

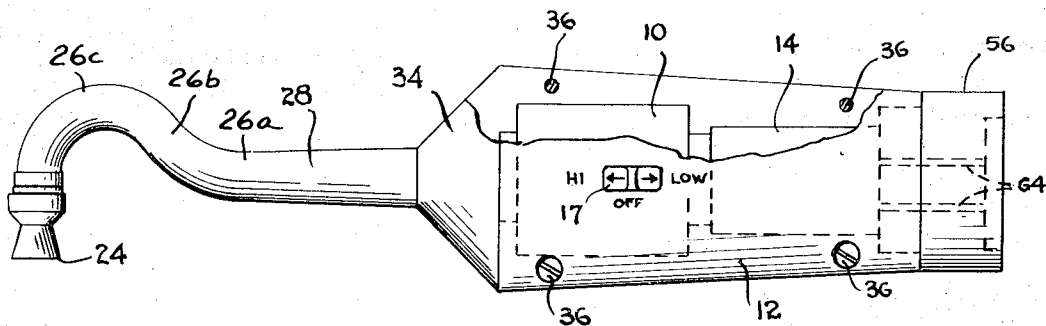
[54] **PORTABLE TOOTH CLEANER**  
 [76] Inventor: **Billy C. Hopkins**, P.O. Box 817,  
 Quincy, Calif. 95971  
 [22] Filed: **Nov. 8, 1971**  
 [21] Appl. No.: **196,562**  
 [52] U.S. Cl. .... **32/59**  
 [51] Int. Cl. .... **A61c 3/06**  
 [58] Field of Search..... **32/59, 58, 27**  
 [56] **References Cited**  
**UNITED STATES PATENTS**  
 3,579,835 5/1971 Levenson..... 32/58

1,907,286 5/1933 Chott..... 32/59  
 3,509,629 5/1970 Kidokoro et al..... 32/27

*Primary Examiner*—Louis G. Mancene  
*Assistant Examiner*—J. Q. Lever  
*Attorney*—Ernest L. Brown

[57] **ABSTRACT**  
 A hand-held, motor driven cleaning cup, wherein torque is delivered from the motor to the cup by a flexible torsion cable to allow the axis of rotation of the cup to be substantially at a right angle to the spin axis of the motor.

**12 Claims, 5 Drawing Figures**



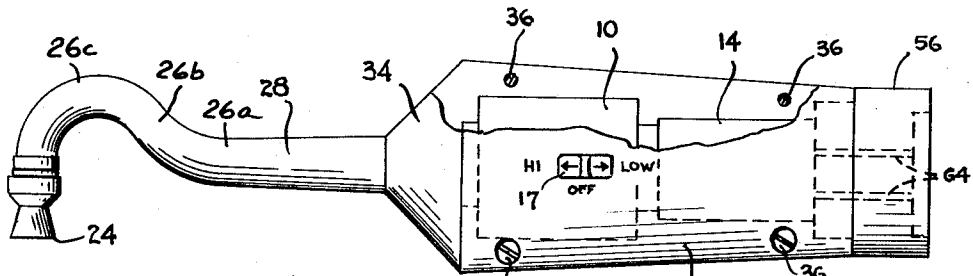


Fig. 1

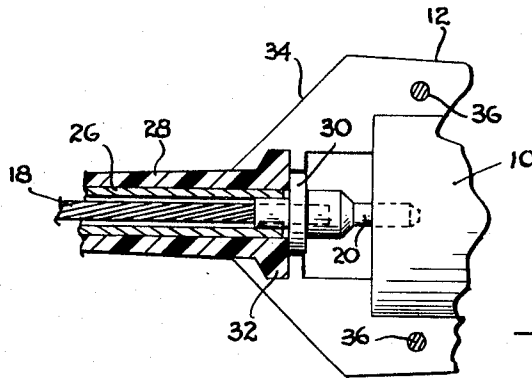


Fig. 2

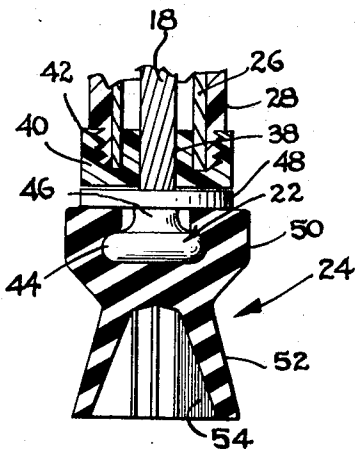


Fig. 4

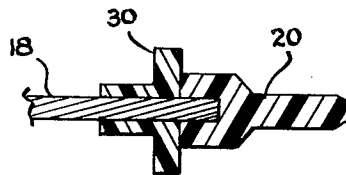


Fig. 3

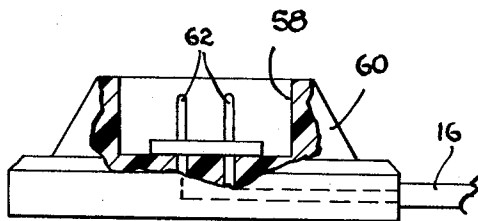


Fig. 5

## PORTABLE TOOTH CLEANER

### BACKGROUND OF THE INVENTION

The use of soft disposable rubber cups for dental hygiene is not new. They have been used by the dental profession for many years because of their proven superiority in cleaning the hard and soft tissues of the mouth. However, no practical means of utilizing this device for home dental care has hitherto been devised.

Right angle hand pieces which are used professionally by dentists have a set of gears to transmit rotation through a right angle. Although such transmissions are excellent, they are relatively expensive and not convenient for home use.

### BRIEF DESCRIPTION OF THE INVENTION

The apparatus contemplated by this invention is a self-contained motor-driven gearless rotary cleaner for home dental care. The apparatus preferably has a detachable rotating soft disposable rubber cup which is superior to a brush in the care of the hard and soft tissues of the mouth.

In a preferred embodiment of the invention, rotary torque generated by an electric motor, contained in the handle of the unit, is transmitted to a disposable cleaning cup by a flexible cable passing through a, preferably metal, housing tube having, preferably, a 90 degree curved bend at the working end. The metal is preferably covered with a plastic that is not chemically active with the saliva of the mouth.

It is therefore an object of this invention to clean teeth.

It is an important object of this invention to clean teeth while, at reduced speed, massaging their investing tissues.

It is a more specific object of this invention to provide a hand-held portable tooth cleaner.

### BRIEF DESCRIPTION OF THE DRAWINGS

Other objects will become apparent from the following description, taken in connection with the accompanying drawings, in which:

FIG. 1 is a profile view, with a portion broken away and in section, of the apparatus of this invention;

FIG. 2 is a sectional view of the apparatus, showing connection of the flexible drive cable to the drive motor;

FIG. 3 is a sectional view of the driving end coupler for the flexible drive cable;

FIG. 4 is a sectional view of the receiving or working end of the flexible cable, showing its attachment to the cleaning cup; and

FIG. 5 shows a typical power plug, partly in section, useful for supplying power to the apparatus of this invention.

An electric motor 10 is enclosed within a handle 12. The motor 10 may be driven by energy from a battery 14 enclosed within the handle 12. If the batteries 14 are rechargeable, they may be recharged through the cord 16 and plugs 62 and 64 from an energy source (not shown). An on-off switch 17 may be used to control electric power delivered to the motor 10.

A flexible cable 18 is attached by a coupler 20 to the spinning drive shaft (not shown) of the motor 10. The working end of the cable 18 is attached, preferably by an attaching member 22, to a tooth cleaning member 24. The coupler 20 is preferably a slip coupler which slips when too heavy a load is placed on the coupler,

thereby avoiding injury to the user and damage to the motor.

To guide the cable 18 and position the cleaning member 24, housing tube 26, preferably fabricate of metal, surrounds the cable and extends from the handle-housing 12 to the cleaning member 24, forming a hook-shaped configuration to cause the cable 18 to bend through, preferably but not necessarily, substantially a right angle from the axis of the spin of the motor 10. To accommodate the flexible cable 18 into a right angled bend while still keeping the cleaning cup 24 reasonably near the axis of the housing 12, the hook-shaped configuration preferably extends outward from the housing 12 substantially along the axis of the housing 12, as at 26a, has a curvature in a first direction as at 26b, then on the distal end has a curvature in a second direction as at 26c. The described curvatures are substantially coplanar as shown in FIG. 1.

The metal housing tube 26 is preferably enclosed within a plastic covering 28, such plastic being preferable to metal to avoid chemical action with the saliva of the mouth, and avoiding electric shocks to the user. Alternatively it is within the contemplation of this invention that the tube 26 also could be made of such chemically inert material.

The coupler 28 has a flange 30 which spins upon a plastic thrust bearing 32 which is formed on one end of the cover 28. The cover 28 is enlarged on the thrust bearing end 32, and it is enclosed by the end 34 of the housing 12. The housing 12 is held to the motor-battery assembly by the screws 36.

The outer end of the flexible cable 18 rotates on a bearing surface 38 in a screwed on washer 40. The washer 40 has an annular spacer element between the metallic housing 26 and the bearing surface 38. The washer 40 is screwed onto the cover 28 at the threads 42.

The attaching member 22 for attaching the rubber cleaning cup 24, or other cleaning apparatus, is preferably formed in the shape of an oval button 44 attached by a stem 46 to a substantially flat collar 48.

The cleaning cup 24, which may be a conventional one, has a shank 50 with an inner surface resiliently gripping the button 44 and abutting the collar 48. The inner surface is shaped in the general shape of a frustum of a cone. The outer surface of the cleaning cup in the cleaning portion 52 is conically shaped and outwardly flared. An opening 54 is adapted to receive the dentifrice and hold it in place by fins or fluting. The wall in the region 52 tapers, becoming thinner at its outer end which enhances its flexibility.

In operation, when electric energy is delivered from the battery 14 to the motor 10, the motor 10 drives the coupler 20. The coupler 20, attached to the flexible cable 18, spins on the bearing surface 30 and delivers torque and angular spin to the cable 18. Spinning of the flexible cable 18 delivers torque and spinat, preferably, substantially right angles to the axis of spin of the motor 10 to the coupler 22 which is rigidly attached to the outer end of the cable 18. The cable spins in the bearing 38.

Spinning of the coupler 22 causes the cleaning apparatus 24 to spin.

The apparatus is grasped in the hand and the spinning cup, usually with dentifrice therein, is applied to the teeth and gums, cleaning them.

Thus, the apparatus of this invention is a self-contained motor-driven gearless rotary cleaner for home dental care. Such apparatus is adapted to provide economical professional style cleaning of the teeth in the home.

Although the invention has been described in detail above, it is not intended that the invention shall be limited by that description, but only in accordance with that description taken in conjunction with the accompanying claims.

I claim:

1. In combination:
  - a motor housing;
  - a tubular housing having a flexible cable therein, said housing having a first portion extending outwardly from said motor housing, a second portion curved from the axis of said first portion, and a distal portion substantially coplanar with said first and second portions and having a curvature opposite to the curvature of said second portion to cause the axes of said first portion and the distal end of said distal portion to be substantially at right angles, whereby said housing reduces cable friction and allows access to all of the surfaces of the teeth of a user;
  - said tubular housing being enclosed with a covering of material which is chemically inert in the presence of saliva;
  - said flexible cable being attached to be driven by said motor; and
  - a cleaning member rotatably attached to the distal end of said tubular housing and connected to be driven by said flexible cable.
2. Apparatus as recited in claim 1 in which said chemically inert material is a plastic material.
3. Apparatus as recited in claim 2 and further comprising a slip connector on the outer end of said cable for attaching said cleaning member to said cable for turning therewith.
4. Apparatus as recited in claim 3 in which said

cleaning member is a dental cleaning cup.

5. Apparatus as recited in claim 3 and further comprising a detachable coupler for connecting said motor to said cable.

6. Apparatus as recited in claim 5 in which said detachable coupler is a slip coupler.

7. Apparatus as recited in claim 6 in which said motor is battery-driven, and further comprising a battery enclosed within said motor housing.

8. In combination:

a handle-housing;

an electric motor enclosed within said housing;

a housing tube enclosing a flexible cable from one end to the other of said tube, said tube extending from one end of said housing thence curving in a first direction, thence into a second direction opposite to said first direction in a hook-shaped configuration to cause the distal end of said housing tube to have an axis substantially at a right angle to the axis of its proximal end, whereby said housing tube reduces cable friction and allows access to all of the surfaces of the teeth of a user;

means for coupling said cable, on a first end thereof, to said motor for rotation therewith; and

attaching means on the second end of said cable, for attaching a dental cleaning member.

9. Apparatus as recited in claim 8 and further comprising a cover for said housing tube and said handle-housing, fabricated of a material which is chemically inert to saliva.

10. Apparatus as recited in claim 9 in which said means for coupling is a slip coupling.

11. Apparatus as recited in claim 10 in which said attaching means is adapted to attach a dental cleaning cup to be driven by said cable.

12. Apparatus as recited in claim 11 in which said attaching means is shaped as an oval button, attached by a stem to a substantially flat collar.

\* \* \* \* \*

45

50

55

60

65