Oct. 20, 1953 D. P. GROVER 2,655,675

POWER-DRIVEN TOOTHBRUSH WITH LIP GUARD

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FIG.1

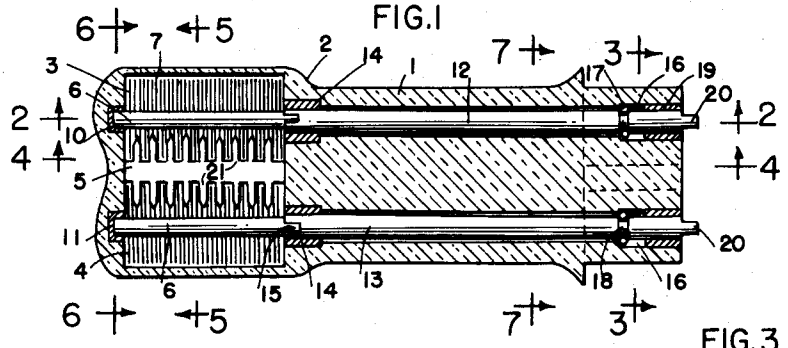


FIG.2

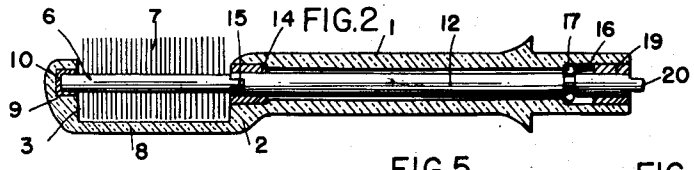


FIG.3

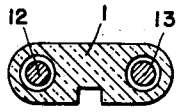


FIG.4

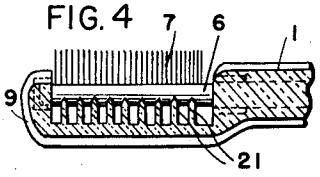


FIG.5

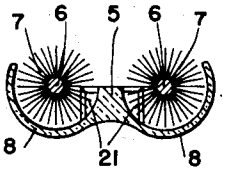


FIG.6

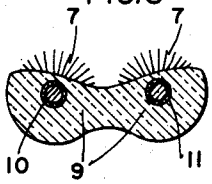


FIG.7

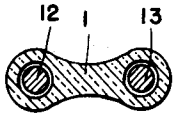


FIG.8

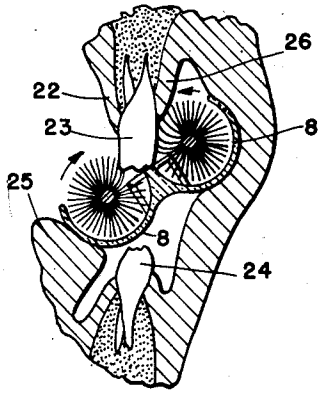


FIG.9

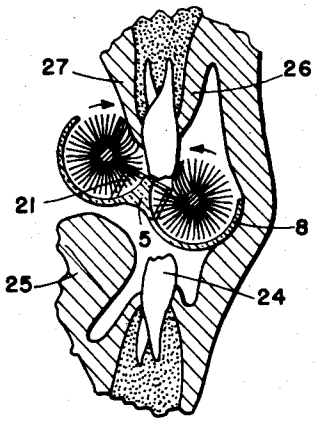
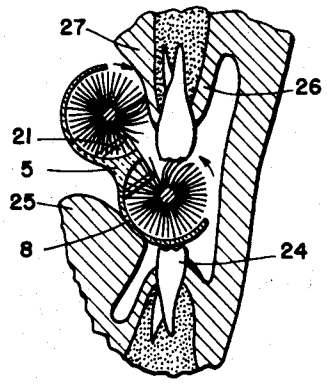


FIG.10



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FIG. 11

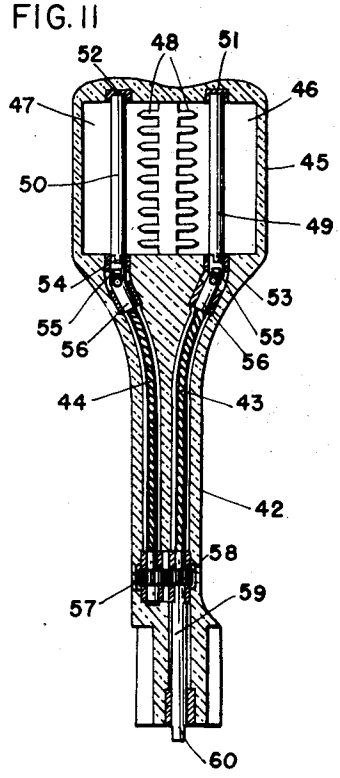


FIG. 12

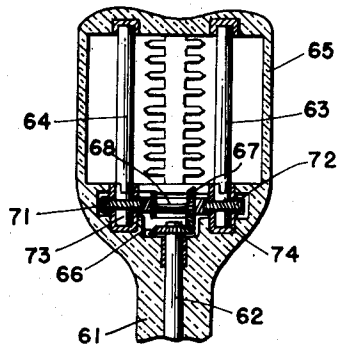
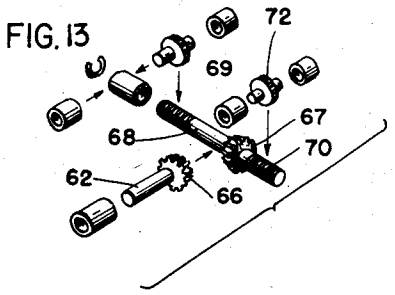


FIG. 13



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POWER-DRIVEN TOOTHBRUSH WITH LIP GUARD

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Application October 10, 1946, Serial No. 702,535

6 Claims. (Cl. 15—23)

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This invention relates in general to power driven toothbrushes and in particular to a type of rotary toothbrush adapted for personal use, as distinguished from those commonly used by dentists.

Various forms of rotary or mechanical toothbrushes have been developed heretofore, but have found very 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, thus causing some of the toothpaste on the brush to be thrown off and splattered about during the rotation of the brush and permitting 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 to prevent such splattering and mouth irritation. However, actual useage of this type of brush proved unsatisfactory because of the tendency of the lip of the user to be drawn inwardly by the bristles of the brush and between the bristles and the edge of the shield when the brush was placed against the teeth, causing laceration and irritation.

All of these earlier toothbrushes contained but a single brush element and since it is considered as important by dentists that the proper way to brush teeth is away from the gums, it has been necessary to provide some reversing mechanism in order to reverse the direction of rotation of the single brush element when cleaning upper and lower teeth. The terminology referring to cleaning or brushing the teeth away from the gums, as used herein, is intended to convey the meaning that the brushing begins on or close to the gums and moves away from the gums toward the biting surface of the teeth.

I have been able to overcome the disadvantages of these earlier types of rotary toothbrushes in my present invention, the principal object of which is to provide an electrically or mechanically driven toothbrush having a plurality of brush elements whereby the teeth of a user may be placed therebetween and thus simultaneously brush and clean the front and back sides thereof.

Another object of the invention is to provide a rotary toothbrush wherein at least two brush elements are provided to receive the teeth of a user therebetween and to rotate these brush elements toward each other in opposite directions away from the gums to insure simultaneous cleaning of the inner and outer surfaces of the teeth.

Still another object is to provide a rotary toothbrush having a plurality of rotatable brush elements wherein novel lip guards are located adjacent to one or both sides of each brush element to prevent the lip or other soft fleshy portions of the inside of the mouth of a user from being drawn inwardly between the bristles and the shield, which would cause laceration and irritation.

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A still further object is to provide novel driving means for simultaneously driving the brush elements in opposite directions.

Another and still more specific object of the invention is to provide a rotary toothbrush wherein a pair of brush elements are mounted on a handle portion or a head provided therefor in substantially parallel relation to the handle portion, whereby the teeth of a user may be placed between the brush elements for simultaneously cleaning the front and rear sides thereof.

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

Fig. 1 is a longitudinal horizontal section through one form of the device of the present invention;

Fig. 2 is a vertical longitudinal section taken substantially along the plane of line 2—2 of Fig. 1;

Fig. 3 is a vertical transverse section taken substantially along the plane of line 3—3 of Fig. 1;

Fig. 4 is a fragmentary longitudinal section substantially along the plane of line 4—4 of Fig. 1;

Fig. 5 is a vertical transverse section taken substantially along the plane of line 5—5 of Fig. 1;

Fig. 6 is a transverse section taken substantially along the plane of line 6—6 of Fig. 1;

Fig. 7 is a transverse section taken substantially along the plane of line 7—7 of Fig. 1;

Fig. 8 is a vertical section through the cheek and molars of a user showing the device of this invention in one position thereof for use;

Fig. 9 is a view similar to Fig. 8 but showing the device in a different position for use;

Fig. 10 is a view similar to Figs. 8 and 9 showing still a third position of the device in use;

Fig. 11 is a longitudinal sectional view through a modified form of the device showing a different driving mechanism;

Fig. 12 is a fragmentary longitudinal section through one end of the device showing a still further modified form of driving mechanism;

Fig. 13 is an exploded view of the driving elements shown in Fig. 12.

The present invention contemplates the use of a plurality of brush elements which are adapted to rotate, or to which any other suitable motion may be imparted which can be adapted to clean the teeth of a user when placed there-

against. The device illustrated herein is similar in some respects, particularly as to the plurality of brushes, with the device shown in my co-pending application bearing Serial No. 700,315 filed September 30, 1946. In my said co-pending application the brush elements have been illustrated as being located at right angles to the handle portion, whereas in the present invention they are illustrated as being parallel thereto. My above referred to application also discloses the use of four brush elements and it is considered within the purview of the present invention that more than the two brush elements can also be used without departing from the spirit of the invention.

Also illustrated herein are various forms of lip guards, all of which have been disclosed for use on a single brush device in one or more of my earlier filed co-pending applications, Ser. Nos. 691,273 now Patent No. 2,533,106; 691,979 now Patent No. 2,533,107; and 692,270 now Patent No. 2,533,108, which were filed respectively on August 17, 1946, August 21, 1946, and August 22, 1946, and all of said patents having been issued on December 5, 1950.

Referring now more particularly to the drawings and especially to Figs. 1 through 10, I have shown the device as including a handle portion 1 which may be formed of any suitable material or combination of materials, which terminates at one end thereof in a slightly enlarged section which may be termed a head 2.

The head may be divided into a pair of cavities or elongated recesses 3 and 4 having a partition 5 therebetween. A brush element having a spindle 6 and bristles 7 extending radially therefrom is adapted to be located in one of the cavities, while a similar brush element is likewise mounted in the other cavity. The head is provided with a bottom or lower side 8 and an upwardly extending forward end 9 adapted to receive bearing members 10 and 11 within which one end of the spindles 6 may be mounted for rotation.

The handle portion 1 is so made as to permit a pair of driving shafts 12 and 13 to extend longitudinally therethrough. The forward end of each shaft is mounted in a bearing 14 and is provided with a transversely extending slot into which a transverse rib 15 on the opposite end of each brush spindle may be received. This construction then forms a coupling so that rotation of either or both of the shafts 12 and 13 will impart of rotative movement to the brush element connected thereto.

The driving means for this device may be any suitable mechanism and may include an electric motor as an integral part of the handle or may embody a flexible shaft connected to a suitable source of rotational movement. It is more desirable and presents fewer problems in the manufacture of the device itself if such a flexible shaft is used. In the construction as illustrated in Fig. 1 the rear end of the handle portion is provided with a pair of openings 16 extending inwardly and adapted to receive the shafts 12 and 13. This opening is slightly larger than the one which extends the full length of the shaft to permit a retaining ring 17 to surround an annular groove 18 in each shaft to limit the longitudinal movement thereof. A bearing member 19 is located in each of the openings 16 and is adapted to rotatably mount the end of each of the driving shafts. It will thus be evident that the retaining rings 17 will bear against the shoulder formed between the two openings within which each shaft rotates to limit the movement of each shaft toward the brush element. From shaft at its outer end is provided with a transverse rib 20 adapted to be received in suitable openings in the end of a flexible shaft whereby when the connection is made, the shafts are caused to rotate, thus driving the brushes.

When it is desired to remove the brush elements such as for cleaning or replacement, the shafts 12 and 13 may be moved rearwardly until the retaining rings 17 bear against the inner ends of the bearings 19. This will be sufficient to give clearance to the brush element spindles and permit removal thereof.

Any suitable lip guards may be provided such as those disclosed in my above referred to co-pending applications, but the preferred form is that as shown in Fig. 1 where the central dividing partition 5 has a plurality of outwardly extending partitions or teeth 21. These teeth are spaced apart along the length of each brush element to permit the bristles thereof to extend therebetween. Thus no impairment of the cleaning qualties of the brush will occur. On the other hand the lip guards are advantageous and highly desirable in that they prevent the soft mouth parts, such as lips, tongue, and other soft fleshy portions of a user from being drawn inwardly by the rotating brush elements and thereagainst thus causing irritation and lacerations as above explained.

Figs. 8, 9 and 10 illustrate a typical use of this type of rotary toothbrush. The positions of the brush elements shown herein will be equally applicable regardless of the angular position of the two brush elements with respect to the handle portion. For example, the positions shown in these figures would be the same if the brush elements extended transversely of the handle portion as shown in my co-pending application first above referred to.

In these figures the mouth of a user may be generally indicated by the numeral 22 wherein upper teeth 23 and lower teeth 24 are shown. Also, the tongue is indicated at 25. In Fig. 8 the brush elements are shown as rotating simultaneously in opposite directions toward each other so that the bristles of the outer brush element will begin to clean on the upper outside gum 26 and will finish the cleaning motion on the outer surface of the teeth 23. At the same time the other brush element is cleaning the inner surface of the teeth.

In Fig. 9 the inner brush element is shown as beginning its cleaning movement on the inner gum portion 27 and finishing the cleaning motion on the inner surface of the tooth itself. The shield 8 has upwardly curved sides partially surrounding the brush elements and the function thereof, to prevent the tongue and cheek from being irritated by the rotating bristles, is clearly indicated in these figures.

In Fig. 10 the brush elements are shown in a position where one is cleaning the biting surface of the upper teeth and the other is operating in a cleaning movement downwardly, beginning on the inside upper gum. The operation will be identical for cleaning the lower teeth and the lip guard on the opposite side will then function to prevent the tongue and inside of the cheek or lips from becoming irritated in the same manner as described above.

While it will be evident that the brush elements can be rotated either alternately or simultane-

ously and can be moved in the same or opposite directions, it has been considered the best practice from a hygienic standpoint that these brushes rotate in such a way as to clean the teeth away from the gums, and the manner of cleaning as illustrated in Figs. 8, 9 and 10 indicates the brush elements as rotating in this manner.

Fig. 11 discloses a modified form of drive mechanism wherein the handle 42 can be made smaller to permit two small flexible shafts 43 and 44 to be inserted therein. The handle 42 may be provided with a similar head 45 which has the cavities or recesses 46 and 47 therein and the lip guards 48. The spindles of the brush elements are indicated at 49 and 50 and the bristles thereof have been omitted from this view in order to more clearly show the construction thereof.

The outer ends of the spindles 49 and 50 may be suitably received in bearings 51 and 52, while the inner ends thereof are provided with the transversely extending ribs 53 and 54 which are adapted to be received in suitable recesses in the portion 55 of a universal joint construction. The other portion 56 of the universal joint in each case is adapted to rotate in suitable bearings within the handle portion and are connected to the ends of the flexible shafts 43 and 44. One of these flexible shafts, for example 44, may have a suitable gear 57 mounted on one end thereof adapted to be in mesh with a similar gear 58 on the shaft 43. The shaft 43 then continues as at 59 and terminates in a suitable connection 60 for purposes of connecting to a source of power for rotating the various shafts. This form of the invention permits the use of a smaller handle portion, but also causes the brush elements to function in their normal manner by simultaneously rotating in opposite directions toward each other for cleaning the teeth.

The drive mechanism disclosed in Figs. 12 and 13 is a modified form of that shown in Fig. 11 wherein the handle portion 61 can also be made considerably smaller because of the fact that a single shaft 62 extends therethrough and is adapted to rotate the spindles 63 and 64 of the brush elements preferably in opposite directions. The head 65 may be similar to that shown in Fig. 11 and the brush elements may be mounted therein in the same way. In this form of driving means the shaft 62 is provided at its inner end with a bevel gear 66 which is adapted to be in mesh with a bevel gear 67 located at right angles thereto and mounted on a transversely extending shaft 68. Other forms of gearing could be used with equal success, for example worm gears, if so desired.

The ends of the shaft 68 are provided with reversely positioned worm sections 69 and 70 which are in mesh with worm gears 71 and 72 repectively mounted on the stub shafts 73 and 74. The outer ends of these stub shafts are provided with transversely extending slots adapted to receive the ribs extending transversely of the inner ends of the spindles 63 and 64. Thus it will be evident that upon rotation of the shaft 62 it will cause a rotation of the transverse shaft 68 through the medium of the bevel gears, which will in turn rotate the spindles 63 and 64 in opposite directions through the worm and worm gear arrangement just described.

From the foregoing description it will be evident that I have provided a novel type of multiple headed rotary toothbrush, which may be distinguished from my earlier filed co-pending application first above referred to by positioning the brush elements in pairs extending longitudinally of the handle portion. The advantages of the various types of lip guards and driving means over those disclosed in the prior art, will be apparent to those skilled in the art. It will be evident that certain 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.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A power driven toothbrush of the class described, comprising a handle portion having a head at one end thereof, a pair of substantially parallel cavities in said head extending lengthwise of said handle portion and having a partition therebetween, a brush element in each of said cavities, means for rotatably mounting a brush element in each of said cavities, and lip guards integral with said partition and extending generally radially outwardly therefrom toward both brush elements to thereby prevent the lip of a user from being injured.

2. A power driven toothbrush of the class described, comprising a handle portion, a pair of elongated brush elements rotatably mounted thereon in parallel relation thereto, a single shaft extending through said handle portion, a gear train connecting said shaft with said brush elements, whereby rotation of said shaft will rotate said brush elements in opposite directions, guard supporting means positioned longitudinally between said brush elements, and guard means on said supporting means disposed between said brush elements and extending substantially radially outwardly toward both of said brush elements and terminating short of the axes of said brush elements to prevent portions of the mouth of a user from being drawn inwardly between the brush elements.

3. A power driven toothbrush of the class described comprising an elongated handle, a pair of brushes substantially circular in cross section, means for removably and rotatably mounting said brushes on said handle in side by side spaced parallelism with the axes of rotation thereof substantially parallel with the axis of said handle, an elongated lip guard supporting member disposed between said brushes and disposed substantially parallel with the axes thereof, and guard means mounted on said supporting member and confined within the space between the axes of said brushes to prevent portions of the mouth of a user from being drawn inwardly between said brushes.

4. A power driven toothbrush of the class described comprising an elongated handle, a pair of brushes substantially circular in cross section, means for removably and rotatably mounting said brushes on said handle in side by side spaced parallelism with the axes of rotation thereof substantially parallel with the axis of said handle, an elongated lip guard supporting member disposed between said brushes and disposed substantially parallel with the axes thereof, and guard means mounted on said supporting member and extending outwardly therefrom toward both of said brushes and terminating short of the axes of said brushes to prevent por-

tions of the mouth of a user from being drawn inwardly between said brushes.

5. A power driven toothbrush of the class described comprising an elongated handle, a pair of brushes substantially circular in cross section, means for removably and rotatably mounting said brushes on said handle in side by side spaced parallelism with the axes of rotation thereof substantially parallel with the axis of said handle, and a plurality of guard members between said brushes spaced apart along the length thereof and confined entirely to the space between the axes of the brushes to prevent portions of the mouth of a user from being drawn inwardly between said brushes.

6. A power driven toothbrush of the class described comprising an elongated handle, a pair of brushes substantially circular in cross section, means for rotatably mounting said brushes on said handle in side by side spaced parallelism with the axes of rotation thereof substantially parallel with the axis of said handle, and a plurality of guard members between said brushes spaced apart along the length thereof and confined within the space between the axes of the brushes to prevent portions of the mouth

of a user from being drawn inwardly between said brushes.

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