

[54] **CHEWING TOOTHBRUSH**

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15/160, 206; 128/62 A; 132/84

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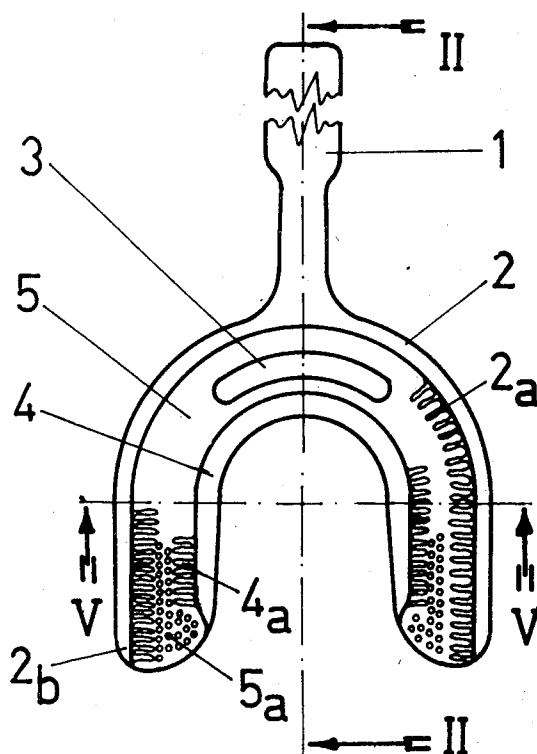
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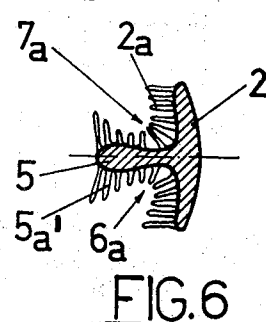
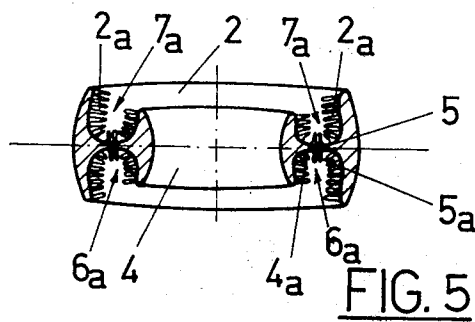
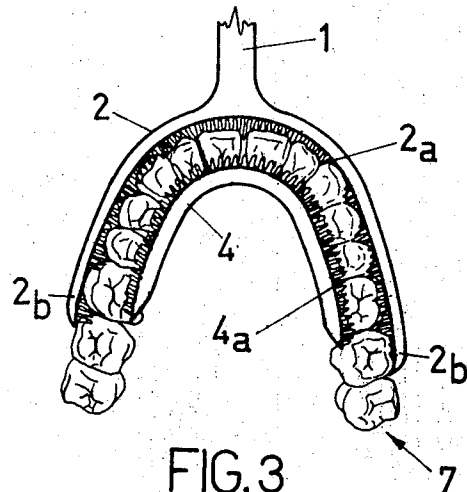
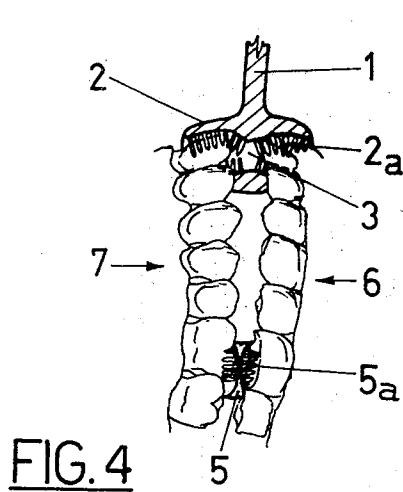
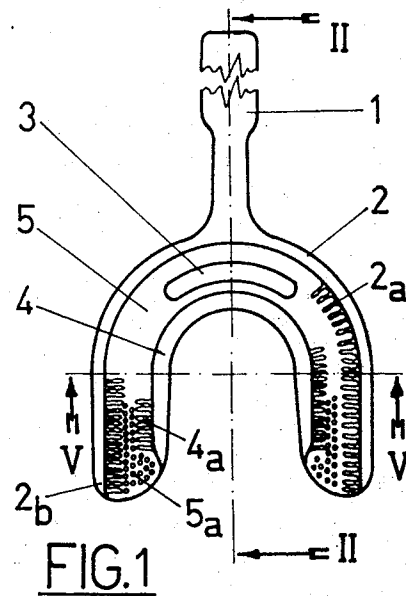
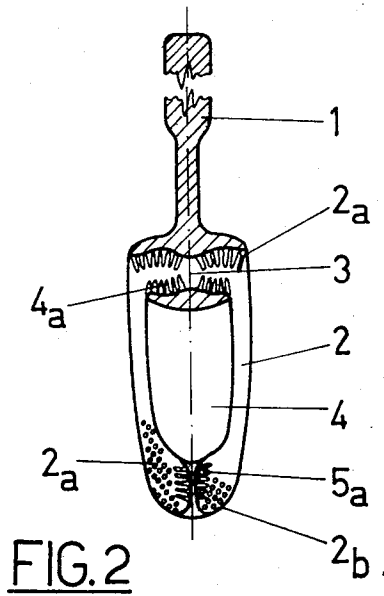
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ABSTRACT

A chewing toothbrush comprising a handle having an arcuately shaped portion of resilient material at one end thereof, which is of a size and shape to conform to the line of teeth of the user when the latter bites down onto the same. The said arcuate portion has upstanding flanges on its edges, which extend generally parallel to the lateral surfaces of the teeth, and projecting from said flanges toward the tooth surfaces are short bristles of soft, elastomeric material, which scrub the surfaces and interstices of the teeth as the user chews on the device.

2 Claims, 6 Drawing Figures





CHEWING TOOTHBRUSH

BACKGROUND OF THE INVENTION

The present invention pertains to a toothbrush of the kind in which the brushing action is simultaneously exerted in the vertical direction on the teeth of both the upper and lower jaws, and on both the inner and outer faces of the teeth, along a more or less extended portion of the arch of the teeth, by chewing into a brush whose H- or U-shaped vertical cross-section embraces the upper teeth from below, and the lower teeth from above.

The need for a toothbrush of the above-mentioned type results from the relative inefficiency of the conventional form of brush in general use today, which consists of an elongated handle ending in a spatula from which a plurality of bundles of perpendicular bristles protrude,

With toothbrushes of this kind, it is virtually impossible to clean correctly the dental interstices, into which particles of food become packed, especially from the tongue side. In addition, the problem is complicated by the fact that modern foods have lost most of their tooth self-cleaning components, and in themselves are rich in carbohydrates, which causes, for the most part, a deposit of a coating on the teeth. Such coating, in turn, causes caries and paradentopathies.

The usual, but almost ineffective horizontal scrubbing movement of the toothbrush along the arch of the teeth is indeed easy, but the necessary vertical movement of the bristles, however, is only possible on the anterior side of the jaw. For this reason children generally, and many adults, also, limit themselves to the easy, but ineffective horizontal scrubbing of the toothbrush on the anterior side of the jaw. Said rubbing movement often causes lesions of the gums and erosion of the enamel of the neck or collar of the teeth. In addition, this causes breakage of the bristles, which are made of relatively thin and fragile material protruding from the toothbrush transversely to the movement of the latter. The broken bristles then become caught in the interstices of the teeth, where they cause acute discomfort to the individual, and must be removed.

The conventional rubbing toothbrushes have white bristles, i.e., of the same color as the above-mentioned dental coating. It is therefore impossible after having used the toothbrush, to determine visually whether the bristles have removed said coating.

There have been various attempts to eliminate the above-mentioned drawbacks of the conventional spatula-shaped toothbrushes, by using chewing toothbrushes of the kind mentioned in the first paragraph of the present specification.

A first attempt to embody a chewing toothbrush provided a handle ending with a curve which sought to imitate in extent and curvature the generally parabolic arch of a normal half jaw. The cross-section of said curve in a vertical plane is generally H-shaped; the flanges of the H embracing from two sides a length of upper and lower jaw with inserted bristles which protrude toward the teeth. The web of the H consists of studs which are adjustable in length, so that they connect said flanges together at adjustable distance, the two faces of said studs being coated above and below with rubber and the like, which serves as an abutment for the biting surfaces of the teeth during the mastication cleaning of them.

This embodiment has one serious drawback: being formed in a parabolic arch of hard material, it does not conform perfectly during the mastication, neither in bending in the horizontal plane, nor in shape in the vertical section, to the manifold configurations of the jaws which are to be cleaned in practice. In addition, this embodiment lacks bristles which work on the chewing surfaces of the teeth. The movable connection at adjustable intervals of the H-flanges by means of said studs, which connection should theoretically permit the adjustment of the H-flanges to the different vertical sections of jaws and in addition its disassembly for cleaning the toothbrush, is complicated in handling and does not provide the necessary stability of the toothbrush in operation.

In an effort to make a chewing toothbrush that conforms more easily to the configuration of the jaw, second and third embodiments were tried, in which the parabolic curve of the first-mentioned embodiment was limited to a few of the teeth in the jaw. In this case, the vertical section of said curve was made H-shaped, or single-channel shaped, and having its bristles inserted on all the extent of the shape, so that the teeth could be brushed on their whole vertical periphery.

Since also these lastly described kinds of toothbrushes are made of hard material, they do not conform to the manifold configurations of different individual jaws. The toothbrushes according to the three above-described embodiments have a further common drawback, in that they are provided with inserted bunches of bristles which, in order to have the brushing flexibility required to avoid damaging the gums and the enamel of the teeth, are as long as the bristles of the conventional spatula-toothbrushes, so that the width of the vertical of the toothbrush is undesirably increased.

SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a chewing toothbrush which is used by placing it in the mouth, biting down on it, and chewing with short, vertical alternative biting movements of the jaws. The teeth are received between two rows of short, very resilient bristles, which can therefore damage neither the gums nor the enamel of the teeth. The bristles scrub vertically and on two opposite sides of the teeth of both the upper and lower jaws at the same time, both the teeth-cleaning and the gum-massage on the greater part of the jaws, and by means of slight rotation of its handle reaches the terminal portions of the jaws which extend beyond the length of the arch of the toothbrush. The latter should, moreover, enable the user to determine visually whether the dental film coating on the teeth has actually been removed.

The invention solves the problem in that the toothbrush is formed of a horse-shoe-shaped mouthpiece made of a resiliently yielding, elastomeric material, whose vertical section is in the form of two oppositely facing channels which are arranged back-to-back and are integral with a common web.

Fastened to the inner surfaces of the channels and projecting inwardly toward the corresponding tooth surfaces, are dark-colored (preferably blue-colored) brushing elements, i.e., bristles. The bristles have substantially the same flexibility and elasticity as the mouthpiece, and can be molded integrally therewith. Alternatively, the bristles can be inserted into the walls of the channels, by means of a bed-film or adhesive.

The multidirectional flexibility of all the components of the toothbrush, according to the invention, makes the toothbrush perfectly adaptable to all shapes and sizes of dental arch (jaw), and to all the vertical sections of jaw, and requires that the length of bristle be only as much as is necessary to penetrate into the dental interstices.

Thanks to the dark coloration, for example blue, of the bristles, it is now easy to see whether and how much they have actually removed of the film coating from the teeth.

One feature of the invention is that it provides a toothbrush with an H-shaped vertical section, which wholly embraces the vertical periphery of the molar teeth.

A second feature provides a toothbrush with a U-shaped vertical section. The toothbrush has therefore a single channel. This toothbrush, which cleans only one jaw at a time, is devised for teeth that protrude exceedingly from the gums (Paradentosi).

A third feature of the invention, in view of the fact that the caries appears only seldom on the tongue side of the teeth, provides a vertical section of tooth brush whose opposed channels have no tongue-sided walls i.e., a double L-shaped section, as seen in FIG. 6 of the drawings. This configuration simplifies considerably the manufacture of the toothbrush and the ease with which it enters the mouth.

A fourth feature of the invention provides a slot in the common web of the two channels, corresponding to the zone of the incisor teeth, and of the eyeteeth, which teeth being overlapping on one jaw in respect of the other jaw need, on the one hand, a passage through the common web, and on the other hand, have no chewing surface to be cleaned, as they end in a sharp, wedge-shaped biting surface.

A fifth feature provides, in the toothbrush, channels whose external side walls are more extended along the jaw than are the corresponding internal side walls, so that the toothbrush can better enter the mouth.

A sixth feature provides, in the common web of the two channels, a hollow space in correspondence to the molar teeth which thanks to the yielding established by said hollow space during the chewing movement, are better embraced by the bristles.

A final feature provides, for a better adaptation of the toothbrush to the different conditions of the chewing apparatus, that the vertical bristles are cylindrical or conical, while the transverse bristles have a lenticular or laminar cross-section.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a chewing toothbrush embodying the principles of the invention;

FIG. 2 is a sectional view of the same, taken at II—II of FIG. 1;

FIG. 3 is a view similar to FIG. 1, showing how the resilient horseshoe-shaped mouthpiece bends to accommodate itself to the dental arch of the user;

FIG. 4 is a view similar to FIG. 2, showing the working of the toothbrush on the teeth of the user;

FIG. 5 is a sectional view taken at V—V in FIG. 1; and

FIG. 6 is a fragmentary vertical section through another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, the toothbrush of the present invention is seen to comprise a handle 1 having a horseshoe-shaped mouthpiece 2 attached to one end thereof. The toothbrush is preferably molded of a relatively soft, resilient elastomeric material, such as polyethylene, for example, which is yieldable in bending so that it can conform to the dental arch, as shown in FIG. 3.

As best shown in FIG. 5, the cross-section of the mouthpiece 2 is H-shaped, with two opposed channels 6a and 7a arranged back-to-back, and sharing a common horizontal web 5, which forms the bottom of both channels. The outer side wall 2b of channels 6a, 7a is formed by a first vertical flange which extends perpendicular to the web 5 along the outer edge thereof. The inner side wall 4 of the channels is formed by a second vertical flange spaced laterally inward from flange 2b and extending perpendicular to the web 5 along the inner edge thereof. The outer side walls 2b is somewhat wider than the inner side wall 4, as seen in FIG. 5, and extends rearwardly for a slightly greater distance than does the inner wall, as shown in FIGS. 1 and 3. This configuration facilitates insertion of the mouthpiece into the mouth, using the handle 1.

Attached to the inner walls of the channels 6a 7a and preferably molded integrally with the mouthpiece 2, are inwardly projecting bristles 2a, 4a, and 5a. The vertical bristles 5a project perpendicularly upward and downward from the horizontal web 5, and these are preferably cylindrical or conical in configuration. Bristles 2a project laterally inward from the outer side wall 2b, and bristles 4a project laterally inward from the inner side wall 4. Bristles 2a and 4a can have a lenticular, or laminar, cross-section, and their long axes perpendicular to the tooth surfaces. These bristles coact with the horizontal sections of the corresponding dental interstices in order to clean the latter thoroughly and at the same time massage the gums well.

In the bottom web 5, which is common to both of the channels 6a, 7a at the midpoint of the horseshoe arch, is a length-wise-extending slot 3, as shown in FIGS. 1 and 2. The purpose of this slot is to allow the anterior teeth (i.e., the incisors and eye teeth) to pass through so their biting surfaces can come together. In this zone, there are no vertical bristles 5a, as in the zone of the molar teeth, but just lateral bristles 4a, 2a.

FIG. 5 is a vertical cross-section of the toothbrush, taken at V—V in FIG. 1, and shows the H-shaped cross-section of the mouthpiece in the zone of the molar teeth. The common web 5 which forms the bottom of the two channels 6a, 7a, and from which bristles 5a project, may alternatively be formed with a hollow space (not shown, for the sake of simplicity) which space during chewing facilitates the embracing of the molar teeth by the bristles 2a and 4a.

FIG. 6 shows a vertical section through another embodiment of the invention, in which the inner side wall (i.e., on the tongue side of the teeth) is omitted, and in its place are subvertical bristles 5a'. Bristles 5a' are longer than the bristles in the middle of the web 5, and their purpose is to reach up along the inner lateral surfaces of the teeth to clean them. This embodiment of the invention has the advantage of being much easier and therefore less expensive to manufacture, owing to its simpler structure. Moreover, it is easier to insert into

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the mouth, which might be desirable for some persons. One factor in favor of this simplified form of the invention is that caries are very rare on the tongue side of the teeth.

The toothbrush of the invention can be manufactured in different sizes, for example: small size for children, and a much larger size for adults. Should the large size tooth brush exceed the size of the user's jaws, it can easily be shortened by cutting its terminal ends, since it is made of resiliently yielding material, which can be cut with a knife or scissors.

While I have shown and described in detail what I believe to be the preferred embodiment of my invention, it will be understood by those skilled in that art that the invention could take various other shapes within the scope of the claims.

I claim:

1. A chewing toothbrush comprising a generally horseshoe-shaped mouthpiece having a handle projecting therefrom, said mouthpiece being made of a resilient, elastomeric material which is readily bendable to conform to the configuration of the curved line of teeth when bitten upon;

said mouthpiece having a horizontal web portion ex-

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tending between the opposed biting surfaces of the upper and lower teeth, and two laterally spaced, vertical flange portions extending perpendicular to said horizontal web along the inner and outer edges of the latter, said vertical flanges and said horizontal web cooperating to form upper and lower channels into which the upper and lower teeth are received when the mouthpiece is bitten down onto, the inner surfaces of said channels having a plurality of bristles protruding therefrom toward the corresponding surfaces of the teeth; and

a portion of said horizontal web being removed to form an open slot through which certain of the teeth can pass in order that their opposed biting surfaces may abut against one another.

2. A chewing toothbrush as in claim 1 wherein said open slot in the web portion is provided at the middle of the horseshoe-shaped mouthpiece to form a lengthwise extending slot therein, through which the front teeth of the user protrude to close their biting surfaces together when the mouthpiece is bitten down onto by the user.

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