Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2654695 C 2015/08/25

(11)(21) 2 654 695

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2001/05/10

(41) Mise à la disp. pub./Open to Public Insp.: 2001/11/29

(45) Date de délivrance/Issue Date: 2015/08/25

(62) Demande originale/Original Application: 2 408 614

(30) Priorité/Priority: 2000/05/22 (US09/576,590)

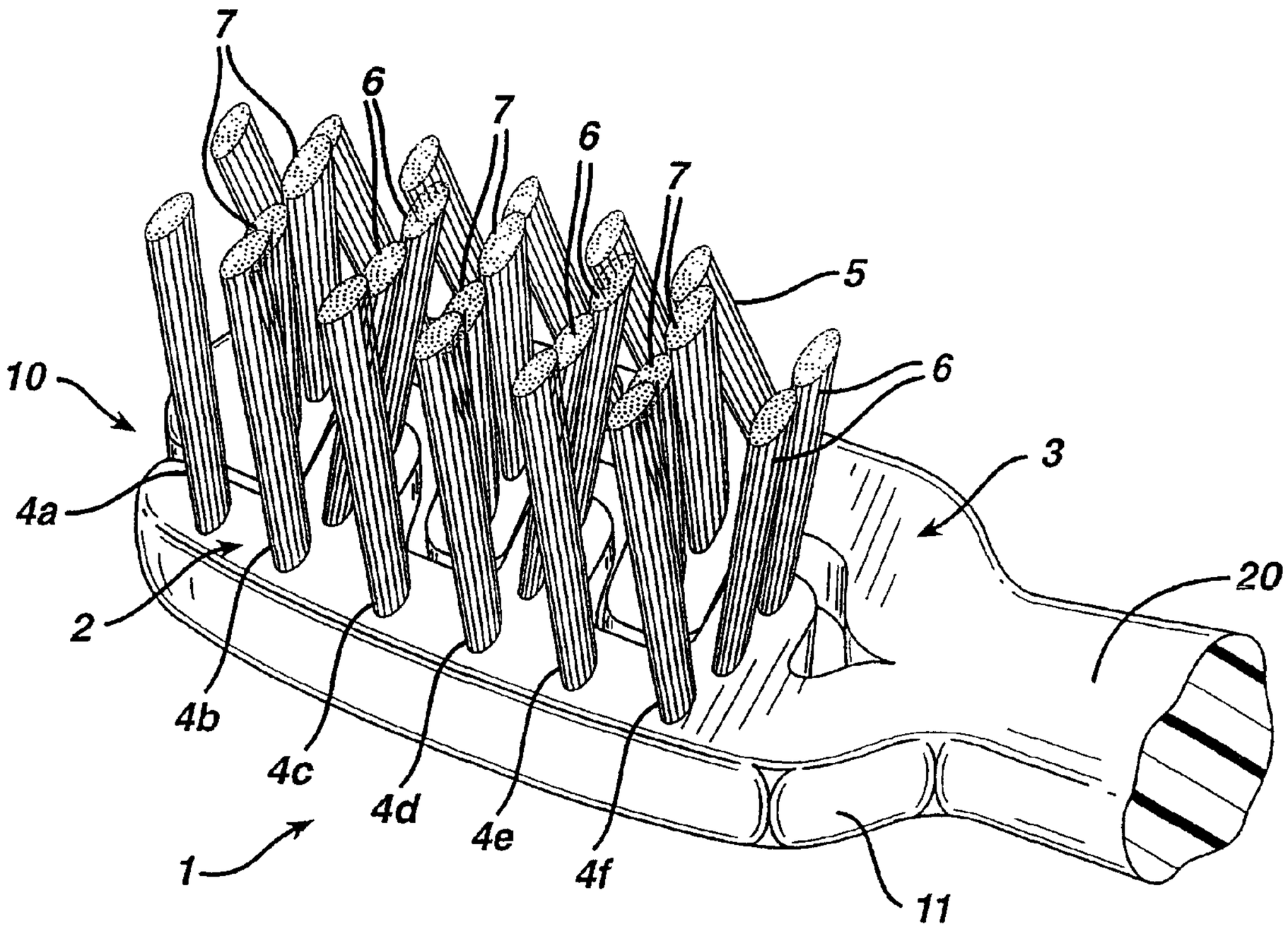
(51) Cl.Int./Int.Cl. *A46B 9/04* (2006.01),
A46B 7/00 (2006.01)

(72) Inventeurs/Inventors:
CLAIRE, KAREN, US;
MASTERMAN, THOMAS CRAIG, US;
BREDALL, WILLIAM A., US;
SCHRECK, JAMES, US

(73) Propriétaire/Owner:
PROCTER & GAMBLE BUSINESS SERVICES CANADA COMPANY, CA

(74) Agent: MBM INTELLECTUAL PROPERTY LAW LLP

(54) Titre : BROSSE A DENTS AYANT UNE TETE QUI INCLUT DEUX PARTIES
(54) Title: TOOTHBRUSH HAVING A HEAD WHICH INCLUDES TWO PORTIONS



(57) Abrégé/Abstract:
A toothbrush includes a head having bristle tufts implanted therein. At least two of the tufts cross so as to permit at least some the bristles to intermingle. One of the two tufts is located adjacent a long side of the head.

ABSTRACT

A toothbrush includes a head having bristle tufts implanted therein. At least two of the tufts cross so as to permit at least some the bristles to intermingle. One of the two tufts is located adjacent a long side of the head.

TOOTHBRUSH HAVING A HEAD WHICH INCLUDES TWO PORTIONS

This application is a division of Canadian Patent Application No. 2,408,614 filed May 10, 2001.

The invention relates generally to the field of oral care, and in particular to toothbrushes.

Tooth brushing and flossing are fundamental steps in achieving good oral hygiene. The practice of flossing, unfortunately, has not met with widespread acceptance among the general populace even though it is acknowledged by the general populace that flossing is something that should be completed as part of good oral hygiene. Furthermore, even people who floss oftentimes do not perform adequate flossing in hard to reach areas of the mouth. Unfortunately, while most commercially available toothbrushes clean the outer buccal face of teeth adequately, they fail to provide improved cleaning of plaque and debris from the gingival margin, interproximal areas, lingual surfaces and other hard to reach areas of the mouth.

One reason that such toothbrushes do not adequately clean the interproximal region is that the tufts are not angled in a direction to optimize interproximal and subgingival penetration. As such, these tufts cannot extend far enough into the interproximal region. Another reason for poor interproximal penetration/cleaning is that the bristle/tuft density is too high: having a large number of bristles/tufts provides good surface cleaning but hinders the bristles from penetrating between teeth.

Some brushes have tufts of bristles which have angled tufts which either appear to cross when viewed head-on (see for example U.S. Patent No. 4,706,322 (the '322 patent)) or from the side (see for example U.S. Patent No. 3,085,273 (the '273 patent)) to provide better interproximal penetration. The crossing tufts of the '322 patent will more effectively penetrate between teeth when the brush is being moved up and down rather than back and forth. Likewise, the crossing tufts of the '273 patent will more effectively penetrate between teeth when the brush is being moved back and forth rather than up and down.

Some current toothbrush designs involve filament tufts angled away from the center line/long axis of the brush head (Figure 7) and some current toothbrush designs involve tuft filaments angled along the center line of the brush (Figure 8). When these toothbrushes are placed on or against the teeth, the filaments bend and are deflected away from the gumline area.

U.S. 4,570,282 discloses a toothbrush having bristle elements arranged in two banks. The free ends of the bristle elements in the first bank extend convergingly with the free ends of the bristle elements in the second bank to provide a V-shaped tooth receiving channel having an acute included angle of from about 10 to 55 degrees. The bristle elements in the banks which are closest together extend into contact with one another at the bristle tips to define a doublet of mutually supported bristle elements.

The present invention is directed to overcoming one or more of the problems set forth above. Briefly summarized, the present invention relates to a toothbrush comprising a head having at least two bristle tufts, wherein the head has two portions which define an opening therebetween, wherein each head portion includes one or more projections alternating with one or more recesses, the projections of each head portion fitting at least partially into the recesses of the other head portion, and wherein at least one of the projections is surrounded on three sides by the other head portion.

Furthermore, the present invention also provides a toothbrush head wherein the head includes at least two bristle supporting portions, the portions being movable independently of each other, wherein the portions include alternating projections and recesses with a projection on one portion mating with a recess on an adjacent portion, and wherein at least one portion comprises at least two projections.

These and other aspects, features and advantages of the present invention will be more clearly understood and appreciated from a review of the following detailed description of the preferred embodiments and appended claims, and by reference to the accompanying drawings.

FIG. 1 is a perspective view of a preferred (split head) brush of the present invention;

FIG. 2 is a bottom view of the brush of FIG. 1;

FIG. 3 is a side view of the brush of FIG. 1;

FIG. 4 is a top plan view of the brush of FIG. 1;

FIG. 5 is an enlarged view of the crossing tufts of the present invention depicting the intermingled bristles;

FIG. 6 is an end view of the brush of FIG. 1;

FIG. 7 is a perspective view of a prior art brush with tufts angled away from the centerline of the brush (Colgate® Total®); and

FIG. 8 is a perspective view of a prior art brush with tufts angled along the centerline of the brush (Oral-B® CrossAction®).

As used herein the term "intermingled tufts" means two tufts which cross so as to force at least some of the individual filaments from each tuft bundle

to mingle with the filaments of the other.

As used herein the term "compound crossing angle" relates to toothbrush filament tufts which are positioned on a toothbrush head at oblique angles such that the tufts appear to cross (one tuft eclipses the other) when viewed from a side of the toothbrush and when viewed from an end of the toothbrush.

Referring to Figure 1, toothbrushes of the present invention are comprised of a handle 20 (shown partially in the figures) connected to a relatively planar head region 1. Head 1 has a maximum preferable width of about 0.45"-1.00", preferably 0.50"-0.80", and most preferably 0.51"-0.72". The head is comprised of two regions: a first region 2 and a second region 3. In a preferred embodiment of the present invention, the tufts are affixed to the first and second region as follows: The first region 2 is comprised of an outer row of tufts 4a-f which are inclined longitudinally toward the distal end of the head 10. The region is further comprised of two inner row of tufts 6 which are angled longitudinally toward the proximal end of the head 11. This results in a first region which appears to have tufts which cross when viewed from the side (see FIG. 3).

Next, the second region 3 is comprised of outer tufts 5 which are angled longitudinally toward the distal end of the head 10 and inner tufts 7 which are angled longitudinally towards the proximal end of the head 11. As such, tufts 6 and 7 of the inner rows alternate with each other along the length of the head. The result is a second region 3 which appears to have crossing tufts when viewed from the side. The free ends of tufts 4a-f are spaced from the free ends of tufts 5 by about 0" (touching)-0.60", preferably 0.05"-0.52", and most preferably 0.10"-0.42". The length of the tufts is about 0.26"-0.75", preferably 0.325"-0.60", and most preferably 0.35"-0.50". The angle A of the tufts along the length of the head (see Figure 3) is about 0-30 degrees, preferably 5-25 degrees, and most preferably 10-25 degrees.

As shown in Figure 6, the two regions of the head 2 and 3 are angled transversely (i.e. tilt inwardly). As a result, the top surfaces of head portions 2 and 3 from which tufts project tilt inwardly such that the tufts tilt inwardly. Tufts which appear to cross from two directions can be on the same head region or on different head regions. The angle B between the regions is about 140-178 degrees,

preferably 150-175 degrees, and most preferably 150-165 degrees. In this embodiment, the tufts appear perpendicular to their respective head region when viewed end on. A maximum depth C from the top of the "V" to the bottom of the "V" is about 0.03"-0.30", preferably 0.075"-0.25", and most preferably 0.10"-0.225".

Alternatively, head 1 can be a conventional head with a flat upper surface, and the tufts themselves can be tilted inward to give the same appearance (not shown in figures). In this embodiment, the tufts would not be perpendicular to the top surface of the head. Either embodiment results in tuft bundles which intermingle (see Figures 4 and 5 also).

Bottom plan view Figure 2 outlines a preferred configuration where the first region 2 and second region 3 form a complimentary relationship as defined by the corrugated space between the regions. Each region has alternating projections and spaces (recesses), the projections of one region engaging at least partially into the spaces of the other region. Regions (portions) 2 and 3 are movable independently of each other. An opening 8 is created between regions 2 and 3 in an interior portion of the head, and allows water to flow through the opening, thus facilitating rinsing of excess toothpaste, saliva and debris from the head. The area of opening 8 at a top surface of the head (see figure 4) is preferably between about 2% to about 20% of the total area (including the area of opening 8) of the top surface of the head, more preferably between about 4% to about 18%, even more preferably between about 6% to about 16%, and most preferably between about 8% to about 14%. Each projection preferably has one or more tufts and is surrounded on three sides by the other head portion.

However, the inventors also contemplate fabricating the brush according to this invention from a solid head with no central opening which is merely molded and tufted such that the bristles take on the geometric orientation as described above. As a further alternative, the central opening in the head is provided, but the two head portions are connected at the end of the head furthest from the handle. As such, relative movement of the head portions will be minimized.

With reference to Figures 3 and 4, a cumulative cross-sectional area

of each of the bristles on the head defines a first area. An imaginary perimeter 22 is shown. Perimeter 22 lies in a plane. This plane intersects all of the bristles except the shortest bristle and is tangent to or intersects at least a portion the free end of the shortest bristle. Perimeter 22 connects an outer surface of all outer tufts. The area within the perimeter defines a second area. The ratio of the first area to the second area is preferably between about 5% to about 20%. The ratio is more preferably between about 6% to about 18%, even more preferably between about 7% to about 16%, even more preferably between about 8% to about 14%, and most preferably between about 9% to about 12%. This ratio defines a bristle density for the brush.

The tuft bundles 4, 5, 6 and 7 preferably have rectangular shaped cross-sections having a 1:2 to 1:6 length to width aspect ratio. More preferably, this aspect ration is from about 1:3 to 1:4. The inventors also contemplate the use of round, rectangular, square or any other shaped tuft bundles known to those skilled in the art. In the most preferred embodiment, the free ends of the individual filaments are rounded into a dome-like shape. These are commonly referred to as end-rounded bristles.

Figure 5 is an enlarged perspective view of two tufts which demonstrate the intermingled nature of these tufts. Region 30 is the region where the bristles are allowed to at least partially intermingle. This region could be done merely at the tips of the bristles (ie. inverted "v", not shown) or, as shown, forming a true crossing (i.e. "x") pattern (see Fig. 3). Alternatively, region 30 could take on the appearance of an inverted "y" with bristles from a first tuft extending past a second tuft, but the bristles of the second tuft not extending past the first tuft (not shown). As shown in Figure 4, one of the two tufts 4b which intermingle is located adjacent a long side of head 1.

The overlapping intermingled compound crossing angle pattern of the present invention promotes better interproximal and subgingival penetration. The tufts of the present invention are able to penetrate between the teeth, and to penetrate under the sulcus, both proximally and along the buccal gingival margin. In addition, it has been observed that the "3-dimensional" angling of tufts resulted in multiple tufts penetrating from different angles simultaneously.

In a most preferred embodiment, the brush head is fabricated from two parts relating to the first region 2 and the second region 3, which each have bristles angled in a pattern compound crossing angle. The two sides consist of intermingled overlapping tufts (see Figure 5) which allow the two sides to be angled to come together in a unique V-shaped configuration (see Figure 6). The angled tufts allow for a spacing and relative tuft angle/height configuration which is not manufacturable using current technology. The ability to have multiple tufts come together at an inward angle, with appropriate spacing, allows multiple tufts to engage interproximally and sub-gingivally simultaneously. Another added benefit of the split handle design is rinsability.

It may be possible to achieve similar results by manufacturing a first region and a second region on a brush head and subsequently bending the two regions relative to each other. It is thus possible to create a similarly acting tufting pattern on a single head with a bent head design, and possibly through the use of staple tufting technology. Additionally, the toothbrush can be made with a replaceable head feature.

A preferred manufacturing technique to produce the brushes of the present invention is to individually mold right and left sides of the brush, capturing the tufts of bristles in the head during molding (a hot tufting process). These two sides are then placed relative to each other and secured together by melting or gluing.

THE EMBODIMENTS OF THE INVENTION FOR WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A toothbrush comprising:

a handle, a neck extending from the handle and a head connected to the neck;

the head having a top surface having a plurality of tooth cleaning elements, and a bottom surface,

wherein the head comprises a first region and a second region; wherein the first region and the second region are spaced apart by an opening therebetween, wherein the opening extends from the top surface to the bottom surface of the head, and

wherein the first region and the second region are connected to the neck and are connected to each other at the end of the head which is furthest from the handle, and the first region and the second region are movable independently of each other.

2. A toothbrush according to claim 1, wherein the first region and the second region are angled with respect to the toothbrush.

3. A toothbrush according to claim 1, wherein the first region and the second region are tilted inwardly such that an angle between the first region and the second region is about 140 to about 175 degrees.

4. A toothbrush according to claim 1, wherein a portion of the cleaning elements for the first region and the second region are angled with respect to the region from which they extend.

5. A toothbrush according to claim 1, wherein a portion of the cleaning elements are angled with respect to the first region and/or the second region.

6. A toothbrush including:

a handle, a head, and a neck extending between the handle and the head,

the head having a top surface having a plurality of tooth cleaning elements, and a bottom surface,

wherein the head comprises a first region and a second region having an opening therebetween, wherein the opening extends from the top surface to the bottom surface of the head,

wherein the first region and the second region are connected to the neck and connected to one another at the end of the head which is furthest from the handle, and the first region and the second region are movable independently of each other.

7. A toothbrush according to claim 6, wherein the first region and the second region are tilted inwardly such that an angle between the first region and the second region is between about 140 degrees to about 175 degrees.

8. A toothbrush according to claim 7, wherein each of the first region and the second region comprise a plurality of cleaning elements extending therefrom.

9. A toothbrush according to claim 8, wherein a portion of the cleaning elements are angled with respect to the first region and/or the second region.

10. A toothbrush including:

a handle, a head, and a neck extending between the handle and the head,

the head comprising a first region and a second region, the first region and the second region having an opening therebetween, the first region having a plurality of protrusions, each of the protrusions comprising a plurality of cleaning elements,

the second region having one or more protrusions disposed between the protrusions of the first region,

wherein the protrusions of the first region and the protrusions of the second region are longitudinally spaced from each other, and

wherein the first region and the second region are connected to the neck and to each other at the end of the head which is furthest from the handle and the first region and the second region are movable independently of each other, and wherein the first region and the second region are angled with respect to the neck.

FIG. 1

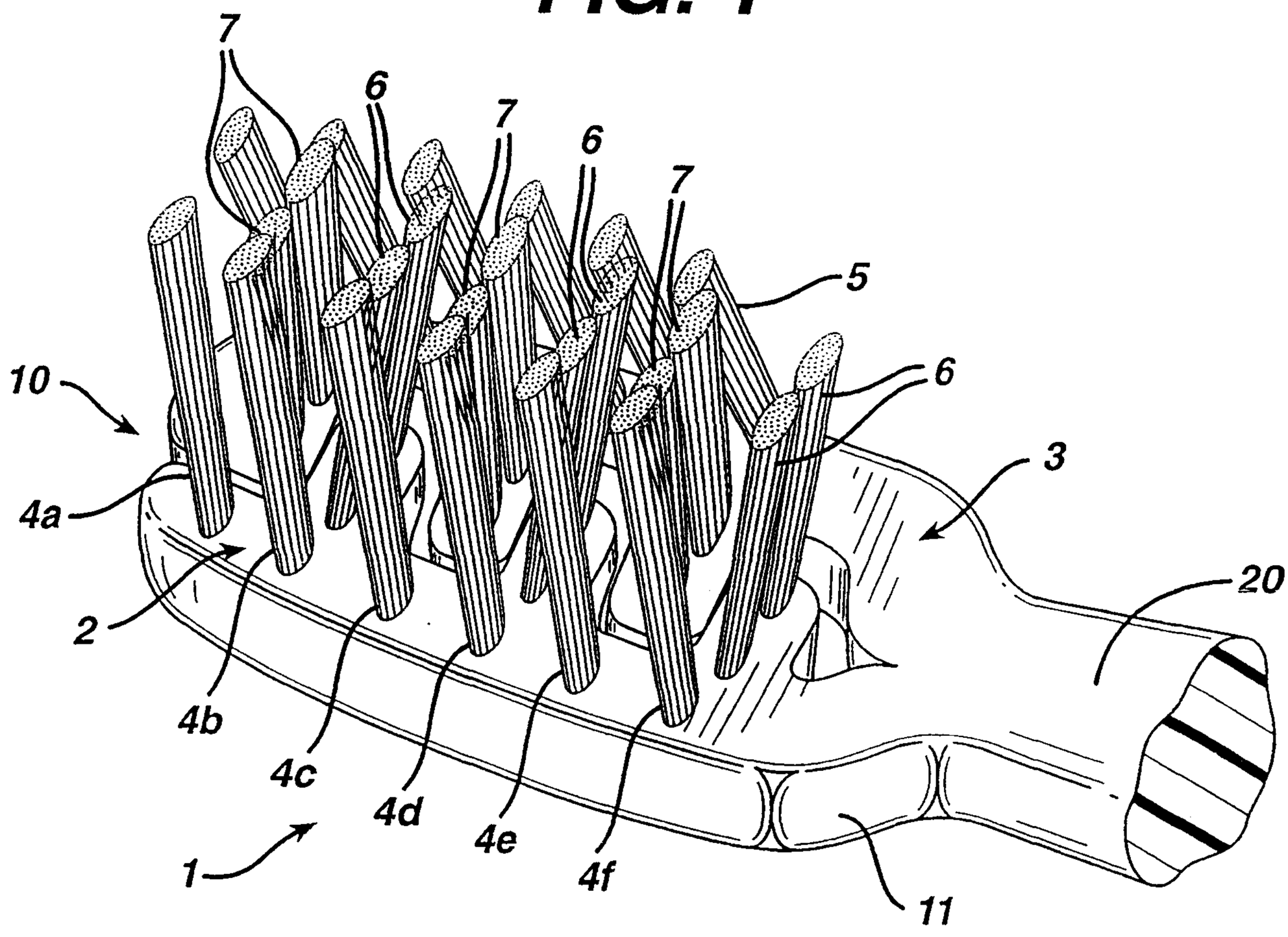


FIG. 2

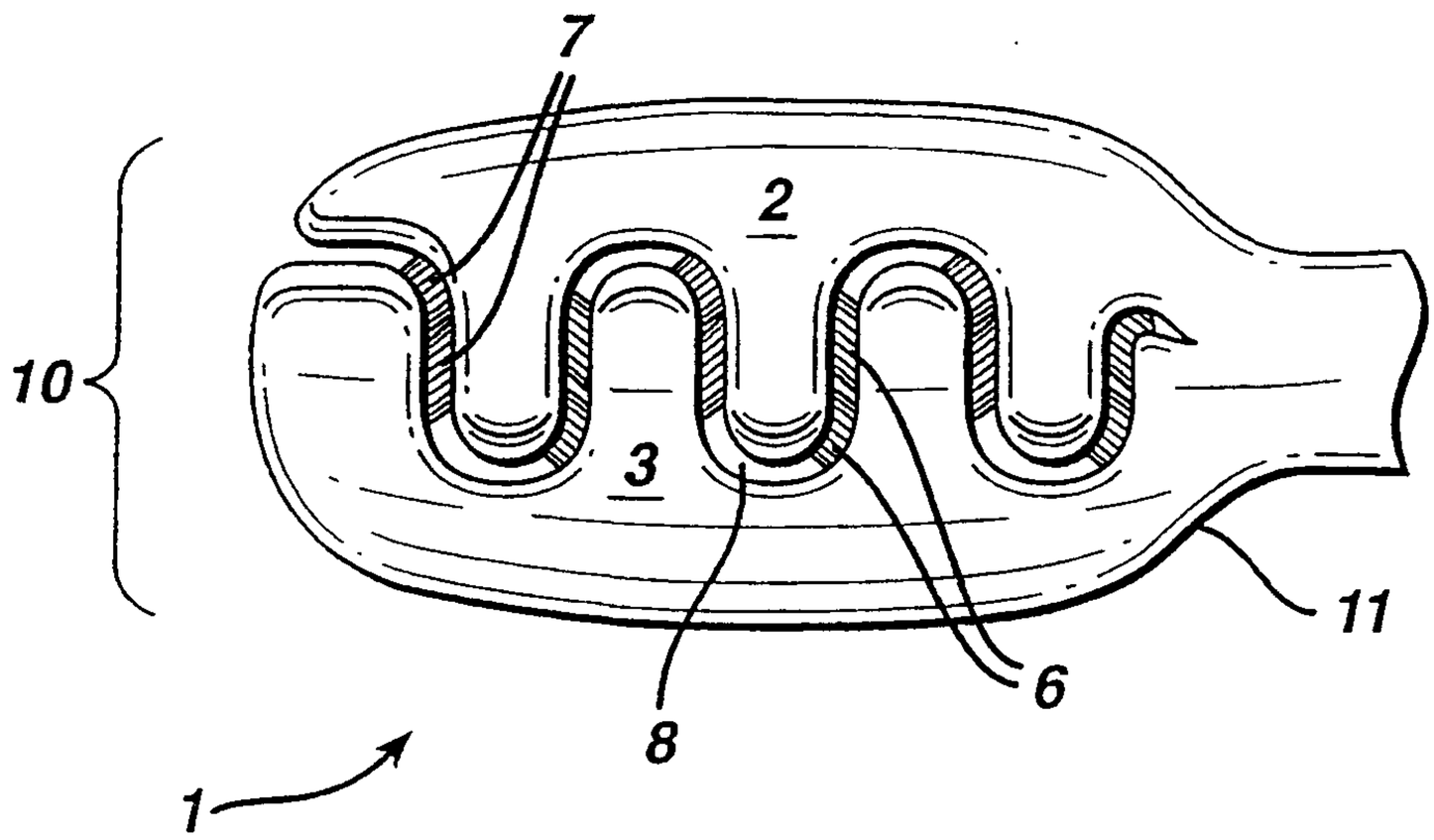


FIG. 3

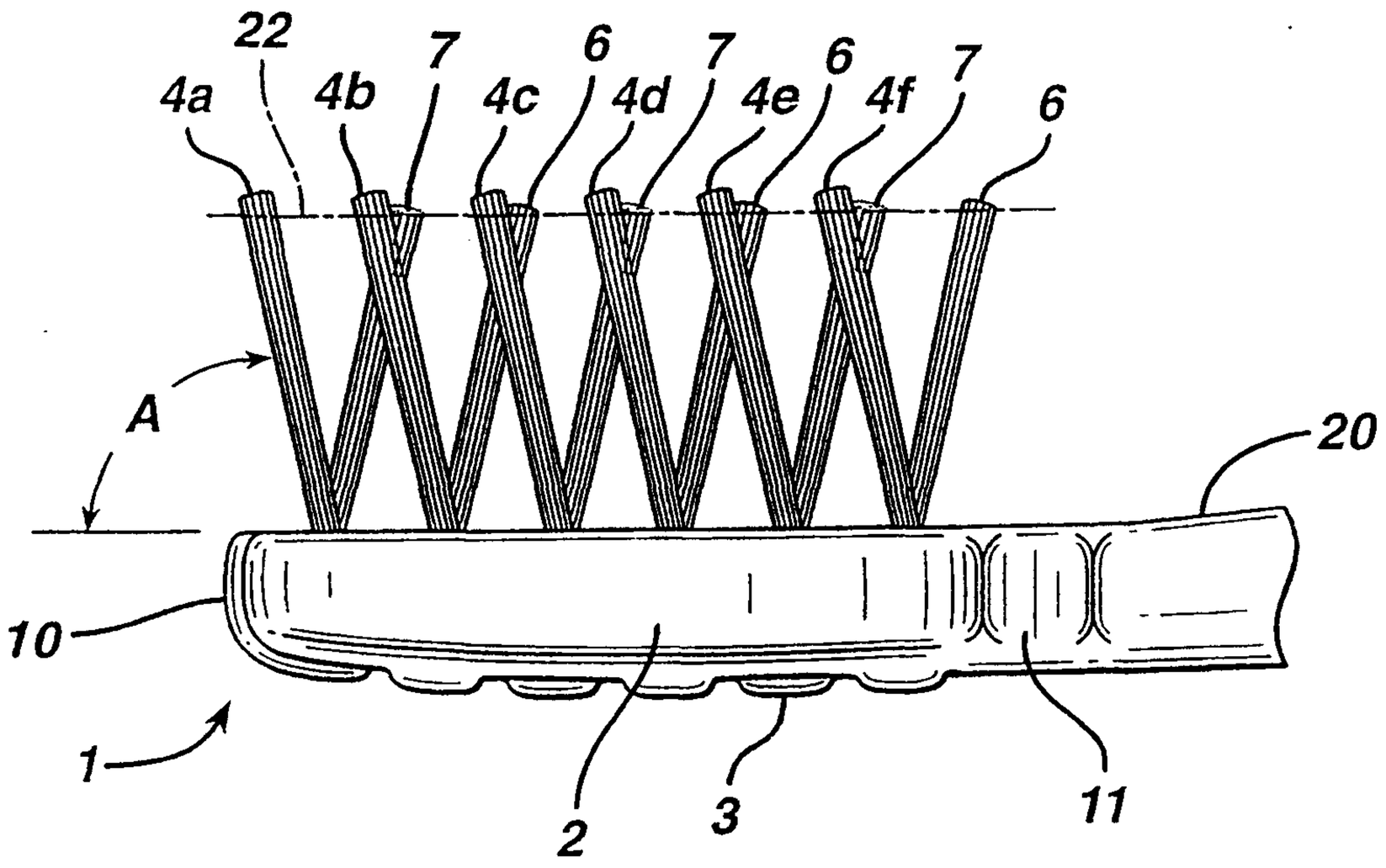


FIG. 4

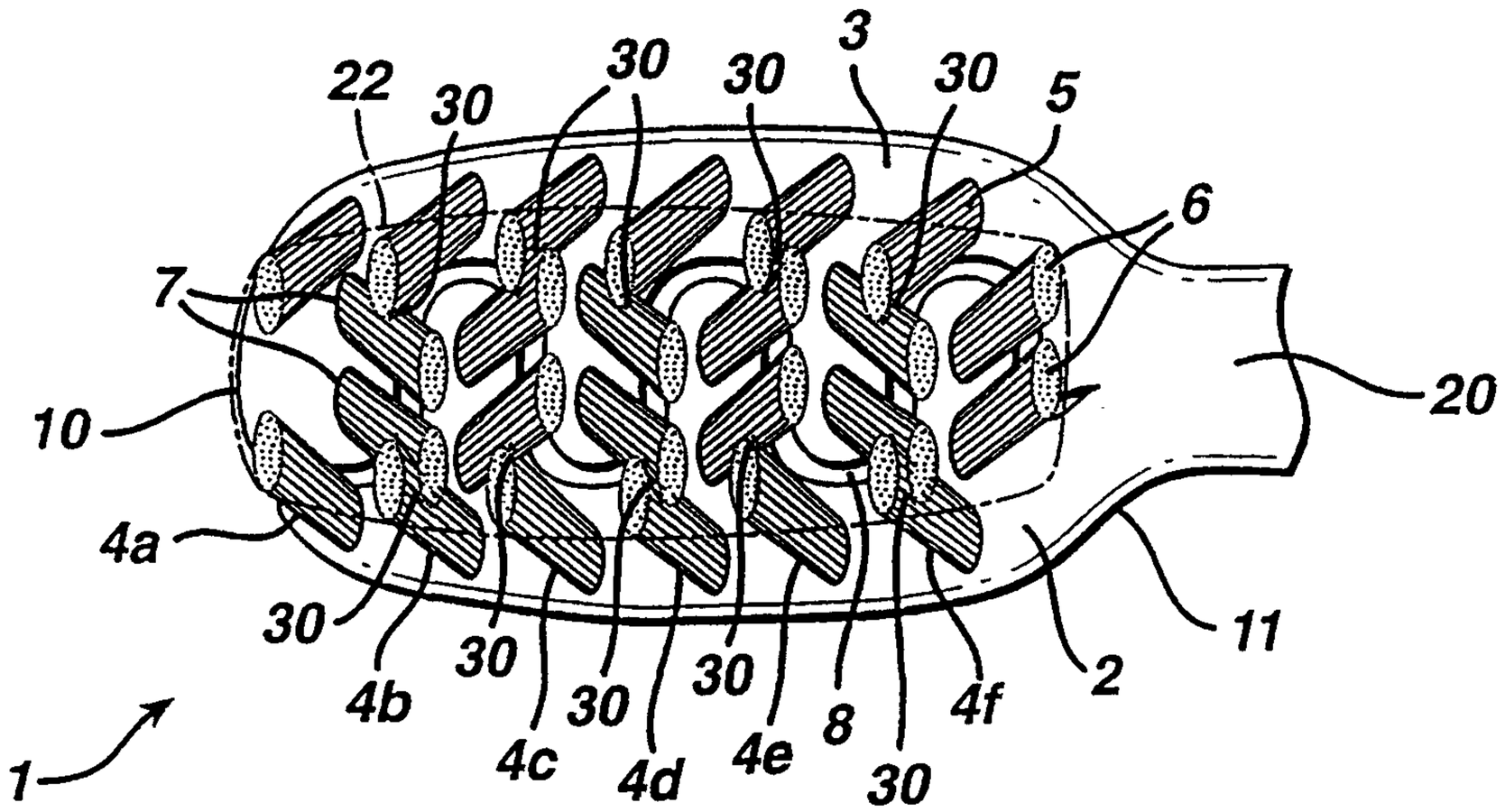


FIG. 5

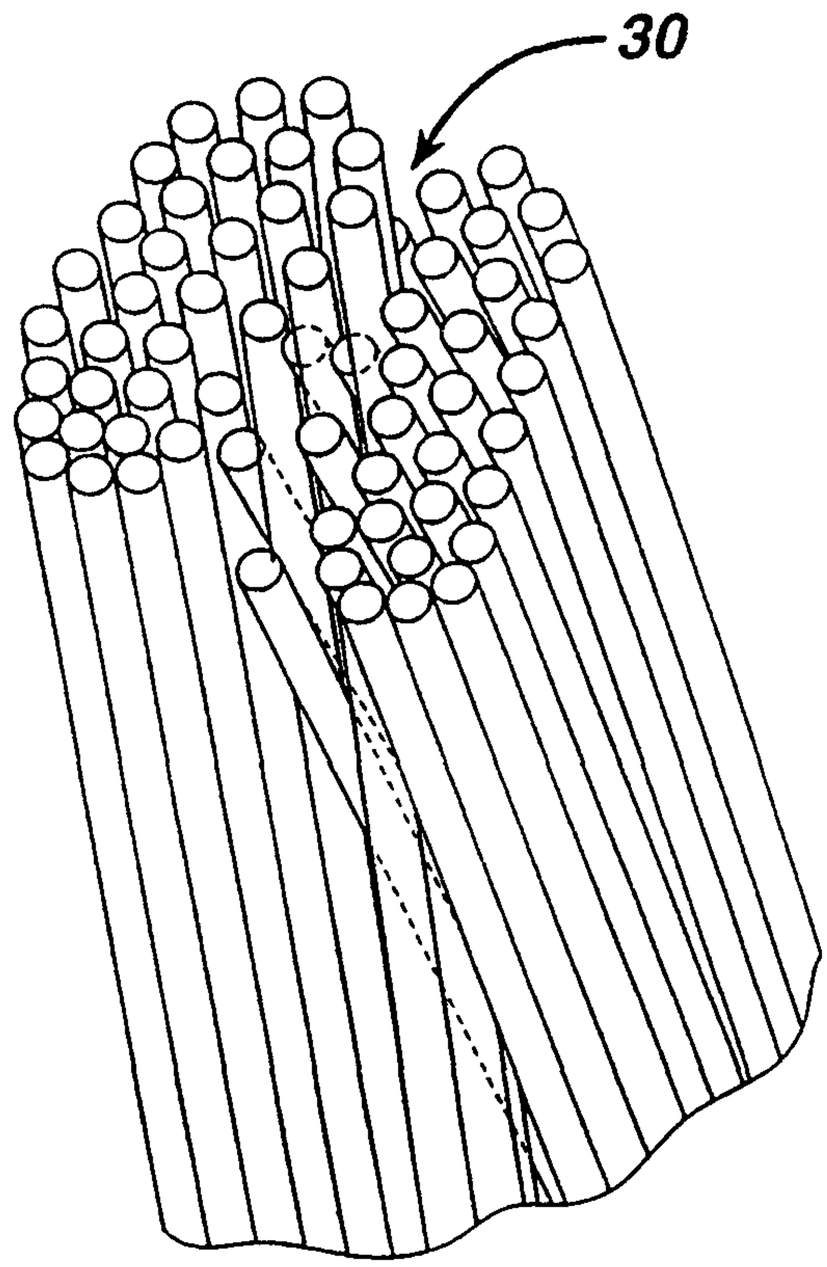


FIG. 6

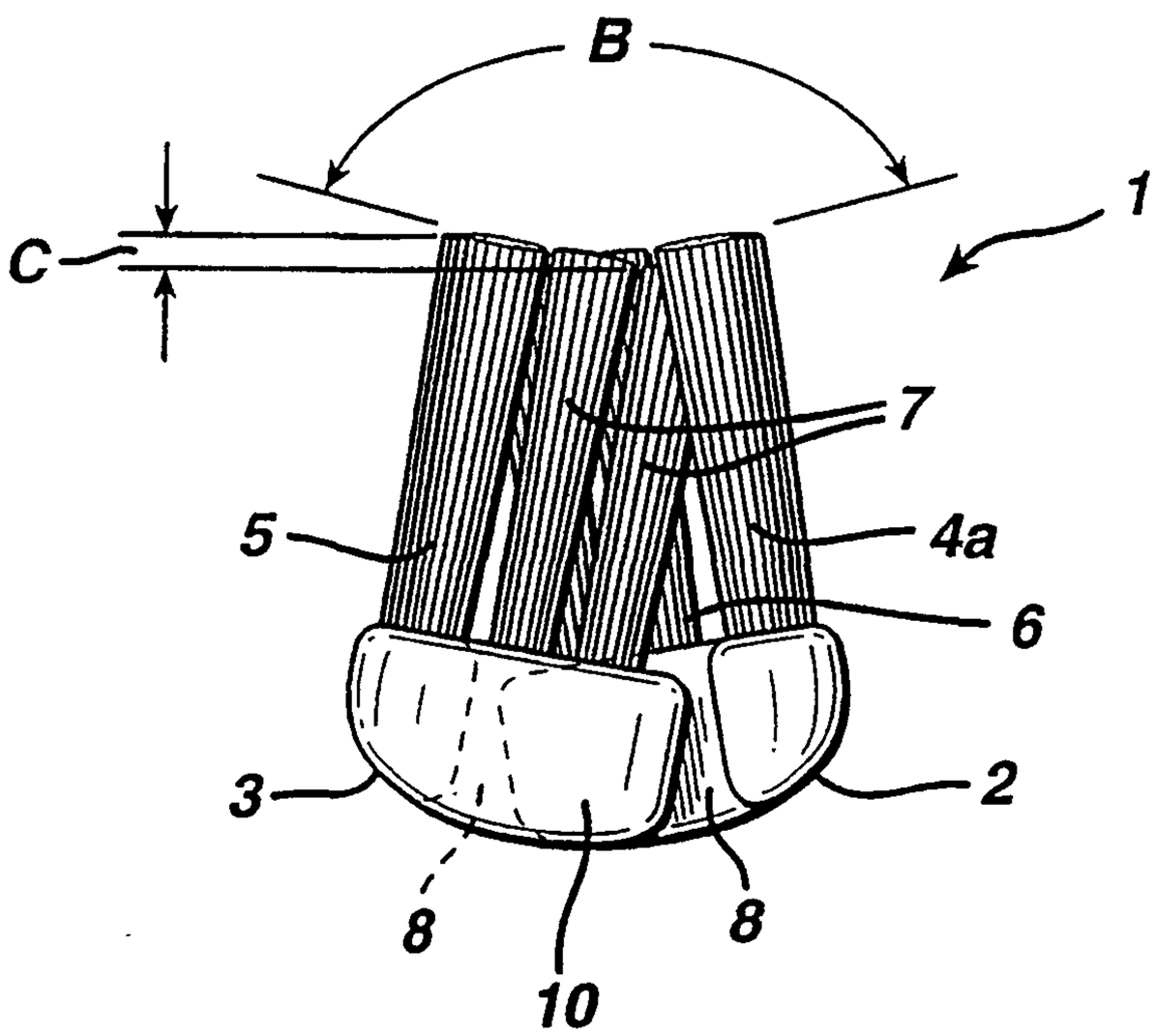


FIG. 7 PRIOR ART

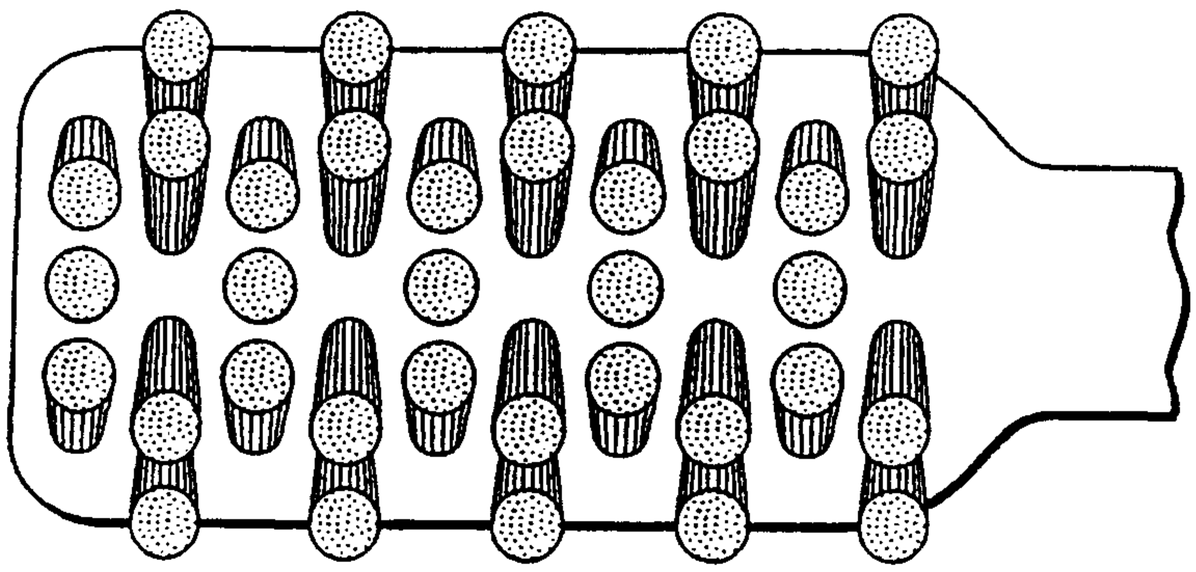
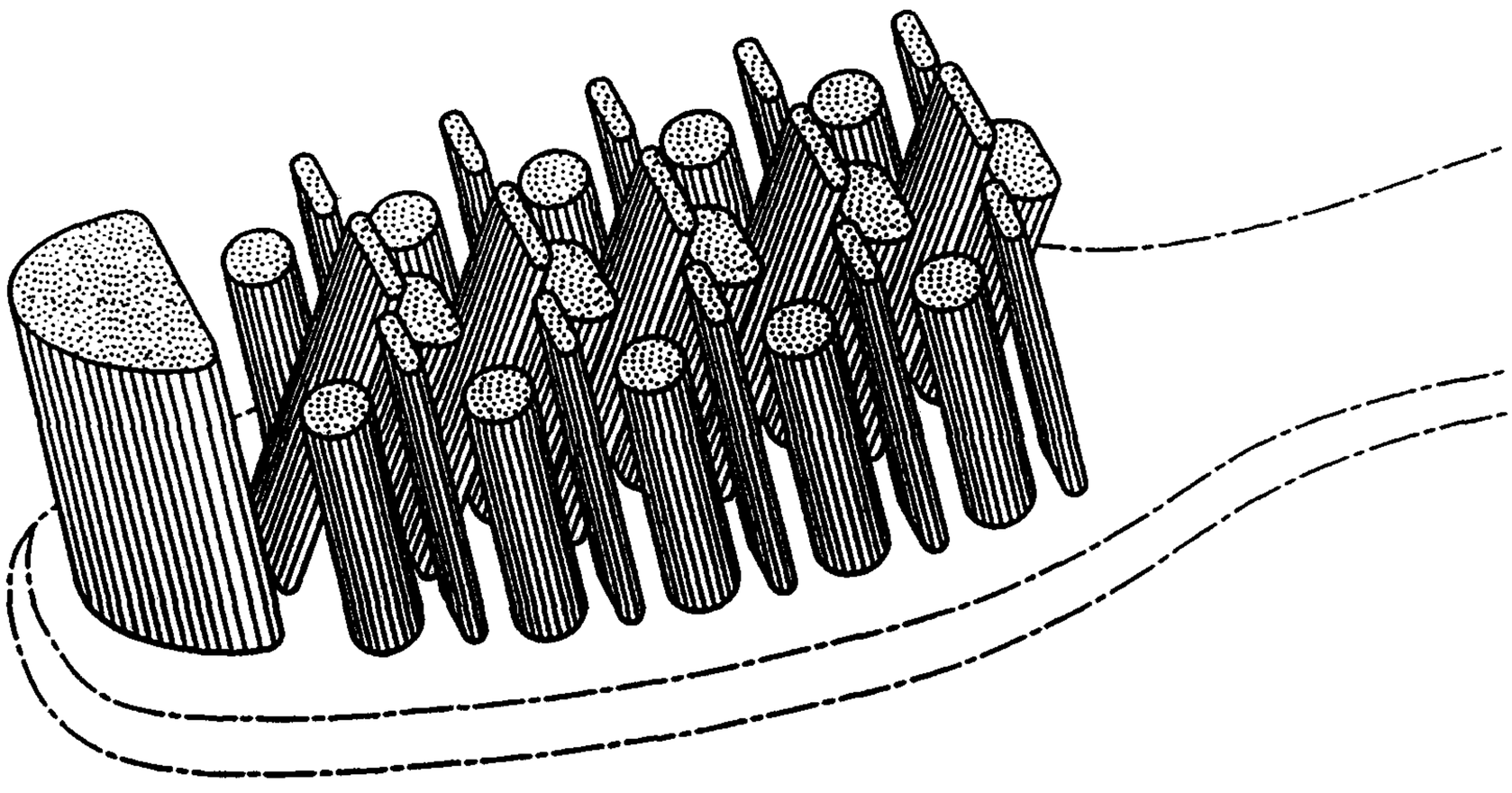
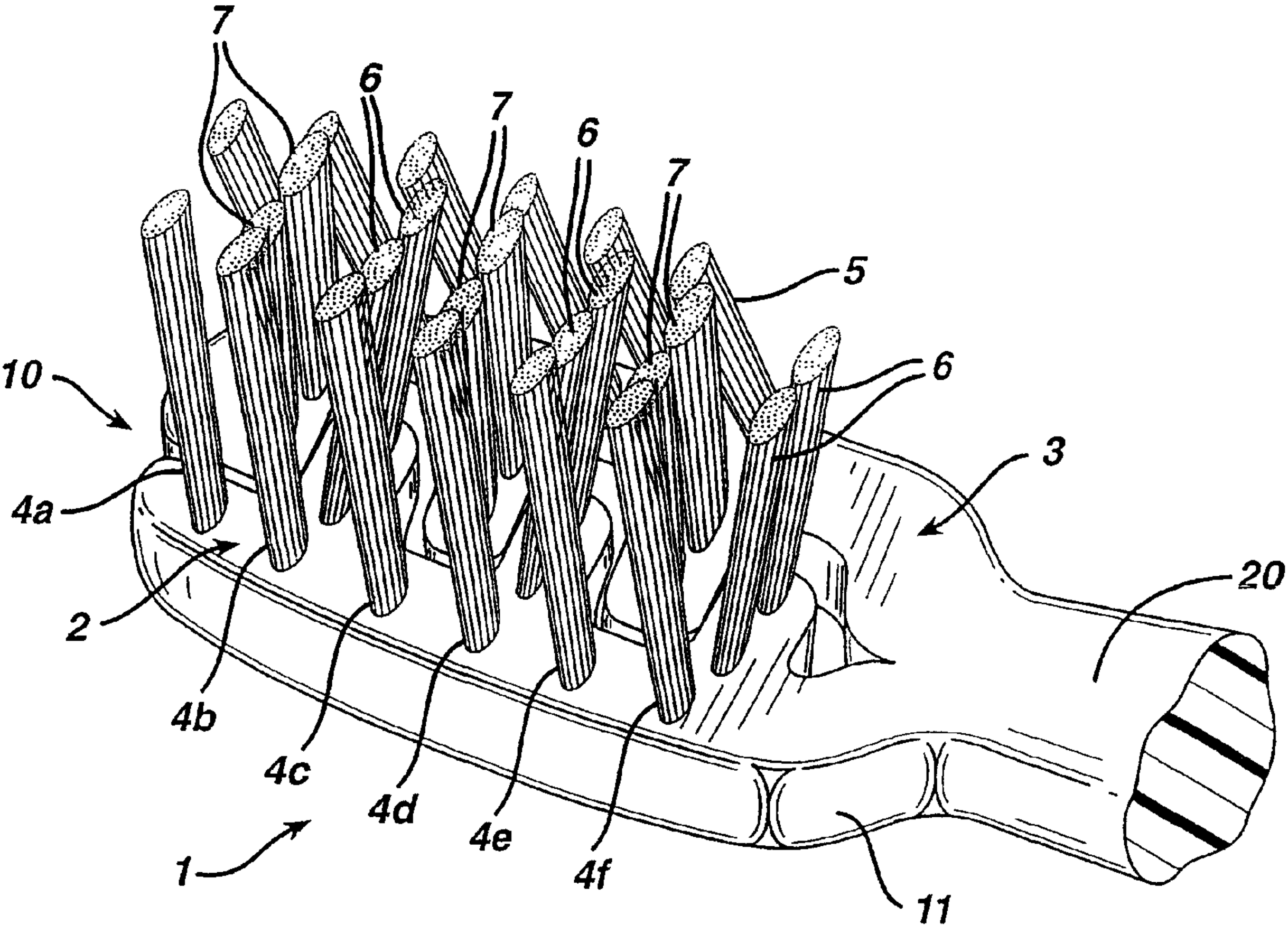


FIG. 8 PRIOR ART




7
6
7
6
7
5
10
6
3
4a
20
2
4b
4c
4d
4e
4f
1
11