

(19)



(11)

EP 3 820 327 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

27.11.2024 Bulletin 2024/48

(21) Application number: **19739970.2**

(22) Date of filing: **11.07.2019**

(51) International Patent Classification (IPC):

A46B 9/02 ^(2006.01) **A46B 9/04** ^(2006.01)
A46B 9/06 ^(2006.01) **A46B 3/16** ^(2006.01)
A46B 3/18 ^(2006.01) **A46B 3/00** ^(2006.01)

(52) Cooperative Patent Classification (CPC):

A46B 9/021; A46B 3/16; A46B 3/18; A46B 9/045;
A46B 9/06; A46B 2200/108

(86) International application number:

PCT/EP2019/068638

(87) International publication number:

WO 2020/011901 (16.01.2020 Gazette 2020/03)

(54) **INTERDENTAL BRUSH HAVING AN INSERTION GUIDANCE TIP**

INTERDENTALBÜRSTE MIT EINER EINSETZFÜHRUNGSSPITZE

BROSSE INTERDENTAIRE AYANT UNE POINTE DE GUIDAGE D'INSERTION

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR

(30) Priority: **11.07.2018 SE 1850882**

(43) Date of publication of application:

19.05.2021 Bulletin 2021/20

(73) Proprietor: **Tepe Munhygienprodukter AB**

213 76 Malmö (SE)

(72) Inventors:

• **LARSSON, Jan-Inge**
240 14 Veberöd (SE)

• **WERIUS, Patrik**

234 35 Lomma (SE)

(74) Representative: **Ström & Gulliksson AB**

P.O. Box 4188

203 13 Malmö (SE)

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Description

Field of invention

[0001] The invention relates to a method of providing an insertion guidance tip at a distal end of an interdental brush.

[0002] The invention also relates to an interdental brush having an insertion guidance tip at the distal end of the interdental brush.

[0003] The invention also relates to use of a first set of a plurality of filaments and a second set of a plurality of filaments in an interdental brush to provide an insertion guidance tip at a distal end of the interdental brush.

Technical Background

[0004] An interdental brush typically comprises a spine and a plurality of bristle filaments secured to the spine. The spine is typically formed from a metal wire being twisted to form the spine and to secure the bristle filaments to the twisted spine. Such interdental brushes are e.g. disclosed in EP 0 680 707 B1, WO 2009/079802 A1, US 4,691,404, EP 1 862 090 B1, US 3,720,975, US2005/257338 A1, and EP 0 294 051 A2.

[0005] In EP 0 680 707 B1 there is disclosed an interdental brush having different bristle thicknesses. It is disclosed that the use of different bristle thicknesses makes it possible to achieve desired sensation of hardness in various zones of the interdental brush. WO 2009/079802 A1 also discloses an interdental brush in which the insertion region contains filaments which are more flexible than the filaments in the rest of the brush. This flexibility in the tip can be achieved by using thinner filaments or by using a different material.

[0006] However, one problem often encountered, when using interdental brushes of this kind, is that it is difficult to insert the interdental brush into the intended interdental space. When the user tries to insert the interdental brush into the intended interdental space, he/she often encounters that the interdental brush is slightly misaligned with the intended interdental space and that as the interdental brush is inserted into the interdental space, the interdental brush causes discomfort by rubbing hard against the gums as the interdental brush is inserted into the interdental space. This is especially true when the user tries to insert the interdental brush into an interdental space at the back teeth.

[0007] This problem is addressed in US 4,691,404. There is disclosed an interdental brush having a handle formed of a rigid portion and a flexible portion. It is said that such a handle may be manipulated by the user's thumb and index finger such that the brush extends at an angle from the handle and that this enables the brush to be inserted into hard to reach places. However, it relies on the user having to put his hand deep into his mouth when trying to reach an interdental space far back in his mouth.

[0008] EP 1 862 090 B1 discloses an interdental brush having a resilient transition portion having a hollow cavity. It is disclosed that the spine may be bent into a smooth curve in order to or in response to being inserted into hard-to-reach interdental spaces far back in the mouth. It is also disclosed that the resilient transition portion provides a cushioning effect protecting the gums and teeth from collision damage.

[0009] US 3,720,975 approaches the problems associated with the insertion of the interdental brush by designing the brush head with a conical shape. The bristles at the distal end is shorter than the bristles closer to the handle. It is said that the foremost bristles being proportioned for initial entry within the space at the cervical portions of two adjacent teeth, thereby to provide an opening wedge for entry of the longer bristles there-behind. However, such a conical brush typically has a relatively short effective stroke length. It quickly becomes too thick as it is inserted into the interdental space.

[0010] In US2005/257338 A1 also discloses an interdental brush having a conical brush. It is also disclosed that there is provided a tapering tip in order to allow the brush to be inserted into an interdental space in a simple manner. There is also disclosed various embodiments having a tapering tip. The shape of the brush head is typically provided by rotating the brush head such that the free ends of the bristles hit a cutting edge. The various shapes disclosed in US2005/257338 A1 would require the provision of cutting edges having complex shapes or the provision of several cutting edges consecutively cutting the bristles such that the brush head is shaped into the desired shape. This would however make the manufacturing process more complicated and costly.

[0011] In EP 0 294 051 A2 there is disclosed an interdental brush having a guiding means formed by a thin plate-like guide fixed to the distal end of the brush. However, the provision of such an additional component make the manufacturing process more complicated and costly.

[0012] Thus, there is still room for improvement when it comes to providing an interdental brush having an insertion guidance tip.

Summary of invention

[0013] It is an object of the invention to provide an interdental brush having an insertion guidance tip.

[0014] This object has been achieved by a method of providing an insertion guidance tip (B) at a distal end of an interdental brush, the method comprising:

positioning a plurality of filaments side by side along a brush portion extending along a longitudinal direction (L) between two strands of a core member, the two strands of the core member extending alongside each other along the longitudinal direction (L) and being formed by folding the core member, wherein there is made use of two different set of fil-

aments to provide a transition in perceived properties close to the distal end, wherein said act of positioning comprises:

positioning a first set of filaments side by side along a first longitudinal sub-length (L1) of the brush portion, the filaments of the first set of filaments having a first filament diameter (D1), and positioning a second set of filaments along a second longitudinal sub-length (L2) of the brush portion, the filaments of the second set of filaments having a second filament diameter (D2), wherein the second filament diameter (D2) is smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1), wherein the second longitudinal sub-length (L2) is positioned at the distal end of the interdental brush, wherein the second sub-length has a length (L2) along the longitudinal direction that is less than 15% of a longitudinal extension (L3) of the brush portion, and wherein the second sub-length has a length (L2) extending along less than three twists of the core member, whereby the transition in perceived properties formed by the use of the two different sets of filaments is provided close to the distal end, and the method further comprising: twisting the two strands about an axis (A) along the longitudinal direction (L) to form a twisted core member and to thereby fasten the filaments of the first and second set of filaments between the two strands such that the filaments of the first and second set of filaments extend radially from the twisted core member and become arranged side by side along a helix (H) extending along the longitudinal direction (L).

[0015] By producing an interdental brush in accordance with this method there is accomplished an improved interdental brush having an insertion guidance tip. By using filaments having a smaller diameter over a comparably small distal sub-length it becomes possible to provide an insertion guidance tip. The distal end loop, formed by the folded and twisted core member and the filaments fastened in the distal end loop, will compared to prior art designs have a smaller size.

[0016] The use of the two different sets of filaments and the fact that the second sub-length is comparably small makes it possible to provide a transition in perceived properties close to the distal end. The thinner filaments of at the distal end are perceived as comparably softer than the slightly thicker filaments coming into abutment with the teeth shortly after the tip has been inserted in the interdental space. The thicker filaments will provide a stronger tendency to centre the interdental brush in the interdental space compared to the thinner filaments.

[0017] By providing the reduced size distal end loop

and by providing a transition in perceived properties close to the distal end the user will experience this as the interdental brush aiding in guiding its way into the interdental space. Thus, with the method disclosed above there is provided a method of producing an interdental brush having an insertion guidance tip.

[0018] The second sub-length has a length extending along less than three, preferably less than two, twists of the core member. A twist is defined as a distance along the longitudinal direction from any first point to a second point at which the strands have swapped place as seen in a plane projection in a plane defined by the longitudinal direction as one vector and a radial direction orthogonally from the longitudinal direction as another vector. This is considered a suitable length providing a distinct perception of an insertion guidance tip.

[0019] It may also be noted that the interdental brush having an insertion guidance tip is significantly easier to manufacture compared to the above discussed prior art attempts involving the use of conical tips. With the inventive design using thinner filaments over a comparably small distal sub-length makes it possible to provide the insertion guidance tip with the filaments in the first set and in the second set having the same length. It is thus possible to provide an insertion guidance tip using a robust manufacturing process where the filaments are all cut to the same length using a straight cutting edge against which the filaments are cut by rotating the brush section about the twist and rotation axis.

[0020] It may be noted that side by side along a direction is intended to refer to the fact that the filaments are arranged side by side essentially forming a queue and that this queue extends along said direction. Side by side denotes that they are positioned with their circumferential envelope surfaces facing and abutting each other; rather than being positioned end to end. It may be noted that in practice, the line or queue formed by the side by side arranged filaments will extend along a direction whereas some of the filaments, just as in an informal queue formed by people queuing, will be slightly offset from a perfect geometrical line. This is a well-known fact to a person skilled in the art but may still be mentioned to avoid any misunderstandings.

[0021] It may be noted that the longitudinal extension of the brush portion of which the second sub-length constitutes less than 15% refers to the total extension along which there are filaments. In case there are only a first set of filaments and a second set of filaments, this longitudinal extension of the brush portion is the first sub-length plus the second sub-length. It may also be noted that the core member typically has an extension greater than the extension along which there are filaments. The portion of the core member along which there are no filaments is typically used to attach the core member to a handle.

[0022] It may also be noted that since the filaments having the smaller diameter are only positioned along a relatively small fraction of the longitudinal extension of

the brush portion, the interdental brush will still present a significant length having thicker filaments providing a significant effective stroke length which makes it easy for the user to accomplish an efficient cleaning of the interdental space.

[0023] It may be noted that it is preferred that the second sub-length is at least long enough such that the distal end loop formed by the twisting of the core member is filled with filaments of the second set of filaments; i.e. filled with filaments having the smaller filament diameter.

[0024] The second filament diameter is between 60-95% of the first filament diameter. This relation between the filament diameters is considered suitable. It will provide suitable reduction in the size of the distal end loop formed by the twisting of the core member compared to the thickness of the twisted core member at any other part of the brush section. It will also provide a suitable reduction in bending resistance, assuming the materials are chosen such that the material stiffnesses are the same or close to each other.

[0025] The second filament diameter may preferably be between 66-90% of the first filament diameter. This relation between the filament diameters is considered even more suitable. It will provide suitable reduction in the size of the distal end loop formed by the twisting of the core member compared to the thickness of the twisted core member. It will also provide a suitable reduction in bending resistance, assuming the materials are chosen such that the material stiffnesses are the same or close to each other.

[0026] The filaments of the first set of filaments and the second set of filaments may be formed of the same material or of different materials having material stiffnesses such that the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter.

[0027] Preferably, the filaments of the first set of filaments and the filaments of the second set of filaments are formed of the same material but with different filament diameters, whereby the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter. It may be noted that bending resistance is related to the actual length of the filament; a short filament having a diameter and being formed of a material will be perceived as having a greater bending resistance compared to a longer filament of the same diameter and the same material. In the above discussion concerning the reduced bending resistance it is assumed, as is also preferred, that the filaments of the first set and the second set have the same length through-out the length of the brush section, or that the filaments at the distal end have a length being at least 75%, preferably at least 90%, of the length of the filaments in the first set of filaments.

[0028] The above object has also been achieved by an interdental brush having a brush portion comprising:

a core member being folded into two strands extend-

ing alongside each other along a longitudinal direction (L) and being twisted about an axis (A) extending along the longitudinal direction (L), and a plurality of filaments being fastened between the two strands and extending radially from the twisted core member and being arranged side by side along a helix (H) extending along the longitudinal direction (L) thereby forming the brush portion, wherein there is made use of two different set of filaments to provide a transition in perceived properties close to the distal end, wherein a first set of filaments are arranged side by side along a first longitudinal sub-length (L1) of the twisted core member, the filaments of the first set of filaments having a first filament diameter (D1), U wherein a second set of filaments are arranged along a second longitudinal sub-length (L2) of the twisted core member, the filaments of the second set of filaments having a second filament diameter (D2), U wherein the second filament diameter (D2) is smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1), wherein the second longitudinal sub-length (L2) is positioned at a distal end of the interdental brush, and wherein the second sub-length has a length (L2) along the longitudinal direction (L) that is less than 15% of a longitudinal extension (L3) of the brush portion and extending along less than three twists of the core member, whereby the transition in perceived properties formed by the use of the two different sets of filaments is provided close to the distal end, and thereby there is provided an insertion guidance tip (B) at the distal end of the interdental brush.

[0029] The discussion above related to the method of providing an insertion guidance tip at a distal end of an interdental brush is also applicable to the interdental brush and reference is made to the above discussion. This also applies to the discussions related to the preferred embodiments of the method; rather than repeating the discussion related to the preferred embodiments, reference is made to the corresponding discussions above.

[0030] The second filament diameter is between 60-95% of the first filament diameter.

[0031] The second filament diameter may preferably be between 66-90% of the first filament diameter.

[0032] The filaments of the first set of filaments and the second set of filaments may be formed of the same material or of different materials having material stiffnesses such that the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter.

[0033] Preferably, the filaments of the first set of filaments and the filaments of the second set of filaments

are formed of the same material but with different filament diameters, whereby the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter.

[0034] The second sub-length may have a length extending along less than two twists of the core member.

[0035] The above object has also been achieved by a use of two different sets of filaments to provide a transition in perceived properties close to a distal end of said interdental brush to provide an insertion guidance tip (B) at the distal end of the interdental brush, the two different set of filaments being: a first set of filaments having a first filament diameter (D1) and being arranged side by side along a first longitudinal sub-length (L1) of a brush portion, and a second set of filaments having a second filament diameter (D2) and being arranged along a second longitudinal sub-length (L2) of the brush portion, the second filament diameter (D2) being smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1), the second longitudinal sub-length (L2) being positioned at a distal end of the interdental brush, wherein the second sub-length has a length (L2) along the longitudinal direction (L) that is less than 15% of a longitudinal extension (L3) of the brush portion and extending along less than three twists of the core member, whereby the transition in perceived properties formed by the use of the two different sets of filaments is provided close to the distal end.

[0036] The discussion above related to the method of providing an insertion guidance tip at a distal end of an interdental brush is also applicable to the use and reference is made to the above discussion. This also applies to the discussions related to the preferred embodiments of the method; rather than repeating the discussion related to the preferred embodiments, reference is made to the corresponding discussions above.

[0037] The second filament diameter is between 60-95%, preferably between 66-90%, of the first filament diameter.

[0038] The filaments of the first set of filaments and the second set of filaments may be formed of the same material or of different materials having material stiffnesses such that the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter.

[0039] Preferably, the filaments of the first set of filaments and the filaments of the second set of filaments are formed of the same material but with different filament diameters, whereby the filaments having the second filament diameter have a reduced bending resistance compared to the filaments having the first filament diameter.

[0040] The second sub-length may have a length extending along less than two twists of the core member.

[0041] The invention may also in short be said to relate to an interdental brush comprising a first set of filaments arranged along a first longitudinal sub-length and having a first filament diameter, and a second set of filaments

arranged along a second longitudinal sub-length and having a second filament diameter, wherein the second filament diameter is smaller than the first filament diameter, wherein the second longitudinal sub-length is positioned at the distal end of the interdental brush, and wherein the second sub-length has a length along the longitudinal direction being less than 15% of a longitudinal extension of the brush portion.

10 Brief description of the drawings

[0042] The invention will by way of example be described in more detail with reference to the appended schematic drawings, which shows a presently preferred embodiment of the invention.

Figure 1 is a side view of a plurality of filaments positioned side by side between two strands of a folded core member.

Figure 2 is a top plan view of the core member and filaments of figure 1.

Figure 3 is a top plan view of an interdental brush having an insertion guidance tip formed from the setups shown in figures 1 and 2.

Figure 4 is an enlargement of the distal end of the interdental brush as indicated by the dashed circle in figure 3.

Figure 5 is a schematic flow chart of a method for producing interdental brushes having an insertion guidance tip.

Detailed description of preferred embodiments

[0043] With reference to figure 3, there is disclosed an interdental brush 1 having a brush portion 2. The brush portion 2 comprises a core member 3 and a plurality of filaments 10, 20. The core member 3 is folded into two strands 3a, 3b extending alongside each other along a longitudinal direction L and twisted about an axis A extending along the longitudinal direction L. The plurality of filaments 10, 20 are fastened between the two strands 3a, 3b and extending radially from the twisted core member 3 and are arranged side by side along a helix H extending along the longitudinal direction L thereby forming the brush portion 2.

[0044] A first set of filaments 10 are arranged side by side along a first longitudinal sub-length L1 of the twisted core member 3. The filaments 10 of the first set of filaments have a first filament diameter D1.

[0045] A second set of filaments 20 are arranged along a second longitudinal sub-length L2 of the twisted core member 3. The filaments 20 of the second set of filaments have a second filament diameter D2. The second filament diameter D2 is smaller than the first filament diameter D1.

[0046] The second longitudinal sub-length L2 is positioned at a distal end 5 of the interdental brush 1. The second sub-length has a length L2 along the longitudinal

direction L being less than 15% of a longitudinal extension L3 of the brush portion 2. It may be noted that the longitudinal extension or length L3 refers to the total extension along which there are filaments 10, 20. The core member 3 typically have an extension greater than the extension along which there are filaments 10, 20. The portion of the core member 3 along which there are no filaments 10, 20 is typically used to attach the core member 3 to a handle (as indicated in figure 3). In case there are only a first set of filaments and a second set of filaments, this longitudinal extension L3 of the brush portion 2 is the first sub-length L1 plus the second sub-length L2.

[0047] With an interdental brush 1 formed according to the above, there is provided an insertion guidance tip B at the distal end 5 of the interdental brush 1.

[0048] The method of providing an insertion guidance tip B at a distal end 5 of an interdental brush 1 will in the following be disclosed in more detail.

[0049] In short, the method may be said to comprise the steps; positioning, twisting, end cutting and attaching to handle (as indicated in figure 5). It may be noted that the method comprising the steps positioning, twisting, end cutting and attaching to handle may comprise other steps before, after or in-between these steps. The steps may be separate steps performed one after the other. Such steps may e.g. be performed at different working stations in a manufacturing machine, but two or more steps may also be performed one after the other in one working station. However, two or more of the steps may also be performed as a single step. In the preferred embodiment the steps are performed as steps one after the other in the disclosed order. In the preferred embodiment the two steps of positioning and twisting is performed one after the other in the disclosed order in a single working station.

[0050] The positioning step comprises positioning a plurality of filaments 10, 20 side by side along a brush portion 2 extending along a longitudinal direction L between two strands 3a, 3b of a core member 3, wherein the two strands 3a, 3b of the core member 3 extending alongside each other along the longitudinal direction L and being formed by folding the core member 3. The act or step of positioning comprises positioning a first set of filaments 10 side by side along a first longitudinal sub-length L1' of the brush portion 2 and positioning a second set of filaments 20 along a second longitudinal sub-length L2' of the brush portion 2. The plurality of filaments 10, 20 are held by a filament holder 33 as indicated in figure 2. The filament holder 33 is typically fed with filaments in a plurality of sets of filaments. One or more such sets form the first set of filaments 10 and one or more such sets form the second set of filaments 20.

[0051] The filaments 10 of the first set of filaments each have a first filament diameter D1 and the filaments 20 of the second set of filaments each have a second filament diameter D2, wherein the second filament diameter D2 is smaller than the first filament diameter D1.

[0052] The second longitudinal sub-length L2' is posi-

tioned at the distal end 5 of the interdental brush 1. The second sub-length has a length L2' along the longitudinal direction being less than about 15% of a longitudinal extension L3' of the brush portion 2.

[0053] After this step or act of positioning, the brush portion 2 has the configuration as shown in figures 1 and 2.

[0054] The twisting step comprises twisting the two strands 3a, 3b about an axis A along the longitudinal direction L to form a twisted core member 3 and to thereby fasten the filaments 10, 20 between the two strands 3a, 3b such that the filaments 10, 20 extend radially from the twisted core member 3 and becomes arranged side by side along a helix H extending along the longitudinal direction L.

[0055] The twisting may e.g. be performed with the use of two rotatable pinchers 31, 32 holding two opposite ends of the folded core member 3 as indicated in figure 2. The two pinchers 31, 32 are configured to rotate in opposite directions relative to the axis A such that the core member 3 becomes twisted. Alternatively, one of the pinchers 31, 32 may be held stationary.

[0056] After this step, the brush portion 2 has the configuration shown in figures 3 and 4. However, note that in figure 3 the brush portion 2 has also been attached to a handle 4. It may be noted that the total length L3' and the sub-lengths L1' and L2' are slightly longer when the filaments 10, 20 of the first and second set of filaments are positioned side by side as in figures 1 and 2 compared to the total length L3 and the sub-lengths L1 and L2, respectively, after the twisting of the two strands 3a, 3b as shown in figures 3 and 4. The proportions and measurements refers to the situation after the twisting of the two strands 3a, 3b as shown in figures 3 and 4.

[0057] It is preferred that the second sub-length L2 is at least long enough such that the distal end loop formed by the twisting of the core member is filled with filaments of the second set of filaments 20; i.e. filled with filaments having the smaller filament diameter D2. In the preferred embodiment disclosed in the figures, the second sub-length L2 has a length such that the filaments having the smaller filament diameter D2 occupies the end loop and one more twist, i.e. two twists.

[0058] By producing an interdental brush in accordance with this method there is accomplished an improved interdental brush having an insertion guidance tip. By using filaments having a smaller diameter over a comparably small distal sub-length it becomes possible to provide an insertion guidance tip. The distal end loop, formed by the folded and twisted core member and the filaments fastened in the distal end loop, will compared to prior art designs have a smaller size. The use of the two different sets of filaments and the fact that the second sub-length is comparably small makes it possible to provide a transition in perceived properties close to the distal end. The thinner filaments of at the distal end may be perceived as comparably softer than the slightly thicker filaments coming into abutment with the teeth shortly af-

ter the tip has been inserted in the interdental space. The thicker filaments will provide a stronger tendency to centre the interdental brush in the interdental space compared to the thinner filaments. By providing the reduced size distal end loop and by providing a transition in perceived properties close to the distal end the user will experience this as the interdental brush aiding in guiding its way into the interdental space. Thus, with the method disclosed above there is provided a method of producing an interdental brush having an insertion guidance tip. It may also be noted that the interdental brush having an insertion guidance tip is significantly easier to manufacture compared to the above discussed prior art attempts involving the use of conical tips. With the inventive design using thinner filaments over a comparably small distal sub-length makes it possible to provide the insertion guidance tip with the filaments in the first set and in the second set having the same length. It is thus possible to provide an insertion guidance tip using a robust manufacturing process where the filaments are all cut to the same length using a straight cutting edge against which the filaments are cut by rotating the brush section about the twist and rotation axis. It may be noted that side by side along a direction is intended to refer to the fact that the filaments are arranged side by side essentially forming a queue and that this queue extends along said direction. Side by side denotes that they are positioned with their circumferential envelope surfaces facing and abutting each other; rather than being positioned end to end. It may be noted that in practice, the line or queue formed by the side by side arranged filaments will extend along a direction where some of the filaments, just as in an informal queue formed by people queuing, will be slightly offset from a perfect geometrical line. This is a well-known fact to a person skilled in the art but may still be mentioned to avoid any misunderstandings.

[0059] With this design it is also possible to design an interdental brush having a passage hole diameter defined by a main portion of the brush portion rather than distal end loop. The passage hole diameter may e.g. be determined using the method disclosed in standard ISO 16409:2016 with title: "Dentistry - Oral care products - Manual interdental brushes". Thereby, there is an increased likelihood that a certain interdental brush with a specific thickness at the main portion may be inserted in a slightly smaller interdental space than would be the case with a prior art brush having a passage hole diameter set by the size of the distal end loop. Alternatively, it may be said that it increases the likelihood that the user may use a brush having a one size larger main portion in a certain interdental space since the distal end loop will not prevent the interdental brush to be inserted into the specific interdental space. Thus, all in all a set of interdental brushes in accordance with the invention may provide a greater cleaning efficiency compared to the interdental brushes disclosed in the prior art. Since the filaments having the smaller diameter are only positioned along a relatively small fraction of the longitudinal exten-

sion of the brush portion, the interdental brush will still present a significant length having thicker filaments providing a significant effective stroke length which makes it easy for the user to accomplish an efficient cleaning of the interdental space.

[0060] The second filament diameter D2 is preferably between 60-95% of the first filament diameter D1. The second filament diameter D2 is more preferably between 66-90% of the first filament diameter D1.

[0061] The filaments 10, 20 of the first set of filaments 10 and the second set of filaments 20 are in one embodiment formed of the same material such that the filaments 20 having the second filament diameter D2 have a reduced bending resistance compared to the filaments 10 having the first filament diameter D1. According to an alternative embodiment, the filaments 10, 20 of the first set of filaments 10 and the second set of filaments 20 are formed of different materials. The materials are chosen such that they have material stiffnesses relative to each other such that the filaments 20 having the second filament diameter D2 have a reduced bending resistance compared to the filaments 10 having the first filament diameter D1.

[0062] It may be noted that bending resistance is related to the actual length of the filament; a short filament having a diameter and being formed of a material will be perceived as having a greater bending resistance compared to a longer filament of the same diameter and the same material. In the above discussion concerning the reduced bending resistance it is assumed, as is also preferred, that the filaments of the first set and the second set have the same length through-out the length of the brush section, or that the filaments at the distal end have a length being at least 75%, preferably at least 90%, of the length of the filaments in the first set of filaments.

[0063] It is preferred that the second sub-length L2 is at least long enough such that the distal end loop formed by the twisting of the core member is filled with filaments of the second set of filaments 20; i.e. filled with filaments having the smaller filament diameter D2.

[0064] The second sub-length has preferably a length L2 extending along less than three, preferably less than two, twists of the core member 3. A twist is defined as a distance along the longitudinal direction L from any first point to a second point at which the strands 3a, 3b have swapped place as seen in a plane projection in a plane defined by the longitudinal direction as one vector and a radial direction orthogonally from the longitudinal direction as another vector. In the figures, the second sub-length L2 has a length such that the filaments having the smaller filament diameter D2 occupies the end loop and one more twist, i.e. two twists (see especially the enlargement in figure 4).

[0065] It may also be said that the disclosure relates to a use of a first set of filaments 10 and second set of filaments 20 in an interdental brush 1 to provide an insertion guidance tip B at the distal end 5 of the interdental brush 1. The filaments of the first set of filaments 10 have

each a first filament diameter D1 and are arranged side by side along a first longitudinal sub-length L1 of a brush portion 2. The filaments of the second set of filaments 20 have each a second filament diameter D2 and are arranged along a second longitudinal sub-length L2 of the brush portion 2. The second filament diameter D2 is smaller than the first filament diameter D1. The second longitudinal sub-length L2 is positioned at a distal end 5 of the interdental brush 1. The second sub-length has a length L2 along the longitudinal direction L being less than 15% of a longitudinal extension L3 of the brush portion 2.

[0066] It is contemplated that there are numerous modifications of the embodiments described herein, which are still within the scope of the invention as defined by the appended claims.

[0067] It may e.g. be noted that, although the preferred embodiment is designed with the filaments in the first set and in the second set having the same length, it is conceivable to combine the use of thinner filaments with a slight conical shape of the end. It is in such a case preferred that the materials, filament lengths and filament diameters of the filaments in the respective set are chosen such that the shorter filaments at the distal end have a lower bending resistance than the longer and thicker filaments in the first set of filaments. With such a choice of materials and diameters, the shorter straws along the comparably small sub-length will still be perceived as softer and will give the perception of aiding in the insertion of the interdental brush. It may be noted that bending resistance is related to the actual length of the filament; a short filament having a diameter and being formed of a material will be perceived as having a greater bending resistance compared to a longer filament of the same diameter and the same material. However, the filaments at the distal end have a length being at least 75%, preferably at least 90%, of the length of the filaments in the first set of filaments

Claims

1. A method of providing an insertion guidance tip (B) at a distal end (5) of an interdental brush (1), the method comprising:

positioning a plurality of filaments (10, 20) side by side along a brush portion (2) extending along a longitudinal direction (L) between two strands (3a, 3b) of a core member (3), the two strands (3a, 3b) of the core member (3) extending alongside each other along the longitudinal direction (L) and being formed by folding the core member (3),

wherein there is made use of two different set of filaments (10; 20) to provide a transition in perceived properties close to the distal end (5), wherein said act of positioning comprises:

positioning a first set of filaments (10) side by side along a first longitudinal sub-length (L1) of the brush portion (2), the filaments (10) of the first set of filaments having a first filament diameter (D1), and
positioning a second set of filaments (20) along a second longitudinal sub-length (L2) of the brush portion (2), the filaments (20) of the second set of filaments having a second filament diameter (D2),
wherein the second filament diameter (D2) is smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1),
wherein the second longitudinal sub-length (L2) is positioned at the distal end (5) of the interdental brush (1),
wherein the second sub-length has a length (L2) along the longitudinal direction that is less than 15% of a longitudinal extension (L3) of the brush portion (2), and
wherein the second sub-length has a length (L2) extending along less than three twists of the core member (3),

whereby the transition in perceived properties formed by the use of the two different sets of filaments (10, 20) is provided close to the distal end (5), and

the method further comprising:

twisting the two strands (3a, 3b) about an axis (A) along the longitudinal direction (L) to form a twisted core member (3) and to thereby fasten the filaments (10, 20) of the first and second set of filaments between the two strands (3a, 3b) such that the filaments (10, 20) of the first and second set of filaments extend radially from the twisted core member (3) and become arranged side by side along a helix (H) extending along the longitudinal direction (L).

2. The method according to claim 1, wherein the second filament diameter (D2) is between 66-90% of the first filament diameter (D1).
3. The method according to any one of claims 1-2, wherein the filaments (10, 20) of the first set of filaments (10) and the second set of filaments (20) are formed of the same material or of different materials having material stiffnesses such that the filaments (20) having the second filament diameter (D2) have a reduced bending resistance compared to the filaments (10) having the first filament diameter (D1).
4. The method according to any one of claims 1-3, wherein the second sub-length has a length (L2) extending along less than two twists of the core mem-

ber (3).

5. An interdental brush having a brush portion (2) comprising:

a core member (3) being folded into two strands (3a, 3b) extending alongside each other along a longitudinal direction (L) and being twisted about an axis (A) extending along the longitudinal direction (L), and

a plurality of filaments (10, 20) being fastened between the two strands (3a, 3b) and extending radially from the twisted core member (3) and being arranged side by side along a helix (H) extending along the longitudinal direction (L) thereby forming the brush portion (2), wherein there is made use of two different set of filaments (10; 20) to provide a transition in perceived properties close to the distal end (5), wherein a first set of filaments (10) are arranged side by side along a first longitudinal sub-length (L1) of the twisted core member (3), the filaments (10) of the first set of filaments having a first filament diameter (D1),

wherein a second set of filaments (20) are arranged along a second longitudinal sub-length (L2) of the twisted core member (3), the filaments (20) of the second set of filaments having a second filament diameter (D2),

wherein the second filament diameter (D2) is smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1), wherein the second longitudinal sub-length (L2) is positioned at a distal end (5) of the interdental brush (1), and

wherein the second sub-length has a length (L2) along the longitudinal direction (L) that is less than 15% of a longitudinal extension (L3) of the brush portion (2) and extending along less than three twists of the core member (3), whereby the transition in perceived properties formed by the use of the two different sets of filaments (10, 20) is provided close to the distal end (5), and thereby there is provided an insertion guidance tip (B) at the distal end (5) of the interdental brush (1).

6. The interdental brush according to claim 5, wherein the second filament diameter (D2) is between 66-90% of the first filament diameter (D1).

7. The interdental brush according to any one of claims 5-6, wherein the filaments (10, 20) of the first set of filaments (10) and the second set of filaments (20) are formed of the same material or of different materials having material stiffnesses such that the filaments (20) having the second filament diameter (D2)

have a reduced bending resistance compared to the filaments (10) having the first filament diameter (D1).

8. The interdental brush according to any one of claims 5-7, wherein the second sub-length has a length (L2) extending along less than two twists of the core member (3).

9. The interdental brush according to any one of claims 5-8, wherein the brush portion (2) of the interdental brush (1) has a slight conical shape at the distal end (5).

10. The interdental brush according to claim 9, wherein shorter filaments of said second set of filaments at the distal end (5) have a lower bending resistance than longer filaments of said first set of filaments.

11. The interdental brush according to any one of claims 5-10, wherein filaments of said second set of filaments have a length that is at least 75% of the length of filaments of said first set of filaments, said length preferably being at least 95%.

12. Use of two different sets of filaments (10; 20) to provide a transition in perceived properties close to a distal end (5) of an interdental brush (1) according to any one of claims 5-11, to provide an insertion guidance tip (B) at the distal end (5) of the interdental brush (1), the two different sets of filaments (10, 20) being:

a first set of filaments (10) having a first filament diameter (D1) and being arranged side by side along a first longitudinal sub-length (L1) of a brush portion (2), and

a second set of filaments (20) having a second filament diameter (D2) and being arranged along a second longitudinal sub-length (L2) of the brush portion (2), the second filament diameter (D2) being smaller than the first filament diameter (D1) in that the second filament diameter (D2) is between 60-95% of the first filament diameter (D1), the second longitudinal sub-length (L2) being positioned at a distal end (5) of the interdental brush (1),

wherein the second sub-length has a length (L2) along the longitudinal direction (L) that is less than 15% of a longitudinal extension (L3) of the brush portion (2) and extending along less than three twists of the core member (3), whereby the transition in perceived properties formed by the use of the two different sets of filaments (10, 20) is provided close to the distal end (5).

13. The use according to claim 12, wherein the second filament diameter (D2) is between 66-90% of the first filament diameter (D1).

14. The use according to claim 12 or 13, wherein the filaments (10, 20) of the first set of filaments (10) and the second set of filaments (20) are formed of the same material or of different materials having material stiffnesses such that the filaments (20) having the second filament diameter (D2) have a reduced bending resistance compared to the filaments (10) having the first filament diameter (D1). 5
15. The use according to any one of claims 12-14, wherein the second sub-length has a length (L2) extending along less than two twists of the core member (3). 10

Patentansprüche

1. Verfahren zum Bereitstellen einer Einführungsführungsspitze (B) an einem distalen Ende (5) einer Interdentalbürste (1), das Verfahren umfassend: 20
- Positionieren einer Vielzahl von Filamenten (10, 20) Seite an Seite entlang eines Bürstenabschnitts (2), der sich entlang einer Längsrichtung (L) zwischen zwei Strängen (3a, 3b) eines Kernelements (3) erstreckt, wobei sich die zwei Stränge (3a, 3b) des Kernelements (3) entlang der Längsrichtung (L) nebeneinander erstrecken und durch Falten des Kernelements (3) gebildet werden, 25
- wobei zwei verschiedene Sätze von Filamenten (10; 20) verwendet werden, um einen Übergang in wahrgenommenen Eigenschaften nahe dem distalen Ende (5) bereitzustellen, 30
- wobei der Vorgang des Positionierens umfasst:
- Positionieren eines ersten Satzes von Filamenten (10) Seite an Seite entlang einer ersten Längsteillänge (L1) des Bürstenabschnitts (2), wobei die Filamente (10) des ersten Satzes von Filamenten einen ersten Filamentdurchmesser (D1) aufweisen, und 40
- Positionieren eines zweiten Satzes von Filamenten (20) entlang einer zweiten Längsteillänge (L2) des Bürstenabschnitts (2), wobei die Filamente (20) des zweiten Satzes von Filamenten einen zweiten Filamentdurchmesser (D2) aufweisen, 45
- wobei der zweite Filamentdurchmesser (D2) kleiner als der erste Filamentdurchmesser (D1) ist, indem der zweite Filamentdurchmesser (D2) zwischen 60-95 % des ersten Filamentdurchmessers (D1) beträgt, wobei die zweite Längsteillänge (L2) an dem distalen Ende (5) der Interdentalbürste (1) positioniert ist, 50
- wobei die zweite Teillänge eine Länge (L2) entlang der Längsrichtung aufweist, die we-

niger als 15 % einer Längserstreckung (L3) des Bürstenabschnitts (2) beträgt, und wobei die zweite Teillänge eine Länge (L2) aufweist, die sich entlang von weniger als drei Drehungen des Kernelements (3) erstreckt, 5

wodurch der Übergang in wahrgenommenen Eigenschaften, der durch die Verwendung der zwei verschiedenen Sätze von Filamenten (10, 20) gebildet wird, nahe dem distalen Ende (5) bereitgestellt wird, und das Verfahren ferner umfassend: 10

Drehen der zwei Stränge (3a, 3b) um eine Achse (A) entlang der Längsrichtung (L), um ein gedrehtes Kernelement (3) zu bilden und dadurch die Filamente (10, 20) des ersten und zweiten Satzes von Filamenten zwischen den zwei Strängen (3a, 3b) zu befestigen, sodass sich die Filamente (10, 20) des ersten und zweiten Satzes von Filamenten radial von dem gedrehten Kernelement (3) erstrecken und Seite an Seite entlang einer Helix (H) angeordnet werden, die sich entlang der Längsrichtung (L) erstreckt. 15

2. Verfahren nach Anspruch 1, wobei der zweite Filamentdurchmesser (D2) zwischen 66-90 % des ersten Filamentdurchmessers (D1) beträgt. 20
3. Verfahren nach einem der Ansprüche 1-2, wobei die Filamente (10, 20) des ersten Satzes von Filamenten (10) und des zweiten Satzes von Filamenten (20) aus dem gleichen Material oder aus unterschiedlichen Materialien mit Materialsteifigkeiten gebildet sind, sodass die Filamente (20) mit dem zweiten Filamentdurchmesser (D2) einen reduzierten Biege- 25
- widerstand im Vergleich zu den Filamenten (10) mit dem ersten Filamentdurchmesser (D1) aufweisen.
4. Verfahren nach einem der Ansprüche 1-3, wobei die zweite Teillänge eine Länge (L2) aufweist, die sich entlang von weniger als zwei Drehungen des Kernelements (3) erstreckt. 30
5. Interdentalbürste mit einem Bürstenabschnitt (2), umfassend: 35

ein Kernelement (3), das in zwei Stränge (3a, 3b) gefaltet ist, die sich entlang einer Längsrichtung (L) nebeneinander erstrecken und um eine Achse (A) verdreht sind, die sich entlang der Längsrichtung (L) erstreckt, und 40

eine Vielzahl von Filamenten (10, 20), die zwischen den zwei Strängen (3a, 3b) befestigt sind und sich radial von dem gedrehten Kernelement (3) erstrecken und Seite an Seite entlang einer Helix (H) angeordnet sind, die sich entlang der 45

- Längsrichtung (L) erstreckt, wodurch der Bürstenabschnitt (2) gebildet wird, wobei zwei verschiedene Sätze von Filamenten (10; 20) verwendet werden, um einen Übergang in wahrgenommenen Eigenschaften nahe dem distalen Ende (5) bereitzustellen, wobei ein erster Satz von Filamenten (10) Seite an Seite entlang einer ersten Längsteillänge (L1) des gedrehten Kernelements (3) angeordnet ist, wobei die Filamente (10) des ersten Satzes von Filamenten einen ersten Filamentdurchmesser (D1) aufweisen, wobei ein zweiter Satz von Filamenten (20) entlang einer zweiten Längsteillänge (L2) des gedrehten Kernelements (3) angeordnet ist, wobei die Filamente (20) des zweiten Satzes von Filamenten einen zweiten Filamentdurchmesser (D2) aufweisen, wobei der zweite Filamentdurchmesser (D2) kleiner als der erste Filamentdurchmesser (D1) ist, indem der zweite Filamentdurchmesser (D2) zwischen 60-95 % des ersten Filamentdurchmessers (D1) beträgt, wobei die zweite Längsteillänge (L2) an einem distalen Ende (5) der Interdentalbürste (1) positioniert ist, und wobei die zweite Teillänge eine Länge (L2) entlang der Längsrichtung (L) aufweist, die weniger als 15 % einer Längserstreckung (L3) des Bürstenabschnitts (2) beträgt und sich entlang weniger als drei Drehungen des Kernelements (3) erstreckt, wodurch der Übergang in wahrgenommenen Eigenschaften, der durch die Verwendung der zwei verschiedenen Sätze von Filamenten (10, 20) gebildet wird, nahe dem distalen Ende (5) bereitgestellt wird, und dadurch eine Einführungsspitze (B) an dem distalen Ende (5) der Interdentalbürste (1) bereitgestellt wird.
6. Interdentalbürste nach Anspruch 5, wobei der zweite Filamentdurchmesser (D2) zwischen 66-90 % des ersten Filamentdurchmessers (D1) beträgt.
7. Interdentalbürste nach einem der Ansprüche 5-6, wobei die Filamente (10, 20) des ersten Satzes von Filamenten (10) und des zweiten Satzes von Filamenten (20) aus dem gleichen Material oder aus unterschiedlichen Materialien mit Materialsteifigkeiten gebildet sind, sodass die Filamente (20) mit dem zweiten Filamentdurchmesser (D2) einen reduzierten Biege- widerstand im Vergleich zu den Filamenten (10) mit dem ersten Filamentdurchmesser (D1) aufweisen.
8. Interdentalbürste nach einem der Ansprüche 5-7, wobei die zweite Teillänge eine Länge (L2) aufweist, die sich entlang von weniger als zwei Drehungen des Kernelements (3) erstreckt.
9. Interdentalbürste nach einem der Ansprüche 5-8, wobei der Bürstenabschnitt (2) der Interdentalbürste (1) eine leichte konische Form an dem distalen Ende (5) aufweist.
10. Interdentalbürste nach Anspruch 9, wobei kürzere Filamente des zweiten Satzes von Filamenten an dem distalen Ende (5) einen geringeren Biege- widerstand aufweisen als längere Filamente des ersten Satzes von Filamenten.
11. Interdentalbürste nach einem der Ansprüche 5-10, wobei Filamente des zweiten Satzes von Filamenten eine Länge aufweisen, die mindestens 75 % der Länge von Filamenten des ersten Satzes von Filamenten beträgt, wobei die Länge vorzugsweise mindestens 95 % beträgt.
12. Verwendung von zwei verschiedenen Sätzen von Filamenten (10; 20), um einen Übergang in wahrgenommenen Eigenschaften nahe einem distalen Ende (5) einer Interdentalbürste (1) nach einem der Ansprüche 5-11 bereitzustellen, um eine Einführungsspitze (B) an dem distalen Ende (5) der Interdentalbürste (1) bereitzustellen, wobei die zwei verschiedenen Sätze von Filamenten (10, 20) Folgendes sind:
- ein erster Satz von Filamenten (10), der einen ersten Filamentdurchmesser (D1) aufweist und Seite an Seite entlang einer ersten Längsteillänge (L1) eines Bürstenabschnitts (2) angeordnet ist, und
- ein zweiter Satz von Filamenten (20), der einen zweiten Filamentdurchmesser (D2) aufweist und entlang einer zweiten Längsteillänge (L2) des Bürstenabschnitts (2) angeordnet ist, wobei der zweite Filamentdurchmesser (D2) kleiner als der erste Filamentdurchmesser (D1) ist, indem der zweite Filamentdurchmesser (D2) zwischen 60-95 % des ersten Filamentdurchmessers (D1) beträgt, wobei die zweite Längsteillänge (L2) an einem distalen Ende (5) der Interdentalbürste (1) positioniert ist, wobei die zweite Teillänge eine Länge (L2) entlang der Längsrichtung (L) aufweist, die weniger als 15 % einer Längserstreckung (L3) des Bürstenabschnitts (2) beträgt und sich entlang weniger als drei Drehungen des Kernelements (3) erstreckt, wodurch der Übergang in wahrgenommenen Eigenschaften, der durch die Verwendung der zwei verschiedenen Sätze von Filamenten (10, 20) gebildet wird, nahe dem distalen Ende (5) bereitgestellt wird.
13. Verwendung nach Anspruch 12, wobei der zweite

Filamentdurchmesser (D2) zwischen 66-90 % des ersten Filamentdurchmessers (D1) beträgt.

14. Verwendung nach Anspruch 12 oder 13, wobei die Filamente (10, 20) des ersten Satzes von Filamenten (10) und des zweiten Satzes von Filamenten (20) aus dem gleichen Material oder aus unterschiedlichen Materialien mit Materialsteifigkeiten gebildet sind, sodass die Filamente (20) mit dem zweiten Filamentdurchmesser (D2) einen reduzierten Biege-
widerstand im Vergleich zu den Filamenten (10) mit dem ersten Filamentdurchmesser (D1) aufweisen.
15. Verwendung nach einem der Ansprüche 12-14, wobei die zweite Teillänge eine Länge (L2) aufweist, die sich entlang von weniger als zwei Drehungen des Kernelements (3) erstreckt.

Revendications

1. Procédé de fourniture d'une pointe de guidage d'insertion (B) à une extrémité distale (5) d'une brosse interdentaire (1), le procédé comprenant:

le positionnement d'une pluralité de filaments (10, 20) côte à côte le long d'une partie brosse (2) s'étendant le long d'une direction longitudinale (L) entre deux brins (3a, 3b) d'un élément central (3), les deux brins (3a, 3b) de l'élément central (3) s'étendant côte à côte le long de la direction longitudinale (L) et étant formés par pliage de l'élément central (3), dans lequel on utilise deux ensembles différents de filaments (10, 20) pour fournir une transition dans les propriétés perçues à proximité de l'extrémité distale (5), dans lequel ladite opération de positionnement comprend:

le positionnement d'un premier ensemble de filaments (10) côte à côte le long d'une première sous-longueur longitudinale (L1) de la partie brosse (2), les filaments (10) du premier ensemble de filaments ayant un premier diamètre de filament (D1), et le positionnement d'un second ensemble de filaments (20) le long d'une seconde sous-longueur longitudinale (L2) de la partie brosse (2), les filaments (20) du second ensemble de filaments ayant un second diamètre de filament (D2), dans lequel le second diamètre de filament (D2) est inférieur au premier diamètre de filament (D1) en ce que le second diamètre de filament (D2) est entre 60 et 95 % du premier diamètre de filament (D1), dans lequel la seconde sous-longueur lon-

gitudinale (L2) est positionnée à l'extrémité distale (5) de la brosse interdentaire (1), dans lequel la seconde sous-longueur a une longueur (L2) le long de la direction longitudinale qui est inférieure à 15 % d'une extension longitudinale (L3) de la partie brosse (2), et dans lequel la seconde sous-longueur a une longueur (L2) s'étendant le long de moins de trois torsions de l'élément central (3), de sorte que la transition dans les propriétés perçues formée par l'utilisation des deux ensembles différents de filaments (10, 20) est réalisée à proximité de l'extrémité distale (5), et le procédé comprenant en outre: la torsion des deux brins (3a, 3b) autour d'un axe (A) le long de la direction longitudinale (L) pour former un élément central torsadé (3) et pour ainsi fixer les filaments (10, 20) des premier et second ensembles de filaments entre les deux brins (3a, 3b) de telle sorte que les filaments (10, 20) des premier et second ensembles de filaments s'étendent radialement à partir de l'élément central torsadé (3) et deviennent disposés côte à côte le long d'une hélice (H) s'étendant le long de la direction longitudinale (L).

2. Procédé selon la revendication 1, dans lequel le second diamètre de filament (D2) est entre 66 et 90 % du premier diamètre de filament (D1).

3. Procédé selon l'une quelconque des revendications 1 à 2, dans lequel les filaments (10, 20) du premier ensemble de filaments (10) et du second ensemble de filaments (20) sont formés du même matériau ou de matériaux différents ayant des rigidités de matériau telles que les filaments (20) ayant le second diamètre de filament (D2) ont une résistance à la flexion réduite par rapport aux filaments (10) ayant le premier diamètre de filament (D1).

4. Procédé selon l'une quelconque des revendications 1 à 3, dans lequel la seconde sous-longueur a une longueur (L2) s'étendant le long de moins de deux torsions de l'élément central (3).

5. Brosse interdentaire ayant une partie brosse (2) comprenant:

un élément central (3) plié en deux brins (3a, 3b) s'étendant l'un à côté de l'autre le long d'une direction longitudinale (L) et étant torsadés autour d'un axe (A) s'étendant le long de la direction longitudinale (L), et une pluralité de filaments (10, 20) étant fixés entre les deux brins (3a, 3b) et s'étendant radiale-

- ment à partir de l'élément central torsadé (3) et étant disposés côte à côte le long d'une hélice (H) s'étendant le long de la direction longitudinale (L) formant ainsi la partie brosse (2), dans laquelle on utilise deux ensembles différents de filaments (10, 20) pour fournir une transition dans les propriétés perçues à proximité de l'extrémité distale (5),
- dans laquelle un premier ensemble de filaments (10) est disposé côte à côte le long d'une première sous-longueur longitudinale (L1) de l'élément central torsadé (3), les filaments (10) du premier ensemble de filaments ayant un premier diamètre de filament (D1),
- dans laquelle un second ensemble de filaments (20) est disposé le long d'une seconde sous-longueur longitudinale (L2) de l'élément central torsadé (3), les filaments (20) du second ensemble de filaments ayant un second diamètre de filament (D2),
- dans laquelle le second diamètre de filament (D2) est inférieur au premier diamètre de filament (D1) en ce que le second diamètre de filament (D2) est entre 60 et 95 % du premier diamètre de filament (D1),
- dans laquelle la seconde sous-longueur longitudinale (L2) est positionnée à une extrémité distale (5) de la brosse interdentaire (1), et
- dans laquelle la seconde sous-longueur a une longueur (L2) le long de la direction longitudinale (L) qui est inférieure à 15 % d'une extension longitudinale (L3) de la partie brosse (2) et s'étendant le long de moins de trois torsions de l'élément central (3), de sorte que la transition dans les propriétés perçues formée par l'utilisation des deux ensembles différents de filaments (10, 20) est fournie à proximité de l'extrémité distale (5), et ainsi il est fourni une pointe de guidage d'insertion (B) à l'extrémité distale (5) de la brosse interdentaire (1).
6. Brosse interdentaire selon la revendication 5, dans laquelle le second diamètre de filament (D2) est entre 66 et 90 % du premier diamètre de filament (D1).
7. Brosse interdentaire selon l'une quelconque des revendications 5 à 6, dans laquelle les filaments (10, 20) du premier ensemble de filaments (10) et du second ensemble de filaments (20) sont formés du même matériau ou de matériaux différents ayant des rigidités de matériau telles que les filaments (20) ayant le second diamètre de filament (D2) ont une résistance à la flexion réduite par rapport aux filaments (10) ayant le premier diamètre de filament (D1).
8. Brosse interdentaire selon l'une quelconque des revendications 5 à 7, dans laquelle la seconde sous-
- longueur a une longueur (L2) s'étendant le long de moins de deux torsions de l'élément central (3).
9. Brosse interdentaire selon l'une quelconque des revendications 5 à 8, dans laquelle la partie brosse (2) de la brosse interdentaire (1) a une forme légèrement conique à l'extrémité distale (5).
10. Brosse interdentaire selon la revendication 9, dans laquelle les filaments plus courts dudit second ensemble de filaments à l'extrémité distale (5) ont une résistance à la flexion plus basse que les filaments plus longs dudit premier ensemble de filaments.
11. Brosse interdentaire selon l'une quelconque des revendications 5 à 10, dans laquelle les filaments dudit second ensemble de filaments ont une longueur qui est au moins 75 % de la longueur des filaments dudit premier ensemble de filaments, ladite longueur étant de préférence d'au moins 95 %.
12. Utilisation de deux ensembles différents de filaments (10, 20) pour fournir une transition dans les propriétés perçues à proximité d'une extrémité distale (5) d'une brosse interdentaire (1) selon l'une quelconque des revendications 5 à 11, pour fournir une pointe de guidage d'insertion (B) à l'extrémité distale (5) de la brosse interdentaire (1), les deux ensembles différents de filaments (10, 20) étant:
- un premier ensemble de filaments (10) ayant un premier diamètre de filament (D1) et étant disposés côte à côte le long d'une première sous-longueur longitudinale (L1) d'une partie brosse (2), et
- un second ensemble de filaments (20) ayant un second diamètre de filament (D2) et étant disposé le long d'une seconde sous-longueur longitudinale (L2) de la partie brosse (2), le second diamètre de filament (D2) étant inférieur au premier diamètre de filament (D1) en ce que le second diamètre de filament (D2) est entre 60 et 95 % du premier diamètre de filament (D1), la seconde sous-longueur longitudinale (L2) étant positionnée à une extrémité distale (5) de la brosse interdentaire (1),
- dans laquelle la seconde sous-longueur a une longueur (L2) le long de la direction longitudinale (L) qui est inférieure à 15 % d'une extension longitudinale (L3) de la partie brosse (2) et s'étendant le long de moins de trois torsions de l'élément central (3), de sorte que la transition dans les propriétés perçues formée par l'utilisation des deux ensembles différents de filaments (10, 20) est fournie à proximité de l'extrémité distale (5).
13. Utilisation selon la revendication 12, dans laquelle

le second diamètre de filament (D2) est entre 66 et 90 % du premier diamètre de filament (D1).

14. Utilisation selon la revendication 12 ou 13, dans laquelle les filaments (10, 20) du premier ensemble de filaments (10) et du second ensemble de filaments (20) sont formés du même matériau ou de matériaux différents ayant des rigidités de matériau telles que les filaments (20) ayant le second diamètre de filament (D2) ont une résistance à la flexion réduite par rapport aux filaments (10) ayant le premier diamètre de filament (D1). 5 10
15. Utilisation selon l'une quelconque des revendications 12 à 14, dans laquelle la seconde sous-longueur a une longueur (L2) s'étendant le long de moins de deux torsions de l'élément central (3). 15

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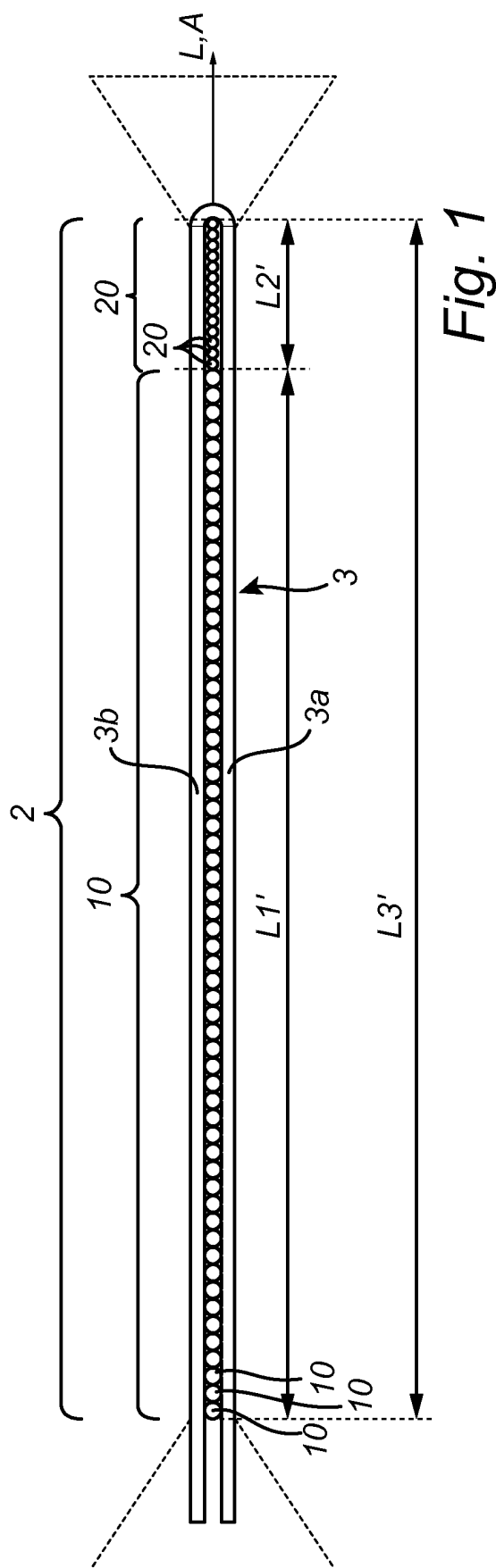
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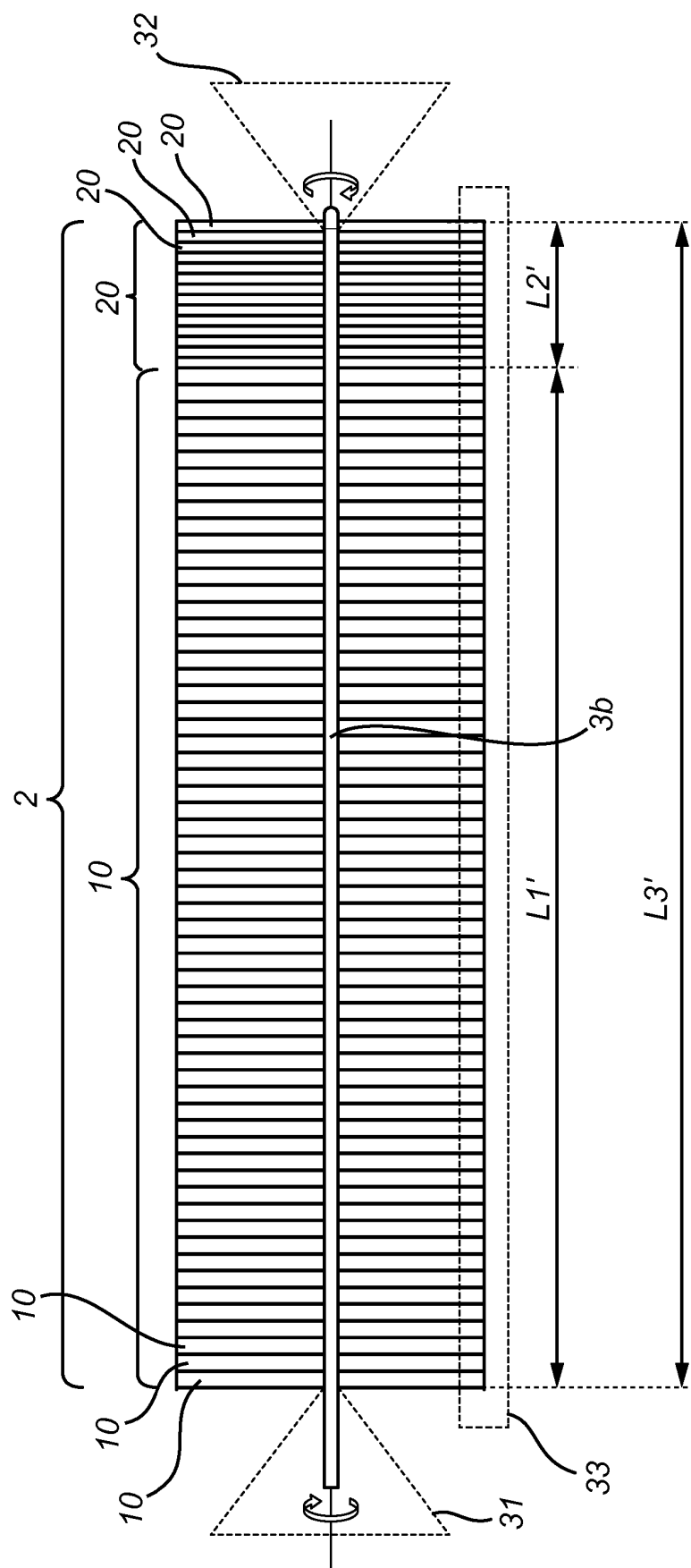
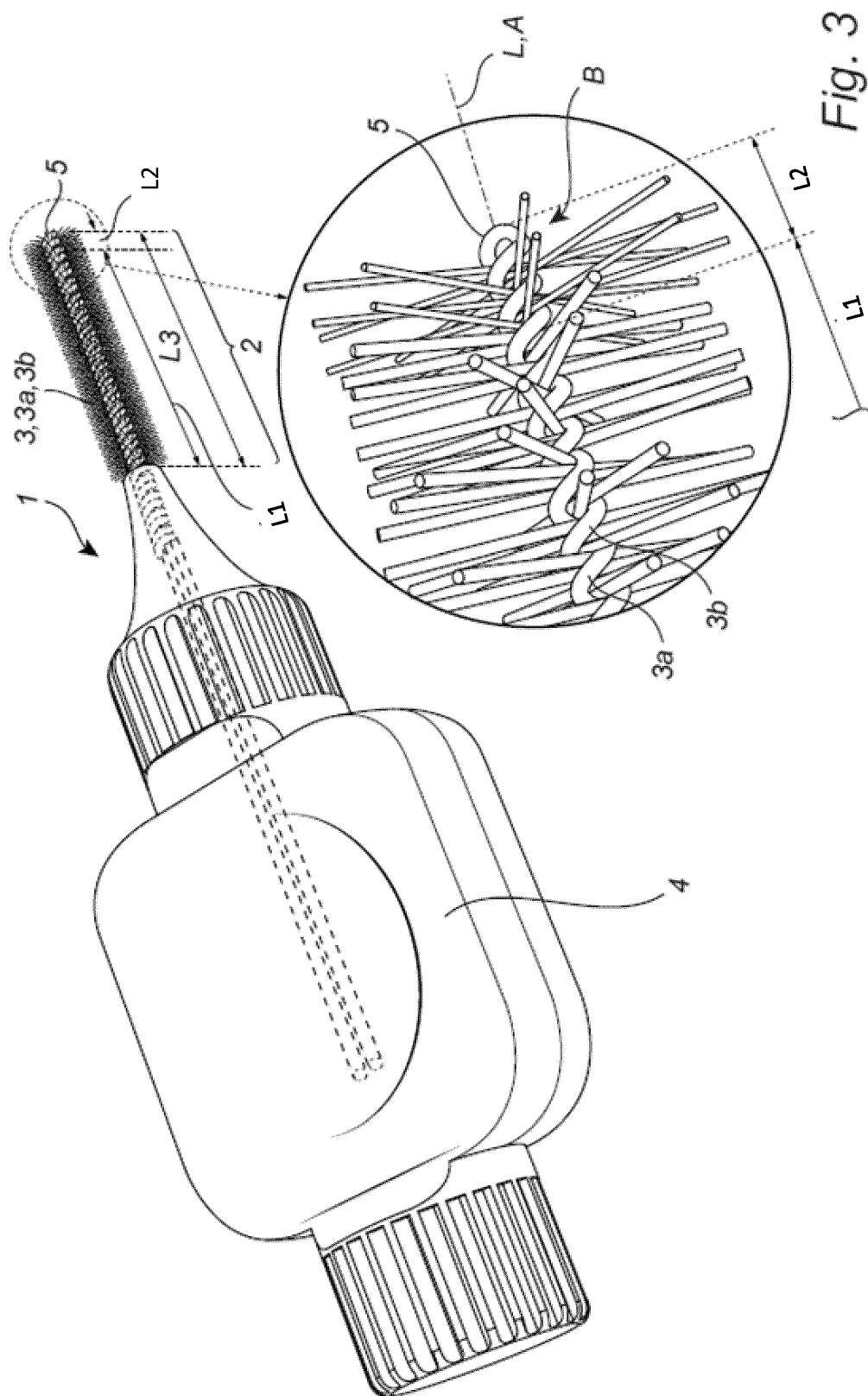


Fig. 2



CORRECTED

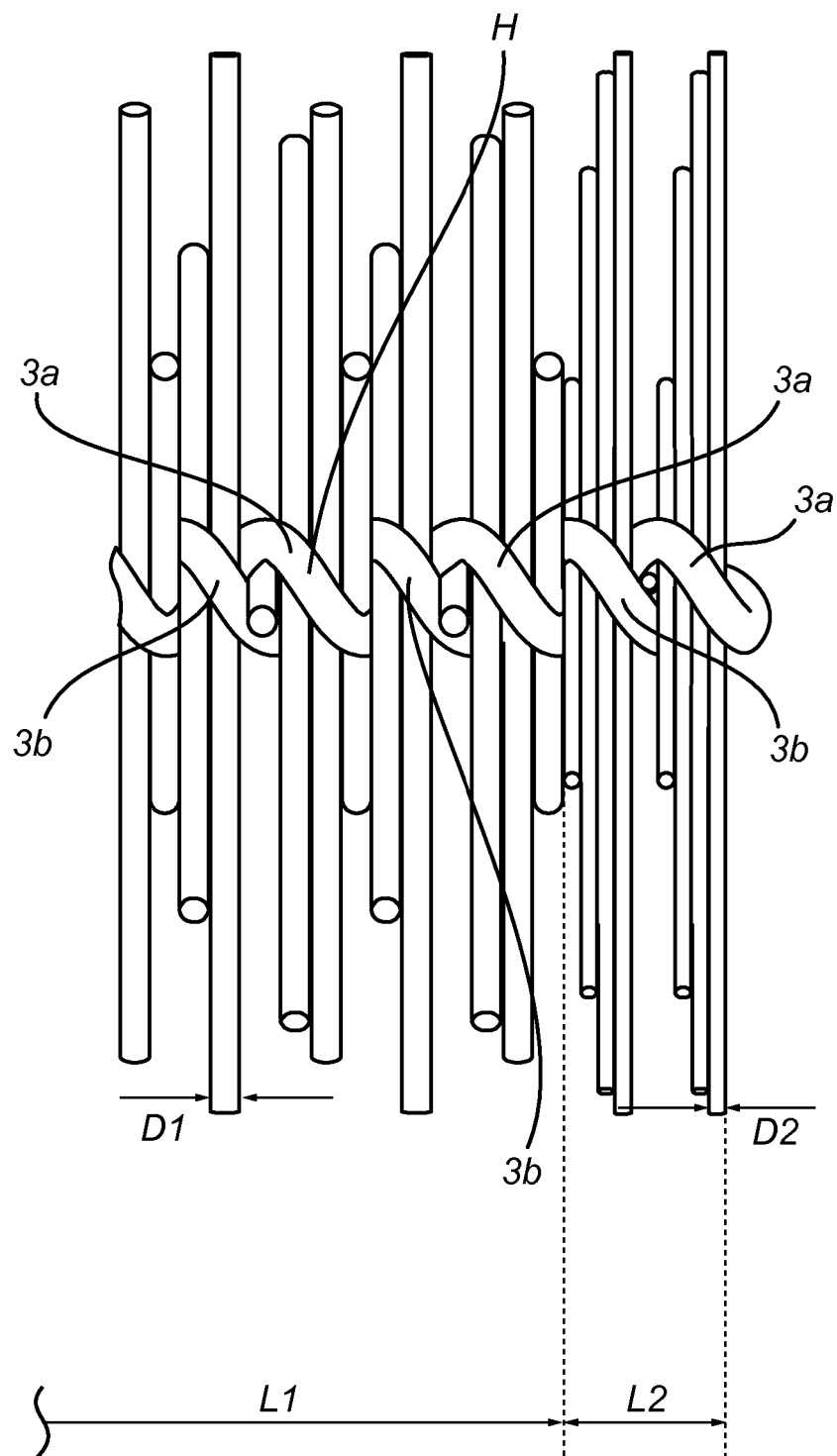


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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