Sept. 29, 1925. 1,555,522

A. SHAPIRO

ROTARY TOOTHBRUSH

Filed April 10, 1924

Fig. 1.

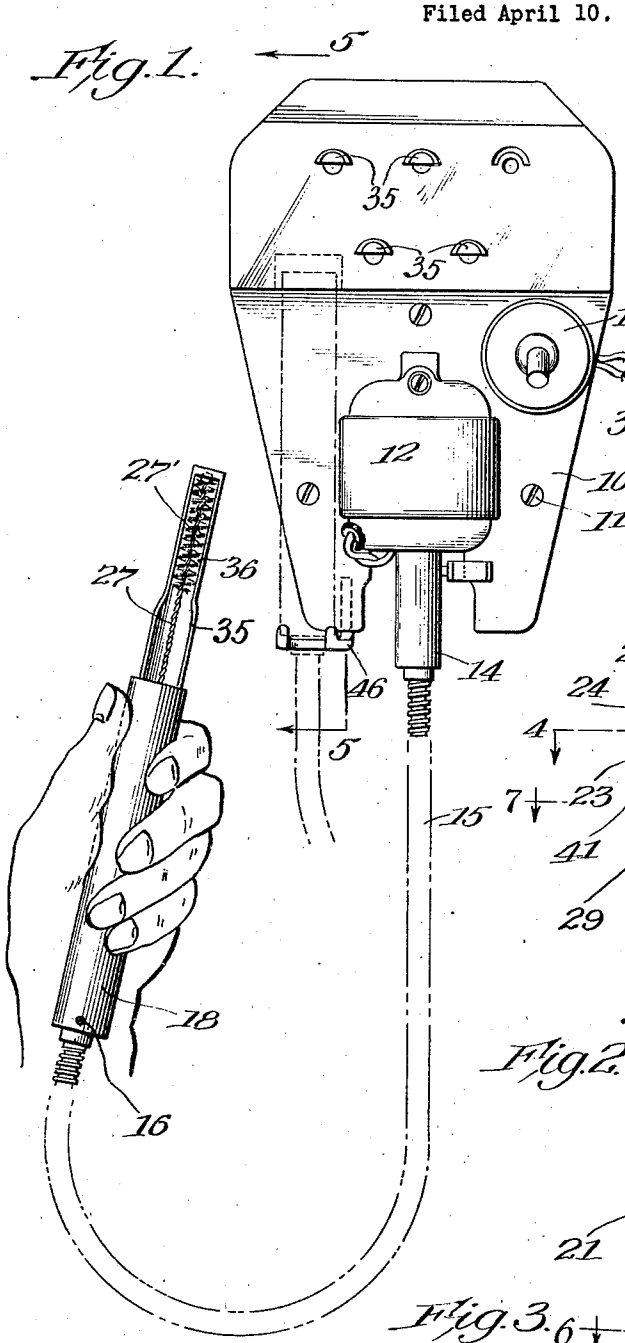


Fig. 5.

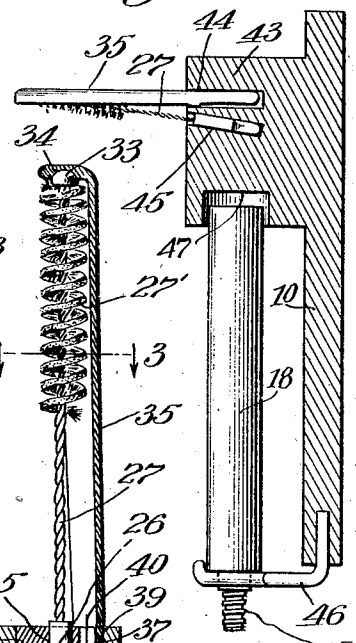


Fig. 2.

Fig. 4.

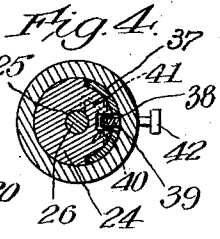


Fig. 3.



Fig. 7

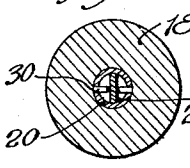
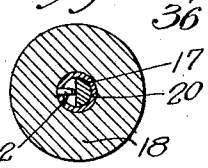


Fig. 6



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UNITED STATES PATENT OFFICE.

ABE SHAPIRO, OF CHICAGO, ILLINOIS.

ROTARY TOOTHBRUSH.

Application filed April 10, 1924. Serial No. 705,439.

To all whom it may concern:

Be it known that I, ABE SHAPIRO, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rotary Toothbrushes, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to rotary tooth brushes and contemplates, among its objects, a power driven device for use with a detachable brush unit.

Other objects of my invention concern means for detachably supporting and journaling the brush unit or shank, a novel guard for the brush, and means for so holding the brush shank and its guard that the guard protects the shank while the device is not in use.

These and further objects and features are set forth in the following description of a specific embodiment of my invention. In the accompanying drawings which illustrate this embodiment,

Figure 1 is a front elevation of the device;

Figure 2 is an enlarged detail partly in longitudinal section of the handle member and the brush shank;

Figure 3 is a transverse section of the brush and guard, taken on the line 3—3 of Figure 2;

Figure 4 is a transverse vertical section through the handle member taken on the line 4—4 of Figure 2;

Figure 5 is a transverse vertical section through the bracket and rack, taken on the line 5—5 of Figure 1.

Fig. 6 is a transverse section through the handle member taken on the plane of the line 6—6 of Fig. 2, and

Fig. 7 is a similar view taken on the plane of the line 7—7 of Fig. 2.

A bracket 10, suitably secured to the wall of a lavatory as by screws 11, supports a small electric motor 12 which is controlled by a switch 13 conveniently located on the bracket. The armature of the motor is connected within an axial boss 14 to the inner end of a flexible shaft 15. At its outer end the flexible shaft carries a stationary sleeve 16 beyond which protrudes the semi-cylindrical end 17 of the live shaft (see Fig. 6). The stationary sleeve 16 is inserted in a counter-bore at the rearward end of a handle member 18, and there secured by a set screw 19. The projecting end 17 of the flexible shaft extends into the end bore of a small shaft or rotary member 20, which is journaled in a bore 21 in the handle member 18. The rotary member 20 is provided with a pin 22 for establishing a driving connection between the flexible shaft and the rotary member.

At its forward end, the handle member has a counter-bore 23 which is closed by a plug 24. The bore 25 of the plug rotatably and reciprocably journals a cylindrical head 26 at the inner end of a brush shank 27. The inner end of the head 26 is cut away on either side to leave a flat blade 28 (Fig. 7) which extends into a counter-bore or driving socket 29 at the outer end of the rotary member 20, pins 30 being provided to establish a driving connection between the rotary member and shank. The head of the shank is urged outwardly by a coil spring 31 disposed within the bore 29 of the rotary member and contacting a washer or disk 32 which, in turn, bears against the inner end of the blade 28 of the head.

The brush shank 27 comprises a pair of twisted wires secured at their inner ends in the head 26, and supporting adjacent their outer ends the spirally arranged transverse bristles which form a rotary brush 27′. The twisted wires terminate in a ball 33 which cooperates with a socket 34 at the outer end of a guard 35 to support and journal the outer end of the brush. The guard 35 is in the form of a shell, semi-cylindrical in transverse section, which closely embraces one side of the brush, leaving but a small longitudinal opening 36 through which a peripheral portion of the brush extends.

The inner end of the guard 35 is inserted in an arcuate slot 37 formed between the plug 24 and the shell-like end of the handle member 18. Adjacent its inner end, the guard is provided with a rectangular hole 38 for co-operating with a latch 39 pivoted at 40 within a suitable radial slot in the plug 24 and pressed into the hole 38 by a spring 41.

When it is desired to detach the brush shank and its guard from the handle member and to substitute another brush and guard, a manually engageable key 42, which extends through the shell of the handle member, is pressed inwardly to release the

latch 39, permitting the guard to be withdrawn from the slot 37. The head 26 is then easily pulled from the bore 25 of the plug, and the shank thus wholly disengaged from the device. Another shank 27 is then inserted in the handle member, the blade 28 of the shank head passing between the pins 30 on the rotary member 20 and compressing the spring 31. Another guard 35 is then inserted in the slot 37, care being taken that the socket 34 of the guard embraces the ball 33 at the outer end of the shank. When the handle is fully inserted and locked in place by the latch 39, the shank 27, it will be noted, is also locked in place. The continual pressure of the spring 31 at all times holds the head 33 in the socket 34 to provide an outer journal for the shank and at the same time to hold the brush within the guard 35.

To use the device, the switch 13 is thrown to start the motor, which, through the flexible shaft and rotary member 20, drives the brush. As the guard 35 is comparatively small it may easily be inserted in the mouth between cheek and teeth to reach all the exposed portions of the teeth. The guard, of course, protects the flesh and gums from accidental contact with the brush, or with other portions of the shank. The flexible shaft permits the brush to be disposed at any convenient angle to reach the desired teeth.

Attention is also called to the very short distance left between the outer end of the brush and the outer end of the guard. This feature permits ready access to the teeth at the back of the mouth, and also to the inner or lingual surfaces of the teeth. The thinness of the shell of the guard and its closeness to the brush facilitate the brushing of exposed tooth surfaces all of the way to the gingival margin.

In order that each member of the household may keep his individual brush and guard conveniently near the device, I prefer to provide the bracket 10 with a rack 43 comprising a plurality of sets of slots 44 and holes 45 therebeneath. Each of these sets of openings is adapted to support a brush and its associated guard. The head of the particular brush shank 27 is inserted in one of the holes 45, while its guard 35 is inserted in the slot 44 directly above the shank 27. In inserting the guard in the rack the user presses the outer ends of the shank and guard together so that the ball 33 is embraced by the socket 34. Once the guard is tightly inserted in its supporting slot 44 in the rack, the brush shank is supported and protected at its free end against accidental bending or other injury. It is also to be noted that the guard is disposed above the shank and so completely envelopes it that dust and soot can not accumulate on the brush.

The angles of the slots 44 and 45 in the rack are preferably such that the shank 27 must be sprung slightly to bring the ball into the socket 34. This tends to bind the shank and guard in their respective openings to further prevent their dislodgment. The bracket 10 also carries a sub-bracket or yoke 46 on which the handle member 18 may be hung when the device is not in use. The rack 43 is preferably cut away as at 47 for the reception of the forward end of the handle member to hold the latter securely in place.

While I have shown this particular embodiment of my invention, I contemplate that changes may be made therein without departing from the scope and spirit of my invention. What I claim is:

1. In a device of the class described, the combination of a handle portion, a rotary member journaled thereon, means for driving said member, an outwardly extending shank disposed longitudinally of said member and having a driven connection therewith, means for journaling said shank at its inner end on said handle portion, a brush on said shank, a bracket extending from said handle portion, co-operating thrust bearing means for said shank on the end thereof and on said bracket, and spring means for urging said shank outwardly.

2. The combination in a rotary tooth brush of a handle member, a driving member rotatably journaled therein, a shank comprising bristles forming a brush, a ball at the outer end of the shank and means at the inner end of the shank insertable in said rotary member for making a driving connection therewith, a guard for said brush supported from said handle, a socket at the outer end of said guard for the reception of said ball, and means for urging said shank outwardly to hold said ball against said socket.

3. The combination in a rotary tooth brush of a rotary driving member, a handle member for journaling said driving member, a shank, a brush on said shank, means for supporting the inner end of said shank and for effecting a driven connection therefor with said driving member, a guard, co-operating means on the outer end on said shank and on said guard for journaling the outer end of said shank, spring-pressed lock means on said handle adapted automatically to snap into locking engagement with said guard when said guard is joined to said handle, and a manually engageable key for releasing said locking means.

4. The combination in a rotary tooth brush comprising a handle portion for rotatably supporting the tooth brush and having an arcuate slot in one end thereof, of a guard for said rotary tooth brush comprising a shell of semi-cylindrical cross-section

for embracing and shielding said rotary brush, an end closure for said shell having an inwardly facing socket for supporting the brush, at its opposite end said shell having a slot engaging portion of arcuate cross-section adapted to be received in said arcuate slot of the handle portion, said slot engaging portion being provided with a shoulder for co-operating with lock means carried by said handle portion.

5. The combination in a rotary tooth brush, of a flexible driving shaft, a handle portion at the end thereof, a brush journaled in said handle portion, a guard projecting from said handle portion and having a bearing for the outer end of said brush, and a spring tending to thrust said brush forwardly to maintain the same in said bearing.

6. The combination in a rotary tooth brush, of a handle portion, a driving member in said handle portion, said driving member having a driving socket, a brush receivable in said socket and adapted to be driven thereby, a guard extending from said handle portion and partially surrounding said brush, a bearing at the outer end of said guard for the end of said brush, and a spring associated with said socket for thrusting said brush into said bearing.

7. The combination in a rotary tooth brush, of a flexible driving shaft, a handle at the end thereof, a rotary member in said handle driven by said shaft, said handle having a bearing plug in one end, said plug having a guide bore therein, a brush adapted for adjustable mounting on said handle comprising a shank, said shank having a cylindrical portion which has bearing support in said guide bore and a flat-sided driving portion extending beyond said cylindrical portion and engaging with said rotary member.

8. The combination in a rotary tooth brush, of a driving shaft, a handle portion at the end thereof, a driving member rotatably supported in said handle portion, a brush member to be driven thereby, one of said members having a socket, the other of said members having a flat-sided portion receivable in said socket, a bearing for the outer end of said brush member carried by said handle portion and a spring in said driving member reacting through said flat-sided portion for thrusting said brush member axially.

9. The combination in a rotary tooth brush, of a flexible driving shaft, a handle member at the end thereof, a driving element rotatably supported in said handle member and connected to said shaft, a plug member secured to said handle member, said plug member having a guiding bore therein, a removable brush comprising a shank, said shank having a cylindrical portion receivable in said guiding bore and having a driving extension projecting beyond said cylindrical portion and adapted to engage with said driving element, one of said members having a recess therein defining an arcuate slot between itself and the other member, and a detachable guard having an end portion of arcuate cross section adapted to be received in said arcuate slot.

In witness whereof, I hereunto subscribe my name this 8th day of April, 1924.

ABE SHAPIRO.