

Toothbrush comprising a brush member having a bristle field and an interdental bristle field.

The invention relates to a toothbrush comprising a grip member and a brush member connected to the grip member, which brush member has a longitudinal axis and at its end remote from the grip member carries a bristle holder which is reciprocatingly drivable through a center position, which bristle holder is mounted on the brush member so as to be
5 movable with respect to a holder axis which extends transversely to the longitudinal axis and which bristle holder has a holder surface which extends substantially transversely to the holder axis and from which, in the area of the holder surface, bristles project transversely to the holder surface, which bristles together form a bristle field; and which in addition comprises an interdental bristle holder, which is reciprocatingly drivable through a center position and is
10 disposed adjacent the bristle holder in the direction of the longitudinal axis of the brush member, which interdental bristle holder is mounted on the brush member so as to be movable and has a further holder surface and from which in the area of the further holder surface interdental bristles project transversely to the further holder surface, which interdental bristles together form an interdental bristle field.

15 The invention further relates to a brush member for a toothbrush which brush member is adapted to be coupled detachably to a grip member of the toothbrush and which brush member has a longitudinal axis and at its end remote from the grip member carries a bristle holder which is reciprocatingly drivable through a center position, which bristle holder is mounted on the brush member so as to be movable with respect to a holder axis which
20 extends transversely to the longitudinal axis and which bristle holder has a holder surface which extends substantially transversely to the holder axis and from which, in the area of the holder surface, bristles project transversely to the holder surface, which bristles together form a bristle field, and which in addition comprises an interdental bristle holder, which is reciprocatingly drivable through a center position and is disposed adjacent the bristle holder in
25 the direction of the longitudinal axis of the brush member, which interdental bristle holder is mounted on the brush member so as to be movable and has a further holder surface and from which in the area of the further holder surface interdental bristles project transversely to the further holder surface, which interdental bristles together form an interdental bristle field.

Such a toothbrush of the type defined in the first paragraph and such a brush member of the type defined in the second paragraph are known, for example from the patent document WO 97/24079. The bristles of the bristle field of this known toothbrush and this known brush member have bristle lengths within a given nominal range, all the bristles on the bristle holder having a smaller length than the interdental bristles, i.e. being smaller than the interdental bristles. As a result of this configuration the situation is obtained that with the known toothbrush and the known brush member the bristles of the bristle holder serve mainly for cleaning the teeth at the location of their easily accessible lateral surfaces and, if desired, their masticatory surfaces and the interdental bristles mainly serve for cleaning the teeth at the location of the interdental spaces. In practice, it has been found that, although a satisfactory cleaning performance can be obtained with the known toothbrush, the attainable cleaning performance is still open to improvement. It is to be noted that in the patent document WO 97/24079 A1 the patent document DE 43 09 035 A1 is mentioned, which is incorporated herewith by reference.

It is an object of the invention to improve a toothbrush of the type defined in the first paragraph and a brush member of the type defined in the second paragraph in a simple manner and by simple means in order to obtain an improved toothbrush and an improved brush member.

According to the invention, in order to achieve this object a toothbrush of the type defined in the first paragraph is characterized in that the bristle field comprises a first field portion and a second field portion and in that the first field portion is disposed at the side of the bristle holder nearest the interdental bristle field and the second field portion is disposed at the side of the bristle holder remote from the interdental bristle field, and in that the bristles of the first field portion are shorter than the interdental bristles, and in that the bristles of the second field portion are longer than the bristles of the first field portion and the bristles of the second field portion thus at the same time form interdental bristles. Owing to the measures in accordance with the invention an improved toothbrush is obtained in a very simple manner and by simple means, which hardly require any additional expense, which is achieved in that in a toothbrush in accordance with the invention some of the bristles on the bristle holder are also available for the purpose of cleaning teeth in the interdental spaces. In addition to a distinctly improved removal of plaque in the interdental spaces by means of the bristles in the second field area of the bristle field, these bristles already present in the second field in conjunction with the interdental bristles provide a satisfactory positioning of the whole bristle

configuration of the brush member with respect to a tooth to be cleaned, which is advantageous for a proper cleaning of the teeth at the location of their lateral surfaces.

In a toothbrush in accordance with the invention it has proved to be advantageous to apply the measures as defined in Claims 2 and 3.

5 According to the invention, in order to achieve the object mentioned hereinbefore, a brush member of the type defined in the second paragraph is characterized in that the bristle field comprises a first field portion and a second field portion and in that the first field portion is disposed at the side of the bristle holder nearest the interdental bristle field and the second field portion is disposed at the side of the bristle holder remote from the
10 interdental bristle field, and in that the bristles of the first field portion are shorter than the interdental bristles, and in that the bristles of the second field portion are longer than the bristles of the first field portion and the bristles of the second field portion thus at the same time form interdental bristles. This provides a brush member in accordance with the invention by means of which the advantages expounded hereinbefore for a toothbrush in accordance
15 with the invention can be obtained.

The above-mentioned as well as further aspects of the invention will become apparent from the embodiment described hereinafter by way of example and will be elucidated on the basis of this embodiment.

20 The invention will now be described in more detail with reference to the drawings, which show an embodiment, given by way of example, to which the invention is not limited.

Figure 1 is a plan view to twice the full-size scale showing the relevant part of a toothbrush in accordance with an embodiment of the invention, which part of the toothbrush
25 includes the brush member of this toothbrush.

Figure 2 shows the brush member of the toothbrush of Figure 1 in a side view to the same scale as in Figure 1 and taken at the arrow II in Figure 1.

Figure 3 shows the brush member of the toothbrush of Figures 1 and 2 in a front view to the same scale as in Figures 1 and 2 and taken at the arrow III in Figure 1.

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Figure 1 shows the relevant parts of a toothbrush 1 in accordance with the invention. The toothbrush 1 has a grip member 2, which is shown only partly in Figure 1, and a brush member 3 connected to the grip member 2. As regards a possible construction of the grip member 2 and the drive means for driving the bristles of the brush member, which means

are accommodated in the grip member 2 and partly in the brush member 3, reference is made to the document WO 97/24079 A1 mentioned in the introductory part and to the international patent application bearing the application number PCT/IB 97/01357, which is incorporated herewith by reference.

5 The brush member 3 comprises a tubular portion 5, which extends in the direction of a longitudinal axis 4 of the brush member 3, and a disc portion 6 which is integrally connected to the tubular portion 5 at that end of the tubular portion 5 which is remote from the grip member 2.

10 The disc portion 6 and, consequently, the end of the brush member 3 remote from the grip member 2 carries a bristle holder 7, which is drivable so as to be reciprocable through a center position shown in Figures 1, 2 and 3. The bristle holder 7 is mounted on the brush member 3, namely on the disc portion 6 of the brush member, so as to be movable, i.e. pivotable, with respect to a holder axis 8 which extends transversely to the longitudinal axis 4, in the present case exactly perpendicularly to the longitudinal axis 4. The bristle holder 7 is
15 drivable by drive means, not shown, the bristle holder 7 performing pivotal reciprocating movement along a circular path when the bristle holder 7 is driven.

The bristle holder 7 has a holder surface 9 which extends transversely to the holder axis 8, in the present case perpendicularly to the holder axis 9. Bristles project from the bristle holder 7 in the area of the holder surface 9 and extend transversely to the holder surface
20 9, in the present case perpendicularly to the holder surface 9. The bristles which project from the bristle holder 7 together form a bristle field 10.

Moreover, the brush member 3 has an interdental bristle holder 11 which is reciprocatingly drivable through a center position also shown in Figures 1, 2 and 3 and which is disposed adjacent the bristle holder 7 in the direction of the longitudinal axis 4. In the
25 toothbrush 1 shown in Figures 1, 2 and 3 the interdental bristle holder 11 is disposed adjacent the bristle holder 7 at the side of this holder 7 which is remote from the grip member 2. The interdental bristle holder 11 is mounted on the brush member 3, i.e. on the disc portion 6 of the brush member 3, so as to be movable, i.e. so as to be pivotable. The interdental bristle holder 11 can be driven by drive means, not shown, the interdental bristle holder 11 performing a
30 reciprocating pivotal movement along a circular path. Thus, it is achieved that the interdental bristle holder 11 performs a movement which is oriented substantially in the longitudinal direction of the interdental spaces between the teeth of a user.

The interdental bristle holder 11 has a further holder surface 12. In the area of the further holder surface 12 interdental bristles 13 project from the interdental bristle holder

11 transversely to the further holder surface 12, in the present case perpendicularly to the further holder surface 12. The interdental bristles 13 together form an interdental bristle field 14.

In the toothbrush 1 shown in Figures 1, 2 and 3 the bristle field 10 of the bristle holder 7 advantageously comprises a first field portion 15 and a second field portion 16. The first field portion 15 is situated at the side of the bristle holder 7 which faces the interdental bristle field 14 and the second field portion 16 is situated at the side of the bristle holder 7 which is remote from the interdental bristle field 14. Furthermore, the configuration is advantageously set up in such a manner that the bristles 17 in the first field portion 15 are shorter than the interdental bristles 13 and that the bristles 18 in the second field portion 15 are longer than the bristles 17 in the first field portion 15. Thus, the bristles 18 in the second field portion 16 at the same time form interdental bristles.

As is apparent from Figure 2, all the bristles 17 in the first field portion 15 have the same length.

As is also apparent from Figure 2, the free ends of the bristles 18 in the second field portion 16 are bounded by two bounding planes 19 and 20 which are inclined relative to one another and which are shown diagrammatically as dash-dot lines in Figure 2.

With respect to the interdental bristles 13 it is to be noted that the interdental bristles 13 are moderately inclined relative to the interdental bristle holder 11, namely in such a manner that two groups of interdental bristles 13 are inclined towards one another, the longitudinal directions of the interdental bristles 13 of the two groups each being oriented at an angle β with a respect to a normal to the further holder surface 12, which angle is approximately 10° .

In the toothbrush 1 as shown in Figures 1 to 3 the bristles in the second field portion 16 are, in addition, also available for tooth cleaning purposes in the interdental spaces, which results in a substantial improvement of the plaque removal in the interdental spaces in comparison with known toothbrushes and known brush members for toothbrushes. In addition, the longer bristles 18 in the second field portion 16 in conjunction with the longer interdental bristles 13 provide a correct positioning of the entire bristle configuration of the brush member 3 with respect to a tooth to be cleaned, which is advantageous for a proper tooth cleaning action both in the area of their lateral surfaces and in the area of the interdental spaces.

With regard to the bristle configuration 3 of the toothbrush as shown in Figures 1, 2 and 3 it is to be noted that in a practical embodiment the following length dimensions were selected for the individual bristle areas. The bristles 17 in the first field portion 15 were

given a length of 7.6 mm. For the bristles 18 in the second field portion 16 a maximum length of 9.3 mm was selected. For the interdental bristles 13 a length of 11.0 mm was selected.

Moreover, realizations were tested in which the bristles 18 of the second field portion 16 had an equal length of approximately 9.5 to 10.0 mm.

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The invention is not limited to the embodiment described hereinbefore by way of example. In a toothbrush in accordance with the invention the interdental bristle holder may alternatively be arranged adjacent a bristle holder at the side of this bristle holder nearest the grip member of a toothbrush, in which case the second field portion of the bristle field is disposed on the bristle holder at the side of the bristle holder remote from the grip member.

CLAIMS:



1. A toothbrush (1) comprising a grip member (2) and a brush member (3) connected to the grip member (2), which brush member (3) has a longitudinal axis (4) and at its end remote from the grip member (2) carries a bristle holder (7) which is reciprocatingly drivable through a center position, which bristle holder (7) is mounted on the brush member (3) so as to be movable with respect to a holder axis (8) which extends transversely to the longitudinal axis (4) and which bristle holder (7) has a holder surface (9) which extends substantially transversely to the holder axis (8) and from which, in the area of the holder surface (9), bristles project transversely to the holder surface (9), which bristles together form a bristle field (10), and which in addition comprises an interdental bristle holder (11), which is reciprocatingly drivable through a center position and is disposed adjacent the bristle holder (7) in the direction of the longitudinal axis of the brush member,

15 which interdental bristle holder (11) is mounted on the brush member (3) so as to be movable and has a further holder surface (12) and from which in the area of the further holder surface (12) interdental bristles (13) project transversely to the further holder surface (12), which interdental bristles (13) together form an interdental bristle field (14), characterized in that

20 the bristle field (10) comprises a first field portion (15) and a second field portion (16) and in that the first field portion (15) is disposed at the side of the bristle holder (7) nearest the interdental bristle field (14) and the second field portion (16) is disposed at the side of the bristle holder (7) remote from the interdental bristle field (14), and in that the bristles (17) of the first field portion (15) are shorter than the interdental bristles (13), and

25 in that the bristles (18) of the second field portion (16) are longer than the bristles (17) of the first field portion (15) and the bristles (18) of the second field portion (16) thus at the same time form interdental bristles.

2. A toothbrush (1) as claimed in Claim 1, characterized in that

all the bristles (17) of the first field portion (15) have the same length.



3. A toothbrush (1) as claimed in Claim 1, characterized in that the bristles (18) of the second field portion (16) are bounded at their free ends by two bounding planes (19, 20) which are inclined with respect to one another in a wedge-like fashion.

4. A brush member (3) for a toothbrush (1) which brush member (3) is adapted to be coupled detachably to a grip member (2) of the toothbrush (1) and which brush member (3) has a longitudinal axis (4) and at its end remote from the grip member (2) carries a bristle holder (7) which is reciprocatingly drivable through a center position,

which bristle holder (7) is mounted on the brush member (3) so as to be movable with respect to a holder axis (8) which extends transversely to the longitudinal axis (4) and which bristle holder has a holder surface (9) which extends substantially transversely to the holder axis (8) and from which, in the area of the holder surface (9), bristles project transversely to the holder surface (9), which bristles together form a bristle field (10), and

which in addition comprises an interdental bristle holder (11), which is reciprocatingly drivable through a center position and is disposed adjacent the bristle holder (7) in the direction of the longitudinal axis of the brush member,

which interdental bristle holder (11) is mounted on the brush member (3) so as to be movable and has a further holder surface (12) and from which in the area of the further holder surface (12) interdental bristles (13) project transversely to the further holder surface (12), which interdental bristles (13) together form an interdental bristle field (14),

characterized in that

the bristle field (10) comprises a first field portion (15) and a second field portion (16) and in that the first field portion (15) is disposed at the side of the bristle holder (7) nearest the interdental bristle field (14) and the second field portion (16) is disposed at the side of the bristle holder (7) remote from the interdental bristle field (14), and

in that the bristles (17) of the first field portion (15) are shorter than the interdental bristles (13), and

in that the bristles (18) of the second field portion (16) are longer than the bristles (17) of the first field portion (15) and the bristles (18) of the second field portion (16) thus at the same time form interdental bristles.

5. A brush member (3) as claimed in Claim 4, characterized in that all the bristles (17) of the first field portion (15) have the same length.

6. A brush member (3) as claimed in Claim 5, characterized in that the bristles (18) of the second field portion (16) are bounded at their free ends by two bounding planes (19, 20) which are inclined with respect to one another in a wedge-like fashion.

