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[45] Patented Oct. 20, 1970

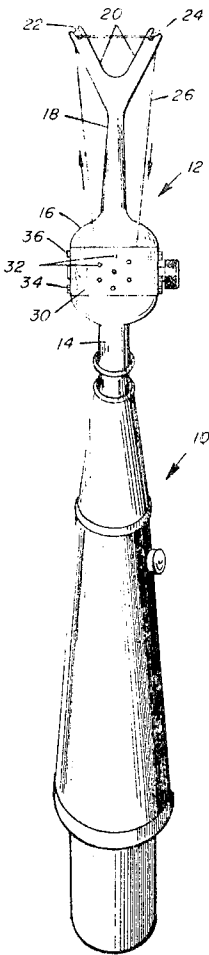
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[54] DENTAL TAPE HOLDER FOR POWER DRIVEN
TOOTH CLEANING DEVICES
13 Claims, 8 Drawing Figs.

[52] U.S. Cl. 132/92
[51] Int. Cl. A61c 15/00
[50] Field of Search 132/92, 95,
79.6, 93, 92.1, 84.1, 89

ABSTRACT: A self-contained dental tape holder and supply unit is provided to be attached to standard power driven teeth cleaning devices.



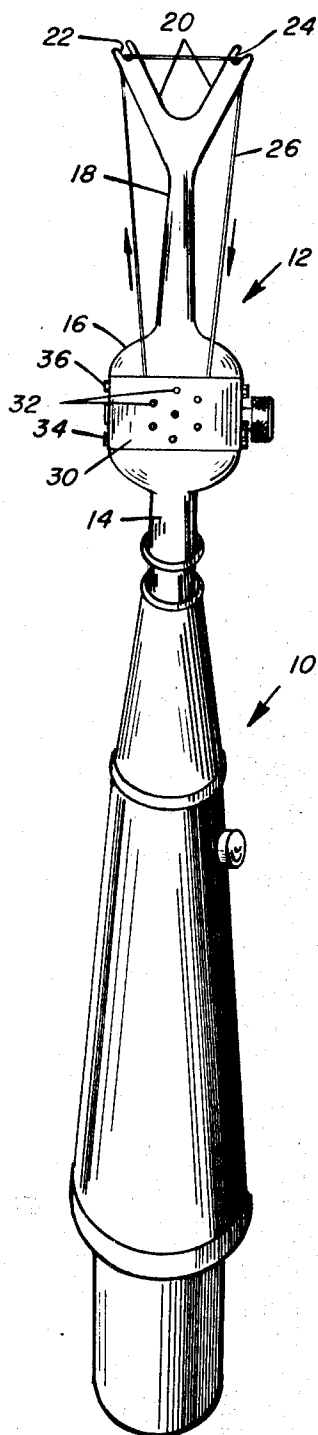


FIG. 1

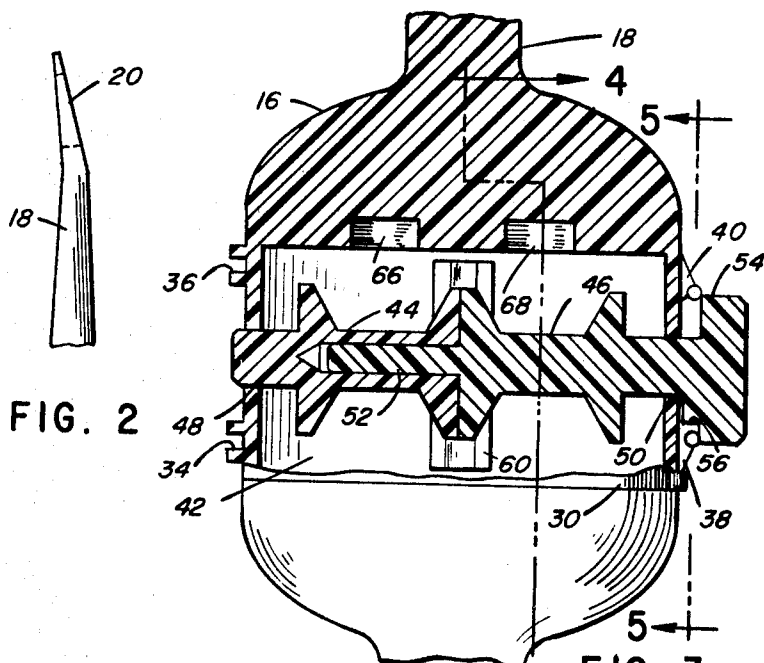


FIG. 2

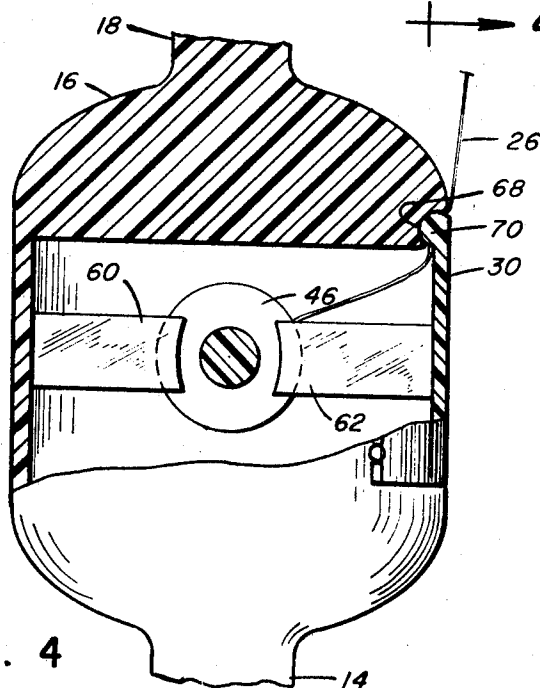
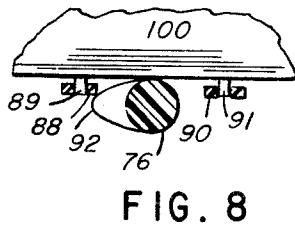
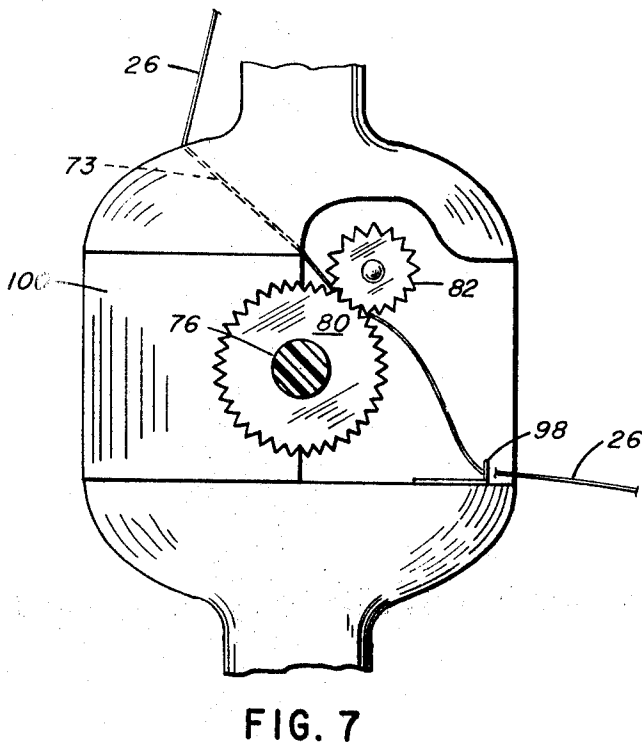
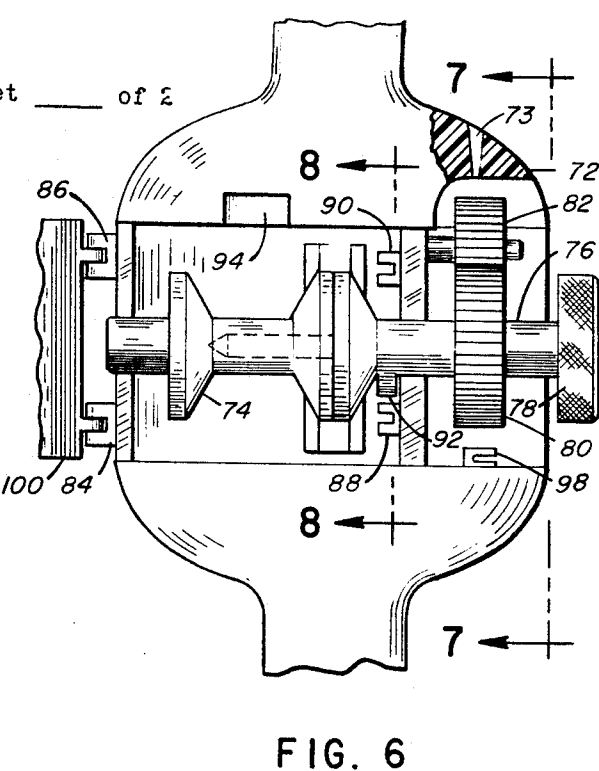
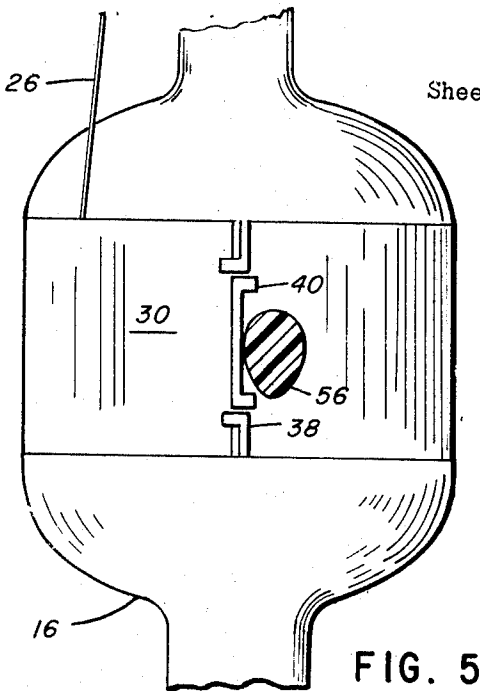


FIG. 3

FIG. 4

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DENTAL TAPE HOLDER FOR POWER DRIVEN TOOTH CLEANING DEVICES

CROSS REFERENCES TO RELATED APPLICATIONS

This is a continuation in part of copending U.S. Pat. No. application Ser. No. 581,235, filed September 22, 1966, now U.S. Pat. No. 3,421,524, issued January 14, 1969.

BACKGROUND OF INVENTION

The invention relates to power driven teeth cleaning devices. In recent years, so-called electric toothbrushes have become increasingly popular for cleaning the teeth. The advantage which these devices have over hand brushing of the teeth lies in the ability of these power-drive appliances to provide a high speed brushing action. However, even the high speed brushing action does not provide complete dental hygiene in those areas between the teeth in which the particles become wedged or retained. These areas between the teeth are best cleaned by utilizing dental floss or tape. Usually, this is supplied on small spools from which the user unrolls a short length which he stretches between his two hands and uses by placing the thumb and forefinger of one hand holding one portion of the floss inside the mouth. This is a cumbersome and unsanitary operation, and eventually devices were designed which stretch the floss tautly between two extending finger components. These devices, however, were cumbersome in shape and simply provided the same type of cleaning motion usually provided by a strand of dental floss held between two hands.

SUMMARY

This invention accordingly provides an improvement over the prior art devices and said copending application and teaches a unitized, self-contained dental tape attachment, the attachment being readily connectable to a typical power handle of the type that will hold a toothbrush attachment. The attachment of this invention comprises spaced prongs of substantially U-shaped to accommodate tooth depth and which retains dental tape thereacross, a tape supply reel and a takeup reel incorporated so as to retain the tape relatively taut in the spaced prongs and which upon using all the tape may be disposed of or recharged with new tape.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the invention.

FIG. 2 is a partial side elevational view of the upper tape holding prong unit.

FIG. 3 is a partial sectional view of the tape supply and takeup mechanism.

FIG. 4 is a partial sectional view taken along the line 4-4 of FIG. 3.

FIG. 5 is a sectional view taken along the line 5-5 of FIG. 3.

FIG. 6 is a partial sectional view of an alternate embodiment.

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 6.

FIG. 8 is a partial sectional view taken along the line 8-8 of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Broadly speaking, the invention comprises a power unit which is adapted to receive a tooth cleaning dental tape attachment replacing the typical toothbrush attachment normally used with the power unit. The attachment includes an elongated shaft having a pair of prongs extending in a plane which is at an angle, preferably within the range of from 5 to 10° and typically about 8° and unitized therewith a dental tape supply reel and takeup reel member all of which are integral as a unit. When the tape is exhausted the unit may be discarded or resupplied. As explained in the aforesaid copending application, it is believed the effectiveness of this invention is that since the power unit rotates the shaft in a small arc, and since the dental tape is held securely by the cooperation of the re-

tention members described and partly because of the flexibility of the prongs, the dental tape moves in a manner to describe a FIG. similar to the surface of two cones joined at the apices as described in said prior copending application. It is believed this conical movement, which is defined herein as radially oscillatorily, pulls the dental tape around the tooth surface to cover more area than would be possible if the movement of the tape were simply a reciprocating or back and forth motion as with a usual electric driven toothbrush.

Referring now to the drawings in detail, the power driven dental cleaner of this invention comprises a power unit, generally designated by the numeral 10. The power may be directly attached to an electric supply source or supplied by rechargeable or conventional batteries, although a spring-wound motor is conceivable. As shown herein, the apparatus of this invention replaced the toothbrush attachment and is designated herein generally by the numeral 12, although an integral power and dental tape unit as defined herein is contemplated. The inner engagement with the power unit handle 10 will depend upon the manufacturer but generally includes a type as shown in the prior copending application. Hence, the apparatus of this invention 12 may be interchangeable with a conventional toothbrush attachment so that the same power drive unit may operate both attachments. Generally the unit 12 comprising the improvement of this invention includes a lower stem portion 14 which includes the aforesaid attachment portion 18 and prong members 20. The prong members 20 extend from the upper shaft portion 18 at a small angle, preferably about 8° as is best shown in the partial side view of FIG. 2. The prongs may include openings as shown in the prior copending application or slots 22 and 24 into which the tape 26 is positioned. The intermediate body portion 16 is an enlarged continuation of the stem and includes a hinged door portion 30 which may include a plurality of small air openings 32 for cleaning or sterilization purposes as may be desired. The cover portion 30 is hinged at 34 and 36, as best shown in FIG. 3, and includes a snap locking arrangement on the opposite sides 38 and 40, similar to the manner in which small plastic boxes are retained together. The intermediate portion includes space 42 within which a supply spool 44 and a takeup spool 46 are rotatably supported at bearing openings 48 and 50. Supply spool 44 is independently rotatable as for example about a supporting shaft 52 which is formed as a part of the takeup reel 46. Outwardly of the takeup spool is a hand knob portion 54 which includes an offsetting cam portion 56 which is used to snap open the cover when it is desired to reel additional dental tape. Interiorly and rearwardly shown is a backup member 60 which is grooved to accommodate and frictionally engage side peripheries of the supply spool 44 and takeup spool 46. As shown in FIG. 4, cover 30 includes a similarly placed brakelike member 62 which engages the supply and takeup spools similarly and acts as a brake to prevent any rotation or movement thereof when the device is in operation. Tape clamping recesses 66 and 68 are provided in the intermediate body portion 16 to provide additional wedging of tape 26 therein by matching detent 70 of cover 30, as shown in FIG. 4 and thus prevent any movement and maintain the line taut about the prongs.

In operation the attachment 12 of this invention ordinarily is supplied as a package adaptable for use in conjunction with a power unit 10. The attachment is connected to the power unit and will generally include dental tape 26 being threaded from the space 42 about supply reel 44, across recess 66, thence upwards as shown by the arrow in FIG. 1 into or through prong opening or slot 22, thereacross, thence into or through opening or slot 24 and downward across recess 68 to the takeup reel 46. Thereafter closure or cover 30 which is hinged at 34 and 36 is snapped shut wherein detent means such as 70 shown in FIG. 4 engages within its mating recess 68, likewise with recess 66, not shown, wherein the dental tape 26 is drawn and maintained in a taut condition. Simultaneously with the closure thereof a braking action occurs by the interengagement of members 60 and 62 against both the

supply and takeup reels 44 and 46 as shown. As such, when the device is turned on the dental tape and the intermediate supply and takeup reel portions will remain relatively affixed undisturbed by the motion. The device is then inserted such that prongs 20 straddle the line of teeth permitting the taut dental tape to be inserted between the teeth and assist in the cleaning thereof. When it is desired to replace the dental tape across the prongs with clean tape, knob 54 is rotated and, since it includes a cam portion 56, lid 30 is opened by the movement simultaneously therewith. This releases the tape to permit unreeling and takeup. Thereafter the opening is closed by snapping lid 30 into place.

Although the supply and takeup reels are shown in FIG. 3 and described herein as dual reels, rotatably independent, it is to be understood that they could be formed of a single unit. In addition, it is conceivable that in lieu of a takeup reel means may be provided for taking up a sufficient amount of new dental tape when desired and thereafter cutting and removing the used portion for removal from the system. This is best shown in the embodiment of FIGS. 6-8. Intermediate body portion 72 includes an opening therein to receive a dental tape supply reel 74 to which dental tape 26 is wound. The reel is independently rotatably upon shaft 76 which may include a winding knob portion 78. An opening 73 in the body portion 72 is a guide through which tape 26 is threaded into the takeup mechanism hereafter described. Integral with the shaft is a spur gear 80 which is adapted to mesh with pinion 82 and through which tape 26 will be retained and will traverse when turned. Hinge means 84 and 86 are adapted to receive a cover 100 which is locked to the body 72 by interconnecting projections 89 and 91 into receptacles 88 and 90 respectively. The cover includes an edge surface over a cam surface 92 of shaft 76 wherein rotation of the shaft 76 will open the cover 100. Also included is a recess 94 similar to that previously described within which a detent portion of the lid will mate and clamp the dental tape 26 in a taut condition. Upon realignment of the cam the lid is closed and the device is ready for operation again. Surplus dental tape is taken up by the gear and rack system and may include means such as a cutoff edge 98 as best shown in FIG. 7, the latter view including a cover 100 over the supply reel space, leaving the takeup mechanism open for washing or cleansing.

I claim:

1. A dental tape tooth cleaning attachment comprising:

a shaft portion, one end of which includes means for attachment to a power unit of the type adapted to move said attachment radially oscillatorily, prong members at the other end of substantially U-shape to accommodate tooth depth, said prong members having means receiving dental tape thereacross;

an intermediate unit integral with said shaft including means to supply a substantially continuous length of said dental tape to said prong;

means to take up said dental tape from said prong members; and

means to retain said dental tape in a substantially taut condition when threaded across said prongs.

2. Apparatus of claim 1 wherein said prong members are canted at an acute angle to said shaft portion.

3. Apparatus of claim 2 wherein said angle is about 8°.

4. Apparatus of claim 1 wherein said means to supply said dental tape includes independently rotatably supply spool and takeup spool and means to rotate said takeup spool.

5. Apparatus of claim 1 wherein said means to retain said dental tape in said taut condition includes a cover for said intermediate unit having means for braking said takeup and supply means and to clamp said tape when closed.

6. Apparatus of claim 5 including means to simultaneously rotate said reels and open said cover.

7. Apparatus of claim 4 wherein said takeup spool comprises a spur and pinion gear between the teeth of which said tape will be retained and traverse upon rotation thereof.

8. Apparatus of claim 7 wherein said unit includes a tape cutting means downstream of said gear and pinion.

9. Apparatus of claim 4 including a cover for said supply spool.

10. Apparatus of claim 9 wherein said takeup spool comprises a spur and pinion gear between the teeth of which said tape will be retained and traverse upon rotation thereof.

11. Apparatus of claim 10 wherein said unit includes a tape cutting means downstream of said gear and pinion.

12. Apparatus of claim 10 including means to simultaneously rotate said gears and open said cover.

13. Apparatus of claim 10 wherein said means to retain said dental tape in a taut condition is incorporated in said cover including means therewith to engage and brake said supply spool and said takeup mechanism and clamp said tape to said intermediate unit when closed.

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