

April 13, 1965

B. CYZER
TOOTHBRUSH

3,177,509

Filed March 5, 1964

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FIG. 1.

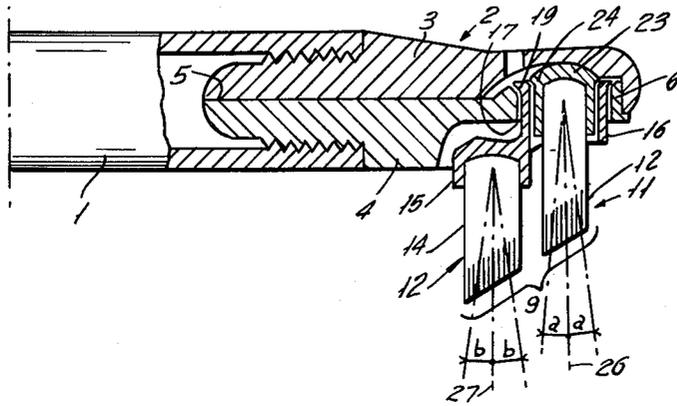


FIG. 2.

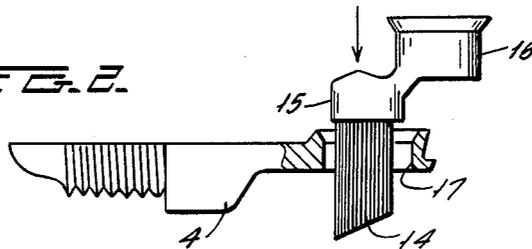


FIG. 3.

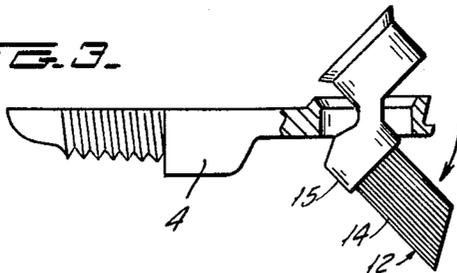
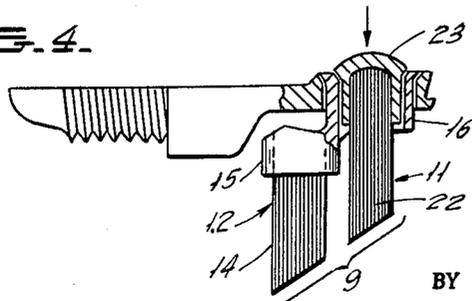


FIG. 4.



INVENTOR.
BERNARD CYZER

BY

OSTROLENY, FABER, GERB & SOFFEN
ATTORNEYS

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FIG. 5.

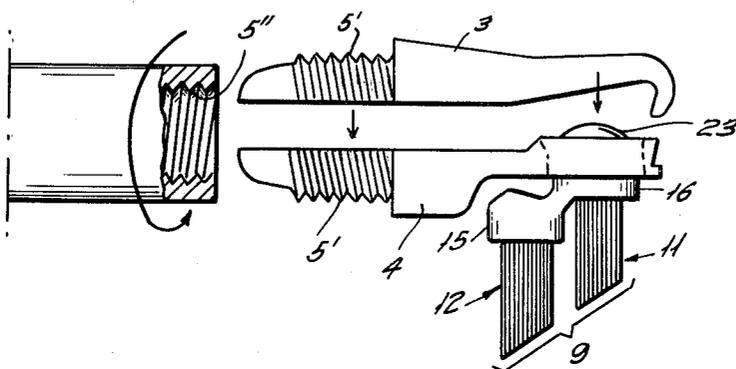
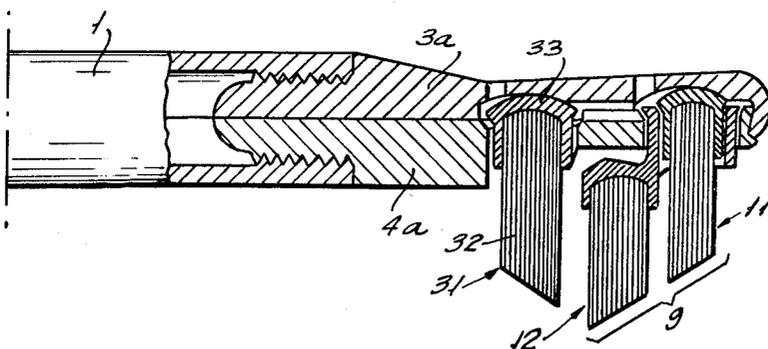


FIG. 6.



INVENTOR.
BERNARD CYZER

BY

OSTROLENN, FABER, GERB & SOFFEN

ATTORNEYS

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TOOTHBRUSH
 Bernard Cyzer, Amidar 10, Hadar Joseph,
 Tel Aviv, Israel
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 10 Claims. (Cl. 15—28)

The present invention relates to tooth brushes of the type having a head in which a plurality of bristle assemblies are movably mounted for achieving efficient cleaning results for the teeth and massage effects for the gum of the user, and is a continuation in part of my copending application Serial No. 137,169, filed September 11, 1961, now U.S. Patent No. 3,129,449.

The object of the invention is to provide a tooth brush of the aforesaid type which provides increased efficiency of cleaning while being easy to manufacture.

The tooth brush according to the present invention comprises a handle and an elongated bristle-carrying head forming an extension thereof. The head is constructed of an elongated top half-shell and a conjugated elongated bottom half-shell assembled together along a longitudinal common surface of separation. The head contains at least one bristle assembly set, comprising a cooperatively associated central bristle assembly and a planetary bristle assembly; the latter being mounted for free rotation about the axis of the central bristle assembly. The central bristle assembly is in turn mounted for rotation in the bottom half-shell on its own axis which is substantially at right angles to the common separation surface of the half-shells forming the tooth brush head.

This particular structure provides for various relative movements of the bristle assemblies during use and, therefore, thorough cleaning in the interstices between the teeth, as well as efficient massaging of the gums.

Further objects and advantages of the present invention will become more apparent in the course of the following description, wherein by way of example two embodiments have been described and shown in the accompanying drawings.

In the drawings:

FIG. 1 is a longitudinal cross section of a first embodiment of a tooth brush according to the invention.

FIGS. 2 to 5 illustrate the progressive steps of assembling to the tooth brush shown in FIG. 1.

FIG. 6 shows a modification of the tooth brush of FIG. 1.

The tooth brush illustrated in FIG. 1 comprises a handle 1 shown only partially and an elongated bristle-carrying head generally designated by the reference numeral 2 and forming an extension of the handle 1.

The head 2 is formed of two elongated half-shells, namely a top half-shell 3 and a bottom half-shell 4 assembled together along a longitudinal common surface of separation 5.

The inner ends of the two half-shells are externally screw-threaded at 5' and pressed together by their engagement in the corresponding internally screw threaded end 5'' of the handle 1. The outer end of one of the half-shells, namely the bottom half-shell 4, is suitably set in a slanting recess 6 provided in the outer end of the other half-shell 3.

A set of two associated bristle assemblies generally designated by the reference numeral 9 comprises a so-called central bristle assembly 11 and a so-called planetary bristle assembly 12.

The planetary bristle assembly 12 is formed of a number of individual bristles 14 secured in a cup 15 of generally cylindrical shape. Cup 15 is secured laterally to a substantially cylindrical bushing 16 mounted for rotary

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movement in a bore 17 provided in the bottom half-shell 4 in a direction at right angles to the surface of separation 5. In the example, the cup 15 and the bushing 16 are cast integral as a single part and together form a sort of crank rotatably mounted in the bottom half-shell 4. The inner end of the bushing 16 is provided with an annular retaining flange 19 adapted to bear against the edge of the bore 17 on the inner face of the bottom half-shell 4 so as to prevent said bushing from moving axially out of its seat.

The central bristle assembly 11 is formed of a number of individual bristles 22 anchored in a cylindrical cup 23, adapted to rotate freely in the bore of the bushing 16. The outer face of the cup bottom 23 is convex and adapted to bear against a corresponding mating portion of the top half-shell 3 in order to position the bristle assembly 11 in axial direction. The bottom of the cup 23 is, in turn, provided with an outer annular flange 23 adapted to bear against the inner end face of the bushing 16 in order to position said bristle assembly in axial direction and to prevent it from moving out of the bottom half-shell 4.

In the example represented, the bristle assemblies 11 and 12 are not only capable of rotating on and about the axis 26 of the bore 17 in the bottom half-shell 4, but also of slightly oscillating in any direction about said axis. For this purpose, sufficient play or clearance is provided between the outer surface of the cup 23 and the bore of the bushing 16 and also between the outer surface of said bushing and the bore 17 in the bottom half-shell 4. If need be, some of the surfaces involved may be conical to a certain extent.

In use, when the user manipulates the tooth brush so that the ends of the bristles engage his teeth and gums, frictional forces created by such engagement cause the bristles to oscillate and to rotate. Thus, the axis of the central bristle assembly 11 may oscillate laterally on any side of the axis 26 of the bore 17 by an angle indicated *a*, with respect to its middle position wherein it is positioned at right angles with respect to the general direction of the handle 1. In a similar manner, the planetary bristle assembly 12 may oscillate on any side by an angle indicated *b*, with respect to its middle position 27, also at right angles with respect to the general direction of the handle 1.

Furthermore, according to the amplitude of the movement being imparted to the head of the tooth brush by the user and also according to the direction of such movement, the planetary bristle assembly 12 may effect complete or partial circular movement about the central bristle assembly 11. This is achieved by bushing 16 rotating in the bore 17 of the bottom half shell 4. In the embodiment illustrated, the central bristle assembly 11 is able to rotate on its axis 26 independently of the movement of rotation of the planetary bristle assembly.

The combined oscillatory and rotary movements of both bristle assemblies provide for efficient cleaning action in the narrow interstices between the teeth and also efficient massaging of the gums.

In a modification, the cup 23 in which the bristles 22 are secured could be made fast or integral with the bushing 16 which carries the other bristles 14.

The successive steps of assembling the tooth brush are illustrated in FIGS. 2 to 5. In a first step, the planetary bristle assembly 12 is placed through the bore 17 of the bottom half-shell 4, with the bristles 14 as shown in FIG. 2; in the second step, the bristle-carrying cup 15 is brought to a slanting position as shown in FIG. 3; in a third step, the bushing 16 is located as shown in FIG. 4, and the central bristle assembly 11 with its cup 23 is then placed into the bore of the bushing 16, from the inner end

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thereof; the bristles 22 extend in the same general direction as the bristles 14 as shown in FIG. 4. Finally the top half-shell 3 is placed against the bottom half-shell 4 as shown in FIG. 5 and the handle 1 is screwthreaded about up the mating screw threaded ends 5' of the half-shells.

FIG. 6 shows a modification of the embodiment of FIG. 1 in which, in addition to the combination central and planetary bristle assembly 9, an additional bristle assembly 31 is mounted beside the central bristle assembly 11 at a distance sufficiently separated therefrom to permit unobstructed circular movement of the planetary assembly 12 between the central bristle assembly 11 and said additional bristle assembly 31.

The additional bristle assembly 31 is formed of a number of individual bristles 32 anchored in a cup 33, also rotatably mounted in a bore 34 of the bottom half-shell 4 and having a convex bottom face adapted to bear against a corresponding bearing portion of the top half-shell 3.

This additional bristle assembly 31 is also able to rotate on its own axis 35 and to oscillate slightly in any direction, provided the cup 33 is mounted with sufficient clearance in the bore 34 and/or the corresponding guiding surfaces of these two parts are slightly conical.

In the embodiments shown and described, provision is made for single combination central and planetary bristle assembly 9, but a plurality of similar bristle assemblies might be arranged in any desired manner in the head of the tooth brush. Furthermore, any number of additional bristle assemblies such as 31 may be combined according to any desired arrangement with the aforesaid combination central and planetary bristle assembly or assemblies.

As many changes could be made in the above construction and many widely different embodiments of this invention could be made without departing from the spirit and scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrated and not in a limiting sense.

What I claim is:

1. A tooth brush comprising a handle and an elongated bristle carrying head forming an extension thereof, said head being formed of an elongated top half-shell and a conjugated bottom half-shell assembled together along a longitudinal common surface of separation, at least one set of two associated bristle assemblies, each comprising a central bristle assembly and a planetary bristle assembly mounted for free rotation about the axis of said central bristle assembly, said central bristle assembly being mounted for rotation in said bottom half-shell on its own axis substantially at right angles to said surface of separation of said half-shells.

2. The tooth brush of claim 1, wherein said central bristle assembly and said planetary bristle assembly are mounted for free rotation about the axis of said central bristle assembly independent of each other,

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3. The tooth brush of claim 1, wherein said central bristle assembly is mounted for oscillating movement independent of its said rotary movement.

4. The tooth brush of claim 1, wherein said planetary bristle assembly is mounted for oscillating movement independent of its said rotary movement.

5. The tooth brush of claim 1, wherein said planetary bristle assembly is secured eccentrically to one end of a cylindrical bushing, the other end of which is provided with an outer retaining flange, said bottom half-shell having a bore with its axis at right angles to said surface of separation, the width of said bore being substantially equal to the outer diameter of said bushing, said bushing being rotatably mounted in said bore with its retaining flange in engagement with the inner face of said bottom shell, said central bristle assembly being mounted axially in said bushing.

6. The tooth brush of claim 5, wherein said central bristle assembly comprises a cylindrical cup and a set of bristles having one end thereof secured in said cup, said cup having a retaining outer flange at its end remote from its open end, said flange being in engagement with the inner end of said bushing, and said remote end of said cup being in engagement with the inner face of said top half-shell.

7. The tooth brush of claim 5, wherein said bore is somewhat greater in width than the diameter of said bushing in order to permit oscillating movement of said bristle assemblies.

8. The tooth brush of claim 5, wherein the outer face of the inner closed end of said cup is convex.

9. The tooth brush of claim 5, wherein the bristles of said planetary bristle assembly are secured to a lateral boss of said bushing having a width smaller than the bore in said bottom half-shell, thereby permitting said boss and said bushing to be passed through said bore from the inner of said bottom half-shell.

10. A tooth brush according to claim 1, further comprising at least one additional bristle assembly mounted in said bottom half-shell beside said central bristle assembly at a distance therefrom sufficiently great for permitting unobstructed rotary motion of said planetary bristle assembly therebetween.

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55 CHARLES A. WILLMUTH, *Primary Examiner*.