

[54] **FLOSS HOLDER**

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[56] **References Cited**

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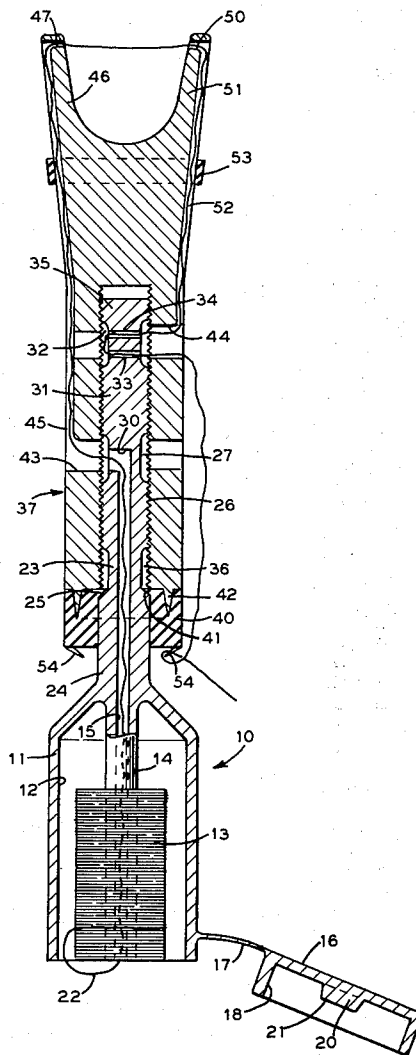
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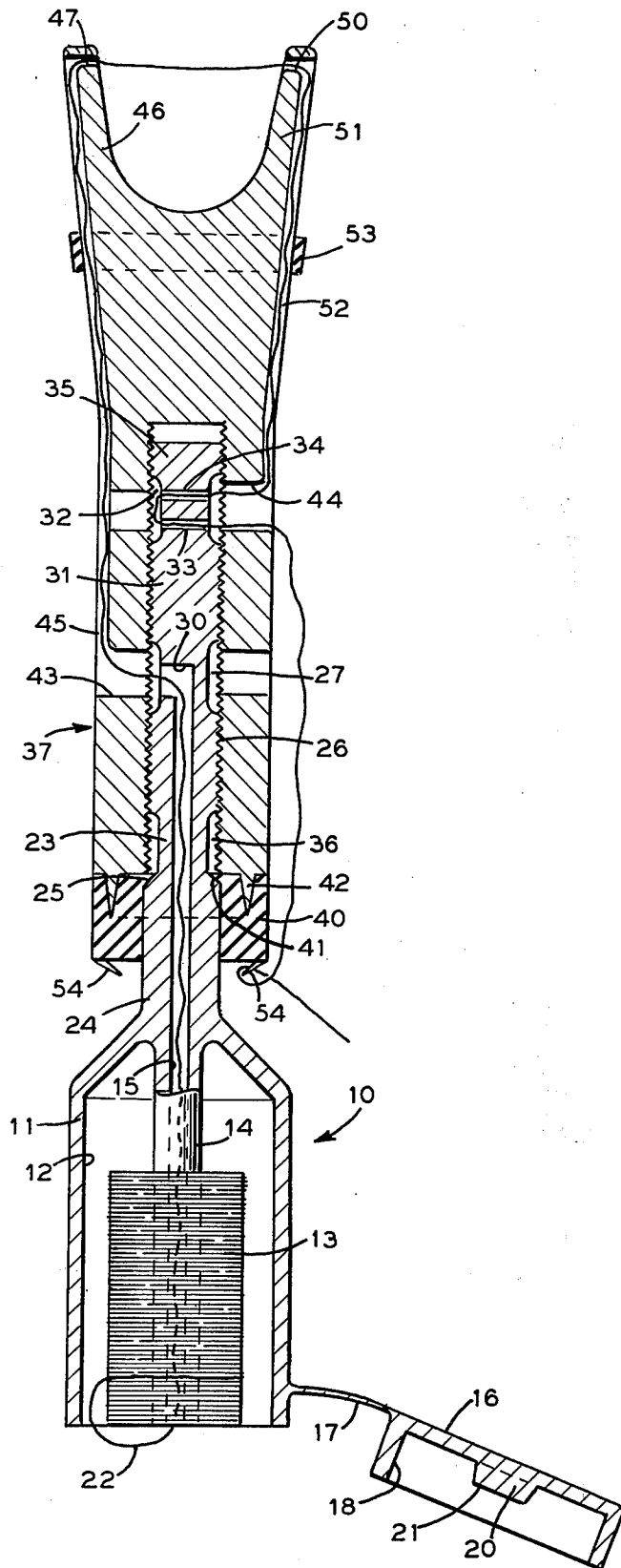
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[57] **ABSTRACT**

An illustrative embodiment of the invention is directed to a dental floss applicator. The applicator has a female spindle that receives the threaded end of a male dispenser spindle. The dispenser spindle includes a handle which stores a supply of dental floss. This floss is fed through a central aperture in the dispenser spindle, across the gap between the tines of an applicator fork on the end of the female spindle and back through the shank of the dispenser spindle. Twisting the dispenser spindle relative to the female spindle winds the floss about the shank and thereby permits the tension of the floss across the tines of the applicator fork to be selected. A friction brake arrangement can be included in the base of the female spindle to maintain a preselected tension, once established.

3 Claims, 1 Drawing Figure





FLOSS HOLDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to cleansing techniques and, more specifically to dental floss applicators, and the like.

2. Description of the Prior Art

There is a need for a sturdy, inexpensive, hygienic and aesthetically acceptable dental floss applicator. To meet these requirements, an applicator must apply enough tension to a strand of floss that will enable the strand to dislodge matter trapped between adjacent teeth.

To accomplish this purpose, a number of other requirements also must be satisfied. In this respect, the applicator must be able to reach all of the teeth in the mouth without at the same time blocking a clear view of these teeth. A useful applicator also must be simple to thread with floss and easy to manipulate within the oral cavity. There is a very important need, moreover, for the applicator to function in a manner that protects the fingers from saliva and does not require the hand to grasp a length of used floss, and from a quick and undesirable release of tension that tends to chip teeth.

Past attempts to reconcile all of these needs have not been satisfactory. In this respect, it has been necessary, with prior applicators, either to grasp a length of used dental floss in order to establish proper strand tension, or to apply a continuous manual force to a strand tensioning device on the applicator—a force that is awkward and incompatible with the primary reciprocating movement of the floss between adjacent teeth. The used floss, moreover, should not touch the clean floss for hygienic reasons.

Thus, there is a need for a dental floss applicator that enables proper strand tension to be established without imposing a requirement to grasp a length of used floss or to obligate the user to combine a number of awkward manual forces and motions.

SUMMARY OF THE INVENTION

These and other problems that have characterized the prior art are, to a large extent, overcome through the principles of the invention. For example, a typical dental floss applicator that characterizes salient features of the invention comprises a female spindle that has a hollow threaded recess on one end for receiving the threaded shank of a male dispensing spindle. A friction brake also is formed on the recessed end of the female spindle to engage a portion of the dispensing spindle shank and thereby to selectively restrain further relative movement of the two spindles.

The end of the female spindle that is opposite to the recessed end terminates in a pair of tines which form a fork that is canted through an angle of about 45° with respect to the spindle axis. The central portion of the female spindle, moreover, has two pairs of diametrically opposed apertures, each of the two pairs of apertures being axially spaced from each other.

The male dispenser spindle has an interrupted thread formed on a shank. The threaded shank can be screwed into the threaded recess in the female spindle. With the dispenser spindle seated within the female spindle recess, two thread interruptions on the shank are in general registration with respective pairs of the axially spaced apertures on the female spindle.

A hollow handle is provided on the end of the dispenser spindle that is opposite to the shank end. A spool of dental floss is stored within the hollow of the handle and mounted on a hollow shaft formed within the handle. A strand of this floss is led from the spool, between a boss on the handle cap and the shaft, through the hollow center of the shaft and out of the dispenser spindle through an aperture that is formed in the spindle at the first of the two thread interruptions. A boss on a handle cap engages the end of the shaft and applies friction force to the strand that is engaged between the boss and the end of the shaft.

The strand is led through one of the apertures on the female spindle with which the first thread interruption is in registration, and through an axial groove that is formed in the outer surface of the female spindle to the end of one of the tines. The strand extends across the gap between the tines, through an axial groove on the opposite side of the female spindle and through the second of the two axially spaced pairs of apertures in the female spindle.

Within the female spindle, the strand is led through a first hole in the dispenser spindle shank at the second thread interruption. The strand then is bent back through a 180° angle to form a U-shaped loop by passing through a second hole in the spindle shank in order to pass out of the dental floss applicator through the same aperture.

To establish a proper tension in the strand between the two tines, the dispenser spindle is twisted, relative to the female spindle, in a direction that will tend to drive the dispenser shank deeper into the female spindle recess. The twisting motion tends to wind the strand of floss about itself on the second thread interruption on the dispenser spindle shank. In this way, the strand, frictionally engaged on the spool end between the boss and the end of the hollow shaft, and, on the free end, wound on the shank, enjoys a selected tension between the tines of the fork that will permit matter to be dislodged from the spaces between the teeth through the usual reciprocating motion.

This tension is maintained without the application of any additional force, by means of the friction brake on the recessed end of the female spindle. This brake engages a portion of the outer surface of the dispenser spindle and essentially impedes the two spindles from moving relative to each other after the proper strand tension has been established.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawing and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWING

The sole FIGURE of the drawing is a front elevation in full section of a dental floss dispenser that embodies principles of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a more complete appreciation of the invention, attention is invited to the sole figure of the drawing.

The illustrative embodiment of a dental floss applicator shown in the drawing has a male dispenser spindle 10 formed from hard plastic, metal, or the like. The spindle 10 has, on one end, a handle 11. The handle 11 has a centrally disposed recess or magazine 12 for receiving a dental floss spool 13. As shown in the drawings, the hollow center of the spool 13 is received on a shaft 14.

Within the shaft 14, and generally coextensive with the longitudinal axis of the dispenser spindle 10, is a hollow bore or passageway 15. A cap 16 for the handle 11 is connected to the handle by way of a flexible ligament 17 so that the cap and the dispenser spindle 10 form a single unit. The cap 16 has a recess 18, and an internal boss 20 within the recess that is centrally disposed within the cap. When the cap 16 is engaged with the open end of the handle 11, the sides of the cap that form the recess 18 fit snugly over the outer surface of the handle and press flat surface 21 on the boss 20 against the end of the shaft 14.

A strand 22 of dental floss is led from the spool 13, between the end of the shaft 14 and the flat surface of the boss 21 through the bore 15 up into a shank 23 that forms the opposite longitudinal end of the dispenser spindle 10. An enlarged shank surface 24 is formed adjacent to the handle 11. As seen in the drawing, spaced from the junction between the handle 11 and the enlarged shank surface 24, the shank forms a truncated conical section 25 that leads directly into a first threaded shank section 26 which terminates in a first thread interruption 27. Within the thread interruption 27 a generally transverse bore 30 is formed to intersect with and to terminate the longitudinal bore 15 within the dispenser spindle 10.

Proceeding further toward the end of the shank 23 in a longitudinal direction, a second threaded shank section 31 is formed. The second threaded section 31 terminates in a second thread interruption 32. Two transverse bores or holes 33 and 34 characterize the second thread interruption 32 in accordance with a specific feature of the invention.

A final threaded shank portion 35 terminates the shank 23.

As illustrated, the threaded shank 23 of the dispenser spindle 10 is received in a threaded recess 32 that is formed in a female spindle 37. Looking at the drawing, it can be seen that the portion of the female spindle 37 closest to the handle 11 has a ring-shaped friction brake 40. The central aperture in the brake 40 has a truncated conical portion 41 that matches and selectively engages the opposing enlarged shank surface 24 on the dispenser spindle 10. Longitudinally protruding prongs 42 penetrate the friction brake 40 and prevent the brake 40 from moving relative to the female spindle 37.

Two pairs of apertures 43 and 44 are formed in the mid-portion of the female spindle 37, the aperture pair 43 being spaced closer to the friction brake 40 than the aperture pair 44. The longitudinal dimensions and relative locations of the aperture pairs 43 and 44, moreover, are sufficient to establish registration, respectively between these aperture pairs and the transverse bore 30 (in the first thread interruption 27) and the transverse bores 33 and 34 (in the second thread interruption 32) through a substantial range of relative longitudinal movement for the two spindles.

A longitudinal recess 45 is formed in the outer surface of the female spindle 37 that extends from the ap-

erture pair 43 lengthwise along the spindle surface to the tip of a tine 46. The end of the tine 46 has a groove, or hole 47 that communicates with the recess 45. The tine hole 47 further is in transverse alignment with a similar groove, or hole 50 that is formed in the tip of an opposing tine 51 that is transversely spaced from the tine 46.

The two tines 46 and 51 form that provides the working end of the dental floss applicator. Not clearly shown in the drawing, but of practical importance when using the applicator to clean between the molar teeth that are spaced well back in the mouth, is the fact that the fork is bent out of the plane of the drawing through an angle of about 45°. This angular relation enables the dental floss applicator to reach these teeth.

Continuing with the tine hole 50, this hole communicates with a further longitudinally disposed recess 52 that is formed in the surface of the female spindle 37 between the tine hole 50 and the aperture pair 44. A band 53 of elastic material circumscribes the outer surface of the female spindle 37 in a transverse plane that approximately matches the apex of the angle between the fork and the longitudinal axis of the female spindle 37.

It will be recalled that the strand 22 of dental floss was led through the passageway 15 to the transverse bore 30 that terminates this passageway. As shown in the drawing, the strand 22 is fed through one of the apertures in the pair 43 and into the longitudinal recess 45 to the hole 47 that is formed on the end of the tine 46. The strand 22 spans the gap between the tines 46 and 51 and is received in the tine hole 50. The communicating recess 52 receives the strand and provides a means for introducing this strand into one of the apertures in the pair 44.

The strand 22 then is passed through the bore 34 in the shank 23 of the dispenser spindle 10 and out through the other aperture in the aperture pair 44. The strand 22 then is bent back upon itself through an angle of 180° in order to pass back through the shank 23 by way of the transverse bore 33. The bitter end of the strand 22 is pulled tight and the dispenser is now ready to permit strand tension adjustment across the gap between the tines 46 and 51. It should be noted that the elastic band 53 is snapped into place at this point in order to keep the strand 22 in the longitudinal recesses 45 and 52 in spite of the angular orientation of these tines relative to the longitudinal axis of the female spindle.

In operation, the handle 11 is twisted relative to the female spindle 37 in a direction that tends to drive the shank 23 deeper into the threaded recess 36. This twisting motion, in accordance with a salient feature of the invention, also has the further effect of winding slack dental floss in the strand 22 about the first and second threaded interruptions 27 and 32. Because of the reentrant loop through the transverse bores 33 and 34, it is not necessary to grasp the bitter end of the strand 22, the loop being sufficient to take a purchase on the strand. Similarly, the frictional engagement established between the flat surface 21 on the boss 20 and the adjacent end of the shaft 14 is sufficient to hold the strand 22 of floss taut until the strand has been wound about the first thread interruption 27 in order to be engaged thereby.

A further important feature of the invention is provided by the relation between the advance of the shank

23 into the threaded recess and the friction brake 40 as the strand is being wound taut about the shank. In this connection, the force applied by the enlarged shank surface 24 against the matching inner surface of the friction brake 40 as the dispenser spindle 10 is screwed into the recess 36 tends to increase the friction forces that impede all relative movement of the two spindles in either direction. In this manner, after a desired tension has been established in the portion of the strand 22 between the two tines 46 and 51 no additional movement or continued application of force is required to retain this tension. Thus, the hands are free to apply the dental floss in the gap between the tines to the separation between adjacent teeth with the usual reciprocating motion and without the need to hold tension on a bit of used floss or apply a force to some tensioning device on the applicator.

To release the tension on the strand of floss, the two spindles need only be twisted in the opposite relative direction to back the shank 23 out of the threaded groove 36. Cutters 54 also are conveniently located on the outer surface of the applicator to permit used floss to be severed from the main strand and thrown away.

There are a number of modifications to this structure that are possible. To name but a few of these modifications that nevertheless remain within the scope of the invention, it should be noted that a "screw" cap could be substituted for the cap 16 described above. The friction brake 40 could be secured within a recess formed within the longitudinal end of the female spindle 37. Appropriate bores could be formed in the female spindle to accommodate the strand 22, rather than the elastic band 53, as shown in the drawing. The strand 22 also could be drawn directly from the magazine 12 through a hole in the handle in alignment with another longitudinal hole in the first threaded shank section 26. The dispenser spindle, moreover, could be made from two independent pieces. In this respect, a dental floss container could be provided with a threaded end that mates with a matching thread on the handle end of the shank 23. The container in which the spool of dental floss is packaged for sale thus becomes the handle for the applicator. A levered detent arrangement also could be substituted for the friction brake 40, and the strand could be engaged between the threads on the shank 23 and a nut, in order to establish the proper ten-

sioning for the strand. A spring loaded, rotatable member transversely disposed relative to the two spindles also could be used to wind up the slack in the strand and allow spring tension to draw the strand taut.

I claim:

1. A dental floss applicator comprising, a dispenser spindle for holding a spool of the dental floss, a shank protruding from said dispenser spindle, said shank having a generally longitudinal passageway formed therein for leading a fresh strand of the dental floss there-through, said longitudinal passageway terminating in a first generally transverse bore to permit the fresh strand of dental floss to be led from said shank and to permit the dental floss strand to wind upon itself, a female spindle relatively movable with respect to said shank having a first aperture formed therein for general alignment with said generally transverse bore, a pair of spaced tines formed on said female spindle for establishing a gap for tensioning the dental floss strand thereacross, said female spindle having a second aperture formed therein, said protruding shank having a pair of generally transverse bores formed therein and spaced longitudinally from said first transverse bore, said generally transverse bores being in general alignment with said second female spindle aperture for enabling a used strand of the dental floss to be led from said pair of spaced tines through said second female spindle aperture and through each of said generally transverse bores in opposite respective directions to take a purchase on and separating the used dental floss strand from the fresh strand led through said first transverse bore and selectively applying tension to the dental floss strand in response to the relative movement of said spindles.

2. A dental floss applicator according to Claim 1 further comprising brake means for impeding said relative movement of said spindles in order to maintain said tension in the dental floss strand.

3. A dental floss applicator according to claim 1 further comprising a cap for engaging an end of said dispenser spindle, said cap having a boss formed therein to apply friction forces to the strand of dental floss and thereby to enable the strand to take a purchase on said dispenser spindle.

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