

⑫

EUROPEAN PATENT APPLICATION

⑮ Application number: **88105157.7**

⑮ Int. Cl. 4: **A46B 9/04** , **A46B 15/00**

⑯ Date of filing: **30.03.88**

⑳ Priority: **03.04.87 IT 290987**

㉑ Date of publication of application:
05.10.88 Bulletin 88/40

㉒ Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

㉓ Applicant: **Barno, Vito**
Via Ambrogio da Calepio, 4
I-24100 Bergamo(IT)

Applicant: **Invernizzi, Maria**
Via Ambrogio da Calepio, 4
I-24100 Bergamo(IT)

㉔ Inventor: **Barno, Vito**
Via Ambrogio da Calepio, 4
I-24100 Bergamo(IT)
Inventor: **Invernizzi, Maria**
Via Ambrogio da Calepio, 4
I-24100 Bergamo(IT)

㉕ Representative: **Luksch, Giorgio, Dr.-Ing. et al**
Ing. A. Giambrocono & C. S.r.l. Via Rosolino
Pilo, 19/b
I-20129 Milano(IT)

㉖ **Toothbrush with double-bristled end and auxiliary toothpick.**

㉗ This toothbrush is characterised by a working end provided with bristles projecting from both its opposing faces so as to be able to also clean teeth by vertical movements consequent on rotating the toothbrush about its axis by manipulating its symmetrical handle, which is aligned with said working end and is provided with a housing for an auxiliary toothpick.

EP 0 285 121 A2

TOOTHBRUSH WITH DOUBLE-BRISTLED END AND AUXILIARY TOOTHPICK

This invention relates to the field of tooth cleaning implements, and specifically toothbrushes.

One of the main causes of dental decay is known to be inadequate tooth cleaning. This is because food residues remaining in the tooth interstices undergo putrefaction. Sugar residues remaining in the oral cavity are particularly dangerous because as they ferment they score the enamel on the teeth so that microorganisms responsible for this decay are able to act.

Once the enamel has been scored, the dentine and pulp degenerate and erode, with the well known unpleasant effects of the consequent pulpitis.

Because of the importance of cariogenic phenomena, various methods have been proposed in the past for removing food residues from the teeth, but these methods mostly involve mechanisms and/or machines of a certain complexity which, because of their high cost, have not been well received by the public and have correspondingly found limited use.

Of these methods forming part of the current state of the art, some are based on the facility for cleaning the teeth by rotating small spiral brushes about their horizontal axis to cause the abrasive bristles to move in the correct vertical direction. This rotation, or oscillation, is mostly effected by electric motors. However, in certain cases it is effected by a stream of water which is discharged directly into the mouth, close to the cleaning bristles.

This automatic execution of such cleaning movements understandably results in overall sizes, weights and vibrational movements which are generally not compatible with the requirements of economy, lightness, simplicity and relaxativity which an implement such as a toothbrush should possess. In the case of traditional toothbrushes, the bristles with which they are provided gives them a fixed single abrasive power. This is a considerable drawback in that the delicacy of the gums varies from day to day and requires the use of different toothbrushes with differently flexible bristles, otherwise the gums are injured if the bristles are too hard, or cleaning is not sufficient if the bristles are too flexible.

An object of the present invention is to provide a toothbrush which has an efficiency comparable to that of motorised toothbrushes in spite of its manual operation.

A further object is to provide a toothbrush of cost comparable to more traditional toothbrushes.

A further object is to provide a toothbrush which can be used either in the conventional man-

ner or in a manner which enables it to exert the cleaning action typical of motorised toothbrushes and of small spiral brushes.

A further object is to provide a toothbrush which can have differing abrasive action by virtue of bristles of different flexibility.

A further object is to make readily available and to hygienically protect a toothpick able to remove food residues which cannot be removed from the tooth interstices by conventional bristles. These and further objects which will be more apparent hereinafter to experts of the art are attained by a toothbrush characterised by a working end provided with bristles projecting from both its opposing faces so as to be able to also clean teeth by vertical movements consequent on rotating the toothbrush about its axis by manipulating its symmetrical handle, which is essentially aligned with said working end and is provided with a hygienic housing for an auxiliary toothpick.

The invention is illustrated by way of non-limiting example on the accompanying drawing, in which:

Figure 1 shows a toothbrush with its bristles in side view;

Figure 2 shows the same toothbrush viewed in a perpendicular direction;

Figure 3 is a plan view of said toothbrush in the arrangement of Figure 1;

Figures 4 and 5 are two examples of possible cross-sections of a handgrip suitable for associating with the toothbrush concerned. In said figures, the reference numeral 1 indicates a handgrip or handle having an essentially rectilinear axis 2 which also forms the axis of symmetry for the end 3 carrying the bristles 4 and 5. Said end 3 is in the form of a flat stem 6 provided with holes arranged for housing the usual tufts or groups of bristles of specific consistency.

The bristles 4 or 5 can obviously be of natural or artificial type. As can be seen on the drawing, they are fixed to the two specific faces of the flat stem 6 to thus form a double toothbrush but provided with only one operating handle 1.

This advantageously enables bristles 4 and 5 to be used which are different in terms of hardness, thickness or quality. In this manner, hard bristles can be positioned on one side, whereas on the other side softer bristles suitable for delicate gums can be used. This is particularly useful as the type of bristles used can be changed-over immediately, without having to use another toothbrush.

The bristles 4 and 5 could however also be of equal flexibility, the two bristled surfaces, orien-

tated in different directions, then allowing other properties or functions to be utilised which do not necessarily depend on this difference.

One of these is to allow the tips of all teeth to be cleaned simultaneously. This is done by sliding said toothbrush along the top of the dental arch while closing the jaw sufficiently for this purpose, so simultaneously cleaning the tips of the teeth of the lower arch and the tips of the teeth of the upper arch.

A further property consequent on the opposing orientation of the bristles is to allow rapid tooth cleaning action by sliding the bristles in a single vertical direction. This is done by rotating the handle 1 by the opposing movements I and P using the forefinger and thumb. Whereas in the case of traditional toothbrushes vertical tooth cleaning movements require a tiring movement of the entire hand to be made, in the case of the toothbrush according to the invention this is done by simply rotating the roundish section of the handle 1 between the forefinger and thumb.

Said rotation can be made either always in the same direction or in alternate directions, but in either case without effort because the moving mass is represented practically only by said toothbrush and the two fingers used, the mass thus resulting in negligible inertial forces.

The rotation speed R depends not only on the force used but in particular on the diameter of the handle 1. The smaller this diameter the greater the number of revolutions it undergoes for the same linear movement (I, P) of the fingers. On the other hand, the smaller this diameter the greater the force required on its surface to overcome the reaction moment developed by the engagement of the toothbrush with the inside of the mouth, and thus the greater the possibility of the fingers slipping on the handle 1. To obtain a compromise between these two opposing situations, either the handle diameter can be suitably chosen or the handle surface can be appropriately shaped. For this purpose, the handle can have a circular cross-section and incorporate longitudinal grooves or projections (Figures 1 and 2), or can be of polygonal cross-section as shown in Figures 4 and 5, or again can have other cross-sections or surfaces of different appearance but satisfying the requirement of providing sufficient friction for the operating grip of the fingers.

In Figure 3 the tips of the bristles on the flat stem 6 follow a circular profile because as the end 3 has to rotate about its axis 2, its periphery has maximum slidability if shaped cylindrically. However, said shape could be different and a working surface be provided which is not cylindrical but simply chamfered, or undulated in accordance with various generators, without leaving the scope of the

inventive idea. A further characterising aspect of the present invention is a handle 1 provided with a cavity 7 for housing the body of a toothpick 8. Said toothpick is provided with a base 9 designed not only to allow its edges 10 to fit securely into the housing 7 but also to enable it to remain in an erect position by virtue of its large base surface 11. In this respect, as a toothpick is an implement which makes contact with internal parts of the mouth, its vertical positioning advantageously prevents it becoming a vehicle for microbes normally found on touching surfaces. Said toothpick, indicated in point form on the drawing, can however have a flat flexible end resulting in high bending strength in a given direction, although be of small thickness, so that it can be inserted between two teeth to perform the action of conventional dental floss. As shown in Figures 1 and 2, between the holding region of the handle 1 and the bristled end 3 there is a cross-sectional reduction 12 so that the pressure exerted on it by the lips does not generate obstacles to its rotation. The ideal reduced cross-section is round, but other smoothly connected reduced cross-sections are suitable, without leaving the scope of the inventive idea.

Claims

1. A toothbrush characterised by a working end (3) provided with bristles (4, 5) variously joined together and projecting from both opposing faces of its flat stem (6) so as to be able to also clean teeth by vertical movements consequent on rotating (R) the toothbrush about its axis (2) by manipulating its symmetrically cross-sectioned handle (1), which is essentially aligned with said working end (3) and is provided with a hygienic housing (7) for an auxiliary toothpick (8).

2. A toothbrush as claimed in the preceding claim, characterised by diverging bristles (4, 5) forming a smoothly connected or arcuate profile determined by generators essentially concentric to the axis (2) of the handle (1).

3. A toothbrush as claimed in the preceding claims, characterised by a rectilinear handle (1) with a cross-section or surfaces (figures 1, 2, 4, 5) such as to allow the generation of tangential friction force components able to also rotate (R) the cleaning end about the handle axis.

4. A toothbrush as claimed in the preceding claims, characterised by a handle (1) having in the vicinity of the bristled end (3) a cross-section reduction (12) which enables it to slide over the lips while rotating (R), the resultant residual cross-section therefore being essentially round.

5. A toothbrush as claimed in the preceding claims, characterised by a handle (1) of polygonal cross-section (Figures 4, 5).

6. A toothbrush as claimed in the preceding claims, characterised by a working end on which the bristles provided on one side are different from those provided on the opposite side.

7. A toothbrush as claimed in the preceding claims, characterised by a toothpick (10) which can be housed, and retained by means (10), in a cavity (7) provided in the end of the handle (1), and which has a flat strip-shaped end.

5

10

15

20

25

30

35

40

45

50

55

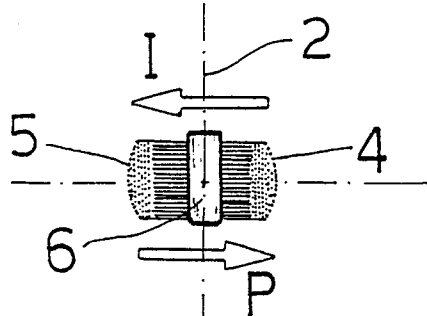
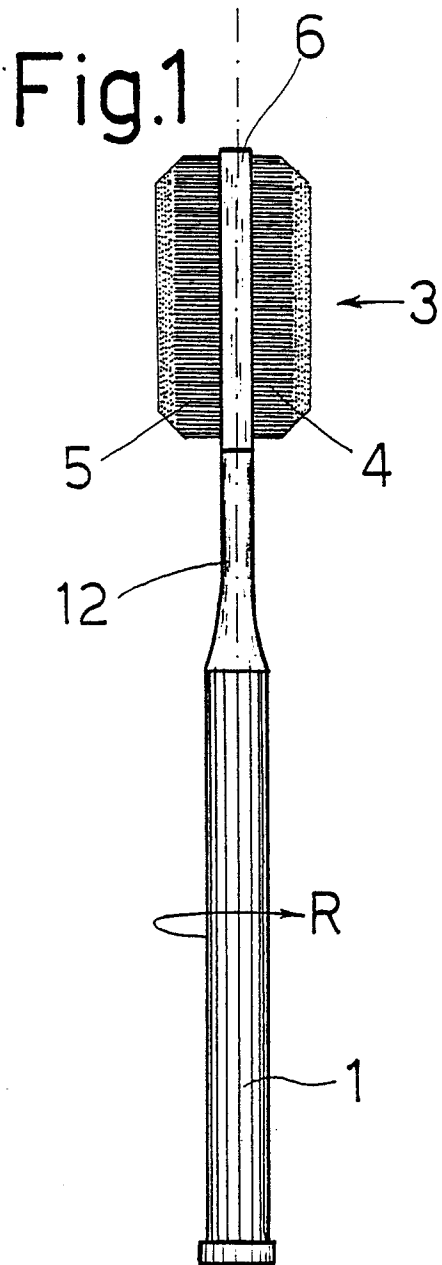


Fig.3

