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 [45] Patented **Jan. 4, 1972**

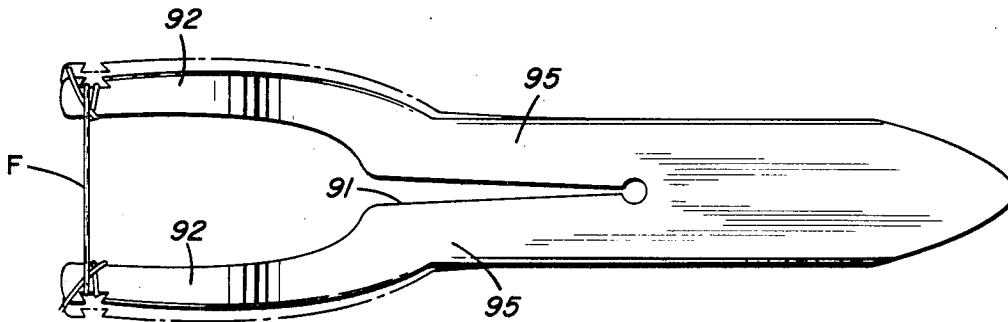
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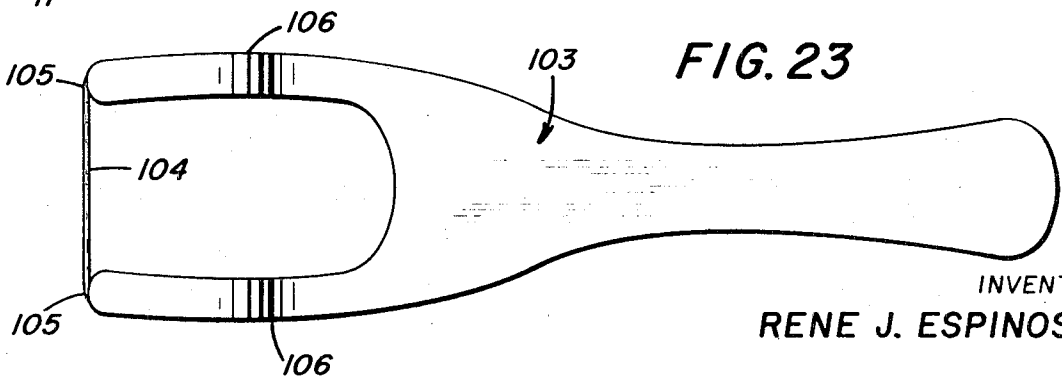
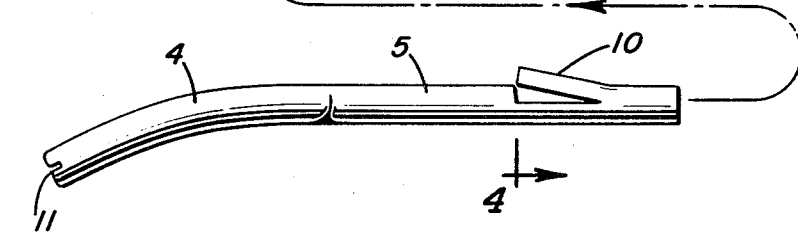
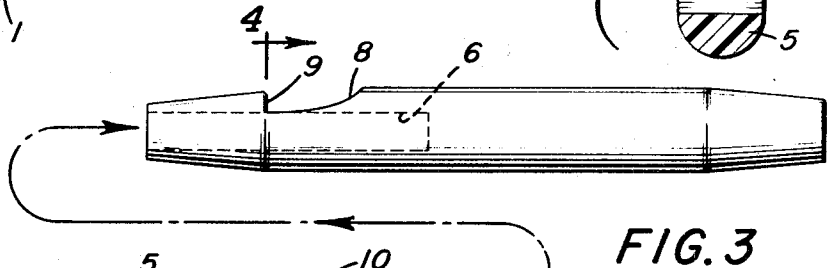
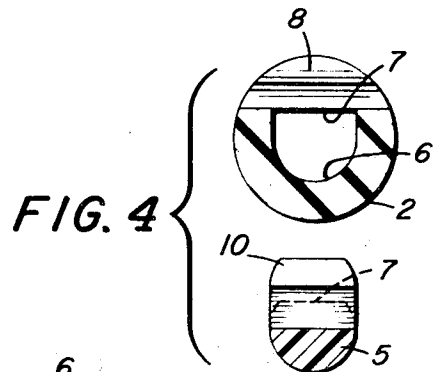
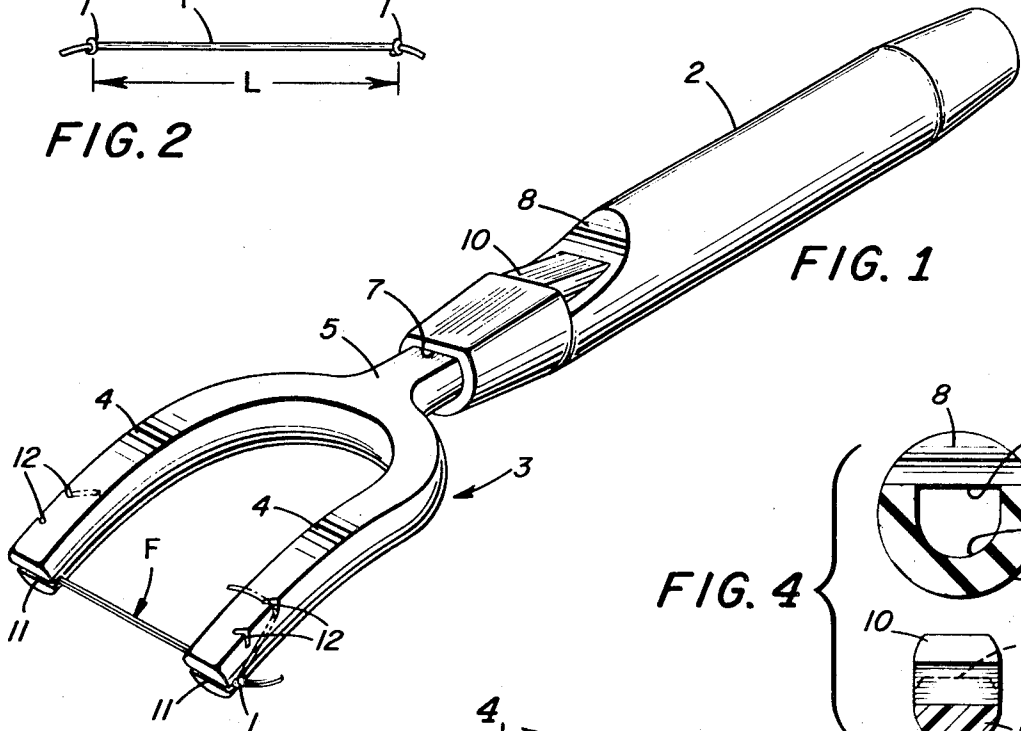
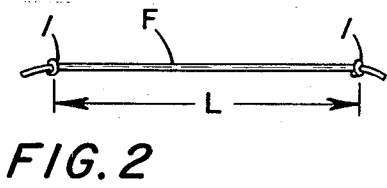
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[54] **DENTAL FLOSS HOLDER**  
 17 Claims, 23 Drawing Figs.

[52] U.S. Cl..... 132/91  
 [51] Int. Cl..... A61c 15/00  
 [50] Field of Search..... 132/91, 90,  
 89, 92, 76.2

**ABSTRACT:** A fork-shaped handle device between whose prongs is positionable a length of dental floss for use in a person's mouth and a new type of floss useable with said device.





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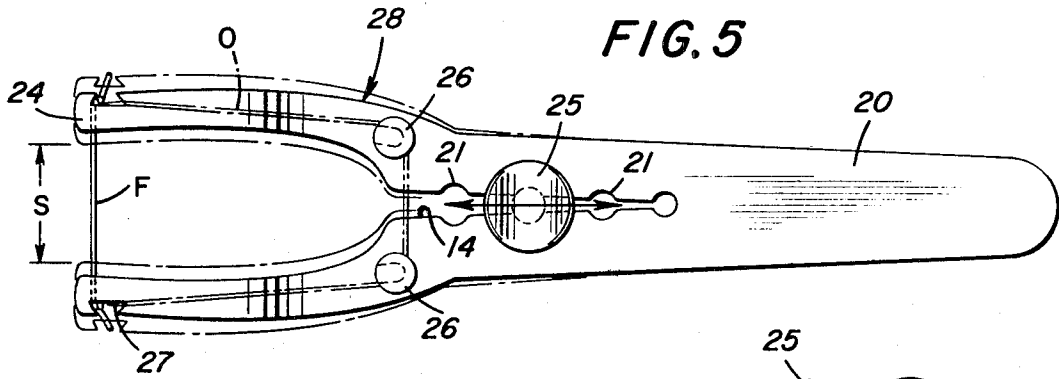


FIG. 6

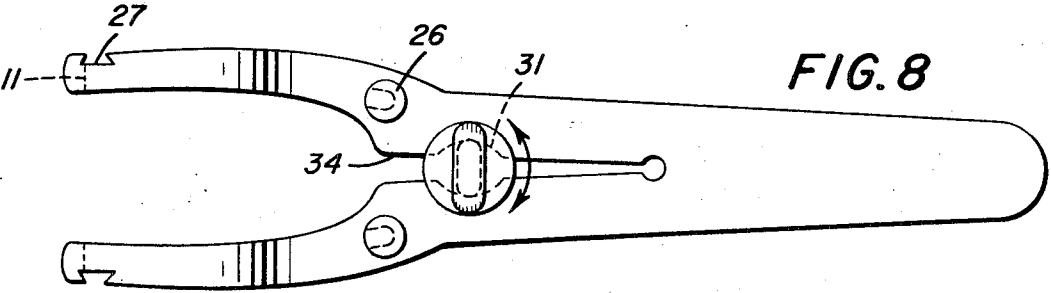
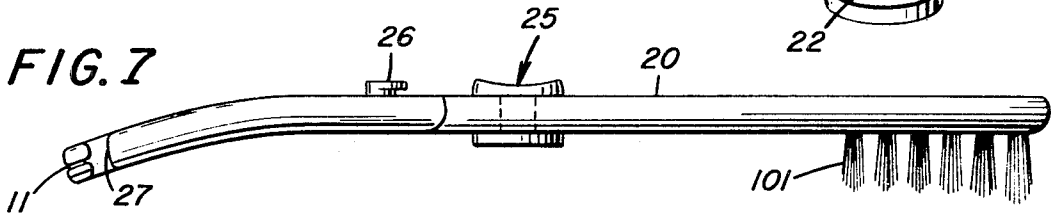
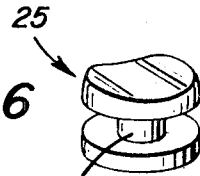


FIG. 8

FIG. 9

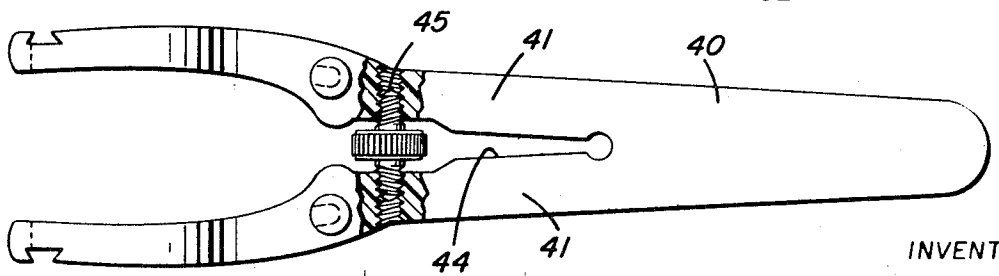
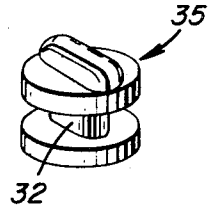
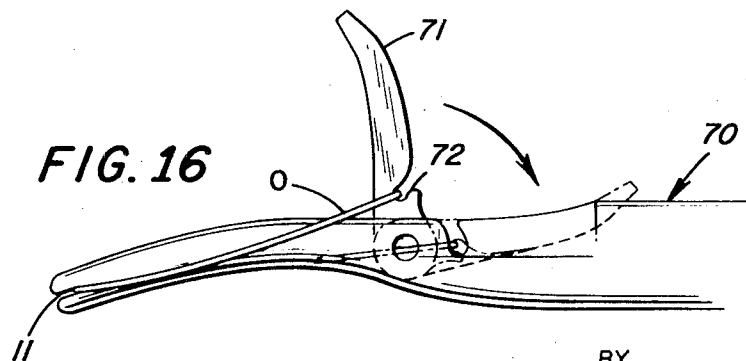
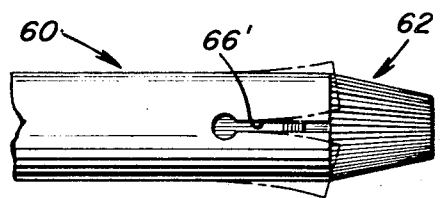
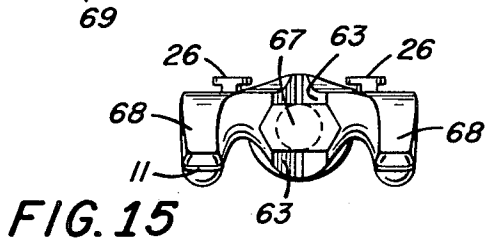
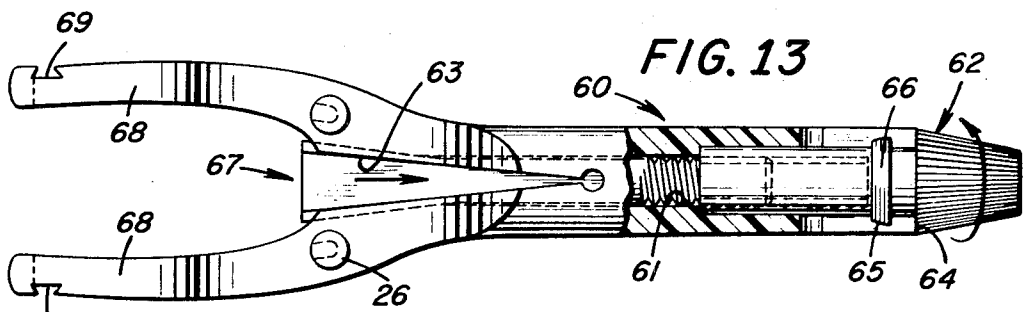
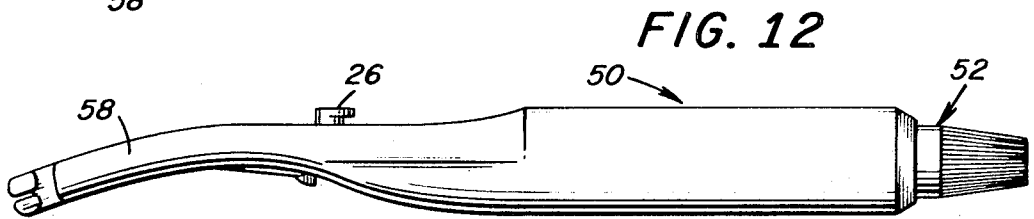
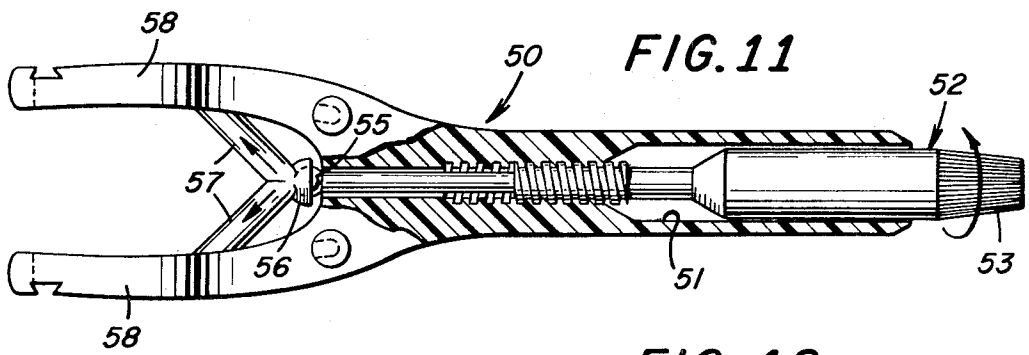


FIG. 10

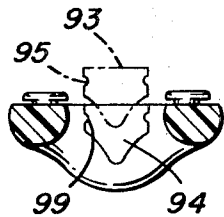
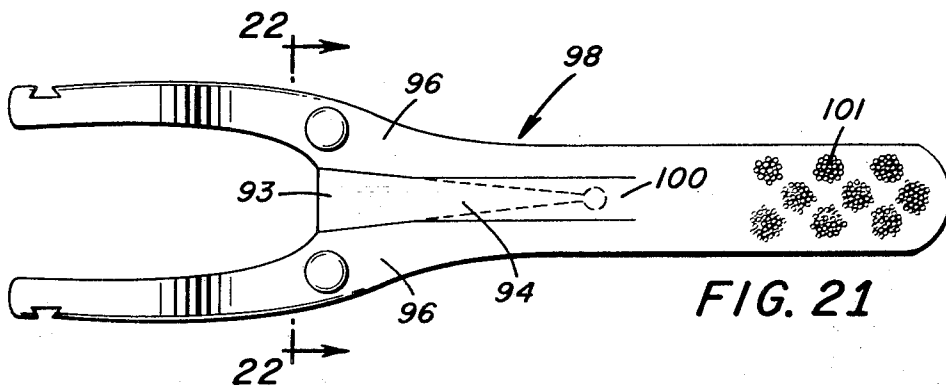
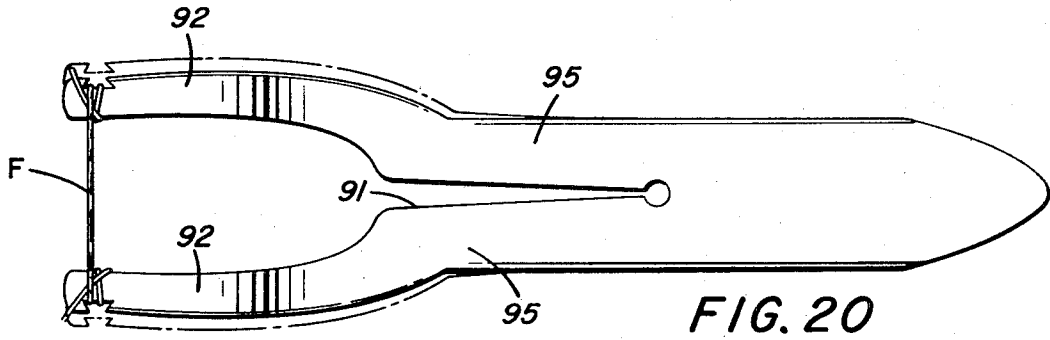
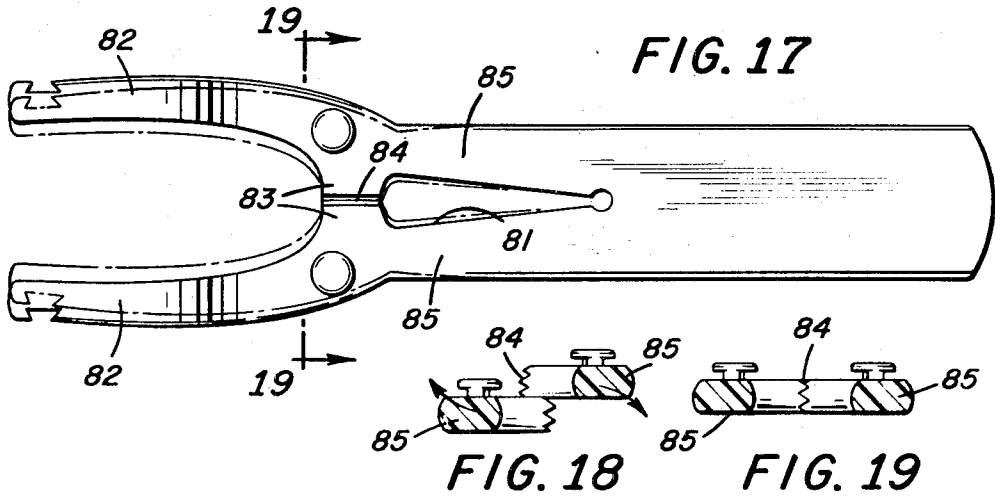
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## DENTAL FLOSS HOLDER

This invention relates to a new type of dental floss and also to a floss holder which provides a handle and a fork means for tensioning a length of floss while it is being used for cleaning teeth.

It is well known that the interface between adjoining teeth can be cleaned by running a fine diameter filamentary material called floss between teeth. Most commonly, a length of the floss is tensioned between the user's two index fingers after first being wound around each of said fingers, and the user then must to some extent insert his fingers into his mouth while using the floss. At best it is a relatively awkward operation; however, the use of floss is highly effective for thoroughly removing food particles from between teeth which it would be impossible to accomplish with an ordinary toothbrush and the oral hygiene benefits derived from using floss are so notable that its use is growing in popularity and is definitely already very widespread.

In order to facilitate the use of floss attempts have been made over a long span of years to develop a floss holder which would permit a user to use floss as easily as one uses a common toothbrush. That is to say, only one hand would be required, and at that, it would be unnecessary for the person's fingers to be inserted into his mouth. Further, it should be noted that the winding of the floss ends around the user's fingers requires a considerable length of floss which is not itself used in the cleaning operation. A holder would reduce waste of floss to a considerable extent.

Dental floss holders per se are well known, such as those disclosed in U.S. Pat. Nos. 1,316,807; 2,873,749; and 3,236,247; however, the known holders are relatively cumbersome, complex in structure and costly to manufacture and, therefore, they have not achieved commercial success. The state of present-day marketing demands that such an item be produceable in great quantities and at very low cost; otherwise, it will not "catch on" and will not be accepted by the public at large.

It is an object of the present invention to provide a dental floss holder which is simple and inexpensive to manufacture and simple to use.

It is a further object of this invention to provide a dental floss holder which incorporates a floss-tensioning feature.

It is a further object of this invention to provide a dental floss holder which may be manufactured in one piece.

It is a further object of the invention to provide a floss holder which may be produced by plastic molding techniques.

It is a further object to provide a floss holder which may employ either conventional straight floss, loop floss, or a nubbed floss according to this invention.

It is a further object of this invention to provide a novel nubbed floss.

Other objects are those which are inherent or obvious in the device and floss disclosed herein, of which there follows a detailed description of various embodiments as illustrated in the accompanying drawings, wherein:

FIG. 1 is an isometric view of a floss holder according to a first embodiment of this invention;

FIG. 2 illustrates a novel type of floss according to this invention;

FIG. 3 is an exploded side view of the holder of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 in FIG. 3;

FIGS. 5 and 7 are respectively a top plan view and a side view of a floss holder according to a second embodiment of this invention;

FIG. 6 is a pictorial view of an element of the holder of FIG. 5;

FIGS. 8 and 9 are respectively a top plan view of a third embodiment of a holder according to this invention and a pictorial view of an element thereof;

FIG. 10 is a top plan view of a holder according to a fourth embodiment of this invention;

FIGS. 11 and 12 are respectively a partially sectioned top plan view and a side view of a holder according to a fifth embodiment of the invention;

FIG. 13 is a partially sectioned top plan view of a holder according to a sixth embodiment of the invention;

FIG. 14 is a broken-away side view of the holder of FIG. 13 illustrating a detail thereof;

FIG. 15 is an end view of the holder of FIG. 13;

FIG. 16 is a partial side view of a holder according to a seventh embodiment of the invention;

FIG. 17 is a top plan view of a holder according to a seventh embodiment of the invention;

FIGS. 18 and 19 are both sectional views taken along line 19—19 in FIG. 17 to show respective dispositions of the holder;

FIGS. 20, 21 and 23, respectively, are top plan views of holders according to three further embodiments of the invention; and,

FIG. 22 is a sectional view taken along line 22—22 in FIG. 21.

Primarily, the novel floss of FIG. 2 differs from conventional floss simply in that it includes nubs 1 at regularly spaced intervals of from one-half to 1½ inches along its length, which nubs could be realized by any known technique. In any event, the nubs should be such as to be able to act as gripping means for placing the floss length therebetween under tension. For this purpose, the nubs are preferably solid and securely fixed along the floss length. The nubs should not be unduly large and it is contemplated that, they in fact, be up to one-sixteenth of an inch in cross-sectional width or diameter. Various techniques are in fact known for imparting regularly spaced nubs along the lengthwise extent of synthetic filaments as part of or following the spinning thereof. The nubs 1 could constitute drops of hardened material applied in liquid form to a straight smooth floss. Alternatively, the nubs 1 could comprise pronounced crimps which have been mechanically imparted to a normally straight floss fiber or they could even comprise clips applied to the floss mechanically.

In any event, the nubby floss of FIG. 2 could be marketed in the form of an uncut length in roll form, for example, and the user could cut therefrom a piece each time it is to be used. Alternatively, the nubby floss of FIG. 2 could be sold in precut lengths. Although the nubby floss of FIG. 2 will be specifically illustrated herein as being used with a floss holder according to the invention, it is to be noted that said nubby floss could also be used by itself in the same manner as conventional smooth floss is commonly used, the nubs 1 enhancing the cleaning action of the floss as it is run between adjoining teeth.

With reference to FIGS. 1, 3 and 4, the floss holder according to the first embodiment comprises a handle portion 2 and a tip portion 3, said tip portion including a pair of transversely spaced prongs, 4, 4 defining a U-shaped recess therebetween and from which longitudinally extends a shank 5 which is received in bore 6 of handle 2, said shank and bore including complementary mating flat surfaces 7 which prevent the shank 5 from turning within said bore 6.

The handle 2 includes a recess 8 which exposes a portion of bore 6, said recess being delimited at its forward end by a shoulder 9 against which abuts the forward end of a torque 10 when the tip 3 is fully seated within said bore 6, this preventing the tip 3 from pulling out of the handle unless the user presses down the tongue 10 until its forward end clears the shoulder 9.

The tip portion 3 can be made in one piece of molded plastic with the tongue 10 being an integrally molded part thereof, said tongue being flexibly bendable about its point of juncture with the remainder of the tip body.

The end of each prong 4 includes a means such as coplanar, linearly aligned slits 11 through which the length of floss F may be extended, said slits being preferably tightly narrower than the floss itself so that the floss is actually pinched or clamped within said slits. If this were the case, even conventional smooth floss could be firmly held in the slits of the holder of FIG. 1. In any event, conventional smooth floss could simply be wound a few turns around the ends of the prongs 4, analogously to the common winding of floss around the user's fingers, and this would firmly secure the floss to the

prongs 4. In addition to such winding, the floss could also be clamped within slits 11 and/or other slits 12 along the sides of prongs 4. In any event, the prongs are resiliently flexed by the floss extending therebetween.

The special floss of FIG. 2, however, is of a length L between successive nubs such that the floss will be tensioned between the fork ends with the nubs 1 bearing against the outer sides of prongs 4. In this regard, it should be noted with regard to all embodiments disclosed herein that the distance between the prongs should be sufficient to bridge across a person's teeth while not being so large as to inhibit use of the device within a person's mouth, said distance being about 1 inch.

As is seen in FIG. 3 and the side views of the holders of the other embodiments, the fork portion 3 is curved in one direction in order to facilitate its insertion into the user's mouth.

The respective holders of FIG. 5 and following each incorporates a floss-tensioning feature.

The holder of FIGS. 5 and 7 is, for example, a one-piece integrally molded body having a slot 14 opening at and extending centrally from the base of the tip portion 28 along an axial extent of the handle portion 20. The sides of the handle portion which define the slot 14 include a plurality of axially spaced-apart recesses 21 adapted to receive the cylindrical pin portion 22 of a button member which is selectively positionable at either of said recesses 21 so as to vary the transverse spacing S between the ends of the fork prongs 24, said prongs being resiliently, flexibly yieldable. The full and phantom lines in FIG. 5 illustrate the respective positions of the prongs 24 corresponding to button member 25 in different ones of recesses 21.

A loop floss O may be easily extended between the fork prongs 24 and around the hook members 26, which may be integrally formed on one surface of the holder, while the button 25 is in the leftmost recess 21, the floss loop O being slack at this time since the prongs 24 are at their full-line position in FIG. 5. The button is then slid to the next recess 21 thereby spreading the prongs 24 to their phantom line position and tensioning the floss loop O. A reversal of these steps facilitate removal of the used loop and replacement thereof with a new one.

The hook members 26 will be properly positioned in conformity with standard size loop floss. Quite clearly, however, the holder of FIG. 5 as well as those of FIGS. 8, 10, 11, 13, etc., are not restricted to the use of loop floss. Conventional elongate smooth floss or the nubbed elongate floss of FIG. 2 could be mounted on the holder along the same path shown in FIG. 5 for loop floss excepting that the ends of this elongate floss would be wound a few turns around the hook members 26 to secure the floss hereto. The holder of FIG. 5, as also all subsequent holders to be described, also includes slits 11 to accommodate a nubbed floss in the same manner as illustrated in FIG. 1. Additionally, the respective herein described embodiments may include side recesses 27 for accommodating the turns of floss which may be wound around the fork prong ends. The recesses 27 provide a seating for the turns of floss so that said floss turns do not create a bulge along the sides of the prongs which could irritate the user's mouth. In any event, the recesses 27 serve as hooking means which prevent the wound floss from slipping along the prongs in either direction. A means of securing a length of elongate floss (whether nubbed or not) is illustrated in FIG. 13 at F. The ends of the floss F simply wind a few times at 69 around the ends of the fork prongs 68.

The holder of FIG. 8 is analogous to that of FIG. 5 in all respects excepting for the fact that slot 34 includes only one recess 31 and the button 35 has an oblong shank 32 instead of a cylindrical one as in FIG. 5. The spreading of the prongs in FIG. 8, therefore, is accomplished simply by turning button 35 90° to the position shown therefor in FIG. 8.

The holder of FIG. 10 also is analogous to that of FIGS. 5 and 8 excepting that the button members of the preceding em-

bodiments are replaced with a threaded means 45 extending transversely between the arms 41 of handle portion 40 and arranged to adjust the spread of said arm 41 which extend on either side of slot 44.

The holder according to the embodiment of FIGS. 11 and 12 comprises a one-piece integrally molded body 50 which includes a handle portion and a fork tip portion which can accommodate any type of floss analogously to the previously described embodiments. The body 50, however, includes an axial through bore 51 which is threaded along an extent thereof so as to threadedly receive the threaded portion of a screw-type adjustment elongate member 52 which extend through said bore and outwardly at opposite ends thereof to provide a finger-grippable knob 53 at one end and a spherical head 55 at the opposite end. Said head 55 fits into a correspondingly shaped forms cup 56 located at the axis of two mutually inclined arms 57 which extend from said cup and up to the inner walls of the fork prongs 58. The cup 56 and arms 57 are preferably integrally molded together with the remainder of the body 50. It is quite clear from FIG. 11 that normally the fork prongs 58 are spaced a certain distance apart and that they can be further spread apart through clockwise turning of member 52 which causes it to move axially leftward (relative to FIG. 11) whereby its head 55 presses against arms 57 tending to straighten them relative to each other. A length of floss, therefore, is positioned across the prongs 58 while the adjustment member 52 is in its screwed outwardly position, the member 52 then being screwed inwardly of the body 50 in order to spread prongs 58 apart thereby tension the floss length. This procedure is reversed in order to remove used floss from the holder.

It is to be understood, of course, that the material of which the body 50 is made is such as to permit resilient flexing of the prongs 58 as well as of the arms 57.

The holder according to the embodiment of FIGS. 13-15 is analogous to that of FIGS. 11 and 12 excepting that the adjustment member 62 is not threadedly engaged with the body 60 but is, instead, threadedly engaged with the wedge element 67 which is wedgingly slidable along the axial extent of a central slot 63 which extends along in axial extent of body 60, said slot being a continuation of bore 61 and opening at the juncture of the prongs 68.

The wedge element 67 is separate from adjustment member 62, each of these members being insertable into body 60 through opposite ends thereof, namely: member 62 being insertable through the free end of the handle portion and wedge 67 being insertable from the fork end. After being so inserted, these members are threadedly engaged with each other through turning of member 62 whereby wedge 67 is pulled into the hollow portion of the body 60, along the slot 63. This, of course, results in a spreading apart of the prongs 68 and a corresponding tensioning of the floss, as already described relative to the embodiment of FIGS. 11 and 12.

The wedge 67 and the slot 63 will each be so shaped so as to preclude rotation of wedge 67 within said slot. FIG. 15 illustrates a six-sided elongate shape for this purpose.

The adjustment member 62 is insertable into the body 60 through the open end of bore 61, said member 62 including a circumferential groove defined between the shoulders 64 and 65. A radially inwardly directed annular rim 66 integrally formed on the open end of body 60 fits into said groove to prevent axial movement or accidental falling out of said adjustment member 62 relative to body 60. In order, however, to permit passage of shoulder 65 past rim 66 (the rim having a smaller diameter than said shoulder) during insertion or removal of member 62, as for cleaning purposes, etc., the body 60 includes two diametrically opposed slots 66 extending from the extreme end of body 60 so as to permit resilient flexing of the body 60 (as shown in FIG. 14).

The holder of FIG. 16 is especially for use with loop floss O which is passed through slits 11 and through the notch 72 in lever 71 which is pivotally mounted on the holder body 70 about an axis transverse to the axis of symmetry extending

between the prongs. It is evident from FIG. 16 that with the lever 71 in raised position, the loop of floss O may easily be mounted. A downward pivoting of lever 71 effects a tensioning of the floss loop since the wall of notch 72 is made to move away from the fork ends by such pivoting.

The FIG. 17 embodiment comprises a one-piece integrally formed (as by plastic molding) body 80 of resiliently flexible material, an axially extending cavity 81 permitting flexing of the arms 85 of the body located on opposite sides of the cavity. The end of the cavity which adjoins the inner ends of the prongs 82 is, however, closed by abutment shoulders 83 which about each other along mating serrated edges 84.

With reference to FIG. 18, the arms 85 are seen to be flexibly transversely offsettable relative to each other to lie in different planes whereby the inherent flexion therein causes the arms 85 to come together in overlapping side-by-side relationship to the position shown in FIG. 18. A length or loop of floss may now easily be mounted on the holder since the prongs 82 are relatively close together. The user then manually pushes the arms, against the bias of the inherent flexion, in opposite directions so as to align the edges 84 in a common phase (FIG. 19), this position being maintained by the interlocking effect provided by edges 84. This, of course, spreads the fork prongs apart and correspondingly tensions the floss extending therebetween.

The FIG. 20 embodiment also is a resiliently flexible, one-piece integrally molded construction comprising arms 95 normally separated by an axially extending cavity 91. A person simply grips the fork end of this holder and forces the prongs 92 towards each other and applies the floss F across the end of the holder whereupon the releasing of the prongs causes them to spring outwardly to tension said floss F.

FIG. 20 illustrates the use of conventional smooth floss with the respective different holders of this invention. The recesses 69 along the sides of the fork prongs provide a seating for the turns of floss while avoiding that said turns form a bulge along the outer side of the prongs, such bulges being possibly irritating to the user's mouth.

The embodiment of FIG. 21 functions analogously to that of FIG. 20, but in reverse. That is, the body 98 is originally formed, as by plastic molding, whereby the arms 96 are normally relatively close together and they are spread apart by forcing of the wedge member 93 into the cavity 94 between said arms 96. In other words, the arms in the FIG. 20 embodiment are normally in their spread-apart condition and must be flexed towards each other by the user in order to mount the floss whereupon release of said arms causes them to spread apart by themselves, while the arm in the FIG. 21 embodiment are normally in their close-together position and must be flexed apart by force in order to tension the floss. Grooves 95 along the wedge 93 and corresponding ridges 99 along the sides of the cavity 94 serve to lock the wedge within said cavity. Said wedge 93 is itself integrally molded with the remainder of the body 98 and is, in this instance, resiliently flexibly joined thereto at base 100. Alternatively, said wedge 93 could be a separately formed member attached to body 98 by any known means.

Although not necessarily mentioned herein with regard to all embodiments, it is quite clear that any of the types of floss (conventional smooth and straight, nubbed straight, or looped) may be used with either of said embodiments. Furthermore, all embodiments which include a floss-tensioning feature are obviously of resiliently flexible construction, especially relative to the fork prongs.

The respective holders disclosed herein could be adapted to incorporate a toothbrush as a part thereof simply by having said toothbrush extending from the free end of the handle portions, oppositely to the fork portion of the holder as shown in FIG. 21. In other words, the herein disclosed floss fork and the toothbrush 101 would both share a common handle, namely, the portion of body 98 interconnecting the brush with the floss fork. This concept is applicable to all the embodiments, even those such as shown in FIGS. 11 to 13 in which case the brush

would be integrally formed with the rotatable adjustment members 52 or 62.

In fact, toothbrush handles are already commonly made of plastic material and this same type of material could be employed to produce the respective holders of this invention. As mentioned previously, the holder material must be one which provides resilient flexibility to the holder parts. In this regard, it should be noted that while the drawing figures show the slits 11 and 12 as being rather open and large, these are, in fact, very fine, razor-thin slits which tightly could grip a floss therein. The resilient flexibility of the holder material, in fact, provides an actual pinching effect on the floss when inserted into slits 11 or 12.

FIG. 23 illustrates an extremely simple to construct holder according to this invention which, by virtue of its simplicity, is so economical to produce that it particularly lends itself to being marketed as a disposable item. This also applies to some of the other holder embodiments disclosed herein which are also economically producible. The FIG. 23 embodiment comprises an integrally molded, one-piece, fork-shaped body 103 which is simpler than the holders of the preceding embodiments in that it does not include in axially extending slot analogous to 81, 91, or 94. Further, the body 103 does not necessarily include any hook members, such as 26 (FIG. 5) for loop floss or any recesses such as 27 (FIG. 8), or any slits analogous to slits 11; instead, the floss 104 may itself be integrally molded with the body 103.

In other words, the complete assembly of FIG. 23 may be marketed with the floss already preattached, so that the user is spared the trouble of having to mount a piece of floss on the holder each time that said user intends to use the floss. Instead, the user buys the holders with the floss already properly mounted thereon. In this regard, the floss 104 may be of the same material as that of the body 103 and be molded simultaneously with the body in a single operation. Alternatively, the floss 104 may be formed separately from the body 103 and then fuse-bonded at 105 to the tips of the body prongs 106. In either case, the respective materials obviously must be of the moldable, fuse-bondable type. Further, in either case, the floss is under the proper tension in the final product.

The concept of fuse-bonding or integrally molding the floss to the tips of the fork prongs as described relative to FIG. 23, could also be applied to other herein disclosed embodiments of holders. For example, a length of floss could be fuse-bonded or integrally molded at the factory to the tips of the respective holders of FIGS. 17 and 21 while the prongs of these holders are in their close-together position. The floss would then be tensioned as already described with reference to FIGS. 18, 19 and 22. Analogously, the floss F in FIG. 20 could also be fuse-bonded to prongs 92 while they are pinched towards each other, whereupon releasing of same results in a tensioning of the floss.

Although the herein illustrated holders all have the floss extending transversely to the longitudinal direction of the holder handle, that is: the fork portion axis coincides with the handle portion axis, the inventive concept is equally applicable to an arrangement wherein the holder may be scythe-shaped, that is: the axis U-shaped fork portion extending either perpendicularly or at some other angle to the longitudinal axis of the handle portion.

It is, further, to be understood that the floss which is useable with any of the respective holders of this invention may comprise conventional floss material, or any other material which is suitable for the purpose. For example, the floss may be a synthetic filamentary material, a cotton fiber, a metal wire, or of any other material which can be produced in filamentary form.

It is, further, to be understood that various of the details presented herein relative to the various embodiments are for illustrative and not limitative purposes, it being within the purview of one skilled in the art to vary such details without departing from the disclosed inventive concept.

What is claimed is:



1. A dental floss holder, comprising a fork means which includes transversely spaced-apart elongate prongs defining a generally U-shaped recess therebetween, free ends on said prongs having means adapted to contact a length of dental floss extending between said prongs, said prongs being transversely displaceable relative to each other so as to tension a length of such floss, said prongs being transversely displaceable by virtue of said holder being of resiliently flexible material whereby said prongs are resiliently flexible relative to each other, said prongs being joined together to form the base of said U-shaped recess, including a handle portion extending longitudinally from the base of said U-shaped recess, a separation extending from said recess along a longitudinal extent of said handle portion and defining respective arms on either side of said separation which are resiliently flexible relative to each other.

2. The holder of claim 1, including a series of holes along the extent of said separation and a button member slidable along said separation into either of said holes whereby the degree of flexing of said arms is variable in accordance with the position of said button member along the extent of said separation.

3. The holder of claim 1, including a hole at a point along the extent of said separation between said arms, a button rotatably mounted in said hole and including cam surface means for engaging said arms, said cam surface means being adapted to transversely flex said arms apart pursuant to rotation of said button.

4. The holder of claim 1, including a rotatable member extending transversely of said arms at a point along the extent of said separation, said member being threadedly engaged with both of said arms whereby rotation of said member effects a spreading or closing together of said arms.

5. The holder of claim 1, including hook means for holding a circumferential extent of a floss loop whereby another extent of such loop may be extended between said prongs.

6. The holder of claim 1, the ends of the prongs including floss-gripping means whereby a length of floss may be mounted to extend only between said gripping means.

7. The holder of claim 6, said gripping means comprising tight slits in the ends of said prongs, said prongs being of a

resiliently flexible material whereby said slits act to pinch a floss which is inserted therein.

8. The holder of claim 6, the extreme ends of said prongs including transversely extending coplanar slits linearly aligned with each other whereby a length of floss may be positioned between said prongs and through said slits.

9. The holder of claim 8, including a length of floss extending between said prongs and through said slits, a nub on each end of said floss abutting against a respective outer side of each of said prongs in tensioned condition.

10. The holder of claim 9, the spacing between said nubs being slightly smaller than the relaxed spacing between the outer sides of said prongs whereby said prongs are in slightly flexed condition as a result of said floss being positioned as mentioned.

11. The holder of claim 1, said separation including a slot extending longitudinally along said handle and opening at the base of said recess.

12. The holder of claim 11, said arms being resiliently flexibly displaceable towards each other.

13. The holder of claim 11, said arms being resiliently flexibly displaceable away from each other.

14. The holder of claim 1, said separation including a slot extending longitudinally along said handle up to a point longitudinally spaced away from said U-shaped recess, mating abutment shoulder means on each of said arms between said recess and said slot, said arms being laterally shiftable relative to each other to lie in adjacent different planes, said arms being in a resiliently flexioned state pursuant to said shoulder means being coplanar and in mating abutment with each other whereby said arms slide alongside each other to produce the separation therebetween pursuant to their being laterally shifted as aforementioned.

15. The holder of claim 14, said abutment shoulder means comprising means to prevent inadvertent lateral shifting of said arms.

16. The holder of claim 15, the last-mentioned means comprising mating ridges in said shoulder means.

17. The holder of claim 13, including a member for locking said arms in resiliently flexioned position away from each other.

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