July 8, 1958 J. V. BLASI 2,841,806

ROTARY TOOTHBRUSH HAVING MEANS TO FEED DENTIFRICE THEREON

Filed Oct. 22, 1954

2 Sheets-Sheet 1

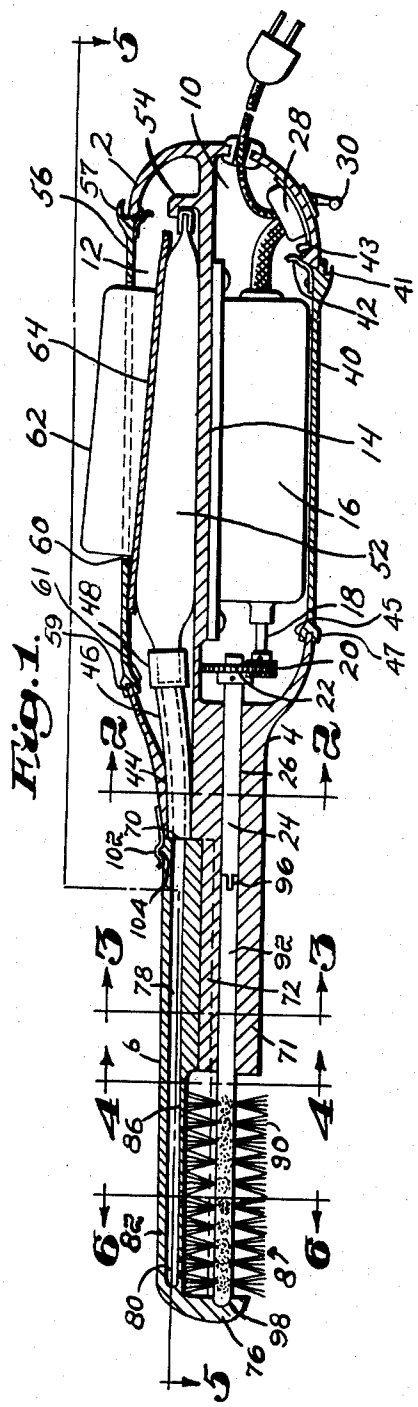

Fig. 1.

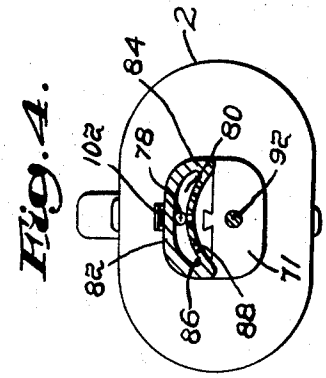

Fig. 4.

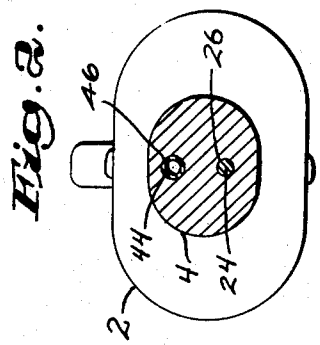

Fig. 2.

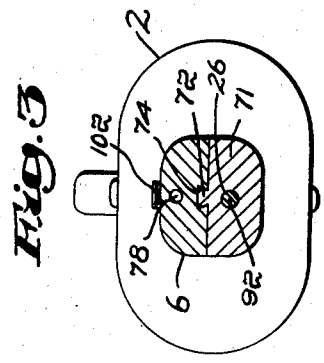

Fig. 3

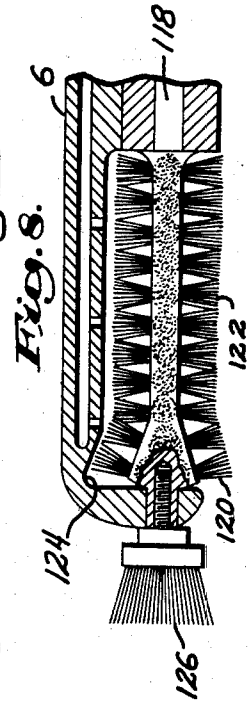

Fig. 8.

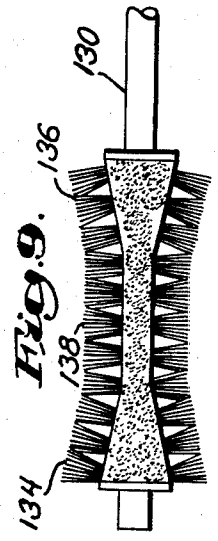

Fig. 9.

Inventor:
John V. Blasi,
by Clyndley Clittick
Attorney

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Fig. 5.

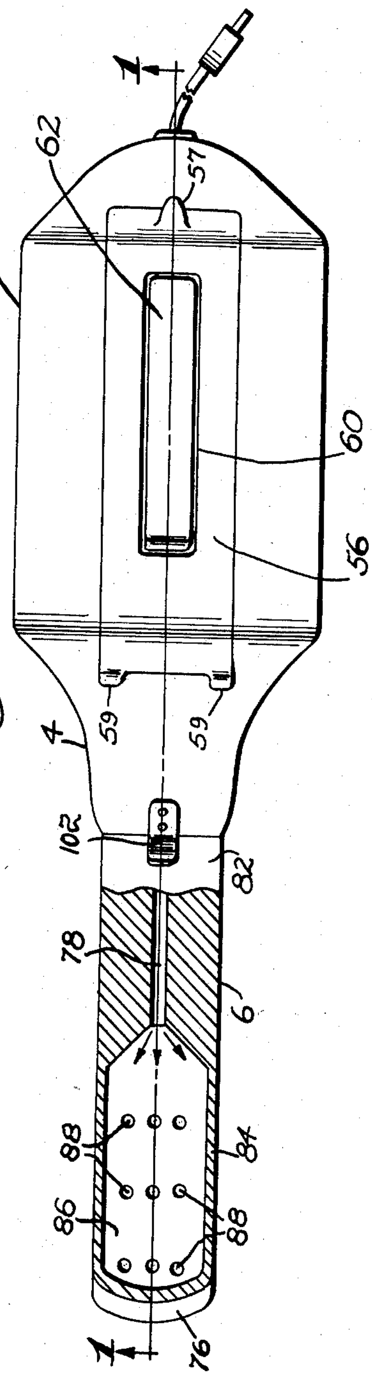


Fig. 7.

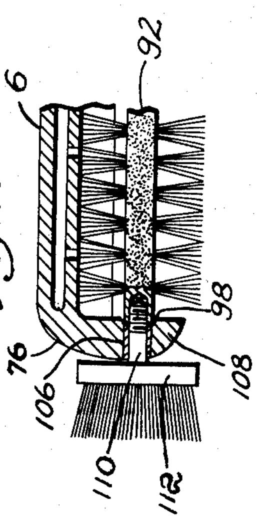
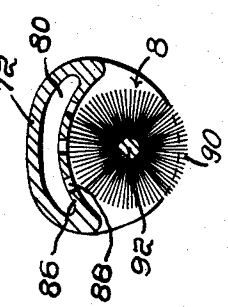


Fig. 6.



Inventor:
John V. Blasi,
by Clyardley Chittick
Attorney

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ROTARY TOOTHBRUSH HAVING MEANS TO FEED DENTIFRICE THEREON

John V. Blasi, Newton, Mass.

Application October 22, 1954, Serial No. 463,863

5 Claims. (Cl. 15—24)

This invention relates to tooth brushes and more particularly to an improved tooth brush of the rotary motor driven type.

An object of this invention is to provide a motor driven tooth brush having a guard that prevents the bristles of the rotating brush from contacting and bruising the inner side of the person's cheek.

Another object is to provide a tooth brush structure having means incorporated therein for holding a tube of dentifrice in paste form together with means for dispensing the paste out of the tube and directing it on to the rotating brush.

A further important object of this invention is to provide a rotary tooth brush that will permit the teeth to be cleaned rapidly with a gum-to-teeth scrubbing action thereby to prevent food particles from being driven up under the gum.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a sectional view in elevation of a motor driven tooth brush constructed according to this invention, the section being taken along line 1—1 of Fig. 5;

Fig. 2 is a sectional view of the neck portion of the tooth brush handle taken along line 2—2 of Fig. 1;

Fig. 3 is a sectional view of the neck portion of the tooth brush handle and the removable element mounted thereon taken along line 3—3 of Fig. 1;

Fig. 4 is a sectional view of the removable element having the dual function of a brush guard and a dentifrice dispenser, the view being taken along line 4—4 of Fig. 1;

Fig. 5 is a combination section and plan view of the assembled device, the view being taken along line 5—5 of Fig. 1;

Fig. 6 is a sectional view of the forward portion of the removable rotating brush and the removable element which functions as a brush guard and dentifrice dispenser, the section being taken along line 6—6 o f Fig. 1;

Fig. 7 is a fragmentary sectional view in elevation of a modified form of the present invention;

Fig. 8 is a fragmentary sectional view of still another modified form of the present invention; and,

Fig. 9 illustrates a modified form of brush usable in place of the brush shown in Fig. 1.

Referring to Figs. 1 and 5, there is shown a rotary tooth brush device wherein 2 generally indicates a hollow head or handle, 4 designates a neck section integral with and forming an extension of head 2, 6 indicates a removable element having the dual function of a brush guard and a dentifrice dispenser, and 8 designates a brush element removably secured in place between neck section 4 and removable element 6.

Handle 2 is of such size and configuration that it may be conveniently grasped in a person's hand and is subdivided into two compartments 10 and 12 by a partition 14. Secured to partition 14 in compartment 10 is an electric motor 16 having a drive shaft 18 carrying a small driving gear 20. Meshing with driving gear 20 is a larger driven gear 22 which is mounted on the end of a shaft 24 journaled in bore 26 in neck section 4.

Motor 16 is of the reversible type and is controlled by a switch 28 having a button 30 extending through an opening in the rear of handle 2. The exact structure of the motor and switch are not shown in detail for the primary reason that both of these elements are of standard construction, being well known to persons skilled in the art, and for the secondary reason that their details do not enter per se into the present invention. It is to be understood, however, that button 30 is movable through three positions, (1) to terminate the flow of current to motor 16, (2) to connect the field coil of the motor so as to cause drive shaft 18 to rotate in a forward direction, and (3) to reverse the field coil connections to cause the drive shaft to rotate in a reverse direction.

Access to motor 16 is afforded through an opening in head section 2 provided with a hinged cover plate 40 carrying a conventional spring clip 42 which, when snapped over abutment 43 locks plate 40 in place. At the rear of plate 40 is a lifting tab 41 engageable by the user's fingernail to facilitate removal. The front end is split to provide raised fingers 47 and an intermediate portion 45 which elements together with spring clip 42 act to hold the plate in closed position.

Spaced from bore 26 in neck section 4 is a short parallel bore 44 within which is secured a hollow conduit or tube member 46. Tube member 46 extends into compartment 12 and is provided at its free end with a threaded coupling 48. Coupling 48 is adapted to receive the threaded neck or mouth of a conventional tooth paste tube 52. Tube member 46 is preferably substantially rigid in order to prevent tooth paste tube 52 from shifting within compartment 12. However, conduit 46 may also be flexible and, if so, an L-shaped bracket 54 integral with partition 14 is provided to hold the closed end of tube 52 in place.

Access to compartment 12 is afforded through a second opening provided with a cover plate 56 which is hingedly secured at one end and snap locked at its other end in the same manner as cover 40. Cover 56 is substantially similar to cover 40 with a tab 57, raised fingers 59 and intermediate portion 61. It differs therefrom in that it is slightly longer and is provided with a slot 60 therein for receiving and guiding an elongated button 62 which is integral with a squeeze plate 64 positioned within compartment 12 between cover 56 and tooth paste tube 52. Squeeze plate 64, in the absence of application of manual pressure to button 62, loosely rests upon tooth paste tube 52 and is prevented from shifting laterally by the guiding action of slot 60 relative to button 62.

Button 62 extends for a substantial distance lengthwise of squeeze plate 64 so that by applying pressure to the button first at the closed end of tube 52 and then gradually shifting the pressure forward toward the mouth of tube 52, the tube is compressed between squeeze plate 64 and partition 14, causing the tooth paste within the tube to be squeezed out into conduit 46. Fig. 1 shows the squeeze plate in the position it assumes when a slight pressure has been exerted on the rearward end of button 62 to squeeze out a small amount of tooth paste.

As seen in Figs. 1, 2 and 3, conduit 46 terminates at 70 where neck portion 4 is cut away to provide a constricted extension 71 provided with a dovetail tenon 72 running lengthwise of the device. Dovetail tenon 72 is adapted to slidably fit within a similarly shaped mortise 74 in removable element 6. Removable element 6 comprises a forward portion 76 extending downwardly there-

from and includes a cylindrical bore **78** which communicates with conduit **46** in the region of the portion **70** when removable element **6** is in place on extension **71** of neck portion **4**. Cylindrical bore **78** connects with a flared chamber **80** provided in the forward end of removable element **6**. The top wall **82** of removable element **6** is curved downwardly on either side of the element as at **84**, in Fig. 4, and is integral with a concave wall **86** provided with a plurality of openings **88**. Tooth paste squeezed from tooth paste tube **52** into conduit **46** is forced upon continued squeezing of tube **52** through bore **78** into chamber **80**. Continued pressure applied to tooth paste tube **52** forces the tooth paste out of chamber **80** through openings **88**.

The tooth paste forced through openings **88** is picked up by the rotating bristles **90** of brush element **8**, and directed by curved surface **86** inwardly of the mouth on to the teeth with which the bristles are in contact. As seen in Fig. 1, brush element **8** comprises an elongated rod **92** to which are affixed bristles **90** at one end. The rod is positioned within bore **26** of neck section **4** and extension **71** and has at its end a slot **96** for receiving the tongue on the end of shaft **24**. The depending end **76** of removable element **6** is provided with a hemispherical depression **98** for receiving the rounded end of shaft **92** and acts as a bearing and guiding surface therefor. A spring clip **102** mounted on neck section **4** snaps over a protuberance on the top surface **82** of removable element **6**, locking the element in place relative to handle **2** so that the depending end **76** of removable section **6** maintains rod **92** in contact with drive shaft **24**.

Because of this structure substitution of another tooth brush element for the one already in place is facilitated. in practice this substitution is effected by lifting spring clip **102** out of engagement with the abutment on surface **82** of removable element **6**, and pulling removable element **6** forwardly away from handle **2**. Removable element **6** slides on the dovetail tenon **72** until it is clear of extension **71**. Brush element **8** is then pulled out of bore **62**, and another brush element is then inserted and its shaft **92** brought into driving engagement with shaft **24**. Thereafter removable element **6** is again mounted on extension **71** by alining dovetail tenon **72** with groove **74** and forcing the removable element into engagement with the undercut portion **70** of neck section **4**. The hemispherical depression **98** in depending portion **76** is automatically brought into engagement with the rounded end of shaft **92** and spring clip **102** snaps back in locking relation to element **6**.

It is evident that by incorporating a reversible motor in the structure it is possible at all times, by properly selecting the direction of rotation of the motor, to have the bristles moving in a direction leading from the gums toward the exposed portions of the teeth so as to force or draw the gums upon the teeth. This is recommended practice since it helps to prevent receding gums and exposure of the softer root portions of the teeth. In addition the action of the bristles upon the gums massages the latter and assists in bringing about a more healthful condition in the oral cavity.

When the dentifrice in tube **52** is exhausted, cover plate **56** is snapped open, and the empty tube **52** disconnected from conduit **46** by loosening coupling **48**. The empty tube is then replaced with a fresh tube which is again connected by means of coupling **48** to tube **46**.

It is to be recognized that initially a small amount of tooth paste is required to be squeezed from tube **52** in order to fill conduit **46**, bore **78**, and chamber **80**. Thereafter as additional dentifrice is squeezed out of tube **52**, it pushes dentifrice already in conduit **46** toward chamber **80**, thereby forcing tooth paste out of chamber **80** through openings **88**.

Substantially all of the tooth paste can be removed from tube **52** if pressure is applied first to the rearward end and then gradually shifted to the forward end of button **62**. In this way the sealed portion of tube **52** is squeezed first and the chance of trapping dentifrice therein is obviated.

It is believed obvious that with a device constructed as described and illustrated that the teeth may be brushed rapidly and uniformly with a minimum of manual effort and that because of the interchangeability of the brush elements, a single unit will suffice for several persons, the only individual expense being for the purchase of an individual tooth brush element.

A further advantage is that element **6**, being removable, can be easily cleaned and maintained in a sanitary condition.

A modified form of the invention having the same, plus additional, advantages is illustrated in Fig. 7. In the modified form the depending end **76** of removable element **6** is provided with bore **106** communicating with hemispherical depressions **98**. A cylindrical bearing sleeve **108** is fixedly positioned in bore **106**.

The rounded end of rod **92** of toothbrush element **8** has a tapped hole for receiving the threaded end of shaft **110** of an auxiliary toothbrush element **112**. The portion of the rounded end of rod **92** surrounding the tapped opening therein bears against depression **98** and the end of sleeve **108** so as to maintain rod **92** in engagement with the drive shaft in the same manner as in the embodiment of Fig. 1.

The auxiliary toothbrush **112** permits easy access to certain portions of the teeth and provides a concentrated rotary brush stroke particularly suitable for use with powdered abrasives and polishing agents. This type of brush is especially adapted for use in cleaning dentures and removable bridges.

When use of the auxiliary toothbrush is not required, it may be removed, thereby converting the modified form of Fig. 7 to the embodiment of Fig. 1.

Fig. 8 illustrates another modified form of the present invention. The modified form is characterized by a brush whose shaft **118** is enlarged at its forward end so that the bristles **120** at the forward end protrude more than the bristles **122** carried by the rest of the shaft. This form of brush is useful in cleaning behind the lower and upper anterior teeth. Provision is made at **124** in removable element **6** for accommodating bristles **120** so that the brush may rotate freely. Shaft **118** is adapted to receive an auxiliary tooth brush element **126** similar to brush **112** in Fig. 7 and removable element **6** is also adapted to accommodate the auxiliary tooth brush.

Fig. 9 illustrates still another form of tooth brush usable with the present invention. The tooth brush illustrated in Fig. 9 comprises a bristle-carrying shaft **130** that has two enlarged bristle-carrying areas to that the bristles **134** and **136** protrude more than the bristles **138** positioned intermediate said bristles **134** and **136**. It is to be understood, of course, that removable section **6** will be modified to accommodate bristles **134** and **136** in a manner corresponding to the modification provided in Fig. 8 for accommodating bristles **120**. The brush of Fig. 9 is especially useful in cleaning the exterior portions of the front teeth.

By modifying removable element **6** so that it will accommodate the brush of Fig. 9, the removable element will then be adapted to accommodate the forms of brushes illustrated in Figs. 1 and 8, as well.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. Therefore, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts specifically described or illustrated, and that within the scope of the appended claims it may be practiced otherwise than as specifically described or illustrated.

I claim:

1. A rotary toothbrush comprising a hollow handle for receiving a tube of toothpaste, said handle having

means adapted to be connected to the mouth of a tube of toothpaste for providing a passageway for toothpaste, a supporting arm extending outwardly from said handle, a toothbrush element comprising a shaft provided with a plurality of radially extending bristles, said shaft being rotatably mounted in said supporting arm, an electric motor mounted in said handle for rotating said brush element, means operatively coupling said motor and said shaft, a toothpaste dispenser member having a portion mounted on said supporting arm, said dispenser comprising a chamber provided with an inlet opening communicating with said toothpaste connecting means, one of the walls of said chamber extending in proximate relation to said bristles, said wall having a plurality of openings arranged to direct toothpaste onto said bristles in a radial direction, said shaft at that portion to which said bristles are affixed flaring to a larger diameter at one end, said bristles being of uniform length and extending into said shaft a uniform distance whereby the longitudinal contour of said brush element conforms to the contour of said shaft.

2. A rotary toothbrush as set forth in claim 1, the surface of said wall adjacent said bristles being shaped in longitudinal section to conform to the contour of said brush.

3. A dental appliance comprising a hollow handle divided longitudinally into two substantially coextensive compartments both of which will normally be within the confines of the user's hand, one compartment adapted to receive a tube of toothpaste, means at the outer side of said one compartment adapted to be pressed inwardly by hand pressure in a direction transverse of the length of the said tube for forcing toothpaste out of a toothpaste tube positioned in said one compartment, a toothbrush element having a plurality of radially extending bristles embedded in the periphery of a rotatable shaft, an electric motor for rotating said shaft mounted within said handle in the other compartment alongside of said tube of toothpaste, means operatively coupling said motor and said shaft, a dispenser member overlying said toothbrush element and removably secured to said handle and means for connecting said dispenser member with a toothpaste tube, said dispensing member acting to direct toothpaste forced out of a toothpaste tube onto the bristles of said toothbrush.

4. A dental device as set forth in claim 3, the said shaft flaring to a larger diameter at one end, the said bristles being of uniform length and extending into said shaft a uniform distance whereby the longitudinal contour of said tooth brush element conforms to the contour of said shaft, said dispenser member having an inner wall shaped in longitudinal section to conform to the contour of said brush element.

5. A dental appliance as set forth in claim 3, said dispenser member including an arcuate wall in concentric relation to the bristles of said toothbrush element, said wall having a plurality of outlet openings arranged to direct toothpaste onto said bristles, said shaft in which said bristles are embedded flaring to a larger diameter at one end, the said bristles being of uniform length and extending into said shaft a uniform distance whereby the longitudinal contour of said toothbrush element conforms to the contour of said shaft, the said arcuate wall being curved in longitudinal section to conform to the contour of said toothbrush element.

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