

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 December 2001 (20.12.2001)

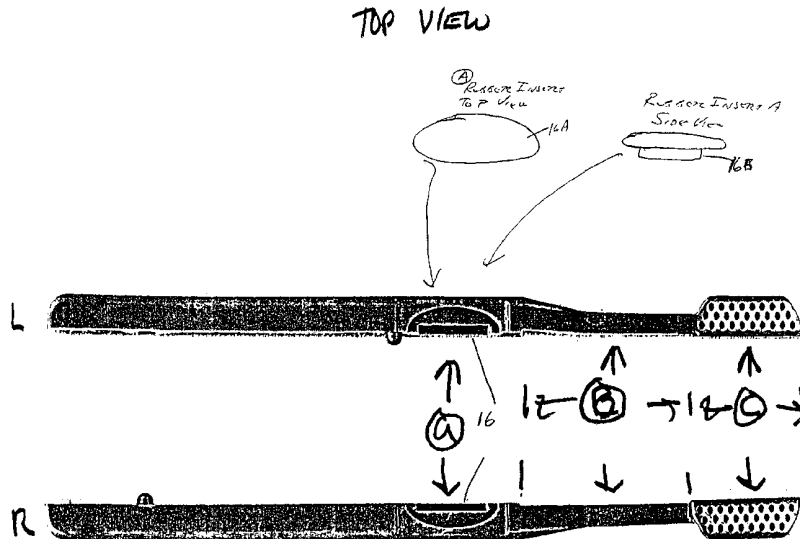
PCT

(10) International Publication Number  
WO 01/95761 A1

- (51) International Patent Classification<sup>7</sup>: A46B 9/04
  - (21) International Application Number: PCT/US01/19441
  - (22) International Filing Date: 18 June 2001 (18.06.2001)
  - (25) Filing Language: English
  - (26) Publication Language: English
  - (30) Priority Data:  
09/596,081 16 June 2000 (16.06.2000) US
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  - (81) Designated States (national): AE, AT, AU, BR, BY, CA,  
CH, CN, CO, CR, CU, CZ, DE, DK, DZ, ES, FI, GB, HR,  
HU, IL, IN, IS, JP, KE, KP, KR, LT, LU, MA, MG, MN,  
MX, NO, NZ, PL, PT, RU, SD, SE, SG, SI, SK, SL, TR,  
UA, VN, YU.
  - (84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,  
CG, CI, CM, GA, GN, 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: TWIN-HEADED TOOTHBRUSH



(57) Abstract: A twin headed toothbrush (10) having an elongated handle (12L, 12R) with a first and second elongated neck (13L, 13R) extending from one end. A bristle support (14) is at the distal end of each of the first and second elongated necks. A plurality of bristles (15) extends from each of the first and second bristle supports, arranged substantially parallel to one another. The elongated handle and the first and second elongated neck are formed of a material having a predetermined flexibility, resilience and bending resistance. The bristles have a predetermined stiffness which is set according to a predetermined relation with respect to the predetermined flexibility, resilience and bending resistance. A further embodiment includes a resilient thumb contact (16) inserted in a cavity (16C) formed in the elongated handle, protruding from the handle at a thumb contact location.

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## TWIN-HEADED TOOTHBRUSH

### BACKGROUND

As disclosed in U.S. Pat. Nos. 5,121,520 and 5,499,421 issued to the present inventor, Michael Brice, the disclosures of which are incorporated herein by reference, to effectively clean teeth and gum areas complex maneuvering of a toothbrush is necessary. It is generally acknowledged that the great majority of individuals brush their teeth and gum surfaces primarily in a horizontal and semi-circular manner, even though this particular technique is not deemed to be the best way of cleaning the teeth and gum surfaces. There are two reasons why most individuals resort to this ineffective technique. First, conventional brushing heads are not particularly designed to follow the contours of the teeth and gum surfaces, and as an extension of the human arm do not permit complicated and exact maneuvers to be performed. Second, most brushing takes place in the early morning when one first arises and in the evening just prior to retiring. This is a key factor, as demanding complicated procedures for this time of day and night are beyond the tolerance of most individuals. For these reasons, most individuals resort to a simple natural horizontal or semi-circular conventional brushing technique.

Numerous attempts have been made in the past as shown, for example, in U.S. Pat. Nos. 860,840 to Strassburger, 3,742,549 to Scopp et al., and 4,67,360 to Marthaler et al. To improve the design of the toothbrush. The bristles and/or head of these prior inventions are angled relative to the handle portion. More particularly, U.S. Pat. No. 860,840 to Strassburger discloses a toothbrush having two rows of bristles which are sloped in opposite directions relative to each other and a central section of bristles arranged parallel and located

between the two outside rows. However, these prior inventions do not simultaneously and/or independently accommodate different contours of the teeth.

In other prior art patents, adjacent head portions of a toothbrush are made to pivot or flex relative to the handle portion so that the bristles are better able to conform to the contours of the teeth and gum surfaces. Such an arrangement is shown in U.S. Pat. Nos. 1,928,328 to Carpentier, 2,266,195 to Hallock, 3,152,349 to Brennesholtz, 4,333,199 to Del Rosario, 4,488,328 to Hyman, 4,691,405 to Reed, and 4,776,054 to Rauch. More particularly, U.S. Pat Nos. 4,333,199 to Del Rosario and 4,488,328 to Hyman disclose a toothbrush having a single discreet brushing head that can be pivoted about the handle. The Del Rosario patent, in addition, discloses a brushing head that can rotate about three planes.

U.S. Pat Nos. 1,928,328 to Carpentier, 2,266,195 to Hallock, 3,152,349 to Brennesholtz and 4,691,405 to Reed show a toothbrush head capable of flexing or articulating relative to the handle. Specifically, the brushing head comprises a plurality of serially arranged flexing head segments, wherein the segments flex in unison or relative to each other.

Finally, U.S. Pat. No. 4,776,054 to Rauch discloses a toothbrush head having three arranged brushing segments, whereby the central segment is aligned with the handle and the two segments on either side are symmetrically arranged relative to the central segment. The bristles on the outer sides of the Rauch patent have narrow, blade-like, contact points which are likely to induce excessive pressure to the gum due to the narrow contact points. In other words, the narrow blade-like bristles inherently place higher excessive concentrated pressure

on the gum more so than bristles with a larger contact area which can spread pressure evenly to the larger contact area.

None of the prior art toothbrushes are directed to overcoming ineffective brushing techniques. These prior inventions do not disclose a toothbrush that overcomes the individual's anatomically limited abilities to effectively clean the curvilinear surfaces of the teeth and provide for gentle stimulation of the varying gum tissues without harm or discomfort for the user by utilizing side-by-side arranged brushing heads.

In addition, none of these prior art toothbrushes provide for the discreet functioning of twin-brushing heads as separate elements in achieving the object of this invention through addressing the force exerted by the user (The X Value), the resistance/resiliency characteristics of the molecular density of the material used in conjunction with the structural dimensions of the device (The Y Value), in concert with the resistance/resiliency of the bristle body as separate functioning elements of the uniform bristle body mass (The Z Value).

Moreover, none of the prior art toothbrushes enables the varying of the brushing pressure, in accordance with the proclivity of the user, in order to prevent excessive pressure from being applied to the gums and/or gingival tissue or from injury to the tooth enamel.

Finally, none of the prior art toothbrushes enables the varying of the brushing pressure, in accordance with the proclivity of a user, in order to prevent excessive pressure from being applied to the gums and/or gingival tissue or from injury to enamel.

## SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is to achieve proper functioning of the twin-brushing heads to function in such a manner as to provide alternate addressing and penetration of the dento-gingival junction of the tooth/teeth/gum structures (the gingival margin) so as to respond independently with the inside and adjacent rows of bristles of each head in maintaining contact and orientation to such gingival-margin areas of each individual during brushing.

Accordingly, one object of the present invention is to provide an improved cleaning instrument for cleaning teeth and gingival tissue that enables a user to achieve correct tooth brushing pressure.

Another object of the invention is to provide a toothbrush whose twin-heads respond to the pressure exerted by the user to enable effective tooth/gingival tissue cleaning, without tooth or gingival damage.

Still another object of the invention is to coordinate the brushing force of a user (the X Value) with the structural dimensions and the molecular density of the materials of the twin-brushing heads of the device (the Y Value), in conjunction and concert with the twin discreet and combined bristle body mass offering resistance and resiliency characteristics (the Z Value).

The above-identified objects and features and advantages of the invention will be better appreciated and understood from the following description.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a top view of the left and right side handles of a toothbrush;

Figs. 1A and 1B show the insert of Figs. 1-3;

Fig. 2 shows a side view of the left and right side handles in which the handles are slightly turned to enable a partial view of the top of the left and right side handles of a toothbrush;

Fig. 3 shows a top view similar to Fig. 1 but wherein the gap of Fig. 1 has been significantly reduced and the left and right side handles are shown in close proximity to illustrate that except for the neck and brush head portions, each of the left and right handles are straight and parallel to each other.

Fig. 4 shows a bottom view of a brush, with the left and right handles being slightly separated;

Fig. 5 shows a top view of the brush with slightly separated left and right handles.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The embodiments described herein have been included for purposes of illustrating the principals of the present invention. Accordingly, the present invention is not limited to the exact configurations and constructions as illustrated and/or set forth herein.

Also, throughout the illustrations of different embodiments of the invention, the same or equivalent elements have been identified with the same reference numerals.

Figs. 1-3 show a first embodiment of the left (L) and right (R) handles of a dual headed toothbrush (10) of the present invention. Conventional molding equipment is used to form the integral right handle (R) and integral left handle (L). The right and left handles of the invention, consisting of handles 12L and 12R, the neck portions 13L and 13R and the brushing head 14L and 14R, are molded from polymers of amorphoric resins or

semicrystalline resins. Thereafter the heads are held flat and holes for the brushes are drilled and bristles 15 plugged into the holes. The bristles have a certain stiffness which can range from soft to hard to vary the resiliency and resistance presented by the bristles to the teeth and gums during the brushing operation. The bristles are cut to any desired length, shape or profile, and then polished in accordance with commercially known techniques.

The left and right handles are then brought together and welded along the handle 12L and 12R by conventional bonding and welding techniques. For example, the Branson Ultrasonic Corporation, manufactures and sells commercial vibrational and ultrasonic welding machines capable of welding various types of plastics.

This invention is dependent upon understanding and addressing the force exerted by the user in brushing his or her teeth (the X Value), meeting the resistance, resiliency characteristics of the molecular density of the material used in conjunction with the structural dimensions of the twin-brushing elements (the Y Value) achieving alternate functioning of the twin-brushing heads in concert with the resistance/resiliency characteristics of the discreet and combined uniform bristle body mass (the Z Value) in maintaining contact with the dento-gingival junction with the inside and adjacent rows of bristles of each independently articulating twin-brushing heads. Addressing each of these factors (values), and the elements for carrying out each of these factors, provides for the proper functioning characteristics of the invention/device in use.

The invention can be analogized to a machine whose moving parts are activated by a power source, e.g. the user. The description which follows sets forth, addresses and describes the elements needed to achieve proper functioning of the invention/device.

The invention/device is wholly dependent on characteristics of necks 13L and 13R, and brush heads 14L and 14R to achieve the proper functioning in use, of the device. Moreover, the brush can work (function) equally well with or without the use of a cushioned insert 16 in the handle. The cushioned insert is shown in the embodiment of Figs. 1-3. The embodiments of Figs.4 and 5 illustrate the invention without the use of a cushioned insert 16.

The inclusion of the "cushioned" insert, which can be made of a rubber having a stiffness which varies from soft to hard can increase the sensitivity for the user. The increase in sensitivity occurs as a result of the pressure transmitted by the user through the thumb being totally or partially absorbed by said insert. The insert can be of any shape or design which fits into a similarly shaped cavity provided in the L & R handles. The insert 16 of Fig. 1 is shown to have an oval top. (See Fig. 1A) Moreover, the oval shaped insert 16 is provided with a rectangular base 16B. The rectangular base 16B slides into a rectangular cavity 16C formed during the molding operation of the left and right handles. Thus, while separated the insert is slide into cavity 16C. A suitable adhesive may be used to hold the rectangular base 16A of insert 16 in cavity 16C of the handles. Thereafter the bonding of the left an right handles will insure the permanent retention of insert 16 in the finished toothbrush. Also, the insert is made of rubber and shaped to accommodate the thumb of the user. The resiliency characteristics of the rubber can be varied to accommodate the pressure exerted on the brush through the thumb of the user. Thus the stiffness of the rubber insert can be varied from soft to hard to provide a range of cushioning characteristics.



Further, the polymers used to make left and right handles can be selected to increase or decrease the flexibility, resiliency and resistance of the necks 13L and 13R of the left and right handles. Similarly, the stiffness of the bristles 5 of the brushing heads 14L and 14R can be selected to range from soft to hard to vary the resiliency and resistance presented by the bristle to the teeth and gum of the user.

The present invention provides for the adaptation of brushing pressure to the changing surfaces of the differing tooth/teeth/gingival structures of the user encountered during brushing by the twin, self-responding self articulating brushing head of this invention. Fully addressing and understanding the previously described X, Y and Z Values allow for the full, proper and safe functioning of said device with the clear objective of accomplishing the orientation to the critical gingival-margin areas of each individual's particular tooth/teeth/gingival structures by the inside and adjacent rows of each brushing head.

The foregoing description is only illustrative of the principle of my invention. It is to be recognized and understood that the invention is not limited to the exact configurations as illustrated and described herein. Accordingly, all expedient modifications can be made within the scope and spirit of the invention.

I claim

1. A toothbrush comprising:
  - an elongated handle, shaped and dimensioned to be grasped by a human hand, having a first end and a second end;
  - a first neck extending from the second end of the elongated handle, having a proximal end attached to the elongated handle and having a distal end;
  - a second neck extending from the second end of the elongated handle parallel to the first neck, having a proximal end attached to the elongated handle and having a distal end;
  - a first bristle support attached to the distal end of the first neck;
  - a second bristle support attached to the distal end of the second neck;
  - a plurality of first bristles extending in a first direction from the first bristle support;
  - a plurality of second bristles extending substantially parallel to and in the same direction as the first direction from the second bristle support,wherein the plurality of first and second bristles are formed of a material having a first stiffness, and the first and second elongated necks are formed of a material having a predetermined resiliency, a predetermined flexibility and a predetermined bending resistance, and wherein the value of said first stiffness relative to said predetermined resiliency, flexibility and bending resistance is set in accordance with a predetermined brushing force to be applied by said bristles thereby achieving the full functioning of the twin articulating heads in making and maintaining contact with the dento-gingival junction.

2. A toothbrush comprising:

an elongated handle, shaped and dimensioned to be grasped by a human hand, having a first end and a second end, said elongated handle having a cavity open at a location where, when the elongated handle is grasped for using the toothbrush, the thumb of the human hand would normally contact;

a resilient thumb contact structure inserted in said cavity, dimensioned such that the human thumb, when the elongated handle is grasped for using the toothbrush, exerts the thumb pressing force primarily on the resilient thumb contact;

a first neck extending from the second end of the elongated handle, having a proximal end attached to the elongated handle and having a distal end;

a second neck extending from the second end of the elongated handle parallel to the first neck, having a proximal end attached to the elongated handle and having a distal end;

a first bristle support attached to the distal end of the first neck;

a second bristle support attached to the distal end of the second neck;

a plurality of first bristles extending in a first direction from the first bristle support;

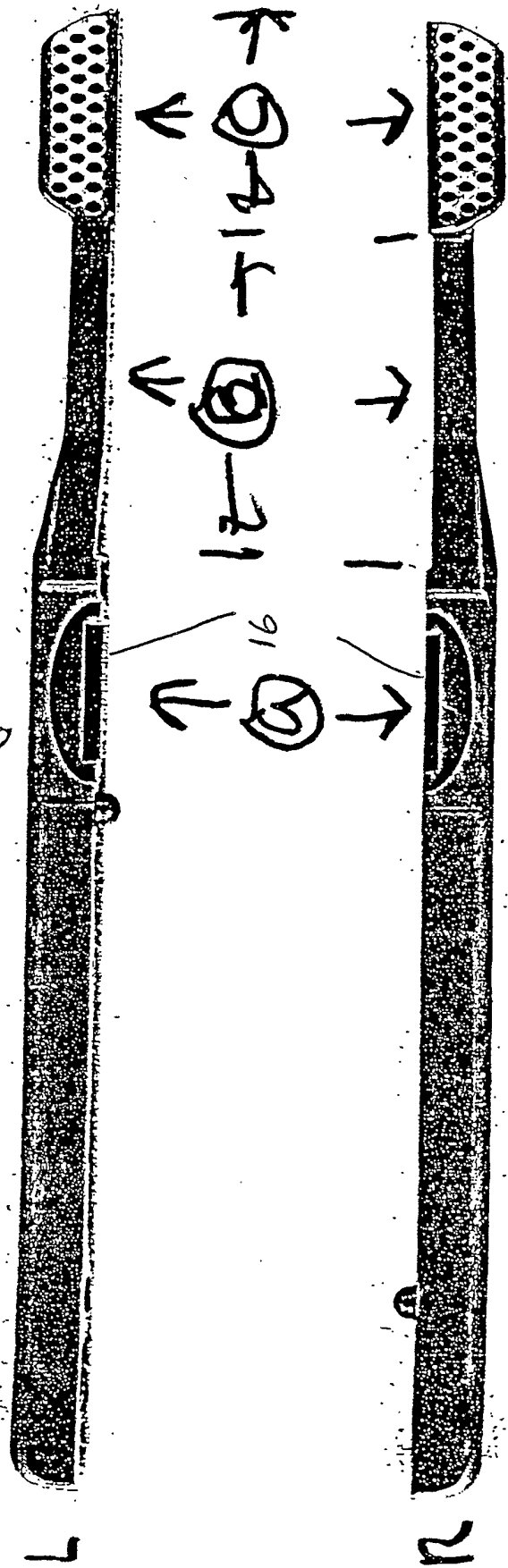
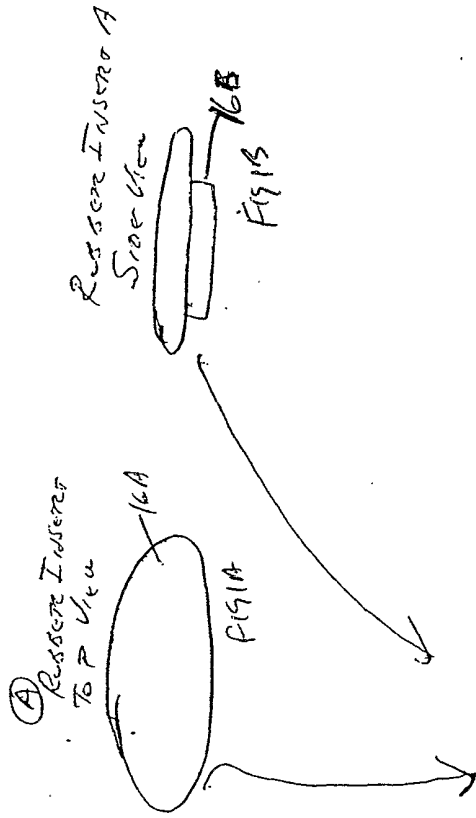
a plurality of second bristles extending substantially parallel to and in the same direction as the first direction from the second bristle support,

wherein the plurality of first and second bristles are formed of a material having a first stiffness, and the first and second elongated necks are formed of a material having a predetermined resiliency, a predetermined flexibility and a predetermined bending resistance,

and wherein the value of said first stiffness relative to said predetermined resiliency, flexibility and bending resistance is set in accordance with a predetermined brushing force to be applied by said bristles.

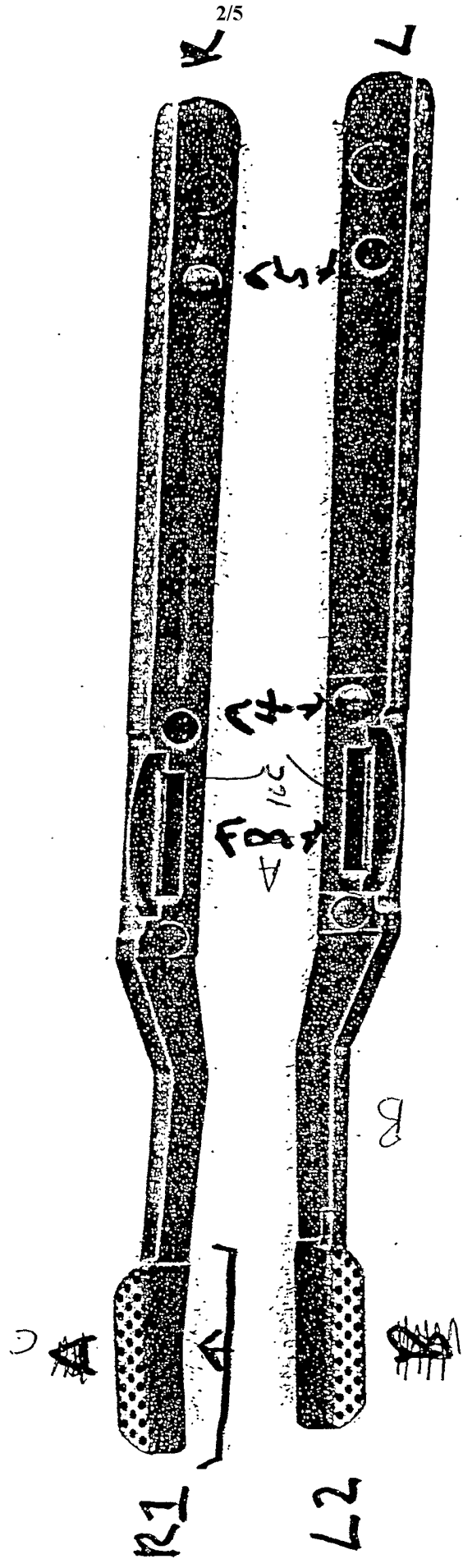
TOP VIEW

FIG 1



3/4 INSIDE OF STRUCTURE

FIG. 2



TOP VIEW

FIG 3

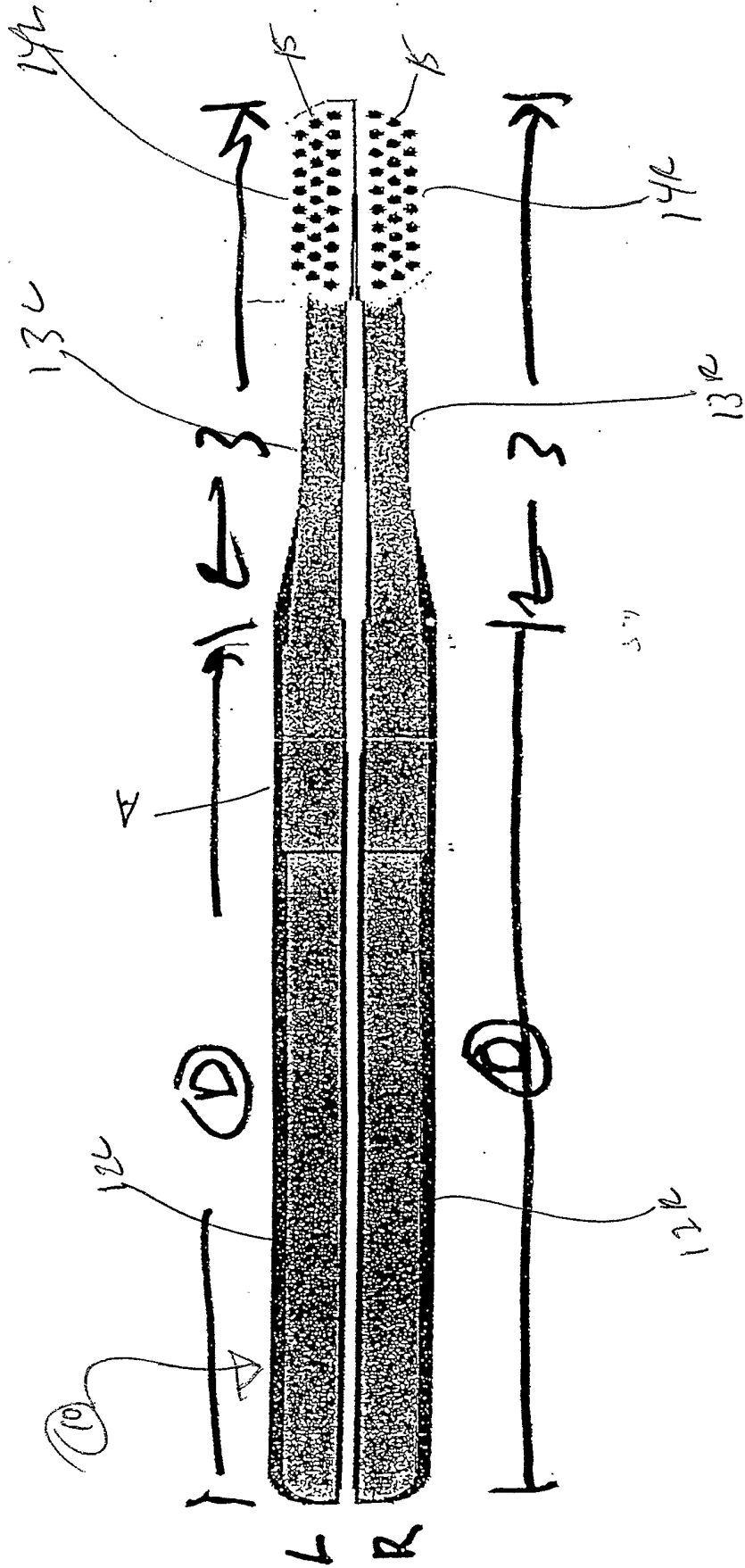


FIG 4

3/4 TOP VIEW

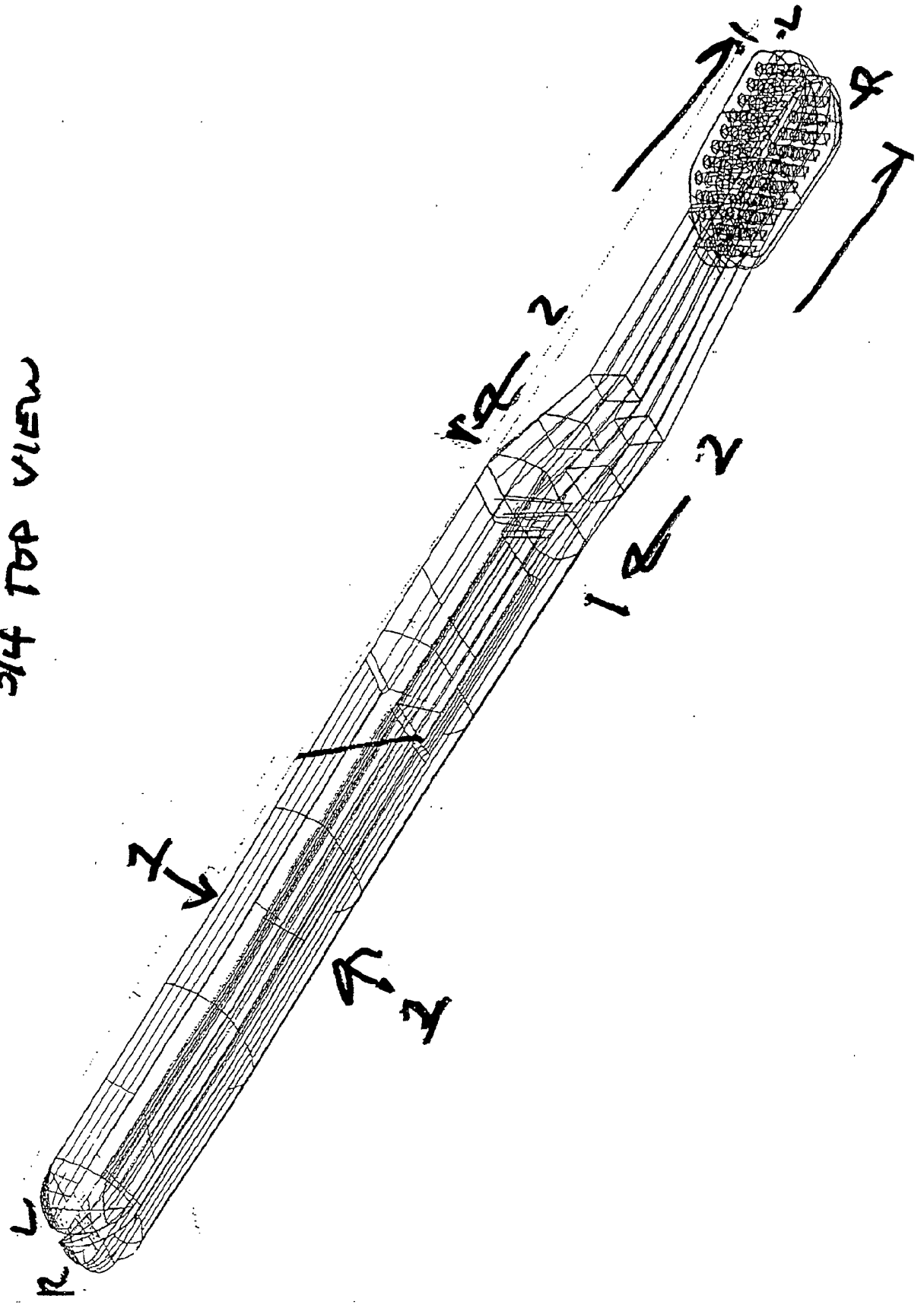
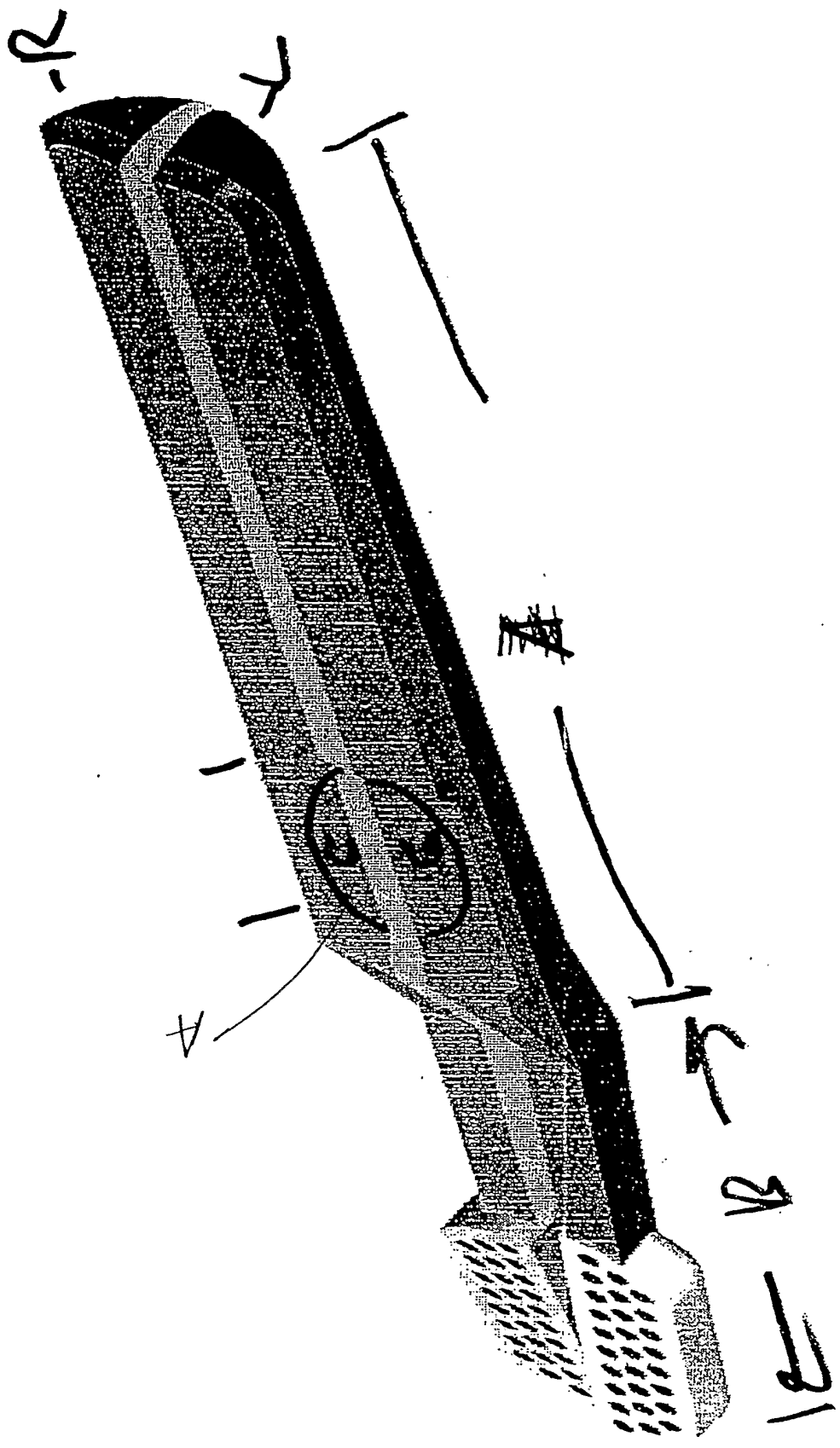




Fig 5



INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/19441

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) :A46B 9/04 US CL :15/167.1, 167.2, 172, 143.1 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 15/110, 143.1, 166, 167.1, 167.2, 172, 201 Dig.5; D4/104, 105, 106, 119 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 practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,499,421 A (BRICE) 19 March 1996, col. 10, lines 10-31	1 --- 2
X --- Y	US 4,864,676 A (SCHAIPER) 12 September 1989, col. 3, lines 53-66	1 --- 2
X --- Y	US 4,472,853 A (RAUCH) 25 September 1984, col. 3, lines 40-66	1 --- 2
Y	US 5,875,510 A (LAMOND ET AL) 02 March 1999, col. 3, lines 40-53	2
Y	US 5,673,452 A (CHANG ET AL) 07 October 1997, col. 3, lines 6-	2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family 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 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	"I" 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 02 SEPTEMBER 2001		Date of mailing of the international search report 21 SEP 2001
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