July 9, 1957 D. P. GROVER 2,798,237

ROTARY TOOTHBRUSH WITH LIP GUARD

Filed Nov. 3, 1950

Fig. 1

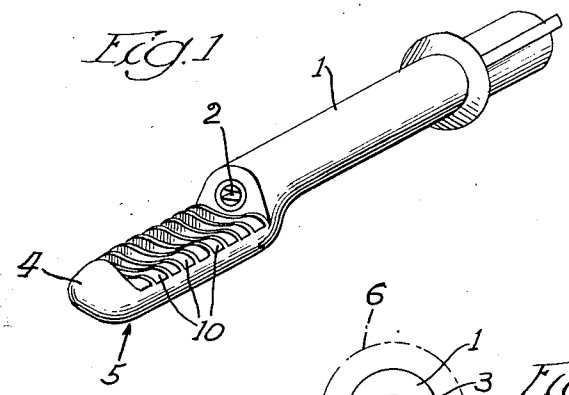


Fig. 2

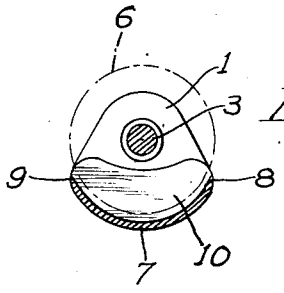


Fig. 3

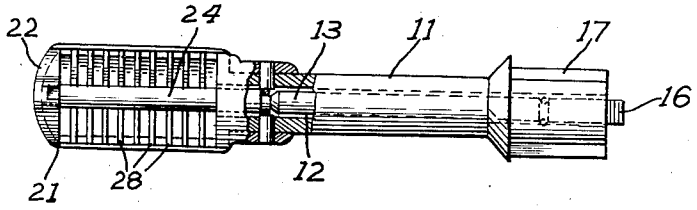


Fig. 4

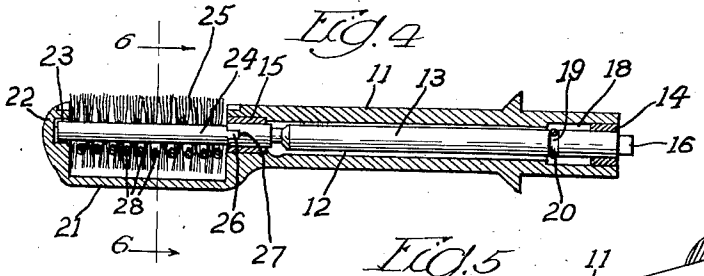


Fig. 5

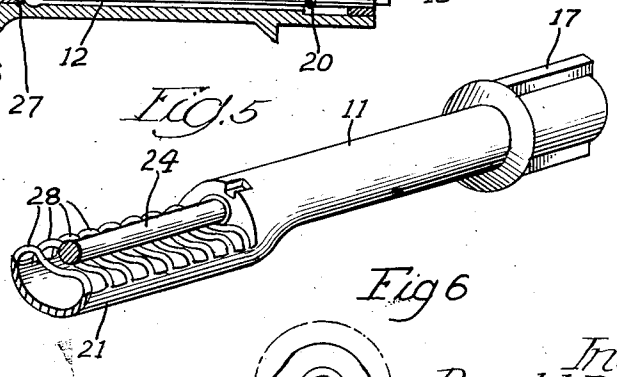
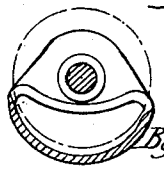


Fig 6



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ROTARY TOOTHBRUSH WITH LIP GUARD

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4 Claims. (Cl. 15—23)

This invention relates in general to rotary toothbrushes adapted to be operated by a source of electrical or other energy and, particularly, to a type of rotary toothbrush adapted for personal use as distinguished from those commonly used by dentists. The present application is a continuation-in-part combining subject matter divided out of my earlier filed co-pending applications, Serial No. 691,273, filed August 17, 1946, and Serial No. 691,979 filed August 21, 1946 now Patents Number 2,533,106 and 2,533,107, respectively.

Various forms of electrically or power driven rotary toothbrushes have been developed heretofore, but for various reasons have found little favor with the public in general. One of the disadvantages of the early type of rotary toothbrush was the absence of any shield partially surrounding the brush element whereupon the rotation of the brush caused some of the toothpaste thereon to be thrown off and splattered about and permitted the brush to contact the soft inner portions of the mouth causing irritation thereof.

A later development introduced a shield which extended lengthwise of and partially surrounded the rotating brush element, thus successfully preventing the splattering of toothpaste, and constituted an attempt, also, the protect the lips and soft portions of the mouth from being lacerated by the rotating brush. Actual usage of this type of rotary toothbrush, however, disclosed that the shield was unsatisfactory as a lip guard because the lip of a user tended to be drawn inwardly against the bristles of the brush and between the bristles and the edge of the shield when the brush was placed against the teeth.

By means of the present invention, as well as those co-pending applications referred to hereinabove, the aforementioned disadvantages of the earlier types of rotary toothbrushes have been overcome and the lip of a user has been successfully prevented from being drawn inwardly between the rotating brush and the edge of the shield.

It is, therefore, a principal object of the present invention to provide a power driven rotary toothbrush having a novel form of guard means to prevent the lip of a user from being pulled or drawn inwardly between the bristles of a brush element and the edge of a shield during rotation of the brush.

Another object of the invention is to provide a rotary toothbrush wherein a plurality of guard members are spaced along the length of the brush element and extend between the bristles on the brush, thereby effectively to prevent the lip of a user from being drawn inwardly against the brush during rotation thereof.

A further object of the invention is to provide a rotary toothbrush having a handle portion thereon wherein guard supporting means extend longitudinally of the handle portion and are provided with individual guard members spaced along the length thereof and extending between the bristles of the brush element from the upper edge of the guard supporting means, whereby the lip of a user is effectively prevented from being drawn inwardly

between the guard supporting means and the bristles of the rotating brush element.

Still another object of the invention is to provide a rotary toothbrush having a shield, or other suitable form of guard supporting means, extending lengthwise of the toothbrush handle at one end thereof, wherein guard members extend transversely of the shield or guard supporting means and are spaced apart along the length thereof a distance of approximately 3/16 inch, or less.

A still further and more specific object of the invention is to provide a rotary toothbrush, wherein guard supporting means are provided at one end of a handle portion and extend longitudinally thereof on opposite sides of a rotating brush spindle and wherein individual guard members in the form of solid partitions extend transversely of the brush spindle and therebelow and are spaced along the length of the guard supporting means.

A still further specific object of the invention is to provide a rotary toothbrush wherein guard supporting means extend lengthwise of a handle portion on opposite sides of a rotating brush spindle, and wherein a plurality of thin elongated lip guard members extend between the sides of the guard supporting means and below the brush spindle, and are spaced along the length of the guard supporting means, thereby to prevent the lip of a user from being drawn inwardly between the guard supporting means and the bristles of the rotating brush element.

Other objects and advantages of the invention will become apparent upon reading the following description taken in conjunction with the accompanying drawing in which:

Fig. 1 is a perspective view of the handle portion illustrating the shield thereon and one form of lip guard which may be used in connection therewith;

Fig. 2 is a vertical transverse sectional view through the shield and between adjacent lip guards;

Fig. 3 is a plan view with parts broken away and shown in section of the handle portion and shield, but illustrating a modified form of lip guard members;

Fig. 4 is a vertical longitudinal section through the device of Fig. 3 showing the brush element in place;

Fig. 5 is a perspective view of the device shown in Figs. 3 and 4 showing the brush spindle and shield in vertical section; and

Fig. 6 is a vertical sectional view taken along line 6—6 of Fig. 4.

Briefly described, the invention herein consists primarily in the provision of guard means against which the lip of the user of a rotary toothbrush will ordinarily bear during the use thereof to guide or direct the lip to the outer side of the shield or guard supporting means and thus prevent the lip from being drawn inwardly between the shield or guard supporting means and the bristles of the rotating brush. When the rotary brush is in use and placed against the teeth, the brush element is usually designed to rotate in a manner to brush the teeth away from the gums which is considered by dentists as the proper way to brush teeth. In actual practice where no lip guards are present, it has been found that brushes of this character in the prior art have a tendency to irritate or lacerate the soft fleshy mouth parts, and if a shield is present the irritation and laceration is caused by the tendency of the brush to pull these soft fleshy mouth parts between the brush and the edge of the shield. Serious injury to the lip and to the fleshy inner portions of the mouth may result, but if the injury is not serious it is decidedly an unsatisfactory and unpleasant experience thereby discouraging further use of the toothbrush. The resulting rawness and bleeding of the lacerated lips and fleshy inner portions of the mouth are considered to be the principal reasons for the lack of commercial, success of earlier rotary toothbrushes.

It will be apparent that numerous specific forms of guard means may be designed to accomplish the main purpose of this invention and some of such forms have been disclosed and claimed in my above referred to earlier filed co-pending applications. The inventon herein discloses, in addition to the foregoing, two more specific embodiments of the invention.

The present invention utilizes individual guard members which extend across the area provided by the shield, or other suitable guard supporting means, and pass below the spindle of the brush. The expression "below" as used herein, with reference to the location of the guard members relative to the brush spindle, is intended to indicate that the guard members pass below the spindle when the toothbrush is held so that the closed side of the shield is disposed downwardly, as illustrated particularly in Figs. 1, 4 and 5.

Referring now more particularly to the drawing, and especially to the form of the invention shown in Figs. 1 and 2, the main body or handle portion **1** may assume any desired shape and size, but preferably it should be of a size convenient to be held in the hand and should be formed of a plastic or other similar and suitable non-conducting material. Broadly speaking, the handle portion may embody its own electric motor to drive the shaft therein, or the shaft may extend through the handle portion and be driven from an external source. The specific form of the invention as disclosed herein contemplates the use of a rotatable shaft within the handle which may be easily connected to a flexible shaft for purposes of driving the brush. The handle portion **1** is provided with a suitable longitudinal opening therethrough adapted to have rotatably mounted therein a shaft which at one end thereof is preferably provided with a slot **2** adapted to receive one end of a correspondingly shaped spindle from which bristles extend to provide thereupon a brush element. The brush spindle **3** may be of any suitable and conventional form of shaft and may be rotatably mounted in a suitable bearing in the outer upturned end **4** of a shield generally indicated at **5**. The brush element has not been shown in Figs. 1 and 2 in order that the lip guard members may be more clearly seen, but the dot-dash line **6** in Fig. 2 illustrates generally the outline of the brush bristles.

The shield **5** may be formed separately and secured to the handle portion and may be formed as an integral part thereof, as shown in Fig. 1. The shield portion has preferably a curved bottom part **7** and upwardly turned sides terminating in the longitudinal guard supporting edge portions **8** and **9**. It will be apparent that if for any reason the shield as such could be omitted, then other suitable guard supporting means extending longitudinally from one end of the handle portion could be provided to take the place of the upper longitudinal opposed edges **8** and **9** of the shield **5**.

The guard members shown in Figs. 1 and 2 constitute a plurality of solid partitions **10** which extend transversely of the brush spindle **3** and between the guard supporting portions **8** and **9** of the shield and are spaced apart along the length of the shield, as shown in Fig. 1. It will be noted that each end of each partition **10** extends upwardly from the supporting edges **8** and **9** and are then curved inwardly in a substantially radial direction. The upper edges of these guard members **10** then are curved downwardly to pass below the brush spindle **3**. This construction, wherein the guard members pass below the brush spindle, is effective to permit removal and replacement of the brush element and cleaning the guard members and shield.

It has been found in actual practice that the spacing between the guard members is critical to the extent that if they are spaced apart too far they will not be effective in preventing the lip from being drawn inwardly between the shield and the bristles of the rotating brush. That is to say, if these guard members were spaced apart a distance as great as ⅜ inch or ½ inch this distance would be sufficiently great to still allow the brush to pull the lip or other soft fleshy portions of the mouth into the shield between the guard members. On the other hand, these guard members or partitions must be spaced apart far enough to permit the bristles of the brush to pass therebetween. Actual practice has proven that the maximum distance the individual guard members can be separated and still effectively prevent injury to the lip is approximately 3/16 inch. The guard members may obviously be located closer together than this maximum limit, but it has been illustrated that approximately 1/16 is about the minimum spacement which can be permitted and still allow the brush bristles to pass between the guard members and effectively clean the teeth.

It will thus be evident from the foregoing that regardless of the direction of rotation of the brush if it is placed against the teeth so that the brush will rotate in a direction to brush the teeth away from the gums, any tendency for the brush to draw the lip of the user inwardly between the edge of the shield and the rotating bristles will be prevented by the outer edges of the guard members **10** which will guide the lip outwardly over the edge of the shield thereby preventing any damage thereto.

The form of the invention illustrated in Figs. 3 to 6, inclusive, embodies similar features described above with respect to Figs. 1 and 2 except that the individual guard members are formed of thin elongated members rather than partitions. In this latter form of the invention a handle member **11** is provided with a longitudinal opening **12** adapted to receive a rotatable shaft **13**. One end of the opening **12** is provided with a bearing **14** and the opposite end has a similar bearing **15** thereby to rotatably support the shaft **13** at each end thereof. The rear or outer end of shaft **13** may be provided with a transverse rib **16** adapted to be received in a suitable opening or socket or flexible shaft (not shown) for purposes of driving the brush. The rear of the handle may also be provided with radially extending ribs **17** securely to hold the end of the flexible shaft in place.

The rear end of opening **12** is enlarged slightly as indicated at **18** and the shaft **13** is provided with an annular groove **19** adapted to receive a retaining ring **20**. This ring is received partially in the groove **19** and partially in the enlarged portion **18** of the opening **12**, whereby a longitudinal sliding movement of the shaft **13** may take place when it is not connected for use in order that the brush element may be removed therefrom as will presently be observed.

A shield **21** or other suitable supporting means may be provided at the forward end of the handle **11** and may be integral therewith, or otherwise suitably secured thereto in the same manner described above with respect to Fig. 1. The shield **21** extends longitudinally of the brush element and partially surrounds it as shown. Forward end of shield **21** has an upwardly extending end **22** having an opening at the inner side thereof to receive a bearing member **23**.

The brush spindle or shaft **24** has radially extending bristles **25** thereon and is adapted to have one end thereof received within the bearing **23**. The other end of the spindle **24** is provided with a transverse rib **26** adapted to be received within a transverse slot **27** in the outer end of shaft **13**. It will thus far be evident that when shaft **13** is connected to a flexible shaft which is, in turn, connected to a source of electrical energy for rotation, shaft **13** will be urged forwardly and rotated thereby to rotate the brush element with it. When it is desired to remove the brush element for replacement or for cleaning, shaft **13** may be moved rearwardly to disengage the slot **27** at the front end thereof from the rib **26** on the brush spindle **24** and thereupon permit the brush element to be bodily removed. It may be stated here that the same construction in detail may be utilized in connection with the form of the invention shown in Figs. 1 and 2.

The guard members in this modified form of the in-

vention consist of elements **28** which may be formed integral with or rigidly secured to the upper longitudinal edges of shield **21**. These elements **28** may be termed bars which are so shaped lengthwise as to curve upwardly at each end thereof from the longitudinal edges of the shield **21** and then downwardly and inwardly to pass beneath the brush spindle **24**. It will be apparent that since these bars **28** are shaped similarly to the upper edges of the partitions **10** in the form shown in Figs. 1 and 2, they will act in the same manner effectively to prevent the lip of a user from being drawn inwardly between the shield and the bristles of the rotating brush. The bars **28** may be formed of any suitable material, such as plastic, or may be molded at an integral part of the shield, or may be formed of thin wire and secured to the longitudinal edges of the shield as shown.

It will be noted that in both forms of the invention the guard members extend below the brush spindle, thereby permitting removal of the brush from the handle portion without disturbing the guard members. Here again the maximum spacement between the guard members **28** is critical and should not be more than approximately 3/16 inch to obtain the most effective result. The greater the spacement between the guard members the greater will be the possibility that some small portion of the lip or other fleshy soft portions of the mouth contacted may be drawn inwardly between the spaced guard members. A space of approximately 3/16 inch, or less, will effectively prevent this.

From the foregoing description it will be apparent that the present device embodies certain novel forms of lip guards for use in connection with rotary toothbrushes, all of which will effectively prevent injury to the lip and fleshy portions of the mouth of a user. As stated previously, the brush is intended to be used in such a way that rotation of the brush element is away from the gums. If the toothbrush is constructed so that the brush element always rotates in the same direction, then the lip guard in any case may be located on only one side thereof. Thus, the lip guards disclosed herein may be dispensed with along one side of the brush element without departing in any way from the spirit of the invention. The provision of lip guards along both sides of the rotating brush element may be necessary, however, if suitable mechanism is provided to reverse the direction of rotation of the brush.

From the foregoing it will be evident that a novel improvement in the art of rotary toothbrushes has been provided wherein suitable guard means effectively prevent the lip or fleshy soft portions of the mouth contacted of a user from being drawn inwardly against the brush or against the shield and the brush element when such a shield is used. It will also be clear that if it is desired to omit the shield, then other suitable guard supporting means may be utilized in its place.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A rotary toothbrush of the class described, comprising a handle portion having a rotatable shaft extending therethrough, a brush element connected to one end of said shaft and rotatable therewith, a shield partially surrounding said brush element, and a plurality of guard members on said shield extending transversely thereof and spaced apart along the length thereof a distance of approximately 3/16 inch or less, thereby to prevent the lip of a user from being drawn inwardly between the shield and the brush element during rotation thereof.

2. A rotary toothbrush of the class described, comprising a handle portion having a rotatable spindle extending therethrough, a brush element connected to one end of said spindle and rotatable therewith, a shield extending lengthwise of and partially surrounding said brush element, and a plurality of partitions spaced apart approximately 3/16 inch or less extending transversely of said shield between the bristles on said brush element, to prevent the lip of the user from being drawn inwardly between the shield and the brush element during rotation thereof.

3. A rotary toothbrush of the class described, comprising a handle portion having a rotatable shaft extending therethrough, a brush element including a brush spindle connected to one end of said shaft and rotatable therewith, guard supporting means extending axially of said handle portion on opposite sides of said brush spindle, and a plurality of partitions extending between said guard supporting means and spaced along the length thereof, at least a portion of the upper edges of said partitions passing below said brush spindle, whereby the lip of a user will be prevented from being drawn inwardly between said guard supporting means and said brush element during rotation thereof.

4. A rotary toothbrush of the class described, comprising a handle portion having a rotatable shaft extending therethrough, a brush element including a brush spindle connected to one end of said shaft and rotatable therewith, guard supporting means extending axially of said handle portion on opposite sides of said brush spindle, and a plurality of partitions extending between said guard supporting means and spaced along the length thereof a distance of approximately 3/16 inch or less, the upper edges of said partitions passing below said brush spindle, whereby the lip of a user will be prevented from being drawn inwardly between said guard supporting means and said brush element during rotation thereof.

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