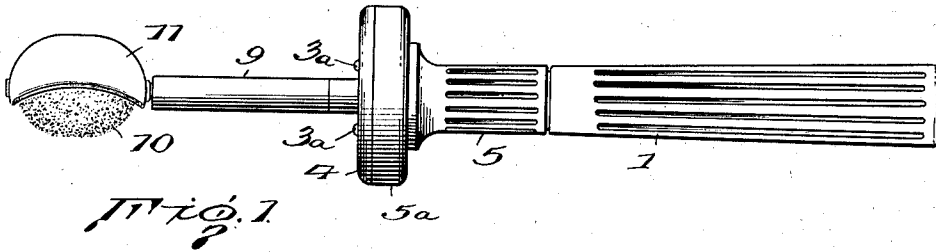
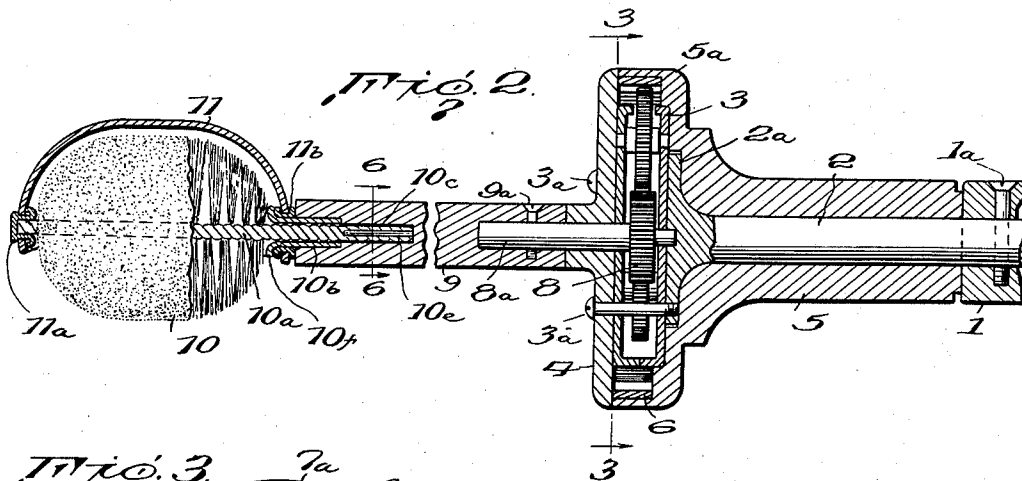
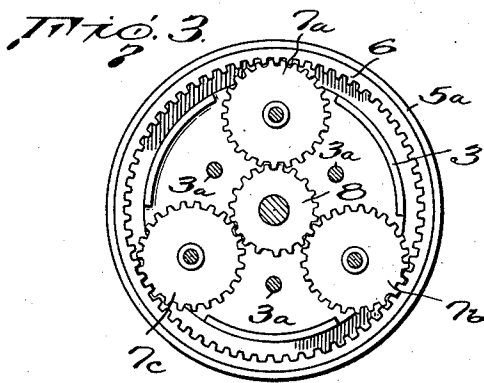
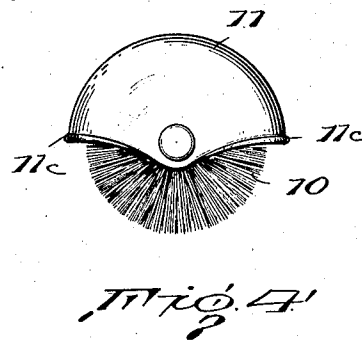
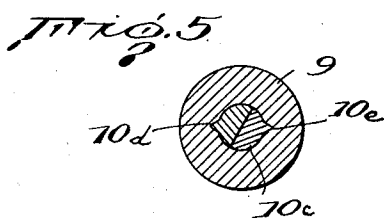


Feb. 13, 1940.

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ROTATING TOOTH BRUSH
Filed June 23, 1937

2,189,891



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2,189,891

ROTATING TOOTH BRUSH

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Application June 23, 1937, Serial No. 149,954

5 Claims. (Cl. 15—25)

My invention relates to rotating tooth brushes, and the present invention is concerned with improvements over the construction disclosed in my Patent No. 2,059,330.

5 An object of the present invention is to devise a rotatable tooth brush which may be operated with one hand and which embodies a speed multiplying gear set for increasing the speed of the brush.

10 A further object is to devise a construction which will permit the renewal of the brush element without the use of special tools or implements.

15 Still another object is to devise a simplified construction of guard element associated with the brush element.

A preferred embodiment of my invention is illustrated in the accompanying drawing in which:

20 Figure 1 is a side elevational view of the rotating tooth brush assembly;

Figure 2 is an enlarged view showing the brush element and the speed multiplying gear arrangement in longitudinal section;

25 Figure 3 is a sectional view taken along the line 3—3 of Figure 2;

Figure 4 is an enlarged end view of the brush element; and

30 Figure 5 is an enlarged sectional view taken along line 6—6 of Figure 2.

Referring to the drawing, 1 indicates a handle for the brush which may be formed of any suitable material, and 2 indicates a shaft secured to the handle 1 by any suitable means such as screw 1a. The shaft 2 is provided with an enlarged head 2a to which is secured the housing 3 of a differential gear arrangement, the gear housing 3 being secured to the flange 2a by means of suitable screws 3a passing through a plate 4 arranged on the outer face of the housing 3, passing through the housing 3 and having threaded engagement with the flange 2a, as clearly shown in Figure 2. Rotatably journaled on shaft 2 is a turning element 5 which is provided with an enlarged cylindrical flange 5a extending over the gear casing 3. Mounted within the cylindrical flange 5a and rotating therewith is an internal ring gear 6 which engages with three idler gears 7a, 7b and 7c journaled in the gear housing 3. As shown in Figures 2 and 3, gear housing 3 is formed of two circular plates provided with abutting cylindrical flanges formed at the periphery of the plates, and idler gears 7a, 7b and 7c are mounted on stub shafts, the ends of which are journaled in opposite walls of

housing 3; the idler gears are arranged so they extend partly out of slots formed in the cylindrical wall of housing 3. A spur gear 8 is rotatably mounted at the center of the gear housing 3 and is provided with a shaft 8a extending 5 through the plate 4 and in axial alignment with the shaft 2. A shaft 9, preferably formed of hard resilient material such as "celluloid", is carried by the shaft 8a and may be secured to the shaft 8a in any suitable manner as by means 10 of a screw 9a. The end of shaft 9 is provided with a socket for receiving the end of the spindle of the rotary brush element 10.

I prefer to form the brush 10 in the manner illustrated in Figure 2, that is, the brush is 15 formed in a conventional manner by supporting bristles between twisted wires forming a core or shaft 10a, and one end of core 10a is mounted in a sleeve or eyelet 10b which in turn fits snugly in a socket formed in the end of shaft 9. Core 10a extends beyond the sleeve 10b as shown at 20 10c in Figure 2, and the extended portion 10c is compressed or swaged into cylindrical form and a pair of sharpened ribs 10d and 10e are formed on the cylindrical surface thereof (see Fig. 5). 25 The cylindrical surface and the sharpened ribs may be formed by pressing or swaging the end 10c of the wire core in a suitable die. This pressing operation not only forms the desired shape for the core, but it also securely locks the ends 30 of the twisted wires together and prevents dislodgement of the bristles from the brush. The compressed portion 10c is forced into a bore formed in the end of shaft 9 having an external diameter slightly larger than the outside cylindrical diameter of the shaft extension. As the 35 extension 10c is forced into the bore, the ribs 10d and 10e cut into the material of shaft 9 and secure the shaft or core 10a against rotation with respect to the shaft 9. If desired, the slots 40 formed on the inner wall of the bore in the end of shaft 9 for receiving ribs 10d and 10e may be formed separately by means of a suitable broaching tool. The natural resilience of the material of shaft 9 in cooperation with ribs 10d and 10e 45 holds the shaft 10c tightly locked in shaft 9.

A guard element 11 is rotatably mounted upon the spindle of the brush element 10 and serves to protect the gum and inner surfaces of the mouth from the bristles of the brush 10 during 50 operation. This guard element may be formed by moulding from plastic material, but I prefer to form the element by suitably shaping the guard from sheet material such as "celluloid." The shape of the guard is clearly indicated in 55

Figures 1, 2 and 4. The outer end of the guard 11 is journaled on the outer end of the spindle of brush 10 by means of an eyelet 11a having a closed end as illustrated in Figure 2. The inner end of guard 11 is journaled upon the sleeve 10b by means of an ordinary eyelet 11b as shown in Figure 2. The outer end of the sleeve 10b is preferably flared outwardly as shown at 10f in Figure 2. This construction forms an abutment on the sleeve 10b for retaining the eyelet 11b in position and against which force may be applied to withdraw the shaft 10c from the socket in the shaft 9 when it becomes necessary to replace the brush element 10. The guard 11 is provided with rounded edges 11c which prevent injury to the gums or inner surfaces of the mouth while the brush is being used.

In using the brush, the instrument is grasped in the palm of the hand by handle 1, and, using the thumb and forefinger, the sleeve 5 may be rotated with respect to the handle 1. The gear casing 3 and the plate 4 are held stationary with respect to the handle 1 by means of the shaft 2, and rotation of the sleeve 5 causes rotation of the idler gears 7a, 7b and 7c by reason of engagement of these gears with the internal ring gear 6 mounted in the cylindrical extension 5a on sleeve 5. The idler gears in turn cause rotation of the gear 8 at an increased speed over the speed of sleeve 5 determined by the dimensions of the gears 6, 7a and 8 respectively. The shaft 9 rotates with the shaft 8a secured to the gear 8 and causes corresponding rotation of the brush element 10. It will be understood that the guard 11 is mounted for free rotation on the spindle of the brush 10 and may be readily positioned within the mouth so as to protect the tongue or the inner surfaces of the cheek from abrasion by the brush 10 while in use.

If for any reason it becomes necessary to renew the brush element 10, the shaft 9 is held by one hand and by grasping the guard 11 with the other hand, the brush assembly may be withdrawn from the shaft 9 by pulling the two elements apart, and a new brush element may be inserted into the socket of shaft 9 without requiring special instruments for this purpose. If desired, more than two ribs may be provided on shank 10c, but I find that two are sufficient.

While all of the elements of my brush, except brush 10, may be formed of suitable metal, I prefer to form the elements 1, 5 and 9 of moulded material such "celluloid", "bakelite", hard rubber, and the like. I also prefer to roughen the surface of elements 1 and 5 in any suitable manner as by the longitudinal grooving shown in Figure 1. The shaft 9 is preferably formed of a relatively small diameter so that the lips may be closed about this shaft while the brush is in use. The plate 4 forming part of the gear assembly serves as a guard to prevent saliva from reaching the handle 1 and the turning element 5.

I have herein described the principle of my invention and illustrated a preferred embodiment thereof. Various modifications will occur to those skilled in the art, and I desire it to be understood that all modifications which fall within the terms of the appended claims are to be considered as falling within the scope of my invention.

What I claim is:

1. A tooth brush comprising a handle, a shaft secured to said handle, a speed multiplying gearing comprising a casing mounted on the end of said shaft in spaced relation to said handle and

having a spur gear journaled therein, idler gears journaled in said casing and meshing with said spur gear, a rotary sleeve mounted directly on said shaft between said handle and said casing and arranged to be rotated by engagement between the thumb and forefinger of the same hand that grasps said handle, said sleeve being of smaller diameter than said casing and being provided with an enlarged cylindrical extension arranged over said gear casing, an internal ring gear mounted within said cylindrical extension and meshing with said idler gears, a rotatable shaft secured to said spur gear and extending out of said casing in axial alignment with said first shaft, and a brush element driven by said rotatable shaft.

2. In combination, a rotary shaft, a rotary brush having a shaft mounted in a bore in the end of said rotary shaft, a sleeve element surrounding the shaft of said brush and being mounted in a socket in the end of said rotary shaft having a diameter larger than the diameter of said bore, said sleeve extending forward of the end of said rotary shaft and being flared at the end thereof, a guard element partly surrounding said brush, one end of said guard element being journaled upon said sleeve element and the outer end of the brush shaft being journaled in a socket bearing formed in the outer end of said guard element, the flared end of said sleeve and the end of said rotary shaft serving to limit the axial movement of said guard.

3. In a rotatable tooth brush including a handle, a rotatable shaft mounted coaxially on said handle having a cylindrical longitudinally slotted orifice formed coaxially in its outer end, a rotatable brush comprising a twisted wire core supporting the bristles of the brush extending beyond both ends of the brush, a bearing formed on one end of said core, a sleeve mounted on the other end of said core having an outwardly flared portion adjacent the bristles of the brush, said sleeve being mounted in a socket formed in the end of said rotatable shaft, said core extending beyond said sleeve and having a cylindrical surface with longitudinal ribs formed thereon for engagement in the longitudinally slotted orifice in said shaft, and a guard element partly surrounding said brush, said guard being rotatably mounted at one end on said sleeve and having a socket bearing at the other end journaled upon the outer end of said core.

4. A brush element comprising a twisted-wire core supporting the bristles of the brush and having one end of the core extending beyond the brush to form a supporting shank, the end portion of said shank being swaged into a substantially cylindrical form having integral longitudinal ribs formed on opposite sides thereof, whereby the swaging of the shank effectively locks together the wires of the core and prevents dislodgment of the bristles of the brush.

5. A brush element comprising a twisted-wire core supporting the bristles of the brush and having an end of the core extending beyond the brush to form a supporting shank, the outer portion of said supporting shank being swaged into substantially cylindrical form having integral longitudinal ribs formed on opposite sides thereof, and a sleeve element mounted on said core between said cylindrical portion and said brush, said sleeve element having an outwardly extending flange at its end adjacent the bristles of said brush.

ADDISON H. FLOURNOY.