

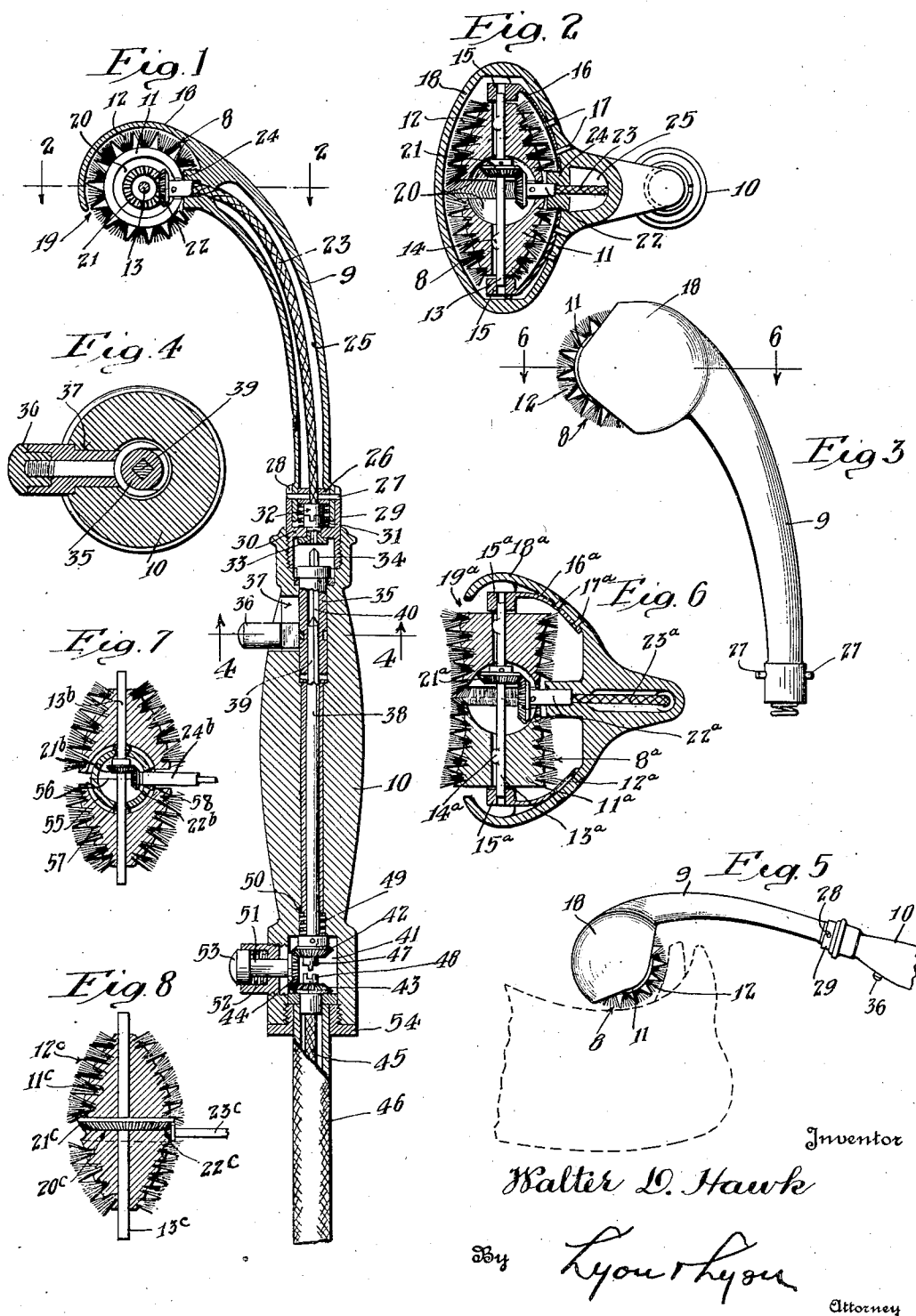
Sept. 19, 1933.

W. D. HAWK

1,927,566

ROTARY TOOTHBRUSH

Filed May 4, 1929



UNITED STATES PATENT OFFICE

1,927,566

ROTARY TOOTHBRUSH

Walter D. Hawk, Los Angeles, Calif.

Application May 4, 1929. Serial No. 360,337

3 Claims. (Cl. 15-23)

This invention relates to rotary toothbrushes, and an object of the invention is to improve the general construction of this type of toothbrushes so as to facilitate the operation of brushing the teeth.

Another object is to make provision for rotating the brush on an axis that is approximately at right angles to the axis of the drive shaft.

Another object is to construct the gear drive between the drive shaft and the brush in such manner as to conceal the gears.

Another object is to make provision for the driving of the brush in opposite directions.

Another object is to provide a clutch that is readily operated by the hand that grasps the handle of the brush.

Another very important object is to provide a construction that will protect the mucous membranes of the mouth from contact with the brush while said brush is in engagement with the teeth.

Another object is to provide a construction which will facilitate removal and replacement, or renewal, of the brush.

Another object is to provide a construction in which the handle and the brush holding stem are readily separated so that different members of the family can take advantage of the power drive by installing in the handle their individual brushes mounted on stems, said stems interchangeably fitting the handle and the sections of drive shafts in said stems being readily coupled to the drive shaft section that rotates in the handle.

Other objects and advantages will appear in the sub-joined detailed description.

The accompanying drawing illustrates the invention.

Figure 1 is a longitudinal section of a rotary toothbrush constructed in accordance with the provisions of this invention.

Figure 2 is a horizontal section on the line indicated by 2-2 Figure 1.

Figure 3 is a side elevation of the detachable stock holding the brush.

Figure 4 is an enlarged horizontal section on the line indicated by 4-4 of Figure 1.

Figure 5 is a reduced fragmental view of the toothbrush as applied to the teeth of the lower jaw, a fragment of which is indicated in broken lines.

Figure 6 is a fragmental sectional view showing a modified form of brush, the plane of section being that indicated by the line 6-6, Figure 3.

Figure 7 is a sectional view of a modified form of brush.

Figure 8 is a sectional view of another modified form of brush.

Referring to Figures 1 to 5 of the drawing, there is provided a brush 8, rotatably mounted in one end of a hollow stem 9, which in turn is detachably secured to a handle 10. The brush 8 comprises a body portion 11 of oblong or egg shape and bristles 12 set into said body in any approved manner. The body portion 11 of the brush 8 is illustrated as being divided in half along its lesser axis to provide in effect two brush sections 8' and 8''. Extending axially lengthwise of the body 11 is a shaft 13 to which the two sections 8' and 8'' of the brush body are secured as by keys 14. The ends of the shaft 13 project beyond the ends of the body 11 and are mounted in bearings 15 which are connected with the stem 9. In this instance, the bearings 15 are connected by spring arms 16 and rivets 17, or their equivalents, to the rear wall of a hood or guard 18 in which the stem 9 terminates. The guard 18 is semi-circular across the short axis thereof and is provided with an opening 19 through which the brush 8 projects. The brush body 11 is provided with a central cavity 20 formed by depressions in each of the sections 8' and 8'' to accommodate a pair of mitre gears 21, 22. The gear 21 is secured to the shaft 13 and the gear 22 is secured to one end of a flexible shaft 23 which extends through the body portion in the space between the two sections 8' and 8'' and which turns in a bearing 24 provided by the guard 18. The flexible shaft 23 extends through the bore 25 of the stem 9 which extends in a long curve so that the end of the flexible shaft 23, to which the gear 22 is secured, rotates about an axis that is substantially at a right angle to the axis about which the other end of said flexible shaft rotates, said other end rotating in a bearing 26 which is mounted in the stock 9. Projecting laterally from the bearing 26 is a pin 27, the opposite ends of which detachably engage in bayonet slots 28 in the outer end of a sleeve 29 which is screwed or otherwise secured in one end of the handle 10. The sleeve 29 is provided internally with a bearing 30 in which rotates a jaw coupling member 31 which releasably engages a second jaw coupling member 32 secured to the flexible shaft 23. The coupling member 31 is provided with a bore 33 that is angular in cross section for receiving a pin 34 of angular cross section, and, thus, said coupling member 31 and the pin 34 together consti-

tute a clutch for connecting the shaft section 23 with a tubular shaft section 35 rotatably mounted in the handle 10.

The shaft section 35 is provided with a button 36 that projects through a slot 37 in the handle 10 so that the thumb of the hand grasping the handle 10 is in position for moving the button 36 to and fro to effect throwing in and out of the clutch.

The shaft section 35 has a sliding engagement with a shaft section 38 rotatably mounted in the handle 10, said shaft section 38 being provided with a portion 39 that is of angular cross section and that engages in the bore 40 of the shaft section 35, said bore 40 being of angular cross section.

Near one end the handle 10 is provided with a gear chamber 41 in which are disposed bevel gears 42, 43 and 44. The gear 42 is fixed to the shaft section 38 and the gear 43 is fixed to a flexible shaft section 45 within a flexible shaft housing 46. The shaft section 45 extends to driving mechanism, not shown, of any suitable description, which mechanism operates the brush through the various operating connections. Projecting from the gears 42, 43 are jaw clutch members 47, 48, respectively, which may be brought into cooperative relation so as to drive the shaft section 38 from the shaft section 45. When the clutch members 47, 48 are engaged, the shaft section 38 will be driven in the same direction as the shaft section 45, and normally the clutch member 47 will be thrust into engagement with the clutch member 48 by a coil spring 49 which surrounds the shaft section 38 and has one end bearing against a shoulder 50 in the handle and its opposite end against a hub of the gear 42.

The gear 44 is rotatably mounted on the inner end of a push button 51 which projects to the outside of the handle 10, there being a coil spring 52 beneath the head 53 of the push button 51, said coil spring 52 tending to hold the push button in its outermost position, in which position the gear 44 is out of mesh with the gears 42, 43. When the push button 53 is pressed inwardly by the operator, it forces the gear 42 away from the gear 43 and thus places the gear 44 in mesh with the gears 42, 43, to thereby secure rotation of the shaft section 38 in a reverse direction to that of the shaft section 45.

The shaft housing 46 is assembled with the handle 10 by a screw thread connection 54.

The construction and operation of the invention will be apparent from the foregoing description, and, briefly stated, the operation is as follows:

Assuming that the shaft section 45 is connected with a suitable motor, or other driving mechanism, and that the clutch members 31, 34 are engaged, rotation of the shaft section 23 will occur, the direction of rotation depending upon which position the push button 53 is in, as hereinbefore explained. The operator will insert the brush portion of the device in his mouth in such manner as to bring the brush to bear upon the posterior surfaces of the teeth. For example, the device will be held as illustrated in Fig. 5 to bring the brush into contact with the posterior surfaces of the teeth of the lower jaw and the brush will preferably be caused to rotate counter-clockwise so as to brush the teeth from their bases toward their points.

The operator will then turn the handle into a position to reverse the brush in the mouth so as to engage said brush with the anterior sur-

faces of the teeth of the upper jaw. It is now advisable that the operator cause the brush to rotate clockwise. The brush will then be applied successively to the anterior surfaces of the teeth of the upper and lower jaws, the brush preferably being caused to rotate toward the points of the teeth. It is readily understood that brushing may be effected in the opposite direction, if that be desirable.

The operator having completed the brushing operation will disconnect the stock 9 from the sleeve 29. It is to be understood that the stock 9 and the parts mounted thereon constitute a detachable unit and that similar units will be provided, one for each member of the family, so that the individuals will have their own brushes and, at the same time, but a single handle and driving mechanism may be employed for furnishing the power to drive the brush. Operation of the brush will be stopped, when desired, by operating the push button 36 to the position indicated in Figure 1.

Now referring more particularly to Figure 6, the elements there illustrated that are similar in function to those hereinbefore described are indicated by the same reference characters with the addition of the suffix "a". In this instance, the circumferential face of the brush is concave, whereas in Figure 2 said face is convex.

Referring more particularly to Figure 7, the elements there illustrated that correspond in function to those described for Figures 1 to 5 are indicated by the same reference characters with the addition of the suffix "b". In this instance, the gears 21b, 22b are enclosed in a gear case 55 constructed in sections, said sections being hemispherical and the joint between them being indicated at 56. The sections of the case 55 may be secured together by a weld or any other suitable means, and the shaft 13b, passes through a stuffing box 57 in the case 55. The bearing 24b is a part of or is fixed to the case 55 and has a stuffing box 58. A suitable lubricant is placed in the case 55 for the gears to run in. The case is stationary while the brush revolves and, therefore, the cavity 20 is of greater diameter than the case for clearance.

Referring more particularly to Figure 8, the elements there illustrated that correspond in function to those described for Figures 1 to 5 are indicated by the same reference characters with the addition of the suffix "c". In this instance, the gear 21c is of greater diameter than the gear 21, hereinbefore described, said gear 21c being of but slightly less diameter than the body 11c. However, the smooth periphery of the gear 21a is below the bristles 12c so that said gear will not contact with the teeth during the brushing operation. By this construction the cavity 20c need only accommodate the one gear 21a and, accordingly, the body 11c need not be cut away to so great an extent as the body 11.

I claim:

1. A rotary toothbrush comprising a curved tubular stem having an opening, a flexible shaft rotatably mounted in the stem, a brush rotatably mounted in the stem and projecting through the opening, the turning axis of the brush being approximately at a right angle to the axis of the shaft, driving connections between the shaft and the brush, and a handle attached to the stem.

2. A rotary toothbrush comprising a tubular stem, a shaft rotatably mounted in the stem, a brush rotatably connected with the stem, driv-

ing connections between the shaft and the brush, a handle, a means detachably connecting the stem to the handle, shaft sections rotatably mounted in the handle, a means slidably and rotatably connecting said shaft sections, a coupling member rotatably connected with the handle, a coupling member connected with the first mentioned shaft and releasably engaging the first mentioned coupling member, a clutch means between one of said shaft sections and the first mentioned coupling member, and a means to shift the last mentioned shaft section endwise to throw the clutch in and out.

3. A rotary toothbrush comprising a tubular stem, a shaft rotatably mounted in said stem, a brush rotatably connected with the stem, driving connections between the shaft and the brush, a handle attached to the stem, a flexible shaft housing secured at one end to the handle, a shaft in the handle connected with the first mentioned shaft, a flexible shaft in the housing, and reversing mechanism in the handle operably connecting the shaft in the handle with the shaft in the housing.

WALTER D. HAWK.

15

90

20

95

25

100

30

105