United States Patent

Haije

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[54] TOOTH BRUSH

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[51] **Int. Cl.** **A46b 9/04**

[58] **Field of Search** .....15/167 R, 167 A, 22, 110

[56] **References Cited**

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[57] **ABSTRACT**

A toothbrush in which the length of the bristles varies with the longer bristles located on the outside and the shorter ones on the inside so as to define a longitudinal groove having a width about equal to half the clinical crown level and a depth about equal to half the width of the groove.

1 Claim, 2 Drawing Figures

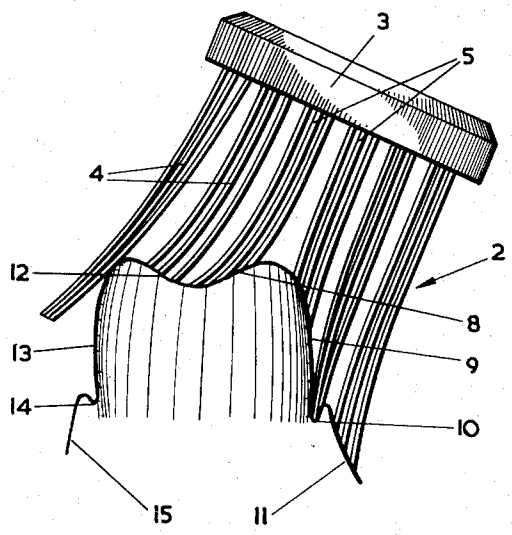

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Fig. 1

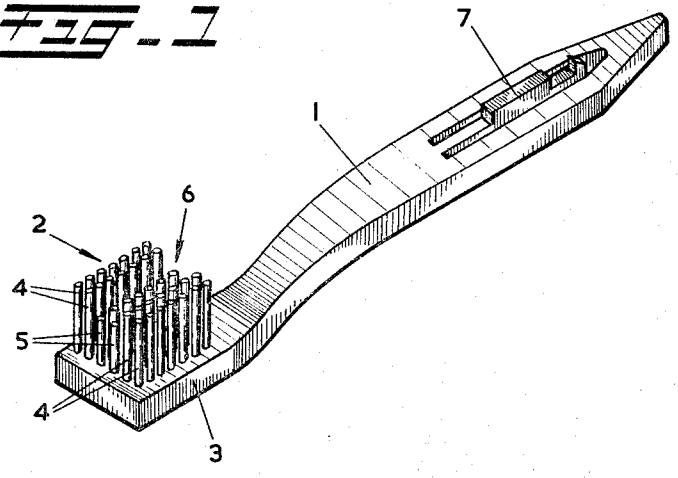
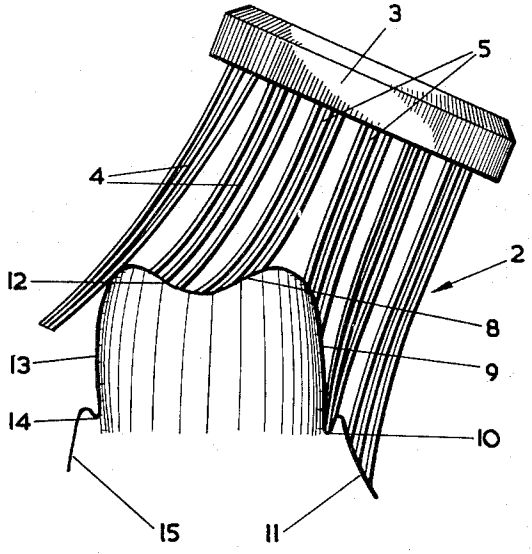


Fig. 2



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TOOTH BRUSH

The invention relates to a toothbrush, in which the bristles are shorter in the longitudinal center part of the brush than along the sides of the brush.

Such a toothbrush is known from the German Gebrauchsmuster No. 1,688,123.

The bristles of this known toothbrush have such a length that there is a crosswise, hollow, symmetrical concavity in the surface of the brush, which concavity is adapted to the somewhat convex side face of a molar.

The cleaning action of this known toothbrush is not any better in essence than that of conventional toothbrushes having bristles in the center part of the brush equal in length with those at the sides since the principle of the cleaning action is virtually the same. This principle is based on the fact that the brush is pushed against the different faces of the molars or teeth with the bristles in perpendicular position to these faces, while the brush is moved to and fro, so that the different faces of the dental members have to be cleaned one by one, whereas neither the interdental spaces nor the sulcus marginalis are cleaned.

On the contrary, the toothbrush according to the invention is based on an entirely novel principle for cleaning the dental members. This principle is based on the fact that the cleaning has to be an imitation of the natural cleaning obtained by natural chewing action. This natural cleaning is achieved by the fact that the dental members are polished by chewing coarse food, while the sulcus marginalis is cleaned and a slight pressure is exerted on the gingiva.

According to the invention, a toothbrush is disclosed and taught, which when applied in the proper way, will give a faithful imitation of this natural cleaning process, because the bristles in the center part of the brush have such lengths when compared to the lengths of the other bristles on the brush that a longitudinal groove is formed or defined in the surface of the brush bristles.

The groove has an advantageous cross-section which will generally be rectangular in shape.

When in use, the toothbrush is placed on a dental member at an angle so that the groove will cover the buccalocclusal or occlusal-lingual edge, and the brush is moved to and fro lengthwise while exerting a slight pressure. Thus, the short bristles at the bottom of the groove clean the dental member and the long bristles defining one side of the groove partly penetrate into the sulcus marginalis and clean it. The long bristles on the outer edge of the brush massage the gingiva by exerting pressure and also prevent the long bristles penetrating into the sulcus marginalis from penetrating too deeply.

Due to the presence of the groove, it is not essential for pressure to be exerted on the brush in order to urge the bristles towards the aforesaid parts, for by exerting only a slight pressure on the brush, the bristles will assume the required curve, and due to their resilience they will contact the faces and follow the convexities of these faces in their entirety when the brush is moved to and fro. In this way also the proper cleaning of the interdental spaces is achieved with the toothbrush of the invention.

In addition, the groove forms a good guideway for the brush, as said groove provides bristles of two kinds of hardnesses or flexiblity, because the short bristles are relatively harder than the long bristles. The latter property is very important because the brush has to clean and massage structures having two widely divergent hardnesses, viz. the structure of the dental members and that of the gingiva, at one and the same time.

It appears from the above that where the toothbrush according to the invention is concerned, the width of the groove and the surface of the brush, as well as the lengths of the bristles have preferably to be adapted to clinical crown level, for example, to the clinical crown level of milk teeth, or that of small, standard and large dental members for instance.

The stiffness or flexibility of the bristles, which is determined by the ratio between the lengths and thicknesses of the bristles or by the material from which they are made, has also some influence on the sizes of the brush and the groove.

The bristles in the groove of the brush according to the invention may advantageously differ in thickness from the other bristles, as a result of which the cleaning action of the brush may be improved even further.

In an embodiment of the toothbrush according to the invention in which the bristles have the same thickness, the width of the groove is about equal to half the clinical crown level, while the depth of the groove is about equal to half its width.

The bristles of the toothbrush according to the invention are preferably inserted in the form of tufts, the brush having six tufts of bristles breadthwise, two centrally disposed tufts which form the short bristles, and two tufts of long bristles on either side of these short tufts of bristles. The first four tufts of bristles, calculated from each side and including the short ones in the middle, determine a distance equal to the clinical crown level.

In order to enable the toothbrush accurately to follow the curves of the teeth, the brush is preferably provided with seven tufts of bristles in the longitudinal direction.

The toothbrush according to the invention is advantageously adapted to be mounted on an apparatus which provides the brush with a lengthwise vibration. This will facilitate the guidance of the bristles along the dental member and ensure a free movement of the bristles, so that the pressure on the gingiva may be maintained during said displacement without the gingiva being damaged in any way.

The invention will now be explained in more detail with reference to the drawing.

FIG. 1 shows an embodiment of the toothbrush according to the invention in a perspective view.

FIG. 2 shows the toothbrush of FIG. 1 in front elevational view, and in position on a dental member.

The toothbrush comprises a handle 1 and a brush 2, the brush being composed of a number of tufts of bristles implanted in a part 3 which forms an integral part of the handle 1. As seen in FIG. 2, there are six tufts of bristles in a row, the outermost two of which 4 have longer bristles than the innermost two tufts 5, so that in the surface of the brush there is formed a longitudinal groove 6.

The handle 1 is provided with a tapering end portion and a resilient pawl 7 thus enabling the toothbrush to be fitted into some type of a receiver part which is, for instance, adapted to vibrate the toothbrush in a longitudinal direction by a power operated mechanism.

When the brush is in use, it is placed on the dental members at an angle, as shown in FIG. 2, and a slight pressure is exerted on the brush, causing the innermost tufts of bristles 5 to clean the buccalocclusal face 8 and the buccal face 9, the innermost of the two long tufts of bristles 4 to penetrate into the sulcus marginalis 10 and to clean it, the outermost of these tufts of bristles 4 to massage the gingiva 11 by exerting pressure (visible anemia) and to prevent the former long tufts to penetrate too deeply into the sulcus marginalis. If the brush has completed its task in the shown position, it is placed on the occlusal-lingual edge at an angle, where it will clean in the same way the occlusal-lingual face 12, the lingual face 13, the sulcus marginalis 14 and massage the gingiva 15.

By guiding the vibrating brush in the shown position along the dental members, the slightly flexed bristles will follow the convexities of the dental members. The vibrating bristles may first be guided to the buccal by the mesial faces of the dental member if a distal movement is made. Then the bristles are approximal or between the teeth and then flow to the buccal face. The mesial face refers to the face of the tooth facing the mesial plane and distal face is the one facing away from the mesial plane. Thus, a distal movement is towards the rear of the mouth and a mesial movement is towards the front. Therefore, when the brush is moved in a mesial direction, the bristles flow in a reverse direction than as described above.

The sulcus maginalis also serves as a guide groove to urge the bristles approximal. Depending on the outward movement of the vibrator, the pressure and the speed of movement, the bristles will sooner or later slip out of the distobuccal or distolingual part of the sulcus marginalis when a distal move-

ment is made. Of course, with a mesial movement, the reverse will happen.

The toothbrush according to the invention will therefore clean simultaneously two faces and half of the mesial and distal face, while cleaning the sulcus marginalis and massaging the gingiva from the natural direction onwards without damaging the gum, all in one continuous operation within a short period of time.

In addition to this, the toothbrush is easy to handle, inasmuch as the brush may be adapted to the clinical crown level due to the guide groove which simultaneously supplies bristles of varying hardness, while only a very slight pressure has to be exerted on the bristles of the toothbrush, so that the brush has a long life.

It has been proved that the toothbrush according to the invention, preferably combined with a mesiodistal vibration, and properly applied as described above, may prevent caries, paradentosis and tartar and cure gingivitis.

Although the invention has been shown and described with reference to specific embodiments, various changes and modifications will be evident to those skilled in the art. Such changes and modifications which do not depart from the spirit, scope, and contemplation of the invention are deemed to come within its purview.

I claim:

1. A toothbrush comprising at least six tufts of bristles breadthwise and each of said tufts of bristles extending from a single flat part, the two centrally disposed tufts comprised of short bristles and the four outer tufts comprised of relatively longer bristles so that the brush bristles define a longitudinal groove centered in the surface of the brush and wherein said groove in vertical cross-section is in the form of a rectangle, the width of the surface of the brush being substantially equal to 3/2 of a clinical crown level whereby four tufts of bristles counted from one side determine a distance substantially equal to the clinical crown level and the width of the groove being substantially equal to one half of the clinical crown level while its depth is substantially equal to one-half of the width thereof, the arrangement being such that when the brush is placed on a dental member at an angle while said groove rests on one of the buccalocclusal or the occlusal-lingual edge of the dental member, the bristles of the brush by only a slight pressure to cervico approximal cover the occlusal buccal part, the entire buccal face, respectively the occlusal-lingual part and the entire lingual face of the dental member, as well as the associated sulcus marginalis and the upper part of the gingiva.

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