This invention relates to a tooth cleaning attachment adapted for connection to a source of power. It is an object of this invention to provide a rotatable tooth cleaning attachment, adapted for connection to a power source, and insertable into the mouth for cleaning the teeth.

It is still a further object of this invention to provide such a unit wherein the brushing member is adapted to be readily removable from the driving unit to permit replacement by a different brushing member.

It is still a further object of this invention to provide a flexible shank for such brushing member and to restrain such flexing to the desired amount and place.

It is still a further object of this invention to provide a flexible brushing member wherein wobble during rotation is eliminated and the tendency of the brush to walk on the teeth is eliminated.

It is still a further object of this invention to provide suitable attaching means between the brushing element and power source to firmly hold the brushing element shank eliminating wobble at this point and to eliminate slippage while at the same time deterring saliva and dentifrice being carried along the shank of the brushing element into the propelling unit.

It is still a further object of this invention to provide a brushing element having superior cleaning qualities without danger of injury to the gum tissues, etc. in the mouth.

Other objects and advantages will be readily apparent from the following description:

In the drawings:

Figure 1 is an elevation of an embodiment of this invention.

Figure 2 is a sectional view of the brushing element and its mounting.

Figure 3 is a perspective view of the brush.

Figure 4 is a partial section of the brush illustrating a modified form of brush.

Figure 5 is a view taken along line 5—5 of Figure 4.

Figure 6 is a perspective view with a portion thereof broken away of a further modification of the brush.

The drive unit 10 may be of any type driving shaft 12. In this instance an electric motor is illustrated connected by cord 14 to a suitable electricity source. Mounted upon shaft 12 is a mandrel 16 which has a bore 18 therethrough. One extremity of bore 18 receives shaft 12 and a screw 20 projects through the mandrel and into a threaded recess in the shaft 12 to key the mandrel to the shaft.

The portion of bore 18 not occupied by shaft 12 flares outwardly forming a frusto-conical recess with the base remote from the drive unit 10. The outer surface of the mandrel 16 is likewise frusto-conical in shape with the base adjacent the drive unit 10.

The brushing element generally designated 22 is formed of three sections. The first or base has a frusto-conical socket 24 therein which receives mandrel 16 having an inturned flange 26 partially overlying the base of the mandrel securely maintaining the brushing element on the mandrel. The socket 24 is slightly smaller than mandrel 16 so that a slight axial stretching of the base of the brushing element is present when mounted on the mandrel. In the socket 24 a frusto-conical projection 28 is provided which snugly fits into the flared end of bore 18. This mounting prevents wobble of the brushing element with respect to the drive shaft 12 as well as slippage relative thereto, because of the frictional engagement between the brushing element and the mandrel.

The brushing element 22 is preferably of either natural or synthetic rubber, which is not injurious to the membranes in the mouth and the event of contact therewith. The base of the brush element is its largest portion. This base is cylindrical in shape, however, the main body or shank of the brushing element is tapered to reduce the thickness thereof forming a shank approximating a cone in shape. This tapering of the shank controls the flexibility of the brushing element. If the brushing elements were of uniform thickness the greatest flexing of the shank would occur at the mandrel. By gradually reducing the thickness of the shank approaching the tip thereof a uniform curvature along the longitudinal axes of the brushing element may be attained. The length of the tapered portion is several times the maximum thickness thereof to provide the desired degree of flexibility toward the end. The brushing element shank is reinforced by a core 30 embedded therein to increase the stiffness for proper brushing pressure. The core is a helical spring and extends centrally along the longitudinal axis of the shank from near the end of projection 28 to adjacent the tip 32 of the brushing element. A helical spring provides increased surface for bonding with the rubber.

A pair of spaced shoulders 34 and 36 are provided on the shank near tip 32 to receive the brush. Three types of brush are illustrated in Figures 3 through 6. Each brush is formed of rubber or a similar suitable material and has a central bore 38 which fits around the shank of the brushing element snugly and each engages the shoulders 34 and 36 at its extremity when mounted on the shank to limit longitudinal movement on the shank during use.

The embodiment of the brush shown in Figure 3 has a plurality of spaced individual wipers 40 in rows on the central body 42 thereof. The embodiment in Figure 4 has a circular wedge-shaped member 44 mounted upon the central body 46. The member 44 is cut as at 48 periodically about its periphery.

The embodiment shown in Figure 6 is cylindrical in shape with a soft foam rubber outer cylinder 50 mounted upon the central body 52.

Obviously the brushes are readily removable from the brushing element by simply pulling them off so that same are interchangeable. Likewise, the whole brushing element may be pulled off of mandrel 16 and replaced by another similar brushing element, so that one motor may accommodate a number of persons using individual brushing elements.

In all forms of brushes shown, the teeth contacting wipers 40 in Fig. 3, the teeth contacting wipers in Figs. 4 and 5, and the cylinder 50 in Fig. 6, extend laterally from the axis of the brushing element 22, so that, when the brushes are applied against the teeth, a reaction producing a lateral flexing of the tip end of the shank is produced. While what heretofore has been described is the preferred embodiment of this invention, it is readily apparent that alterations and modifications can be resorted to without departing from the scope of this invention and such alterations and modifications are intended to be included within the scope of the appended claims.

I claim:

1. A tooth cleaning device adapted to be removably attached to a source of rotary power comprising: an-
larged base including a coupling adapted to engage said power source, an elongated tapered shank of flexible material having a length considerably greater than the maximum thickness, a receiving tip, a universally flexible spring embedded within said shank extending from said base to said tip, and a tooth cleaning member attached to said tip, said member having at least one laterally projecting element connected thereto.

2. A tooth cleaning device adapted to be removably attached to a source of rotary power comprising: an elongated flexible shank formed of a resilient material and gradually reduced in diameter, an enlarged base including a coupling, adapted to engage said power source, integrally formed with said shank at the larger end thereof, a receiving tip integrally formed at the reduced end of said shank, a universally flexible spring embedded within said shank extending from said base to said tip, and a tooth cleaning member attached to said tip, said member having at least one laterally projecting element connected thereto.

3. A tooth cleaning device adapted to be removably attached to a source of rotary power comprising: an elongated flexible shank formed of a resilient material and gradually reduced in diameter, an enlarged base including a coupling, adapted to engage said power source, integrally formed with said shank at the larger end thereof, a receiving tip integrally formed at the reduced end of said shank, a helical spring embedded within said shank extending from said base to said tip, and a tooth cleaning member attached to said tip, said member having at least one laterally projecting element connected thereto.

4. A tooth cleaning device adapted to be removably attached to a source of rotary power including a coupling mandrel of frusto-conical form having a frusto-conical bore, the outer and inner conical surfaces of the mandrel and bore tapering in opposite directions, comprising: an elongated flexible shank formed of a resilient material and gradually reduced in diameter, an enlarged base including a coupling, adapted to engage the mandrel on said power source, integrally formed with said shank at the larger end thereof, said base having a frusto-conical socket therein slightly smaller than the frusto-conical mandrel with a centrally located frusto-conical projection therein, said frusto-conical socket and said frusto-conical projection tapering in opposite directions and adapted to matingly engage the mandrel and bore, respectively, of the power source, a receiving tip integrally formed at the reduced end of said shank, and a tooth cleaning member attached to said tip.

5. A tooth cleaning device as defined in claim 4, in which the outer end of the base includes an inturned flange adapted to engage the base end of the mandrel.

6. A tooth cleaning device as defined in claim 4, including an elongated spring embedded within said shank having one end terminating adjacent the tip and the other end extending into the frusto-conical projection.

7. A tooth cleaning device as defined in claim 6, in which the tooth cleaning member includes a central body surrounding the tip and in which the tip end of the spring extends through said central body.

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