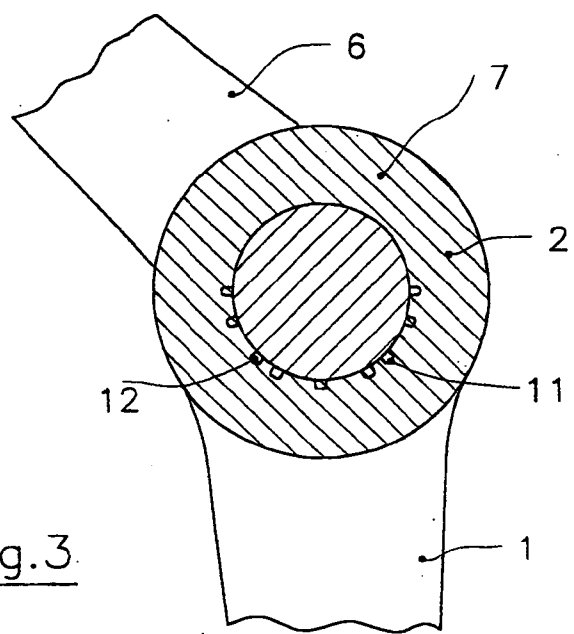


Fig. 3

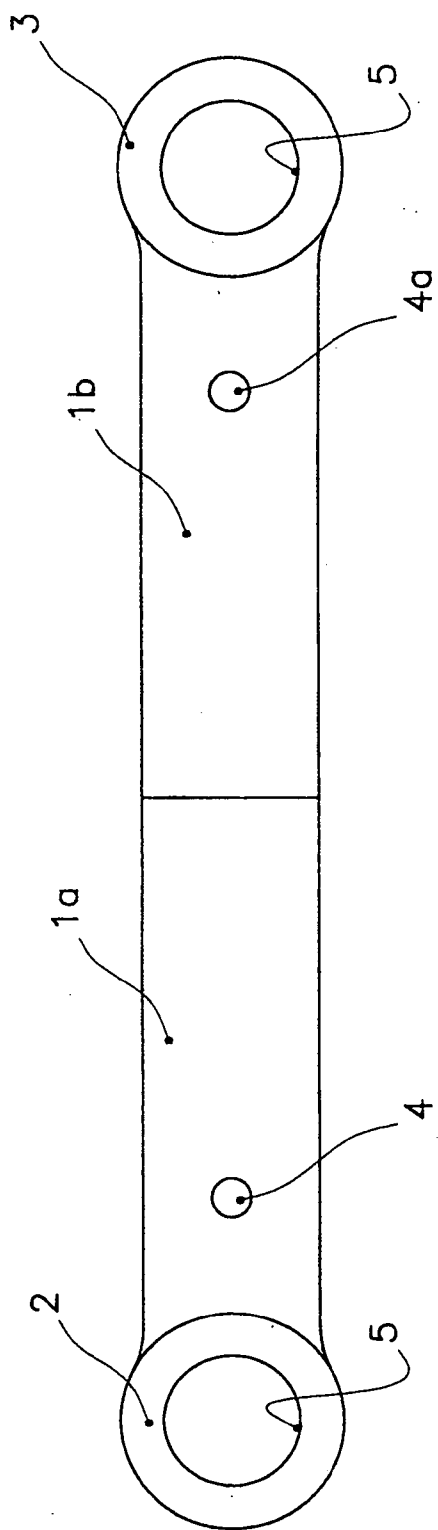


Fig. 4

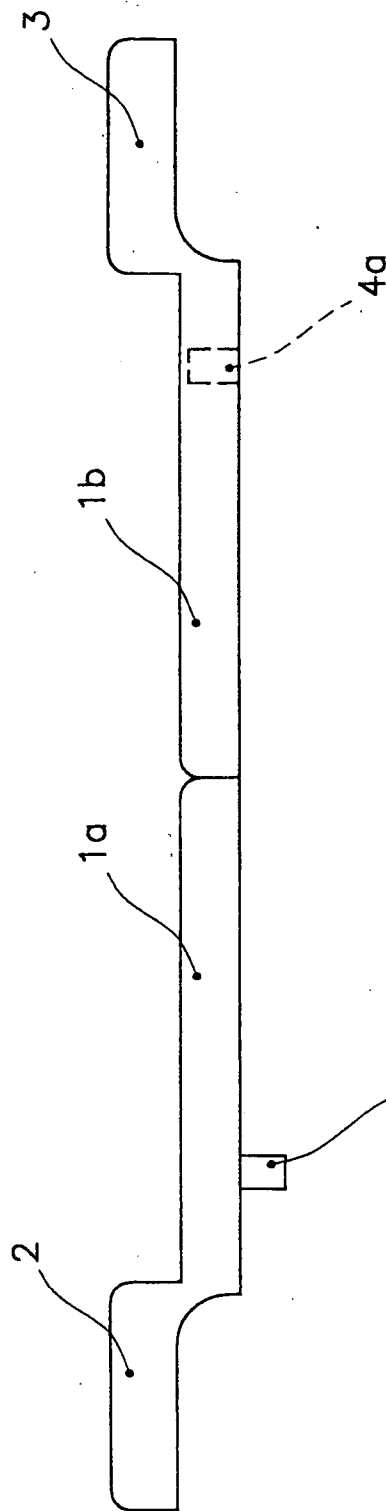


Fig. 5

ADJUSTABLY TILTABLE INTERDENTAL TOOTHBRUSH

FIELD OF THE INVENTION

[0001] The present invention generally relates to devices and accessories for oral care, and more particularly to an adjustably tiltable interdental toothbrush.

BACKGROUND OF THE INVENTION

[0002] Toothbrushes of the type mentioned above are known already. Substantially these comprise an elongated handle and a wire brush, made of a metallic wire and a plurality of radial bristles, extending axially from one end of the handle. The wire brush can be mounted on the handle so as to be replaceable, or the whole toothbrush may be of a disposable type. Also known are toothbrushes of the above-mentioned type in which the wire brush can be tilted at an angle with respect to the axis of the handle such that the toothbrush may also be inserted in the hardest to reach spaces between the teeth. According to U.S. Pat. No. 4,691,404 the possibility of tilting or flexing the wire brush with respect to the handle is obtained if the portion of the handle that the wire brush is joined to is manufactured in a flexible material. In this way, by suitably acting on that portion with two fingers the desired tilt may be conferred on the wire brush. This solution, though widely used, has the drawback of reducing the effective length of the toothbrush, that has to be gripped with the fingers in correspondence with the proximal end of the handle. A similar solution is described in U.S. Pat. No. 5,488,751.

[0003] Another solution that enables tilting of the wire brush with respect to the handle is described in the U.S. Pat. Nos. 5,309,596 and 5,377,377. In the toothbrush described in these two patents the wire brush is engaged in a seat from which two axial arms extend, flexibly attached to a handle made of two parts that are attached to one another in such a way as to be able to slide in the axial direction. The attachment between the two arms and the seat of the wire brush on the one hand, and between the two parts of the handle, on the other, is flexible, so that when one part of the handle is made slide with respect to the other, the wire brush tilts with respect to the handle. The greater the amount of sliding of the two portions of the handle, the greater is the degree of tilt.

[0004] In these solutions, it may be difficult to maintain the desired angle of tilt and, at any rate, it is impossible to keep it at the desired value. Besides, in the travel or disposable type models, where it is the user who has to put the wire brush into the seat made in the handle, it is impossible to ensure perfect tightness of the connection and the wire brush may be unstable and even become unattached when in use.

OBJECTS AND SUMMARY OF THE INVENTION

[0005] The object of the present invention is to provide an interdental toothbrush that enables tilting of the wire brush with respect to the axis of the handle to be adjusted in a simple and safe way without the drawbacks of the known interdental toothbrushes.

[0006] Another object of the present invention is to provide an interdental toothbrush of the type mentioned above

in which the wire brush is replaceable easily and maintains its position stably during use.

[0007] These objects are accomplished with the interdental toothbrush according to the present invention in which the wire brush is integral with a support member joined rotatably to the handle, so that tilting of the wire brush from the axis of the handle can be adjusted and means are provided for locking the support at the desired angle with respect to the handle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention will be illustrated in greater detail in the description that follows of one embodiment, provided as a non-limiting example, with reference to the accompanying drawings in which:

[0009] **FIG. 1** is a side elevational view of the interdental toothbrush according to the invention;

[0010] **FIG. 2** is a side elevational view of the interdental toothbrush of **FIG. 1**, rotated through 90°;

[0011] **FIG. 3** is an enlarged partial view of the toothbrush according to the invention in correspondence with the joint, showing a cross section taken according to the arrows III-III of **FIG. 1**;

[0012] **FIGS. 4 and 5** show, in plan view and side elevational view, a handle for the toothbrush according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0013] With reference to the abovementioned figures, the interdental toothbrush according to the present invention comprises a handle **1** culminating in a pair of ring-shaped, parallel expansions **2** and **3**. The circular seats **5** formed on the two expansions **2** and **3** are coaxial. The toothbrush according to this invention also comprises a stem **6**, in particular truncated-conical shape in this embodiment of the invention, having at its end of larger cross-section a transversal pin **7** suitable for engaging in the seats **5** of the expansions **2** and **3**. Extending axially from the lower cross-section end of the stem **6** is a conventionally shaped wire brush **8**, formed of a rod **9** from which a plurality of radial bristles **10** extend.

[0014] The diameter of the pin **7** is substantially equal to that of the seats **5** and the material from which the handle **1**, and more particularly the two end expansions **2** and **3**, is made, has sufficient elasticity to allow the pin **7** to access the seats **5** when moderate force is applied, establishing a rotating attachment between the handle and the stem **6**.

[0015] Adjustment of the tilting of the stem **6**, and accordingly of the wire brush **8** integral with it, with respect to the handle **1** is obtained due to the fact that the attachment between pin **7** and expansions **2** and **3** enables the pin **7** to be rotated in the seats **5**, when a moderate force is applied on the stem **6**. To ensure that the stem **6** can be positioned stably at the desired angle, as shown in **FIG. 3**, the joint between handle **1** and stem **6** also comprises means for locking, the stem **6** in the chosen tilted position. In the embodiment illustrated in **FIG. 3**, the locking means provided comprise at least a tooth **11** extending radially from the pin **7** in correspondence with at least one of the expan-

sions 2 and 3 and a plurality of cavities 12 formed in the surface delimiting the seat 5 and angularly spaced one from the other. When the tooth 11 engages in one of the cavities 12, the stem 6 is locked at the desired angle of tilt. The elastic properties of the materials that pin 7 and expansions 2 and 3 of the handle 1 are made of should be selected so as to permit passage of the tooth 11 from one cavity 12 to another when moderate force is applied on the stem 6.

[0016] The wire brush 10 is provided together with the stem 6 and is therefore integral with it. Thanks to the snap-lock attachment between handle 1 and stem 6, the toothbrush of the invention may be put together at any time and taken apart so that its dimensions are kept to a minimum and that it may easily be carried on the person either in a small bag or a purse.

[0017] Still with the object of minimizing dimensions of the toothbrush, the handle may also be manufactured in such a way that its thickness is as low as possible. As is shown in fact in FIGS. 4 and 5, to advantage the handle may be built in two halves 1a and 1b, that may be coupled together by pressure means. The two halves 1a and 1b are joined to one another in correspondence with the respective ends opposite the ring-shape expansions 2 and 3 which lie on a different plane, parallel to the plane of the two halves 1a and 1b, such that, when coupling is effected, the expansions 2 and 3 are spaced apart from one another so as to receive the pin 7.

[0018] To join the two halves, a protrusion 4 is provided, in particular in the form of a connection plug, extending from a face of one of the halves, suitable for engaging in a corresponding cavity 4a made in the corresponding face of the other half when they are put one on top of the other, and the elasticity of the material they are made of is put to effect, enabling both a reciprocal rotation along the connection side and also a moderately forced, reversible at any time, engagement of the rib 4 in the cavity 4a.

[0019] Advantageously the handle may be made of rubber and the bristles of the wire brush may be subjected to antibacterial treatment.

1. An interdental toothbrush comprising a handle and a wire brush attached thereto, wherein the wire brush is integral with a support joined rotatively to the handle, so that tilting of the wire brush with respect to the axis of the handle can be adjusted, means being provided for locking said support at the desired angle with respect to the handle.

2. The interdental toothbrush according to claim 1, wherein said support has a pin transversal with respect to the axis of the wire brush engaging rotatively in a seat made in the end of said handle.

3. The interdental toothbrush according to claim 2, wherein two parallel, ring-shape expansions, each defining a circular seat, are made in the end of said handle.

4. The interdental toothbrush according to claim 1, wherein said support has a pin transversal with respect to the axis of the wire brush engaging rotatively in a seat made in the end of said handle, said seat having a circular shape and being defined by two ring-shape expansions extending in a parallel way from one end of the handle.

5. The interdental toothbrush according to claim 4, wherein the diameter of said seat is substantially equal to the diameter of said pin.

6. The interdental toothbrush according to claim 2, wherein said pin means for locking the support at a desired angle with respect to the handle comprise at least one radial tooth formed on said pin and cavities formed on the surface delimiting said seat for engaging said tooth, said cavities being spaced angularly to one another, so that the wire brush may be locked at the desired angle.

7. The interdental toothbrush according to claim 4, wherein said pin has at least one radial tooth and cavities are provided on the surface delimiting at least one of said seats for engaging said tooth, said cavities being spaced angularly to one another, so that the wire brush may be locked at the desired angle.

8. The interdental toothbrush according to claim 1, wherein said support is an elongated stem, from one end of which the wire brush extends, a transversal pin being provided at the other end.

9. The interdental toothbrush according to claim 1, wherein said handle is made of two connectable halves, each of said halves terminating with one of said ring-shape expansions and being rotatively joined to one another by their opposite ends, a protrusion being provided on one of said halves for engaging in a corresponding cavity, made correspondingly in the other half, with moderate force being applied to keep said two halves reversibly joined one to the other.

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