

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 February 2003 (27.02.2003)

PCT

(10) International Publication Number
WO 03/015574 A1

(51) International Patent Classification⁷: **A46B 9/04**, 15/00

(21) International Application Number: PCT/EP02/07581

(22) International Filing Date: 8 July 2002 (08.07.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
01306931.5 14 August 2001 (14.08.2001) EP

(71) Applicant (for AE, AL, AM, AT, AZ, BA, BE, BF, BG, BJ, BR, BY, CF, CG, CH, CI, CM, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, FR, GA, GE, GN, GQ, GR, GW, HR, HU, ID, IS, IT, JP, KG, KP, KR, KZ, LC, LR, LT, LU, LV, MA, MC, MD, MG, MK, ML, MR, MX, NE, NL, NO, PH, PL, PT, RO, RU, SE, SI, SK, SN, TD, TG, TJ, TM, TN, TR, UA, UZ, VN, YU only): **UNILEVER N.V.** [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL).

(71) Applicant (for AG, AU, BB, BZ, CA, CY, GB, GD, GH, GM, IE, IL, KE, LK, LS, MN, MW, MZ, NZ, OM, SD, SG, SL, SZ, TT, TZ, UG, ZA, ZM, ZW only): **UNILEVER PLC** [GB/GB]; UNILEVER HOUSE, Blackfriars, London, Greater London EC4P 4BQ (GB).

(71) Applicant (for IN only): **HINDUSTAN LEVER LTD** [IN/IN]; HINDUSTAN LEVER HOUSE, 165 - 166 Backbay Reclamation, 400 020 Mumbai (IN).

(72) Inventors: **DAVIES, Richard, Huw**; Lever Fabergé Italia SRL, Via Lombardia, I-20083 Gaggiano (IT). **DI-DRUSCO, Isotta**; Via San Marco 18, I-20121 Milano (IT).

GIANI, Paola; Lever Fabergé Italia SRL, Via Lombardia, I-20083 Gaggiano (IT).

(74) Agent: **ROSEN JACOBSON, Frans, L., M.**; Unilever NV, Patent Department, Olivier van Noortlaan 120, NL-3133 AT Vlaardingen (NL).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

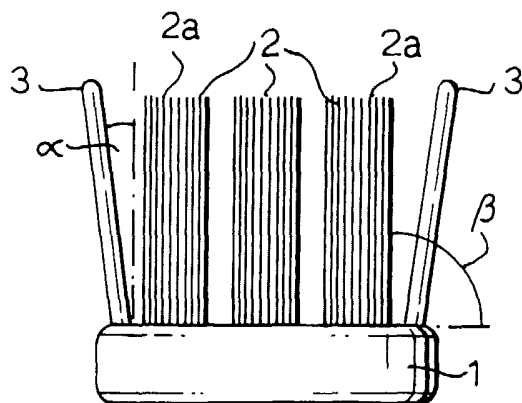
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TOOTHBRUSH



(57) Abstract: Toothbrush comprising a head and a handle, the head (1) comprising massaging wings (3) extending from a bristle-bearing face said massaging wings flanking a central bristle area and angled outwardly from said area, wherein the bristles are arranged in bristle tufts (2) and of the bristle tufts which are adjacent to a wing, at least a portion are angled towards said wing.

WO 03/015574 A1

- 1 -

TOOTHBRUSH

The present invention relates to a toothbrush comprising massaging elements.

5

Toothbrushes comprising rubbery massaging elements are known in the art. Typically, these comprise rubbery fingers which, either alone or in combination with conventional bristle tufts, project from the bristle-bearing surface in the normal fashion and exert their massaging action during brushing.

WO 98/18364 (P&G) describes a toothbrush with combination of bristles, soft cleansing pad and/or polishing fingers. The polishing fingers are preferably made of a thermoplastic elastomer and the soft polishing pad is an absorbent pad capable of providing an improved cleaning benefit.

GB-A-2 040 161 (Vowles) describes an improved toothbrush comprising, in addition to conventional bristles tufts, a gum massaging member located outermost on opposite sides of the brushing surface.

WO 98/22000 (Asher) discloses a toothbrush comprising a plaque removing member being formed from a mixture of relatively soft elastomeric material and particles of an abrasive material.

WO 01/21036 (Unilever) discloses a toothbrush comprising a wall-like member which is flanked by bristles. The wall-like

- 2 -

member is designed so as to provide improved polishing to the teeth during brushing.

DE 299 19 122 (Teske) discloses a toothbrush comprising a
5 pair of gum massaging members either side of a central bristle area and wherein the wings are angled outwardly of the bristles.

Despite the prior art there remains a consumer need to
10 improve the health of the gums without having to receive specialist treatment, such as a mouthwash or an antibacterial toothpaste.

The present invention aims to provide an improved massaging
15 effect of a toothbrush, which also has a conventional cleaning action through the use of conventional bristles.

Accordingly, the present invention provides a toothbrush comprising a head and a handle, the head comprising
20 massaging wings extending from a bristle-bearing face said massaging wings flanking a central bristle area and angled outwardly from said area, characterised the bristles are arranged in bristle tufts and of the bristle tufts which are adjacent a wing, at least a portion are angled towards said
25 wing.

The toothbrush according to the invention comprises massaging wings which are angled outwardly from the bristles. Such an arrangement facilitates the massaging
30 effect of the wings while at the same time allowing the conventional bristles of the brush to exert their regular

- 3 -

cleaning action. The feature which leads to an improved cleaning effect of the toothbrush is where the conventional bristles, particularly the conventional bristles which are nearest the massaging wings, are angled outwardly. A
5 disadvantage of having a brush which has massaging elements at the sides is that the cleaning action of the conventional bristles is easily compromised by including either not enough bristles, therefore not providing enough of a cleaning benefit, or including the same number of bristle as
10 would normally be presented on a toothbrushing surface but not giving them enough room to effect their action. By angling the conventional bristles in between the massaging wings allows the bristles to splay more during brushing. This angling of the bristles, at least of the outermost
15 bristles, also has the added benefit of a better perception of brushing by the consumer.

The massaging wings should be angled relative to a plane, which extends orthogonally from the bristle-bearing surface
20 and longitudinally down the brush head. Preferably, the wings should be angled from 1 to 30°, more preferably from 2 to 20° and more preferably from 2.5 to 7° relative to said orthogonal plane.

25 In an alternative embodiment, the toothbrush according to the invention comprises a head with a massaging wing, which has an outer surface and an inner surface and extends from a base to a tip, wherein the base of the wing sits on an outer edge to the toothbrush head. Such a construction allows the
30 maximisation of the space on the bristle-bearing surface for conventional bristles. As mentioned below, it is of great

- 4 -

importance that the cleaning effect of the bristles is maintained and that the space taken up by the massaging wings is minimised as much as possible. In a particular embodiment the outer surface of the massaging wings
5 continues down from its tip down past the bristle-bearing surface of the brush head base such that the outer surface of the wing actually provides the edge of the brush head. The massaging wing may continue in its path along its outer surface such that it passes around the edge of the head. It
10 may then either finish at some point on the bottom surface of the head or even to continue such that a pair of wings on either side of the head may then be connected to each other on the underside of the brush head base. Preferably, said wings may join at a tip region of the head so that a
15 buffering effect may be provided to reduce damage to the gums during brushing.

In a preferred embodiment the brush comprises an array of bristle tufts some of which will necessarily be adjacent the
20 massaging wings. Preferably, a portion of these adjacent bristle tufts are also angled with respect to said orthogonal plane and in a direction towards the adjacent massaging wing. In this way the brushing characteristics of the brush can be improved without compromising the effect of
25 the massaging wings. As mentioned above, it is a problem with brushes comprising massaging members that they often do not provide an acceptable level of cleaning since the numbers or arrangement of bristles is not optimal. However, by splaying these adjacent bristles in a similar fashion to
30 the massaging wings an improved bristle arrangement can be provided. Typically, these bristle tufts will be angled from

- 5 -

1 to 30°, more preferably from 2 to 20° and more preferably from 2.5 to 7° relative to said orthogonal plane.

The inner surface of the massaging wing preferably passes
5 from the tip down to the brush head and is attached to the edge of the brush head base. The wing may be attached to the edge of the brush base merely as a result of the manufacturing process, e.g. by injection moulding, or even by an adhesive. In any case, the attachment of the wing to
10 the brush head base may be improved by way of surface formations, such as corrugations, on the brush head, which may increase the surface area of the edge in contact with the wings. In a preferred embodiment the inner surface of a massaging wing sits on a stepped ledge on the edge of the
15 brush head base. The ledge may run for a part or the whole length of the wing on the brush head.

The material comprising the wing comprises an elastomeric material such as those often used in toothbrush manufacture.
20 The thermoplastic elastomer which forms the wall may be a thermoplastic vulcanate (TPV) consisting of a mixture of polypropylene and EPDM (ethylene propylene diene monomers) which is available as Santoprene (brand), described in US patent 5,393,796 issued to Halberstadt et al, or Vyram
25 (brand), another TPV consisting of a mixture of polypropylene and natural rubber, both Santoprene and Vyram (brands) being elastomers marketed by Advanced Elastomer Systems. Other suitable elastomers include Kraton, a brand of styrene block copolymer (SBC) marketed by Shell, and
30 Dynaflex G 2706 (brand), a thermoplastic elastomer marketed by GLS Corporation and which is made with Kraton (brand)

- 6 -

polymer. Other thermoplastic compounds include base:styrene block co-polymer (SEBS) e.g. Thermolast K from Gummiwerk Kraiberg (GmbH) or PONA-flex S from PLASTOLEN (GmbH).

5

Preferred elastomeric materials include those with a Shore A hardness ranging from 10 to 40, preferably from 15 to 30 and more preferably from 17 to 23 and especially preferably around 20.

10

In a preferred embodiment at least one massaging wing has surface formations which improve the massaging effect of the wings on the gums. Preferably, said surface formations are present on one or both of the inner and outer surfaces of the massaging wings. Preferred surface formations include raised spherical, square, egg-shaped, triangular or wavy formations. The most preferred formations are spherical formations. Preferably the surface formations extend from 10 to 90% of the width of the wing at the level at which the particular formation is located. For example, at one point down its length the wing may be 1 mm wide in cross section. At this point on the wing surface the surface formation may extend from 0.1 mm to 0.9 mm from the surface of the wing.

25 In another embodiment the wings extend below the brush head such that they have an increased contact with the material of the brush head to improve bonding between the two materials. There is a danger when using a brush such comprising such wings in that the wings, which are bent
30 outwardly during use, may become detached from the head. By

- 7 -

increasing the surface contact between the wing and the head one can reduce the chances of such breakage.

In yet another embodiment the brush according to the
5 invention comprises a bristle profile which closely matches the profile of the massaging wings. This does not necessarily mean that the wings need to extend from the bristle-bearing surface to a similar extent to the bristles, but only that the profile of each matches. This helps to
10 avoid an excess of bristle cleaning where no massaging is taking place and also prevents the wings being buffeted by the bristles during use.

In a preferred embodiment the massaging wings extend for a
15 distance equal to from 60 to 120% the length of the average bristle tuft on the head. Preferably, the wing extends for a distance equal to from 65 to 95, more preferably from 70 to 85 and especially about 75% of the length of the average bristle tuft. Where the wings are shorter than the average
20 bristle length the wings are less likely to be buffeted by the bristles during use and are able to exert their massaging action without affecting the cleaning efficacy of the bristles on the teeth.

25 In an alternative embodiment the massaging wings are profiled in a way that they present an uneven tip edge so as to present an uneven massaging capability. This helps to improve the sensation of massaging which would otherwise be reduced should the tip profile be even. Preferably the tip
30 profile includes a raised section at either end with a recess in the middle.

- 8 -

Particular embodiments according to the invention will now be discussed in more detail with reference to the following non-limiting figures in which figure 1 is a plan view of a brush according to the invention and figures 2 and 3 are elevation and end views of the embodiment according to figure 1. Figure 4 is an end view of another embodiment; figures 5, 6 and 7 are embodiments exhibiting surface formations; figures 8 and 9 are end views of preferred embodiments; figure 10 is a view of the brush during use and figure 11 is an elevation of the most preferred embodiment.

Figure 1 discloses a brush head (1) according to the invention comprising bristle tufts (2) projection from said head and a pair of outwardly extending massaging wings (3). Bristle tufts (2a) adjacent the wings (3) are also angled towards said wings (3).

Figure 2 discloses a brush head (1) comprising a massaging wing (3) and conventional bristle tufts (2).

Figure 3 discloses a brush head (1) comprising a pair of massaging wings (3) and conventional bristles (2). The wings are angled by α° relative to the plane (11) running orthogonally from the bristle-bearing surface and longitudinally down the brush head. The angled bristle tufts (2a) are also angled by β° relative to the brush head surface from which they extend.

Figure 4 discloses another embodiment according to the invention in which the massaging wings sit over the edge (4) of the brush head and are tapered towards their tips (5). In

- 9 -

addition the base end of the massaging wings (7) extend around the edge of the brush head and form tabs on the surface (6) of the brush head opposite the bristle bearing face. This embodiment provides improved grip between the
5 material of the wings and the material of the brush head.

Figure 5 discloses a brush head comprising a massaging wing which has surface formations (8) thereon for improving the sensory experience of the consumer. The surface formations
10 (8) are in the form of ridges running along a length of the wing.

Figure 6 also discloses a brush head comprising a massaging wing with surface formations (8) which are in the form of
15 raised spherical regions.

Figure 7 discloses a brush head according to figure 6. The surface formations (8) are present on both sides of the wings (3).
20

Figure 8 discloses a brush head comprising a pair of outwardly extending massaging wings (3a/3b) and bristle tufts (2a, 2b, 2c) arranged in three formats. Bristle tuft (2a) is adjacent wing (3a) and is angled towards said wing.
25 Bristle tuft (2b) is adjacent wing (3b) and is angled towards said wing. Bristle tuft (2) extends orthogonal to the bristle-bearing surface.

Figure 9 discloses a brush head comprising a pair of
30 massaging wings, which are connected to one another along the underside of the brush head. This allows the wings to be

- 10 -

manufactured in a single injection moulding step. It also provides improved stability of the wings during use when they are bent away from the brush head.

5 Figure 10 discloses how the brush according to the invention has a massaging effect during use. The wings (3) are splayed outwardly such that they are in contact with the gums (9) while the bristles contact the teeth. Accordingly, the wing moves along the gum surface during use and this improves the
10 oxygenation of the gum tissue, which helps to provide stronger healthy gums.

Figure 11 discloses a brush head comprising a wing (3) which has a curved tip edge (10) to improve the massaging effect
15 on the gums by presenting an uneven contact during use.

- 11 -

CLAIMS

1. Toothbrush comprising a head and a handle, the head
comprising massaging wings extending from a bristle-
5 bearing face said massaging wings flanking a central
bristle area and angled outwardly from said area,
characterised the bristles are arranged in bristle tufts
and of the bristle tufts which are adjacent a wing, at
least a portion are angled towards said wing.
10
2. Toothbrush according to claim 1, wherein the wings sit
over an edge of the head of the brush.
3. Toothbrush according to claim 1 or 2, wherein each
15 individual wing is connected to the head by way of a tab
which extends along an underside surface of the head
opposite the bristle-bearing face.
4. Toothbrush according to any preceding claim, wherein the
20 wings are made from an elastomeric material.
5. Toothbrush according to any preceding claim, wherein at
least one of the wings comprises a surface formation.
- 25 6. Toothbrush according to any preceding claim, wherein the
wings have a tip profile which closely matches a tip
profile of the bristles.
7. Toothbrush according to any preceding claim, wherein the
30 wings are integral with one another.

- 12 -

8. Toothbrush according to claim 7, wherein the wings are connected to each other by way of an elastomeric channel which extends from one wing, around a tip portion of the brush head and to the other wing.

Fig.1.

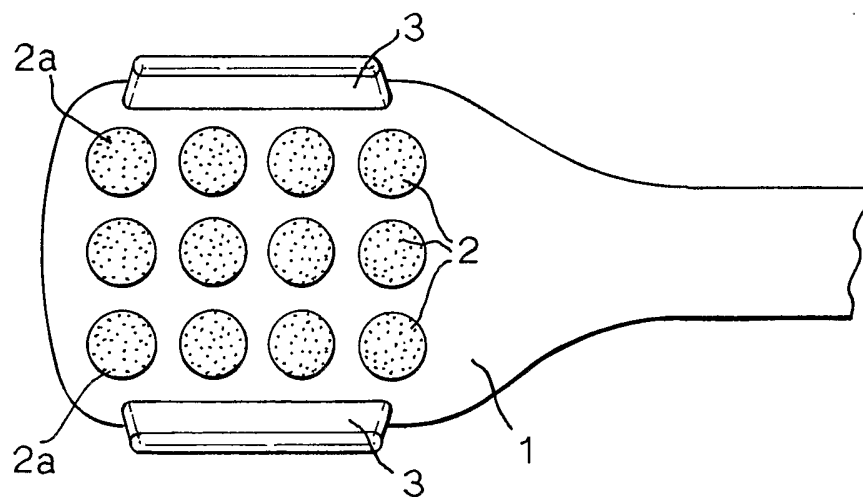


Fig.2.

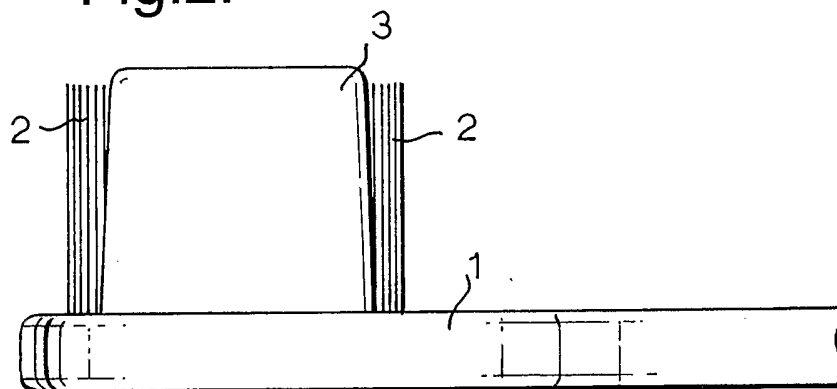


Fig.3.

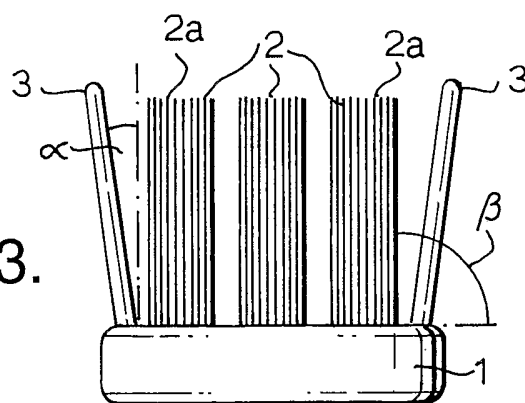


Fig.4.

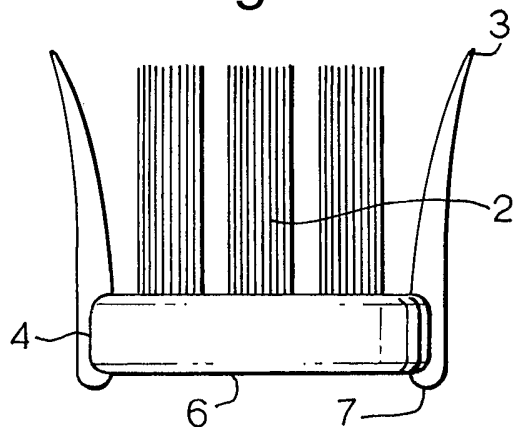


Fig.5.

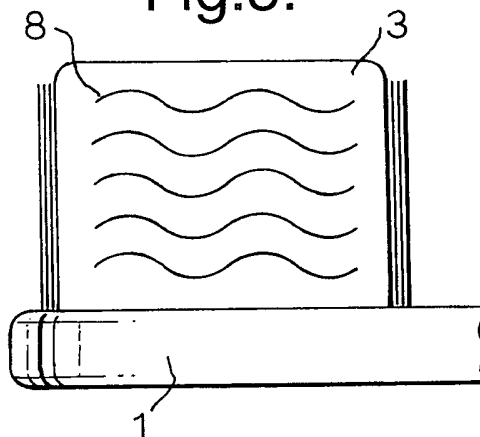


Fig.6.

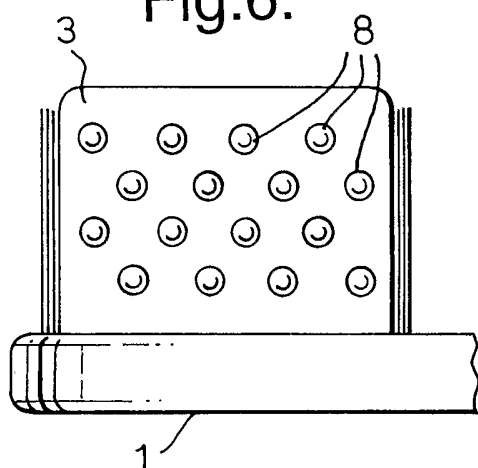


Fig.7.

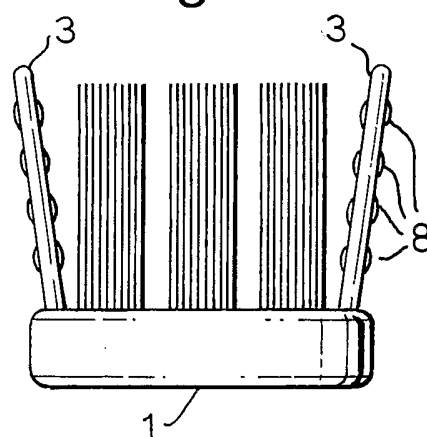


Fig.8.

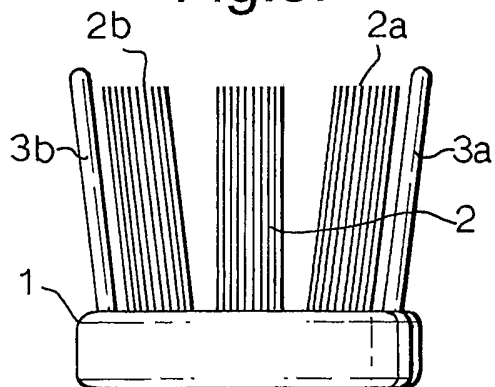


Fig.9.

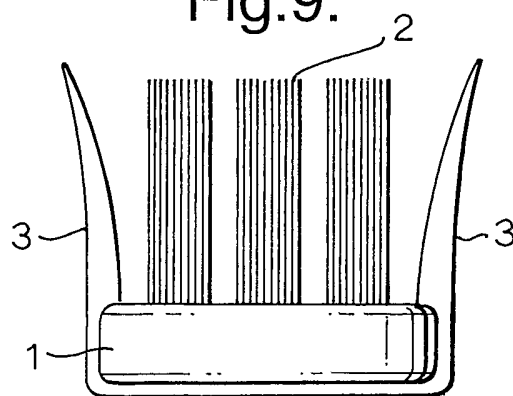


Fig.10.

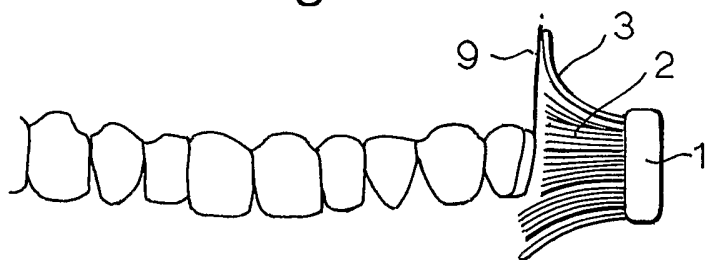
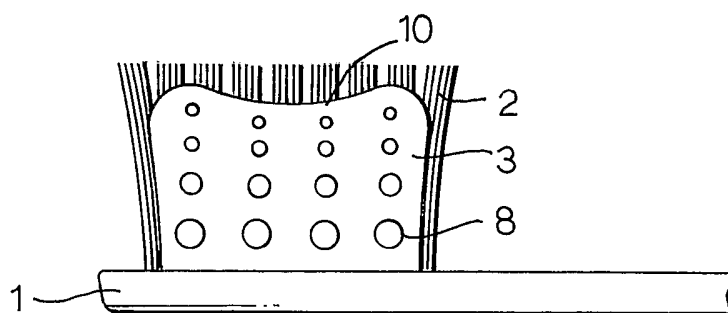


Fig.11.



INTERNATIONAL SEARCH REPORT

In International Application No

PCT/EP 02/07581

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A46B9/04 A46B15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2 139 245 A (OGDEN FLOYD H) 6 December 1938 (1938-12-06) page 2, left-hand column, line 28 -right-hand column, line 30 figures 1,3,4	1-7
Y	US 4 776 054 A (RAUCH SAMUEL) 11 October 1988 (1988-10-11) column 2, line 50 - line 56 column 6, line 48 - line 51 figure 6A	1-7
X	US 4 277 862 A (WEIDEMAN CHRISTIAAN R) 14 July 1981 (1981-07-14) column 2, line 32 -column 4, line 7 figures	1,4-7
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date, or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

11 November 2002

Date of mailing of the international search report

20/11/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

van Hoogstraten, S

INTERNATIONAL SEARCH REPORT

Int. Patent Application No.
PCT/EP 02/07581

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 117 174 A (JONES JAMES M) 10 May 1938 (1938-05-10) page 2, right-hand column, line 3 - line 37 figures	1,4-6

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No
PCT/EP 02/07581

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2139245	A	06-12-1938	NONE	
US 4776054	A	11-10-1988	NONE	
US 4277862	A	14-07-1981	AU 534449 B2	02-02-1984
			AU 5468880 A	31-07-1980
			CA 1140711 A1	08-02-1983
			DE 3001382 A1	31-07-1980
			FR 2447163 A1	22-08-1980
			GB 2040161 A ,B	28-08-1980
			IL 59159 A	31-12-1982
			JP 55099210 A	29-07-1980
			ZA 7903829 A	30-07-1980
US 2117174	A	10-05-1938	NONE	