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 Continuation-in-part of application Ser. No.
 744,278, June 10, 1968, now abandoned.

[50] Field of Search..... 132/91, 92

[56] **References Cited**
UNITED STATES PATENTS

2,554,526 5/1951 Dembenski..... 132/92

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[54] **DENTAL FLOSS DISPENSER**
 10 Claims, 11 Drawing Figs.

[52] U.S. CL..... 132/91

[51] Int. CL..... A61c 15/00

ABSTRACT: This invention relates to improvements in a device for dispensing dental floss from a source of supply such as a spool by a clutch member which cooperates with a drive means for unwinding and feeding the floss to an exposed position exteriorly of the housing preparatory for use, the clutch member holding the floss taut while in use.

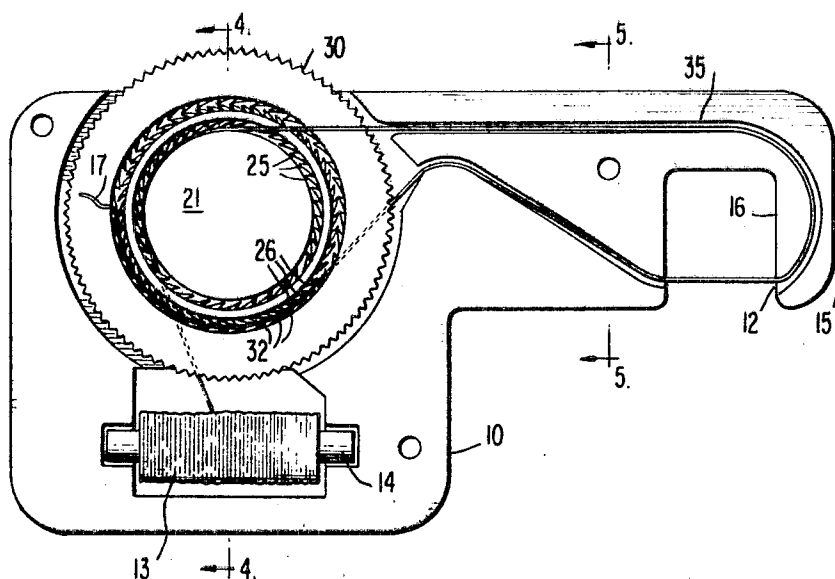


FIG 1

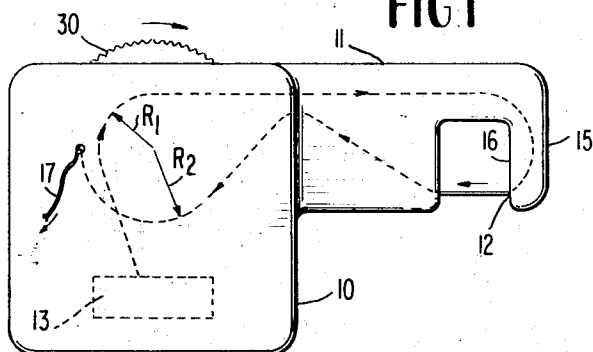


FIG 2

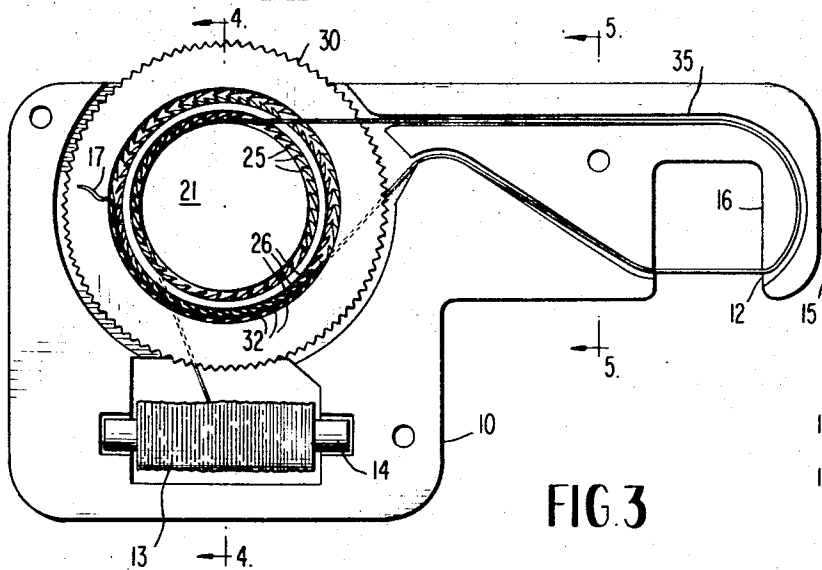
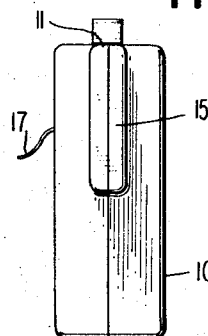


FIG 3

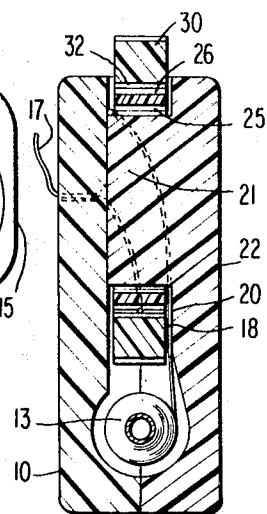


FIG 4

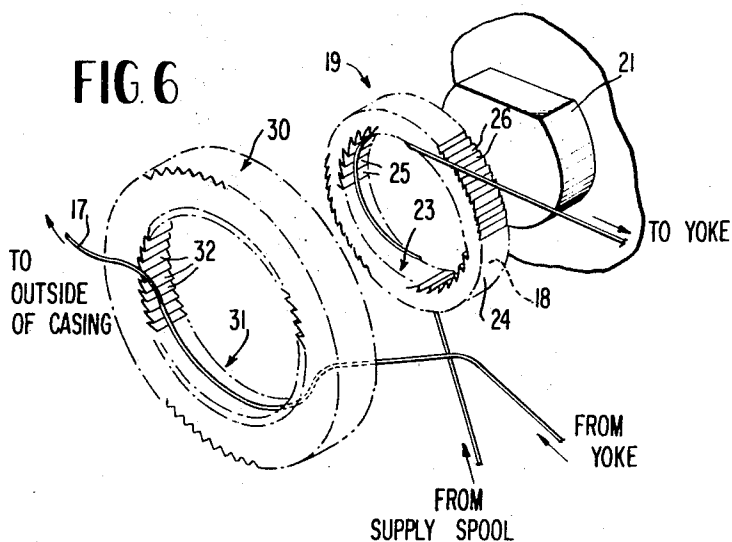


FIG 6

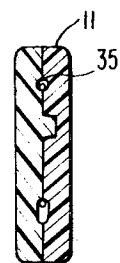


FIG 5

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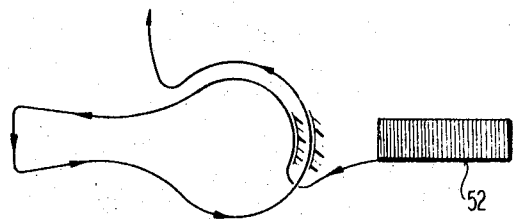
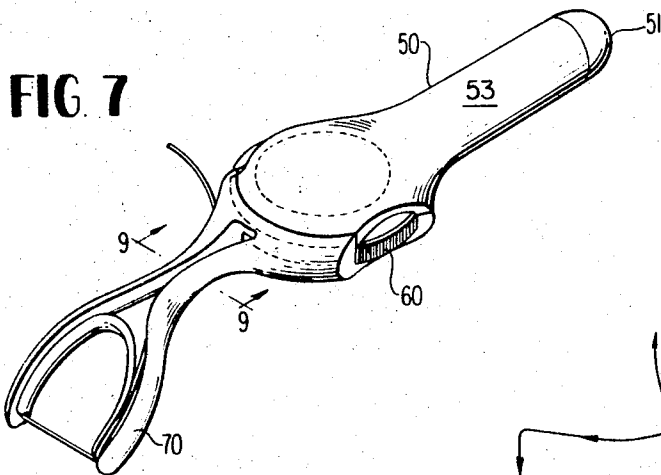


FIG. 8

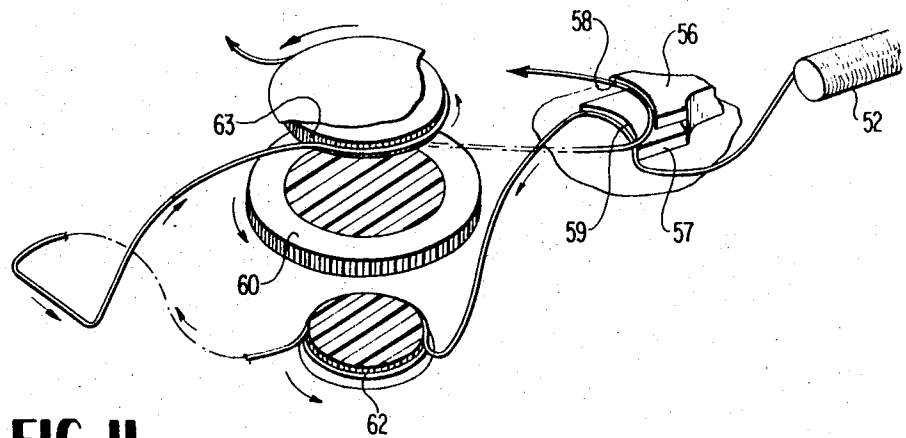
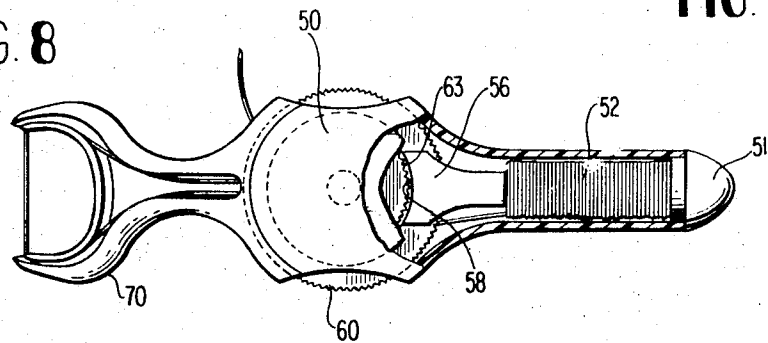


FIG. 11

DENTAL FLOSS DISPENSER

This application is a continuation-in-part application of Ser. No. 744,278, filed June 10, 1968, now abandoned.

BACKGROUND OF THE INVENTION

There is now available in commerce a recently introduced dental floss dispenser which comprises an extruded plastic container comprising a housing that includes an integrated cover hinged at its back side to the housing and at the front has a depending tongue that locks the cover to the front wall of the housing. Within the housing of this type of device there is positioned an integrated assembly arranged to hold a spool of dental floss, one end of which may be passed upwardly through a slot and then transversely of the housing to a combination gripping and cutting means. This structure is covered by U.S. Pat. No. 3,289,681 to Chambers. However, the cover in that patent must be moved to disengage a gripping means from the strand so that a new yarn supply may be fed to the yoke.

Generally speaking, practically all known dental floss dispensing devices, including the above-mentioned, have the same characteristics, some being more simplified and more cheaply constructed than others, that is, a container for the dental floss and an apertured cap through which the floss may be passed to a cutting-gripping member carried by the cap. However, no one has provided for a dental floss dispenser which dispenses the floss by means of a simple "pushbutton" motion of a handwheel, and holds it taut in a position convenient for use in cleaning between the teeth. In other words, although dental floss dispensers have become more sophisticated, they are still strictly of the disposable type and are merely storage devices which include a perforation through which the user must pull the floss and use his fingers to hold the floss in a position in the mouth convenient for cleaning between the teeth.

Accordingly, it is the principal object of this invention to provide a dental floss dispenser which comprises clutch mechanisms or other actuators which are operable in unison by a simple, pushbutton-type motion applied by the user to a single thumbwheel which permits the user to feed the floss through the passageways in the housing into a position of use, hold it taut during use, and subsequently submit it to waste.

Another object of the invention is to provide a dental floss dispenser constructed of economy-type material which can be economically formed such as the transparent plastics, examples of which would include polyvinyl, the polyacrylates, polyethylene, etc.

Still another object of the invention is to provide one embodiment of a dental floss dispenser comprising separable, stationary members or housings adapted to contain the supply of floss (in form of a spool, reel, skein, ball or otherwise), at least a portion of said housing including a passageway through which the floss can be guided to the point of use and thence through an outlet in one wall of the housing.

In yet another embodiment the thumbwheel is formed integral with the clutch elements which feed the strand of floss to the yoke.

These and other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of the dispenser showing the floss supply and its passage through the housing in phantom or dotted outline;

FIG. 2 is a front elevational view of the dispenser;

FIG. 3 is a side elevational view of the interior of the dispenser with one sidewall cover removed;

FIG. 4 is a cross-sectional view on line 4-4 of FIG. 3;

FIG. 5 is a cross-sectional view on line 5-5 of FIG. 4;

FIG. 6 is an exploded view on one modification of the clutch means and its actuator by which clutching action is generated

by the reaction of rotating flexible teeth 25 against stationary plug 21, clearly showing the path of travel of the floss through the dispensing mechanism;

FIG. 7 is a perspective view of another embodiment of the invention;

FIG. 8 is a plan view with a partial section showing the cooperative elements in detail;

FIG. 9 is a cross section on line 9-9 of FIG. 7;

FIG. 10 is a diagrammatic view showing the travel of the strand from supply to the yoke; and

FIG. 11 is an exploded view showing in greater detail the cooperative elements and how the strand of yarn cooperates therewith.

DESCRIPTION OF THE FIRST EMBODIMENT

Turning now to the drawing in more detail and particularly that of FIG. 1, there is shown a separable dental floss dispenser housing or container 10 integrated into which and offstanding from one end wall is an arm 11, the lower face of which is notched as at 12 to provide a yoke.

In phantom outline there is generally shown in FIG. 1 also the path of travel of the dental floss 13 from the supply member 14 (FIG. 3) outwardly and through the first, or unwinding, clutch mechanism whose pitch-line is determined by R_1 , thence through the arm 11 and downwardly through an arcuate passageway in the leg portion 15. At this time the floss is arranged to be passed from means defining an opening (not shown) in the front wall 16 of the leg portion 15, whereupon it now straddles the yoke 12 and reenters the opposed rear wall of the housing 10 through means defining another opening (not shown).

At this time the path of travel of the floss is modified from a straight horizontal line direction of travel to a steep incline, for a purpose that will be better understood as the description progresses, thence downwardly and about the second, or rewinding, actuator, operating at a pitch radius of R_2 , where it is fed outwardly through the sidewall of the housing, as indicated at 17, by means of the third actuator, not shown.

For a more clear understanding of the operation of the improved dental floss dispenser, reference will be made at this time to both FIGS. 3 and 6.

As the floss 13 is pulled upwardly from the supply 14, it will pass up the annular wall 18 on one side of clutch 19 adjacent to the wall 20 of the housing (FIG. 4) and about the annular plug or boss means 21 that is integrally formed with the rear section 22 of the housing. It is believed to be clear from the view in FIG. 3 that the floss 13 is pinched between the perimeter of the plug 21 and the inner circumferential wall 23 of the annular clutch means 24, and thus is caused to flow at a linear speed determined by the pitch-line velocity of the unwinding actuator. Similarly, the floss is caused to flow at the same pitch-line velocity as that of the rewinding actuator, as the floss passes through the second clutch mechanism. Since the two actuators operate at the same angular velocity, and the pitch radius of the rewinder is greater than that of the unwinder, the linear velocity of the floss will be greater as it rewinds than as it unwinds, the difference being compensated for by stretch in the floss, which generates a tautness in the floss between the two clutching mechanisms. The annular clutch member 24 is constructed of any rubberlike material or any suitable plastic with primary consideration being given to the degree of elasticity of the inner and outer circumferential walls of the clutch member. It is also to be understood that although the clutch mechanism as shown in the drawing is constructed of one piece of material, it may be found desirable to have the clutch constructed of concentrically disposed layers of material of varying hardnesses.

As further shown in FIGS. 3 and 6, the clutch member 19 is provided on its inner and outer circumference with angularly disposed driving teeth 25 and 26, respectively. Teeth 25 and 26 are sufficiently firm at their root portion, but slightly flexible at their apices, in order to be able to perform a twofold

function of feeding the floss into a position of use as well as preventing retrograde motion back toward the spool when pressure is applied to the floss during a teeth-cleaning function.

Reference is made at this time, in more detail, to FIG. 6 and particularly to the clutch driving wheel 30 which is provided on its exterior perimeter with knurling, as shown, and on its annular inner circumferential wall 31 with teeth 32. It should also be pointed out here that is also within the contemplation of this invention that the knurled driving wheel may also be constructed of concentric layers of material in order to achieve the most desirable driving relation between its inner teeth 32 and the outer teeth 26 provided on the clutch member. Of course, it would be desirable that the knurled surface 30 of the driving wheel have a firm hard surface adapted to be engaged by the finger of the user whereas the inner concentric layer would be more flexible so that a driving force can be imparted to the dental floss.

It will be apparent by again referring at this time to FIG. 3 that subsequent to use of the floss by positioning the yoke 12 over the teeth and performing a cleaning operation therebetween, it may be desirable to advance a new section of clean floss for use between other adjacent teeth at which time the knurled wheel 30 is rotated forwardly or in the direction of arm 11 thereby advancing the floss across the notched area previously described.

It is believed apparent since the inventive concept is well disclosed in the drawing that (see FIG. 3) the used floss will be readily pulled through the passageway 35, past the yoke and returned to the outer perimeter of the rewinder 19 by rotary movement of the knurled wheel 30 in a forward direction. Thus, it is to be understood that the snubbing or pinching action which is achieved not only between the plug 21 and the outer circumference of the clutch 19, but the pinching action which is achieved as well between the confronting teeth 26 and 32 carried by the clutch and the inner circumference of the driving wheel 30, respectively, will not only provide a driving force for feeding the floss, but also a gripping or locking action thereon while in use.

As mentioned earlier, it is contemplated that the device disclosed herein may be used over and over again or at least as long as desired by the purchaser.

Moreover, it is also considered that supplies of floss other than the type shown in the drawing (skeins, balls, etc.), will be made available so that when one does not desire to throw away his dispenser, he has only to remove the top cover and tie a knot between the ends of the previously used floss and the new supply, clip the tails of the knot with scissors, place the new supply in the housing, and replace the cover for use. The knot will be readily fed between the teeth because of the confronting tooth root arrangement and flexibility of the driving surfaces.

Although the housing may be made of transparent plastic as indicated hereinbefore, where it is constructed of some other translucent or opaque material, a viewing window may be provided in the front or rear wall thereof adjacent to the spool of floss so the quantity thereof remaining on the spool may be noted from time to time.

Another embodiment of this invention is clearly shown in the second sheet of drawing in FIGS. 7-11.

FIG. 7 shows a perspective view of a hollow casing 50 which is provided at one end with a frictional cap 51 that may be readily removed for insertion of a spool of dental floss 52, all of which is well-shown in the fragmentary view of FIG. 8.

Also, in FIG. 7 it will be noted that the casing 50 is provided with a removable cover portion generally indicated at 53. This cover may be provided on the inner wall thereof with spring fingers and adapted to engage the depressions or recesses provided on the interior of the casing or secured in any other manner preferred, it only being necessary to provide a medium of access to the casing to install the operative elements thereof.

In the first embodiment of this invention the clutch 19 and the clutch guiding wheel 30 are separable elements, whereas in the second embodiment the thumbwheel and clutch means are integrated into one piece.

Referring at this time to FIG. 11, the elements that are essential to the operation of the dental floss dispenser are shown schematically with the path of travel of the floss being depicted by arrows.

It is to be understood that the interior wall of the casing is provided with a pair of spaced boss means 56 and 57 each of which includes a concave or semicircular surface 58, 59, respectively, with the bosses being spaced apart sufficiently to permit the thumbwheel 60 to rotate freely therebetween.

Each side of the thumbwheel is provided with a clutch means, the clutch 62 being the means by which the floss is withdrawn from the supply spool and the other clutch 63 being a rewind clutch to feed the floss from the yoke out through a perforation provided in the casing 50. Suitable bearing means (not shown) are provided within the casing for cooperation with the oppositely extending surfaces of the clutch members.

In view of the foregoing it is believed that the following description of the path of travel of the floss through the casing and its cooperation with the respective elements will provide a clear understanding of the operation of the second embodiment.

Upon actuation of the thumbwheel 60, the yarn from the spool 52 is fed across the concave surface 59 of one boss and partially about the unwinding clutch 62, whereupon it passes under tension through one side of the bifurcated portion forming a yoke 70. Thence the yarn, which is still under tension, traverses back through the other bifurcated arm of the yoke 70 to the rewind clutch 63. The floss then travels between the concave surface 58 of the other boss and the clutch 63. From FIG. 11 it will be observed that the floss travels about a substantial distance of the surface area of the clutch, but not completely thereabout, and is passed out through a perforation in the wall of the casing 50 as indicated hereinbefore.

It will be apparent from a study of this embodiment that a relatively simple organization of elements provides an extremely efficient method of unwinding dental floss from a supply spool and passing it while in a tensioned condition about a pair of clutches and across a yoke where it may be utilized for the purpose of cleaning teeth.

Although only two embodiments of the invention have been depicted and described, it will be apparent that these embodiments are illustrative in nature and that a number of modifications in the apparatus and variations in its end use may be effected without departing from the spirit or scope of the invention as defined in the appended claims.

That which I claim is:

1. A dental floss dispenser comprising a casing having a yoke, means movable relative to said casing providing access to the interior thereof, at least a pair of tensioning clutches positioned within said casing and including means to drive said clutches, said means to drive the clutches being accessible from the exterior of said casing, stationary boss means concentric with and adapted to cooperate with at least one of said clutches for gripping or locking action, and yarn supply means positioned within said casing and arranged to furnish a supply of yarn to said tensioning clutches so that the yarn that passes through said yoke is tensioned thereby.

2. A dental floss dispenser according to claim 1, wherein the clutch means are integral with the means arranged to drive the clutches.

3. A dental floss dispenser according to claim 1, wherein at least one of the clutches is disassemblable from the means arranged to drive the same.

4. A dental floss dispenser according to claim 1, wherein the boss means includes an annular body which is circumscribed by said clutch means.

5. A dental floss dispenser according to claim 1, wherein the clutch means include a peripheral surface portion and the boss means is arranged to cooperate therewith.

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6. A dental floss dispenser according to claim 1, wherein the boss means straddle the means arranged to drive said clutches.
7. A dental floss dispenser as claimed in claim 4, wherein the boss is flattened into a chord to permit radial movement of the floss and movement of the clutch associated therewith.
8. A dental floss dispenser as claimed in claim 4, wherein at least one of said clutch means is constructed of a rubberlike material.

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9. A dental floss dispenser as claimed in claim 4, wherein at least one of said clutch means includes inner and outer surfaces, at least one of which is provided with flexible teeth.
10. A dental floss dispenser as claimed in claim 9, wherein both surfaces of the clutch means are provided with flexible teeth and are arranged to rotate in unison.

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