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ROTARY TOOTHBRUSH

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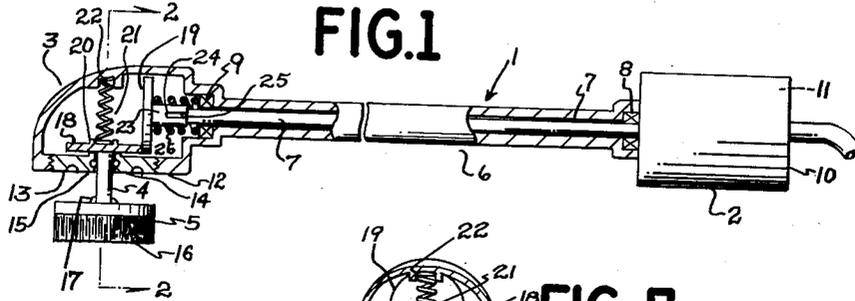


FIG. 1

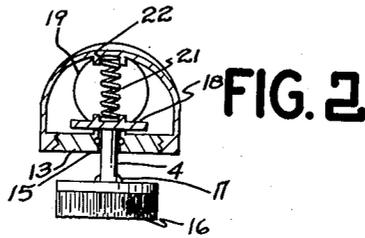


FIG. 2

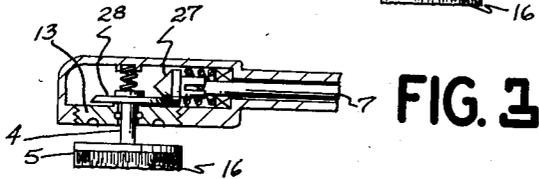


FIG. 3

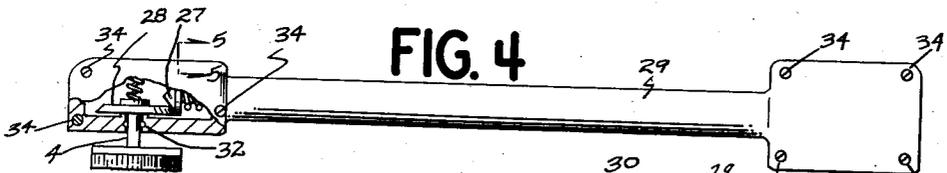


FIG. 4

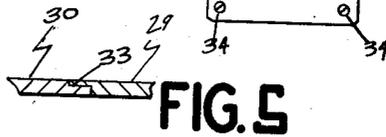


FIG. 5

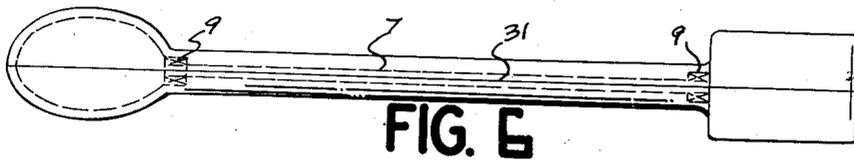


FIG. 6

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**ROTARY TOOTHBRUSH**

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4 Claims. (Cl. 15—28)

The present invention relates to a rotary tooth brush and more particularly to a tooth brush which may be driven by electric power although from a constructional consideration the invention also applies to one in which the motor power may be supplied manually. One of the difficulties of providing a rotary tooth brush of the type of the present invention is that it may be slightly clumsy or large and that it is difficult to apply any speed adjustment. Another further difficulty is that the brushes should be removable and that the structure should be substantially water tight so that one may serve for the entire family, each individual having his own brush which may be attached to the rotating element.

The present invention overcomes the difficulties set forth above and at the same time provides a simple inexpensive construction by means of which the cost of manufacture may be greatly reduced from structures previously used in the art.

In the present invention the housing may be made of very few parts. The drive shaft extends through the handle which has enlarged end cavity sections, one for the motor and the other for the rotary mechanism to which the tooth brush is attached. This construction permits the whole housing to be made, if desired, of a unitary molded form with openings at only two ends to each of the cavity sections.

In a modified form the housing may be made of two substantially symmetrical halves with no other elements forming the housing, which halves are held together either by cement or by suitable screws at various points in the housing.

The merits and advantages of the present invention will be more fully understood from the specification set forth below when taken in connection with the drawings illustrating embodiments of the same, in which:

Figure 1 shows a side elevation of the invention partly in section.

Figure 2 shows a section on the line 2—2 of Figure 1.

Figure 3 shows a modified form of the head cavity partly in section.

Figure 4 shows a modified form for the housing which may be applied substantially to the structure shown in Figure 3.

Figure 5 shows a sectional view on the line 5—5 of Figure 4, and,

Figure 6 shows a plan view of the form shown in Figure 4.

In the arrangement indicated in Figure 1, there is indicated a housing 1 which has a motor cavity section 2 at the right end and a gear cavity section 3 at the left end from which a spindle 4 projects to which a brush 5 is attached. The housing 1 is preferably composed of some light material such as plastic but may also be composed of metal such for instance as aluminum or other suitable materials. The housing 1 has a long shaft or handle section 6 within which the shaft 7 is contained which rotates in sleeve bearings 8, at the motor end, and 9 at the gear housing end of the housing. These

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bearings 8 and 9 carry and support the shaft 7 clear of the internal walls of the housing. The motor shell 2 of the housing may be opened at the end 10 and thereby permit the shaft 7, the bearing 8 and the motor 11 to be inserted in the housing all as a single unit. The fact that the motor housing is open at the end 10 will permit the adjustment of the bearing 8 which may be a self lubricating bearing. The gear housing end has a flat surface 12 threaded to receive a plate or disc 13 serving as a closure for a cylindrical opening in the face 12. This closure 13 has a bearing 14 through which the spindle 4 extends. An O ring 15 may be set in the walls of the bearing 14 so as to make a liquid-tight joint on this bearing.

The brush 5 is a flat brush with bristles 16 extending from the exposed face away from the holder, and may be snapped on in a snap fastener fashion as indicated at 17. The spindle 4 passes through the bearing 14 into the housing and on its inner end has a gear disc 18 which may be made out of fiber or other suitable material providing friction with the peripheral engaging drive disc 19. The disc 18 is rigidly attached to the shaft 4. On the back of the disc 18, there is provided a circular flange 20 with an internal recess in which a spring 21 sets. This spring 21 also engages in a cavity 22 at the top of the case so that the spring 21 normally exerts pressure on the end of the shaft 4 indirectly through the disc 18. It will be seen therefore that when pressure is placed upon the bristles 16, the brush will hold against the action of the spring and the disc 18 will raise from the position shown in Figure 1 nearer the center of the disc 19 with which it engages. The disc 19 which may also be of similar material as the disc 18, but in any event a frictional material so that it will drive the disc 18 on its periphery, is mounted on a sleeve 23 which fits over the shaft 7. This sleeve 23 has a slot 24 extending from its end, which slot engages a pin 25 projecting from the side of the shaft 7. A coil spring 26 is positioned around the shaft between the bearing 9 and the back face of the disc 19. The purpose of this construction is to provide a resilient spring contact between the driven disc 18 and the driving disc 19 in whatever position the disc 18 may be. As the shaft 4 is moved upward from a position shown in Figure 1, the disc 18 will move towards the center of the disc 19 and the rotational speed of the brush will therefore be diminished in accordance with the ratios of the effective diameters of the discs 18 and 19. While this speed will be diminished, the torque will of course be increased since the same power is available on the motor shaft.

In the arrangement indicated in Figure 3, the shaft 7 carries at its end a conical driven gear 27 which is mounted in the same way as shown in Figure 1. This permits the conical gear 27 to be pushed to the right as the driven gear 28 is moved upwards by pressure against the bristles 16. The speed of the brush 5 is decreased as it is forced upwards from the position indicated in Figure 3.

In the arrangement indicated in Figure 3, the housing may be made of a single unitary element as in Figure 1 with the gear housing end having a threaded cylindrical plate 13 as in Figure 1. However this threaded cylindrical plate which contains the bearing surface for the spindle 4 may be omitted where the housing is made in two substantially symmetrical sections 29 and 30 as shown in Figure 5. The dividing line 31 is longitudinal as indicated in Figure 6 and is in a plane containing the spindle axis 4 and the axis of the shaft 7. Each half of the casing may have a semi-circular groove in which the O ring 32 may be contained for making the spindle liquid-tight. The casing itself may have a liquid-tight gasket, but if the joint in the casing is lapped as indicated

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by the closure 33, Figure 5, this would ordinarily not be necessary. The two halves of the casing may be cemented together but if it is desired to get at the internal mechanism, the halves may be held together by a plurality of screws 34, 34, coming through the casing from one half to the other half.

In the assembly of the modification shown in Figures 5 and 6, the shaft 7 together with the self lubricating bearings 8 and 9 and the motor 11 may be laid in one half of the casing and so also the other elements comprising the discs 28, 27 and the springs and also the spindle 4. This arrangement therefore provides a very simple assembly for the whole device.

It is very important in a device of this nature that it be of such a size so that it can be readily inserted in the mouth. The size of the front end or the head end where the brush is contained as indicated in Figures 3 and 4, is quite small and it will be seen that this is well adapted to be used in the mouth since it will quite readily go between the teeth and the cheek and likewise in any other part of the mouth without any difficulty.

While the device has been described in connection with a driven motor 11, the shaft 7 may if desired be spun by hand in manners which are well known in the art.

Having now described my invention, I claim:

1. A rotary tooth brush comprising a housing with a handle at one side, a rotatable shaft mounted in said housing, a driving disc secured at the end of the shaft in said housing and rotatable therewith, a spindle having a bearing in the wall of the housing, a driven disc mounted on said spindle and positioned to engage the flat surface of said driving disc, spring means bearing against the driven disc for maintaining the spindle normally in the furthest projecting position out of said housing wherein said driven disc frictionally engages the periphery of said driving disc, and a brush mounted on the outer end of the spindle whereby when pressure is applied against said brush, it will be forced inward against the action of the spring means with corresponding reduction in the rotation thereof.

2. A drive for a rotary tooth brush comprising a housing with a handle at one side, a rotatable shaft mounted in said housing, a driving disc within said housing, means coupling said driving disc to said shaft for rotation therewith, a spindle having a bearing in the wall of said hous-

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ing, a driven disc mounted in said housing on said spindle and with its edges in frictional engagement with said driving disc, said coupling means having a spring element maintaining contact between said driving and driven disc, and a spring member yieldably urging the edge of the driven disc to engage the periphery of the driving disc.

3. A rotary tooth brush comprising a housing with a handle at one side, a rotatable shaft mounted in said housing, a driving disc, means coupling said driving disc to said shaft in said housing, a spindle having a bearing in the wall of said housing, a driven disc mounted in said housing on said spindle and in frictional engagement with the surface of said driving disc, said coupling means having a spring element yieldably maintaining contact between said driving and driven discs, a spring member positioned to urge said spindle outwardly in an axial direction with respect to said housing with the driven disc frictionally engaging the driving disc near the periphery of its face, and a brush mounted on said spindle outside of said housing whereby when pressure is put on said brush, said driven disc will be moved nearer the center of the driving disc against the action of the spring member with a corresponding decrease in speed of said brush.

4. A rotary tooth brush comprising a housing, a shaft mounted in said housing, means for rotating the shaft, a driving cone mounted on one end of the shaft, a spindle extending through a wall of the housing and carrying a driven disc within the housing adjacent the driving cone, a spring mounted in the housing and urging the edge of the driven disc to frictionally engage the periphery of the conical surface of the driving cone and a rotary brush mounted externally of the casing on the end of the spindle whereby pressure exerted on the brush will move the driven disc against the action of the spring toward the apex of the cone.

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