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A61C 15/00 15/04

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A5R RDQ1

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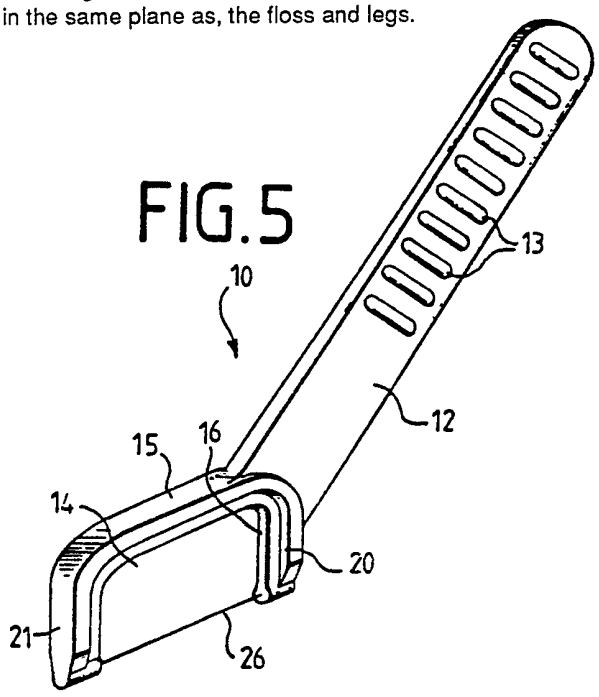
(58) Field of search
UK CL (Edition J) A5R RDQ1
INT CL⁴ A61C

(54) Tooth-cleaning device

(57) A tooth cleaning device for supporting at least one strand of dental floss. The device includes a floss holder portion and a manipulating handle portion. The holder portion may be secured to or releasably connectable to the handle portions. The holder portion has two spacial legs which define an intervening span bridged by the or each strand of dental floss, and the handle is at angle to and in the same plane as, the floss and legs.

FIG.5



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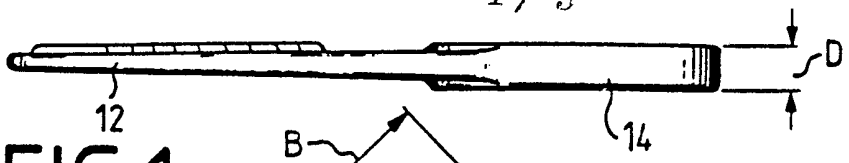

FIG.1

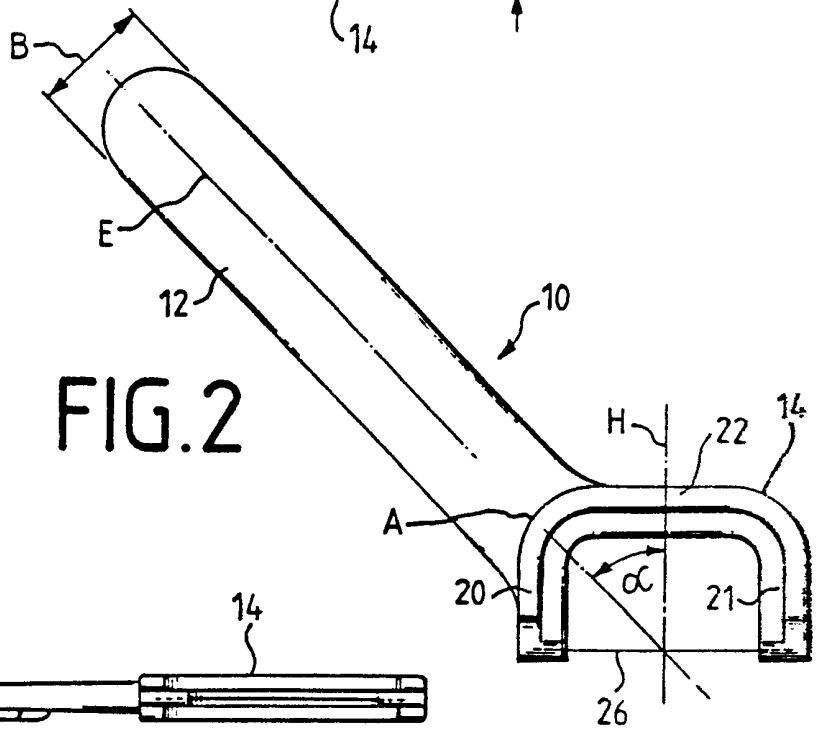

FIG.2

FIG.3

FIG.4

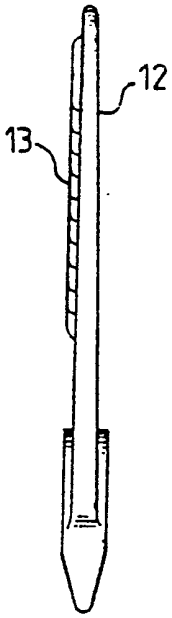

FIG.5

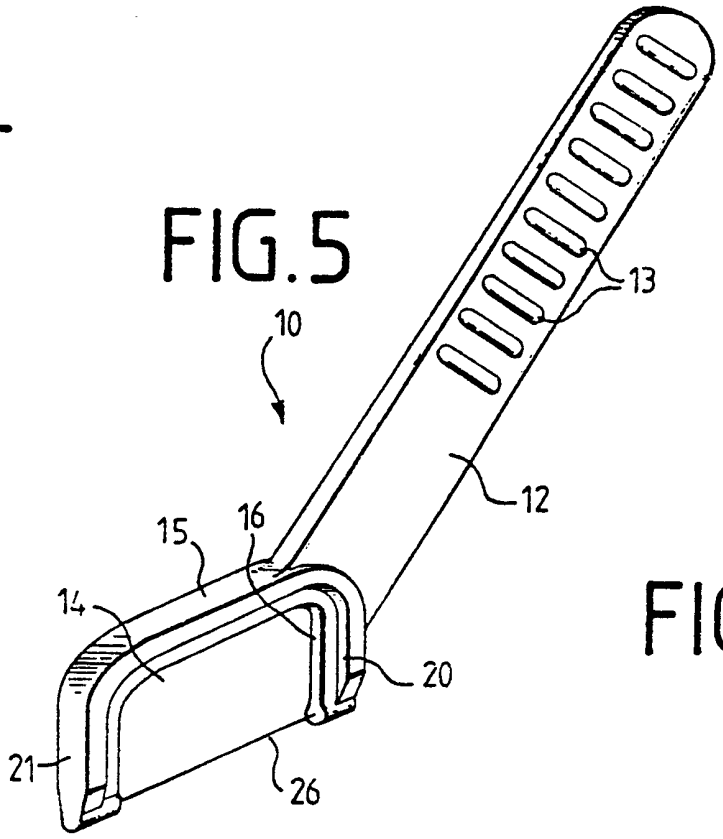

FIG.6

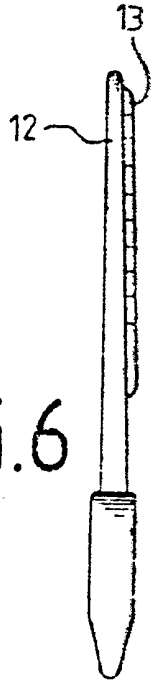

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FIG.7

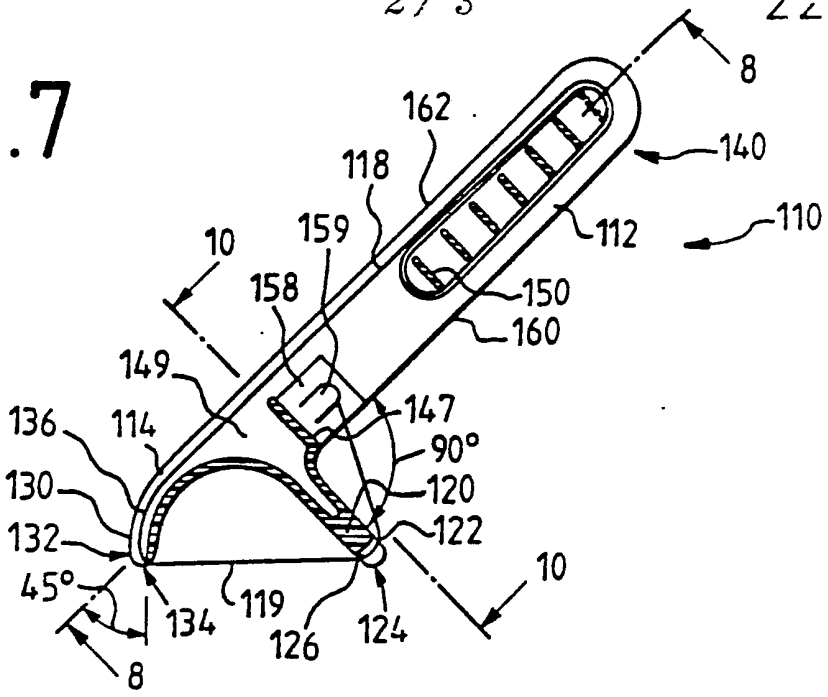

FIG.8

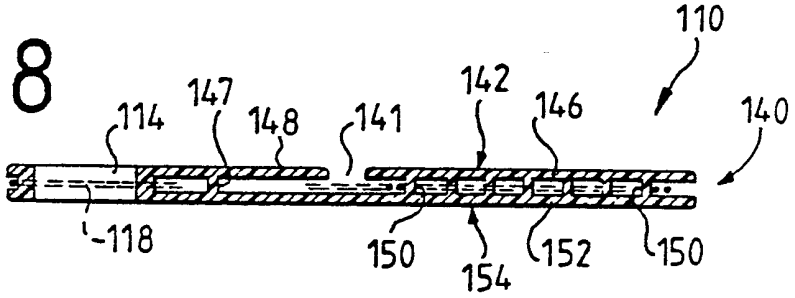

FIG.9

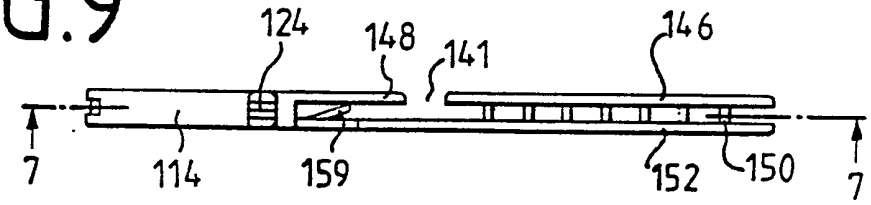

FIG.10

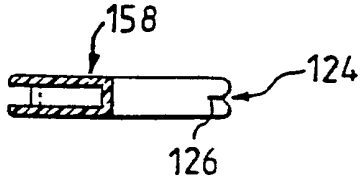

FIG.11

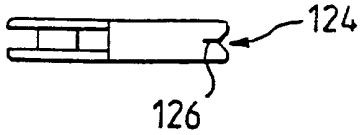

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FIG.12

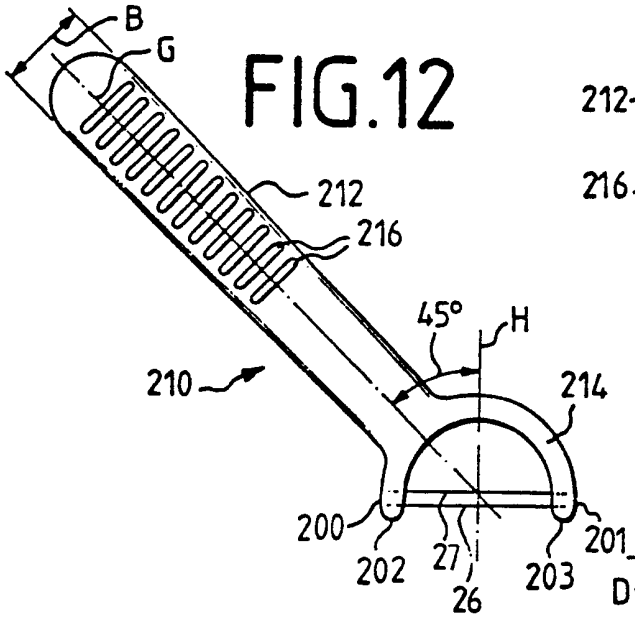


FIG.13

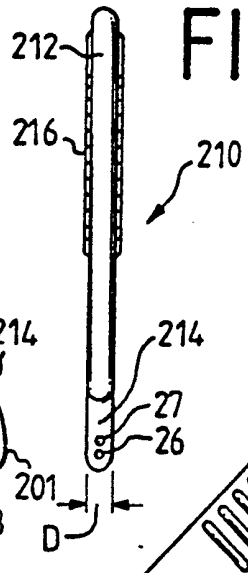


FIG.14

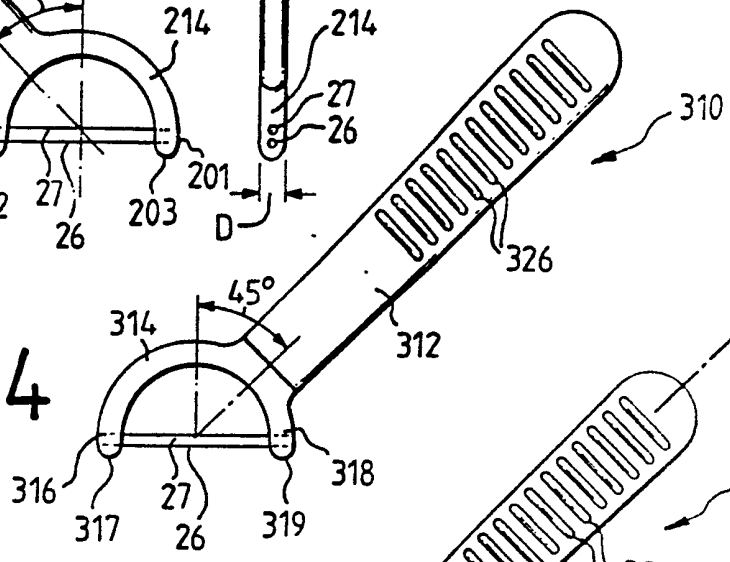


FIG.15

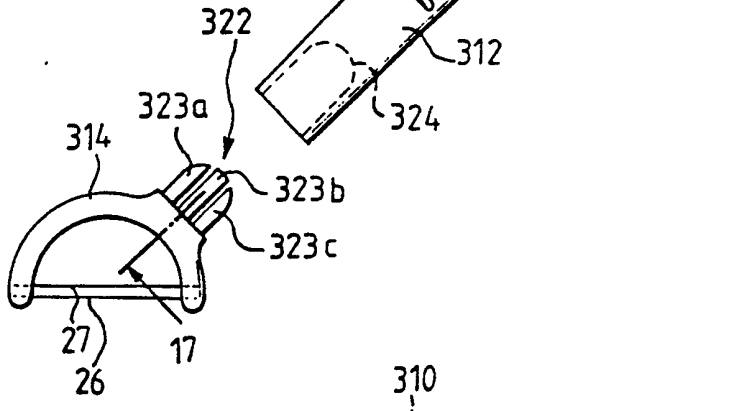


FIG.16

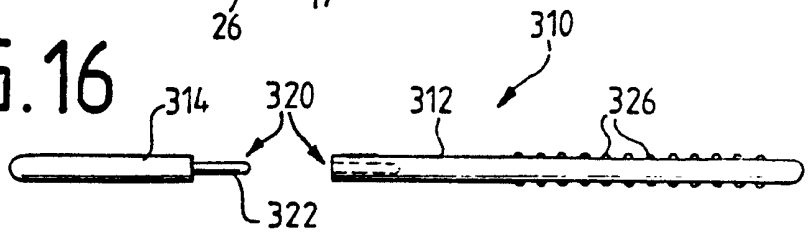
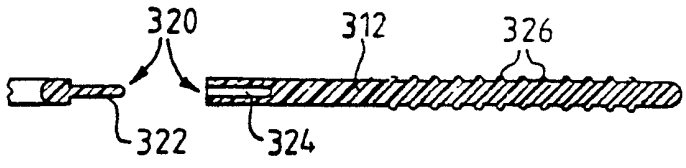


FIG.17



TOOTH CLEANING DEVICE

The invention relates to a tooth cleaning device with a handle, on which a holder with two legs is provided, between which legs a thread-shaped strand of dental floss runs.

A device for cleaning teeth is already known (Swiss Patent 521 751) which consists of a handle with a hoop mounted thereon, between the legs of which hoop thread-shaped dental floss runs. In this device, the handle is disposed either parallel or perpendicular to the path of the thread-shaped dental floss strand.

The goal of the invention is to make a tooth-cleaning device of this kind more stable and considerably to facilitate its handling without making the device more complicated and hence, more expensive to manufacture.

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The special design of the tooth-cleaning device according to the invention, especially the angular arrangement of the handle relative to the strand of dental floss, the special design of the flat grip, the arrangement of the flat grip and the dental floss strand in the same plane, etc. ensures considerably better handling, especially in the area of the spaces between the molars, which are very difficult to access. Guidance of the tooth-cleaning device is facilitated. In addition, the device is very stable by nature, so that a much more delicate cleaning process is made possible.

Tooth-cleaning devices are already known that have a handle on which a holder with two legs is provided to receive at least one thread-shaped strand of dental floss. The holder is screwable for example onto the upper end of the handle. The lower end of the holder as well as the upper end of the handle, when the tooth-cleaning device is assembled, form a V-shaped groove, which serves as a pinch connection for one end of the strand of dental floss; the handle is made hollow and serves to hold a roll of dental floss, with the end of said dental floss strand being brought out through an opening provided in the handle. The strand of dental floss brought out through the opening is guided over two pins provided on the legs of the holder and then placed in the V-shaped groove between the holder and the upper end of the handle. Rotating the holder on the handle narrows the width

of the groove and thus grips the end of the dental floss strand tightly (U.S. Patent 3,949,769).

Accordingly, the invention also has the additional purpose of improving such a device to make it simpler and less expensive and guiding and fastening the dental floss strand in such manner that it is installed in an absolutely problem-free manner and kept reliably under tension.

By virtue of the advantageous arrangement of the winding plate on the outside of the handle, the dental floss strand can be guided inside the handle plane and be completely covered in the vicinity of the handle, so that when the handle is gripped, the dental floss strand cannot be touched or interfered with. It is advantageous in this connection for the winding plate to form one outer side of the handle and to be connected by ribs with the other outer side of the handle running parallel thereto. Hence, the ribs serve advantageously for winding up the strand of dental floss. Since the flat side of the winding plate and the flat side of the holder lie in roughly the same plane, good guidance of the dental floss strand as far as the holder is achieved without deflection. It is also advantageous for the ribs to be disposed crosswise with respect to the lengthwise axis of the handle and for the winding plate to project laterally above the ribs, so that the dental floss strand is completely covered.

One end of the dental floss strand (supply end) can be secured during manufacture in a clamping device provided at any point on the handle; then the dental floss strand to be supplied is wound up in the handle receptacle. To make it possible to cut off the dental floss strand easily during use after guiding it over the legs, a cutting plate is provided next to the clamping device, said plate being covered by a plate provided in the same plane as the winding plate. In this manner, the end of the dental floss strand can be cut off simply. The two legs of the holder can be disposed, for example, so that they diverge, creating a considerable working length for the dental floss strand. A very strong deflection of the dental floss strand is accomplished on the leg with the clamping slot by bending it, for example, 90° relative to the handle; this provides a reliable clamping action.

A device is also known for cleaning the teeth (German Specification A1 35 16 544) consisting of a shaft with a hoop mounted thereon, between whose legs thread-shaped dental floss is stretched. The legs of the hoop are designed so that the thread-shaped dental floss, by deflection in the free tensioned area, crosses over between the legs. This is intended to ensure that when the dental floss is inserted in the gaps between the teeth, the tooth will be cleaned on both sides. The point of intersection of the dental floss is

located approximately in the middle between the two legs of the hoop so that only the right or left half of the dental floss can be used for cleaning. In addition, a device is known from German Specification C2 29 23 057 with a hoop-shaped spring-tensioned frame and a plurality of strands of dental floss arranged therein parallel to one another in one plane.

In another advantageous embodiment, according to the invention, for especially efficient and rapid cleaning of the spaces between the teeth, with especially satisfactory and reliable guidance of the cleaning device, it is proposed that a plurality of strands of dental floss be provided.

By using two dental floss strands mounted one behind the other and running parallel to one another, a considerable improvement in the cleaning of the teeth is achieved, since now a more intensive action of the strands of dental floss on the tooth surface is possible, taking place in several stages. This is also accomplished in particular by virtue of the fact that the two dental floss strands are located in one plane, and run parallel to the lengthwise side of the legs of the holder. This ensures good guidance of the tooth-cleaning device along the tooth surface.

In addition, a tooth-cleaning device is known with a handle and a holder connected thereto for receiving a strand of dental floss

(U.S. Patent 3,949,769), consisting of two legs running parallel to one another, said legs being bent laterally at approximately 40° to the lengthwise central axis of the handle. The holder has a screw part on one side, which can be screwed onto the upper end of a screw part of the handle. The handle is made hollow and serves to receive a roll of dental floss, with the end of the roll of dental floss being guided outward through an opening and clampable firmly in a V-shaped groove in the handle. The groove is reduced in size by screwing the holder onto the handle so that a clamping action is produced to secure the end of the strand of dental floss.

In addition, a device is known with a dental floss holder and handle that fit together by means of an open plug-in connection (U.S. Patent 3,769,396).

Therefore, in another possible embodiment of the invention, in order to improve hygiene and further reduce the cost of the device during use, the holder and the upper end of the handle are so designed and disposed that the holder can be connected in simple fashion with the handle. This is achieved by a clamping connection between the handle and the holder. As a result, after use, the holder with the dental floss strand in it can easily be replaced by a new holder with a strand of dental floss. The clamping connection means that the holder need only be pulled out of the handle. Then the new holder can be placed on the upper

end or in a hole provided in the handle. For this purpose, the clamping connection is formed of a plug disposed on the holder which is pluggable into an opening provided in the handle. In this manner, the plug can consist of at least two pins made with spring tension and running parallel to one another, said pins being capable of being pressed together when slid into the opening in the handle and then returning to their original position in the opening; as a result, a clamping connection is created between the holder and the handle.

In order for the two pins not to be bent too far together, it is advantageous to provide an additional pin between the above two pins. It is also advantageous for the three pins to be in one plane and to be made flat.

A good clamping action is achieved in simple fashion by making the flat side of at least one pin convex or concave. In this manner, the convex or concave part of the pin can lock into a matching part in the hole in the handle.

Insertion of the pin of the holder into the opening of the handle is facilitated by the fact that the ends of the pins lie on a common arc of a circle.

The invention will now be described in greater detail with reference to the accompanying drawings, in which

Figure 1 is a top view of a tooth-cleaning device according to the invention;

Figure 2 is a side view;

Figure 3 is a view from below (working side) of a tooth-cleaning device in Figures 1 and 2;

Figure 4 is a front view;

Figure 5 is a perspective view;

Figure 6 is a view of the other front side;

Figure 7 is a lengthwise section through a second embodiment of a tooth-cleaning device according to the invention (Section 7-7 in Figure 9);

Figure 8 is a section along line 8-8 in Figure 7;

Figure 9 is a view of the tooth-cleaning device according to Figure 7;

Figure 10 is a section along line 10-10 (Figure 7);

Figure 11 is a view of the handle end of the tooth-cleaning device in Figure 7;

Figure 12 is a side view of another embodiment of the tooth-cleaning device with a bent holder and two strands of dental floss;

Figure 13 is a front view of the tooth-cleaning device according to Figure 12;

Figure 14 is another embodiment of the tooth-cleaning device with an interchangeable holder in the assembled state;

Figure 15 shows the holder and handle of the tooth-cleaning device, separately;

Figure 16 is a view of the tooth-cleaning device in Figure 14;

Figure 17 is a section through the tooth-cleaning device along line 17-17 (Figure 15).

In the drawing, reference 10 refers to a tooth-cleaning device consisting of a handle 12 and a holder 14 mounted thereon. Handle 12 is made approximately rectangular in cross section; it is much wider (width B) than thick (thickness d) and is considerably rounded at its upper end and at its respective side edges. In addition, for improved handling, it has on one of its two flat outer sides, lengthwise handle ribs 13 which run parallel to one another and are made essentially half-round. These handle ribs 13 can only be disposed over a partial area or over the entire area of handle 12. They are preferably made raised.

Holder 14 consists of two legs running essentially parallel to one another (20 and 21) and merge with a rounded part and a rib 22, roughly forming a U. In the immediate vicinity of the outermost ends of legs 20 and 21 a strand of dental floss 26 is firmly stretched, sealed, or injected.

For improved handling and more stable design for tooth-cleaning device 10, the two legs 20, 21 that run parallel to one another

are mounted so that they are at an angle to central axis E of handle 12. The angle α between lengthwise central axis H of the two legs 20, 21 and the lengthwise central axis E of handle 12 can be 45°. However, it is also possible to make the angle α between approximately 40° and approximately 50°.

As Figure 2 also shows, handle 12 is offset laterally on rib 22, in such fashion that contact point A of handle 12 is located roughly in the area of the leg-rib rounded part of holder 14.

It is possible for the thickness D of the tooth-cleaning device to be the same both in the vicinity of holder 14 and in the vicinity of handle 12. However, to save on material and to make it simpler to produce using tools, it is advantageous for handle 12 to be slightly thinner (thickness d) than holder 14 (thickness D) and for handle ribs 13 then roughly to correspond to the thickness difference D-d. In addition, as shown in the embodiment (Figures 1,3,4, and 6) holder 14 can be made thicker on both sides by the same difference than the handle.

Thickness d of handle 12 can taper constantly and uniformly from contact point A on holder 14 to the free end of the handle.

U-shaped holder 14 is given a T profile. This makes it especially resistant to twisting. The outer part 15 of the T profile comprises the internal, centrally formed T profile

section 16 approximately half as wide, from which dental floss strand 26 emerges.

The free ends of T profile 15, 16 of holder 14 are formed with tapered points and rounded.

In the drawing, in the embodiment shown in Figures 7-11, reference number 110 refers to a tooth-cleaning device which consists of a handle 112 with a holder 114 integrally formed thereon. Holder 114 is made of two divergent legs 120 and 130.

Handle 112 forms a receiving part 140 for a dental floss strand 118. This dental floss strand 118 is wound up and stored in receiving part 140. This receiving part 140 is made up of parts of handle 112. It consists of a winding plate 146, the actual handle plate 152, and a plurality of connecting ribs 150 between the inside of handle plate 152 and the inside of winding plate 146. The exteriors 142 and 154 of handle plate 152 and winding plate 146 are in the same plane as the side surfaces of holder 114 and legs 120 and 130.

Connecting ribs 150 run crosswise with respect to the lengthwise axis of handle 112; they are slightly narrower than the width of handle plate 146 or the width of winding plate 152. The first and last ribs 150 are staggered inward away from the edge of winding plate 152 and winding plate 146. This creates the

receptacle for the wound dental floss strand 118, with this strand winding being nearly completely covered by plates 146 and 152.

Winding plate 146 is made shorter than handle plate 152; looking in the lengthwise direction of the device, it terminates approximately at the center to approximately two-thirds of the total length. In this way, a threading opening 141 for dental floss strand 118 is created at this point. A cover plate 148 abuts threading opening 141 in the direction of holder 114, said plate being located in and made in the same plane and with the same material thickness as winding plate 142.

Holder 114 with its legs 120 and 130 is shaped somewhat like a claw. The claw opening is molded at approximately an angle of 40° to 50° to the lengthwise axis of handle 112. This is accomplished in this example by virtue of the fact that the first leg 120 of holder 114 is bent at an angle of 90° relative to the lengthwise narrow side 160 of handle 112. The second leg 130 abuts first leg 120 with the inside of holder 114 in the shape of an arc, while its outer side fits into the extension of the long narrow side 162 of the handle and then makes the transition with a radius to the arc on the inside. End 132 of leg 130 forms an arc approximately in a direction 45° to the central axis to the handle.

This divergent arrangement of legs 120 and 130 produces, first of all, a relatively wide free stretch for part 119 of dental floss strand 118, which as the actual working part of dental floss strand 118, is used for cleaning. On the other hand, this divergent arrangement results in a considerable deflection of the dental floss strand at ends 120 and 132 and hence in an absolutely secure locking of dental floss strand 118 or its segment 119.

The angling (40° to 50°) of the two legs 120 and 130 or of the leg opening, as shown, also facilitates handling of tooth cleaning device 110 because this inclined position largely prevents handle 112 from being in the way when holder 114 or handle 112 is introduced into the mouth in the vicinity of the spaces between the molars which are difficult to access.

Ends 122 and 132 of legs 120 and 130 have guides 124 and 134 for dental floss strand 118. Guide 134 in end 132 of second leg 130 is made approximately U-shaped and, with the same contour, merges directly with a hollow throat 136 formed in the outside of second leg 130 and serving to guide and receive dental floss strand 118 which is unwound from receiving part 140 via hollow throat 136 and guide 132 to first leg 120. On leg 120, in its end 122, there is a guide 124 in the form of an approximately 45° cut in the rounded area. In the top of the 45° cut, in the direction in

which the dental floss travels, a clamping slot 126 is provided in which dental floss strand 118 can be positively locked.

In order to be able to cut off the used end of dental floss strand 118 (segment 119), a cutting plate 158 is provided in a recess in handle plate 152 in the transition area from the holder 114 to handle 112. This cutting plate 158 is a metal part from which a curved cutting tongue 159 projects. Cutting tongue 159 and/or cutting plate 158 is covered by cover plate 148. To tear or cut off the dental floss, strand 118 has its working end introduced into threading opening 141 and it is then cut off on cutting tongue 159.

Following a cleaning process with working segment 119 of dental floss strand 118, the latter is pulled out of clamping slot 126, unwound from receiving part 140 by one stored length, clamped by means of guide 134 with clamping slot 126, and cut off at cutting plate 158 or its cutting tongue 159. It is advantageous to adjust the winding length of receiving part 140 (maximum distance of the first and last ribs 150 and their width) to the distance between ends 122 and 132 of legs 120 and 130.

Tooth cleaning device 110, which can be made in the form of an injection-molded plastic part, is advantageously given approximately the same wall thickness at all points. With this design, in the transition area from handle 112 to holder 114,

ribs 147 and/or cavities 149 are provided. In conjunction with hollow throat 136 or the U-shaped design of leg 130, a stable design is achieved despite a very lightweight structural design. At the same time, however, assurance is provided that dental floss strand 118 will be held under tension and associated elastic spring tension will be provided by legs 120 and 130. In this way, the tension on segment 119 of dental floss strand 118 is retained during use, and there is always optimum stretching and hence delicate use with the tooth cleaning device according to the invention.

In Figures 12 and 13 of the drawing, reference number 210 refers to a tooth cleaning device consisting of a handle 212 and a holder 214 associated therewith. Handle 212 is again made approximately rectangular in cross section and sharply rounded at its upper end and the side edges. In addition, for improved handling, on its two flat outer sides it has a ribbing 216 (see for example handle ribs 13 in Figure 5).

Holder 214 consists of two legs 200 and 201 which merge approximately in a semicircular fashion and merge with handle 212. In the vicinity of outer ends 202 and 203 of legs 200 and 201, there are two dental floss strands 26 and 27 firmly attached to the ends 202 and 203 of legs 200 and 201. The two dental floss strands 26 and 27, as shown in Figure 12, are located one behind the other (relative to the free lengthwise sides of legs

200 and 201), parallel, and in a plane which runs parallel to the lengthwise sides of legs 200 and 201.

For improved handling of tooth cleaning device 210, legs 200 and 201 are in turn bent laterally to the lengthwise side of handle 12. The angle between lengthwise central axes H of the two legs 200, 201 and lengthwise central axis G of handle 212 can be 45°.

In the drawing, in Figures 14 to 17, reference number 310 refers to a tooth cleaning device which consists of a handle 312 and a holder 314 releasably connected thereto. Holder 314 consists of two semicircularly disposed legs 316, 318, whose two opposite end parts 317, 319 run approximately parallel to each another in a partial area. The lengthwise central axis, which runs through holder 314, together with the lengthwise central axis of the handle, forms an angle of about 45°. It is also possible, however, to make the angle between the two lengthwise central axes between 40° and 50°.

As indicated by Figures 14, 15, 17, the handle is provided with a ribbing 326, which makes handle 312 easier to handle.

In order for holder 314 with dental floss strand 26 (or strands 26 and 27) to be replaceable in the shortest space of time by a new holder with a new strand of dental floss after use, the new holder is releaseably connected by a clamping connection 320 with

..andle 312. Clamping connection 320 is made in the form of a plug 322 with two spring-tensioned pins 323a and 323b running parallel to one another, said pins being designed to be pushed into an opening 324 provided at the end of the handle. When pushed into the opening, the two pins 323a and 323b are compressed slightly, but then spring back into their final position, thus locking themselves firmly in opening 324.

In order for the two pins not to be pushed too far together, another pin 323c is provided between the two outer pins 323a and 323b which run parallel to each other.

As indicated in Figure 17, the three pins 323a,b,c are all in one plane. The flat side of at least one of pins 323 can be made convex and engage a depression provided in opening 324. Of course, it is also possible to provide the pin with a depression which cooperates with a convex part in the opening, thereby improving the clamping connection between holder 314 and handle 312.

The ends of the three pins 323 lie on an arc of a circle, thus facilitating the insertion of the pins into opening 324, since this design has a centering action.

For improved handling of tooth cleaning device 310, in this example also the two legs 316, 318 of holder 314 are bent at an

gle sideways relative to the lengthwise central axis of handle 312. The angle between the lengthwise central axis of holder 314 and the lengthwise central axis of handle 312 can be between 40° and 50°. Preferably, however, the angle between the two lengthwise central axes is 45°.

Of course, legs 316, 318 of holder 314 can be made T-shaped, U-shaped, or the like in this embodiment as well, in order to achieve a greater resistance to twisting.

C L A I M S

1. A tooth cleaning device having a handle portion, a holder portion and at least one strand of dental floss held by said holder portion, said holder portion having two spaced legs defining a span bridged by said dental floss, at least one of said legs being bent laterally to the long side of the handle at an angle between approximately 40° and approximately 50°, and said handle, holder, holder legs and dental floss strand all lying in a substantially common plane.

2. A tooth cleaning device according to claim 1, wherein the two spaced legs of the holder portion lie substantially parallel to each other and wherein the lengthwise central axis between the two legs forms an angle between 40° and 50° with the lengthwise central axis of handle.

3. A tooth cleaning device according to claim 1, wherein the holder portion is substantially T-shaped in cross section and has an outwardly directed flange extending at least partly therearound and an inwardly directed rib being approximately half as wide as said flange.

4. A tooth cleaning device according to claim 1, wherein guides for the dental floss strand are provided in the free ends of the legs, said dental floss strand being interchangeably tensioned by said guides and firmly clampable in a clamping slot in the guide of a first leg, and wherein a dental floss accommodating chamber is defined in handle whereby a wound supply of dental floss is guidable by the guide in the second leg.

5. A tooth cleaning device according to claim 4, wherein the handle includes a handle plate and a winding plate spaced apart and interconnected by a plurality of ribs forming the receiving chamber.

6. A tooth cleaning device according to claim 1, wherein the legs of the holder diverge from one another.

7. A tooth cleaning device according to claim 6,

wherein the lengthwise axis of a first leg lies at an angle of approximately 90° to a lengthwise side of the handle and the lengthwise axis of the second leg lies at an angle of approximately 45° laterally with respect to the other lengthwise side of handle, and wherein the media axes of the opening defined by the legs lies at an angle of approximately 40° to 50° to the lengthwise axis of the handle.

8. A tooth cleaning device according to claim 1, wherein two strands of dental floss extend in spaced substantially parallel relationship between the legs.

9. A tooth cleaning device according to claim 1, wherein the holder portion is arcuate in configuration.

10. A tooth cleaning device according to claim 1, wherein the holder portion is releasably connectable by a clamping arrangement with the handle portion.

11. A tooth cleaning device substantially as hereinbefore described with reference to Figures 1 to 6, Figures 7 to 11, Figures 12 and 13, or Figures 14 to 17 of the accompanying drawings.

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