United States Patent [19]

Thierman

[11] **3,734,107**

[45] **May 22, 1973**

[54] DENTAL FLOSS TOOTH CLEANING TOOL

[76] Inventor: **Irwin B. Thierman,** 8817 N. Swenson St., Portland, Oreg. 97203

[22] Filed: **Nov. 12, 1971**

[21] Appl. No.: **198,263**

[52] **U.S. Cl.** ..... **132/92 A**
[51] **Int. Cl.** **A61c 15/00**
[58] **Field of Search** ..... 132/91, 90, 92 R, 132/92 A

[56] **References Cited**

UNITED STATES PATENTS

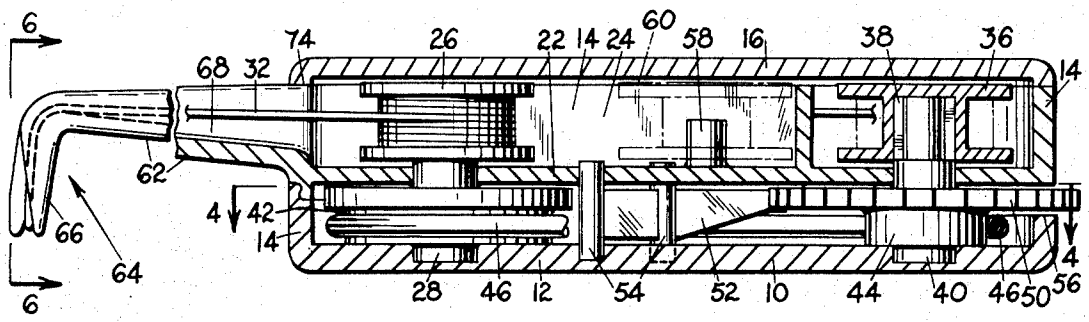
3,340,881	9/1967	Cowan	132/92 R
2,450,635	10/1948	Dembenski	132/92 A
1,815,408	7/1931	Jordan	132/91
1,667,134	4/1928	Sherwood	132/91
3,289,681	12/1966	Chambers	132/92 R

Primary Examiner—Antonio F. Guida
Assistant Examiner—Gregory E. McNeill
Attorney—Eugene M. Eckelman

[57] **ABSTRACT**

A tool for holding dental floss and being capable of being manipulated for cleaning interproximal areas between the teeth. The tool has a body member supporting a supply spool of dental floss and a take-up spool. A pair of arms project from the body member and have downturned fingers across which dental floss between the supply spool and take-up spool is stretched tightly. The dental floss being supported across the fingers can be worked between the teeth by suitable manipulation of the tool. The supply spool of dental floss and the take-up spool have a rotatable connection with each other such that when new dental floss is presented to the fingers such floss is simultaneously taken up and held tight.

5 Claims, 8 Drawing Figures



PATENTED MAY 22 1973

3,734,107

SHEET 1 OF 2

FIG. 1

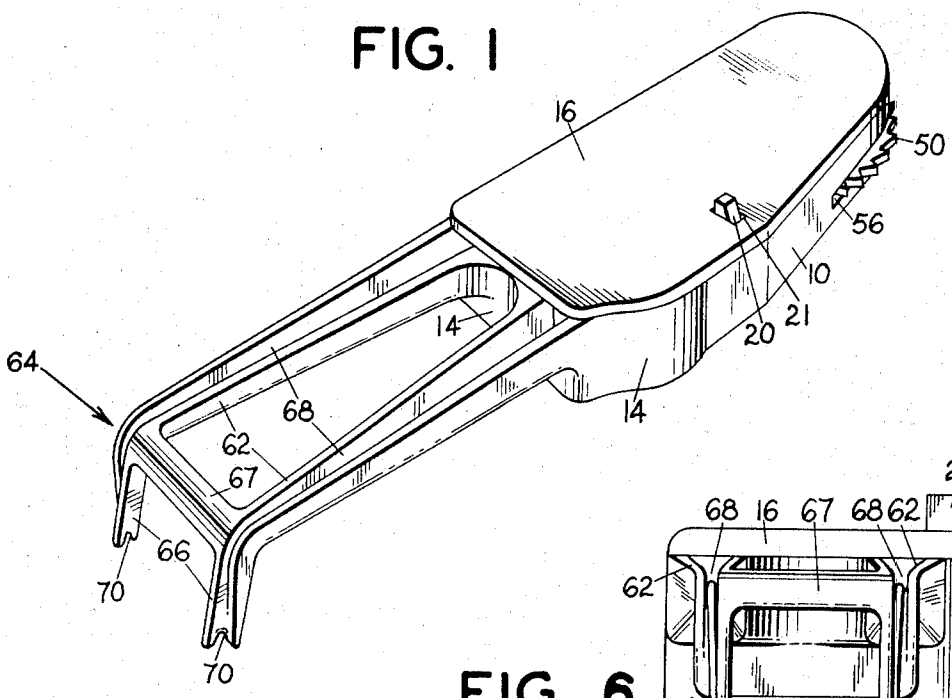


FIG. 6

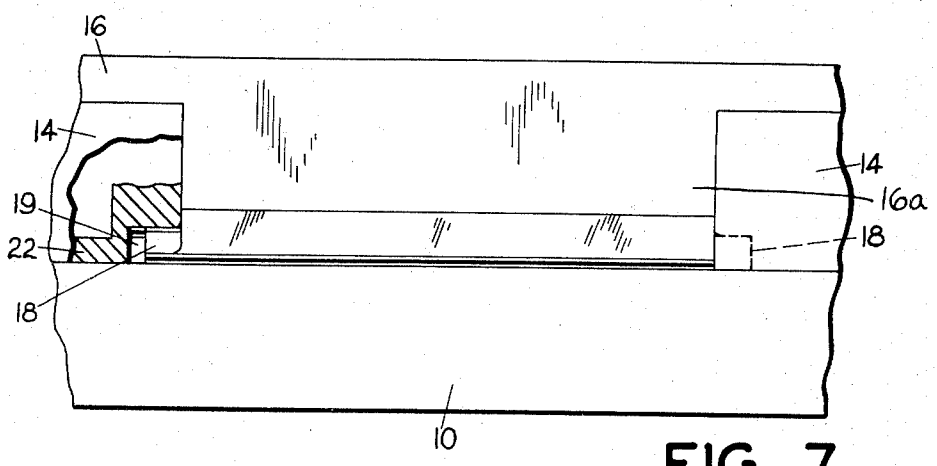


FIG. 7

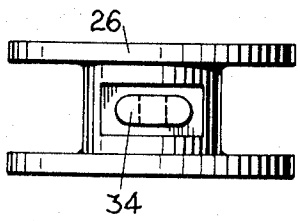


FIG. 8

INVENTOR.
IRWIN B. THIERMAN
BY Eugene M. Eckelman
ATTY.

PATENTED MAY 22 1973

3,734,107

SHEET 2 OF 2

FIG. 2

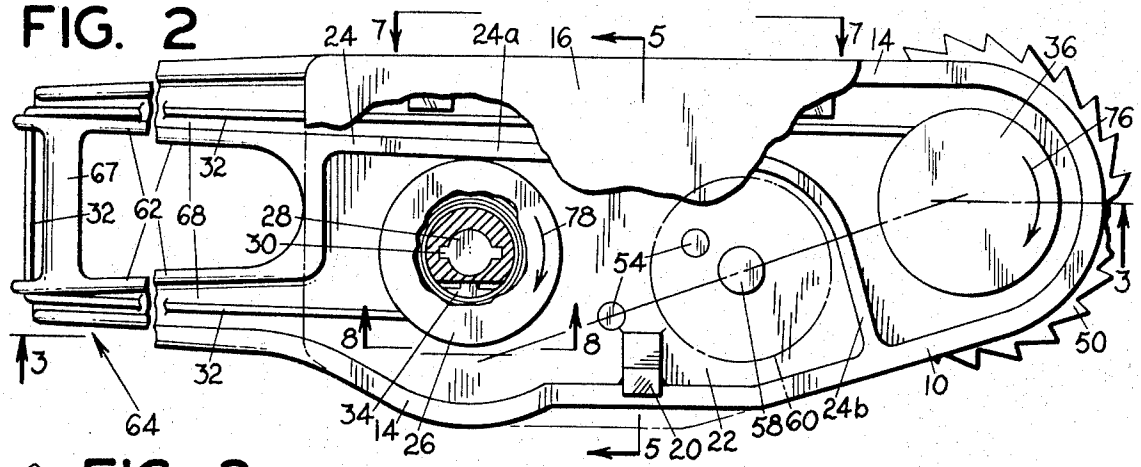


FIG. 3

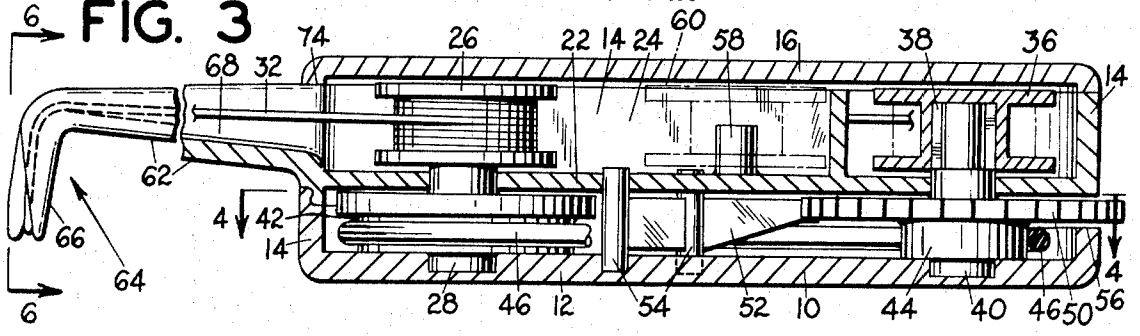
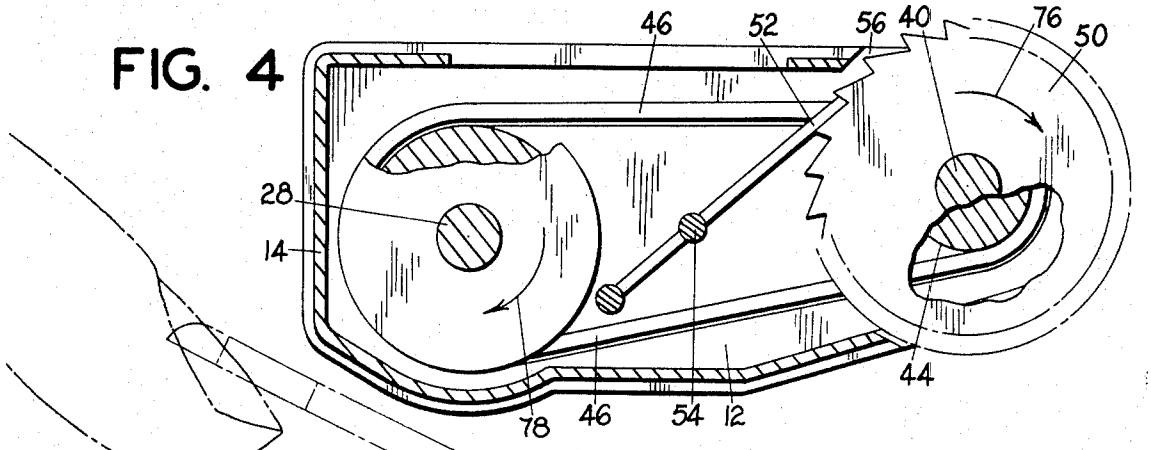


FIG. 4



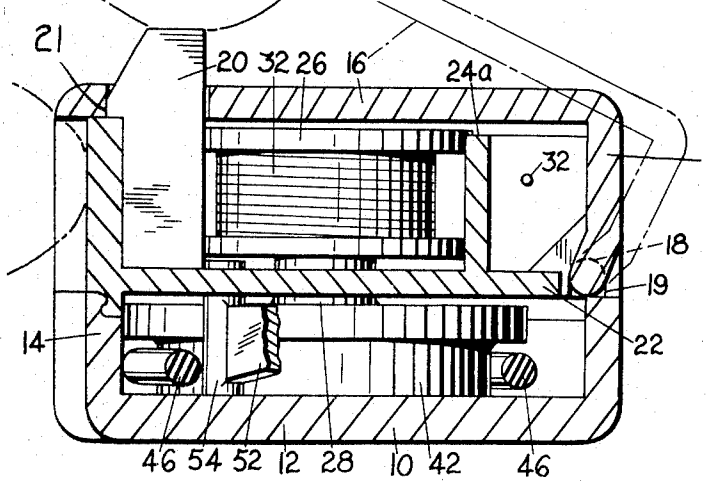


FIG. 5

INVENTOR.
IRWIN B. THIERMAN
BY Eugene M. Eckelman
ATTY.

DENTAL FLOSS TOOTH CLEANING TOOL

BACKGROUND OF THE INVENTION

This invention relates to a new and novel tool for holding a supply of dental floss and for presenting a portion thereof on the tool for working in interproximal areas between the teeth.

Dental floss is usually supplied in small spools, and for the purpose of using the floss between the teeth, a short length is cut off and wrapped around fingers on opposite hands. In order to obtain a good grip on the floss, it must be wrapped securely around the fingers. In doing this and in the manipulating operation of the dental floss, the latter tends to cut into the fingers, shut-off the circulation, and otherwise be uncomfortable and inefficient in use. Also, in order to use the floss in this manner, it is necessary that several inches be separated from the spool in order that a good grip can be obtained thereon. Thus, considerable wastage is involved.

SUMMARY OF THE INVENTION

According to the present invention and forming a primary objective thereof, a tool is provided which holds a supply of dental floss and which presents a portion of the dental floss for working between the teeth.

More particular objects of the present invention are to provide a dental floss tooth cleaning tool having a body member which holds a supply of dental floss, the tool having a pair of projecting arms with outer fingers across which dental floss from the supply means is suspended to present a dental floss portion capable of being worked in the interproximal areas between the teeth; to provide such a tool having supply and take-up spools in the body member rotatably connected with each other so that as dental floss is unrolled from the supply spool, it is taken up by the take-up spool; to provide such a rotatable connection between said supply and take-up spools which is arranged to apply a tension to the dental floss so that it will be taut at all times, and also to provide a rotatable connection between the supply and take-up spools which employs pulleys and an elastic belt whereby the elastic belt stores energy to insure that the dental floss is maintained in a taut condition.

The invention will be better understood and additional objects and advantages will become apparent from the following description taken in connection with the accompanying drawings which illustrate a preferred form of the device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a dental floss tooth cleaning tool embodying features of the present invention;

FIG. 2 is a foreshortened top plan view of the tool with parts thereof broken away to show internal structure;

FIG. 3 is a vertical sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a horizontal sectional view taken on the line 4—4 of FIG. 3;

FIG. 5 is a transverse sectional view, slightly enlarged, taken on the line 5—5 of FIG. 2;

FIG. 6 is an end elevational view of the tool taken on the line 6—6 of FIG. 3;

FIG. 7 is an enlarged fragmentary elevational view taken on the line 7—7 of FIG. 2; and

FIG. 8 is an elevational view, slightly enlarged, of a supply spool apart from the other structure, taken on the line 8—8 of FIG. 2.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now in particular to the drawings and first to FIGS. 1–5, the dental floss tooth cleaning tool of the present invention comprises a hollow body member **10** which in its overall shape and size is adapted to be gripped by one hand. The body member has a bottom wall **12**, a peripheral wall **14** which extends around the sides and ends of the body member, and a cover **16**. Cover **16** extends over the top of the body member and partly down one side in a flanged portion **16***a*, FIGS. **5** and **7**. As best seen in these latter two figures, flange portion **16***a* has a pair of integral oppositely extending stub shaft portions **18** which are received in opposed pockets **19** formed in the body portion adjacent the lower end of flange **16***a*. Stub shaft portions **18** are rotatable in pockets **19** and thus form a hinge support for the cover **16**.

The cover is held releasably in closed position by a latch finger **20** integral with the body member and projecting through an aperture **21** in the cover. The parts are arranged such that finger **20** has an interference engagement with one defining edge of the opening, namely, the left edge as viewed in FIG. **5**, for accomplishing the releasable locking function. Release of the cover from its closed position is accomplished by distorting the parts slightly, such as by applying opposing pressure between the side of the body member and the top of the finger **20**, as shown in FIG. **5**. The cover is shown in a partly open position in FIG. **5** by phantom lines, and it is to be understood that it can be swung open wide for access to the interior of the body member.

Body member **10** has a horizontal dividing wall **22**, FIGS. **2**, **3**, **5** and **7**, and as best seen in FIG. **2**, the upper chamber as formed by the wall **22** has a vertical partition **24** with a longitudinally extending portion **24***a* and a lateral portion **24***b*, the portion **24***a* leading from the front of the body member and the portion **24***b* connecting with the side of the body member forward of the rearward end. Disposed on one side of partition **24** is a supply spool or roll **26**, FIGS. **2**, **3**, **5** and **8**, removably mounted on a shaft **28** having rotatable support in wall **22** and also in bottom wall **12**. Spool **26** has a spline connection **30** with the shaft **28** for driving rotation therewith and such spool can be removed from the shaft merely by lifting it off the end thereof, assuming of course that the cover **16** is first opened. Spool **26** comprises a supply spool for dental floss **32** and has an anchor pin **34**, FIG. **2**, on its drum portion to which the end of the dental floss is tied.

A take-up spool or roll **36** is disposed in the upper chamber portion of body member **10** on the other side of partition **24** from the supply spool. This spool has a spline connection **38**, FIG. **3**, with a shaft **40** journaled in the wall **22** and side wall **14** of the body member **10**. Spool **36**, similar to spool **26**, is adapted to be lifted off the end of the shaft upon opening the cover **16** of the body member, and may have suitable means, not shown, on its drum portion for securing an end of the dental floss thereto. Spool **36** is arranged such that den-

tal floss to be wound thereon extends into the body member along the portion **24***a* of the partition **24** opposite from the spool **26.**

With particular reference to FIGS. **3** and **4,** the shafts **28** and **40** have pulley or drum portions **42** and **44,** respectively, engaged by an O-ring belt **46** to establish a drive connection between the two spools whereby when one spool is rotated, the other one will also rotate. Spool **36** has one way rotation by means of a ratchet wheel **50** secured on the shaft **40** and engageable by a pawl **52** forming an integral part of a pair of posts **54** secured between walls **22** and **12** of the body member **10.** The pawl is made of a plastic or semiflexible material which while having sufficient rigidity to engage the back side of the teeth of the ratchet wheel and hold it against reversing, it is sufficiently flexible to ride over the teeth and pick up the next tooth as the ratchet wheel is rotated. The rearward end of the housing has a horizontal slot **56** and the ratchet wheel **50** projects a short distance outwardly of the slot so as to permit the operator to rotate the ratchet wheel by one finger.

The wall **22** has a short post **58** in the supply roll chamber. This post is for holding an extra supply spool **60.**

Projecting integrally from the forward end of body member **10** in substantially parallel relation is a pair of arms **62** terminating in an outer head portion **64.** Head portion **64** includes a downturned end portion or finger **66** on each arm **62** and an interconnecting web **67.** Each of the arms **62** has a longitudinal groove **68** in the top outer side thereof. These grooves extend the full length of the arms **62** and also extend down the front outer edge of downturned fingers **66.** Cross grooves **70** are provided in the bottom edge of the fingers **66** at about the inner corner of the groove **68.** The forward wall of body member **10** has openings **74,** one of which is shown in FIG. **3,** aligned with each of the groove portions **68** so that floss from the two spools is capable of extending forwardly along the arms, as will now be described.

To load the tool with dental floss, a supply spool **26** is mounted on the shaft **28** and a free end of the dental floss **32** pulled out through the aligned opening **74** and along the groove **68** of arm **62** on that side. It is then passed down the front groove in the finger **66** of the one arm and then across the notches **70.** Thereupon, such end is brought up the groove **68** in the other finger **66** and along the groove **68** in the other arm **62.** Such free end is moved through opening **74** which is aligned with said other arm and then connected to the take-up spool **36.** Take-up spool **36** is rotated in the direction of arrow **76,** FIGS. **2** and **4,** by manual engagement of ratchet wheel **50** to tighten the dental floss.

The arrangement of the spools **26** and **36** is such that when spool **36** is rotated in the direction of arrow **76,** it will take up floss and spool **26** will rotate in the direction of arrow **78** to release floss. The pulley **42** is larger in diameter than pulley **44** and their drive relationship from the belt **46** will thus cause the floss to be taken up on spool **36** a little faster than it is released from supply spool **26.** This drive relationship exists throughout the entire range from full clean spool and empty soiled spool condition to empty clean spool and full soiled spool condition. Since the pulleys are of different diameter, some slippage of the belt thereon will occur. A round O-ring type pulley engageable with flat surface pulleys has been found to provide the desired connection between the drums and the necessary slippage. Thus, as the operator rotates the ratchet wheel **50,** the floss will tighten and remain stretched in a taut condition along the length of the arms and across the notches in fingers **70.** Belt **46** as stated above is preferably of an elastic material so that as the ratchet wheel is rotated to a new position with relation to its pawl, the belt will be stretched, and if the floss should stretch slightly when the operator is using the tool, the stored energy in the belt will automatically take up such slack in the floss. As stated, the spool **36** takes up floss fastener than the spool **26** releases it. The stress at which the belt will slip is preselected since it is desired that the floss be held tight but at the same time allowed to slip before it breaks.

In summary, the present tool provides a convenient means of holding dental floss and of manipulating the floss for cleaning interproximal areas between the teeth. When it is desired to present clean floss to the head **64,** it is merely necessary to rotate the ratchet wheel **50** only sufficiently to bring new floss into the suspended area between the fingers **66.** The used floss is isolated from the new floss by a partition **24.**

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A dental floss tooth cleaning tool comprising a hollow body member, a pair of projections supported on said body member in spaced relation, means on said projections for holding dental floss in suspended relation thereacross, said projections being spaced apart sufficiently from each other such that by manipulation of the tool dental floss suspended thereacross can be worked in an area between teeth for cleaning such area, a supply spool in said body member, a shaft in said body member mounting said supply spool for rotation, a take-up spool in said body member receiving floss from said supply spool which first extends from said supply spool across said projections, a shaft in said body member mounting said take-up spool for rotation, a pulley on each said shaft connected by a belt, the pulley on said supply spool shaft being larger than the pulley on said take-up spool shaft so that said take-up spool will automatically take up floss faster than it is released from said supply spool to cause said floss between the spools to be stretched tight, said belt having a slippage connection on said pulleys at a selected tension of the dental floss to allow for any difference in rate of take-up or release and being elastic to store energy resulting from the greater rate of take-up by said take-up spool to automatically maintain the dental floss taut across said projections.

2. The dental floss cleaning tool of claim **1** including a ratchet wheel operably connected to one of said supply and take-up spools for advancing the dental floss across said projections, a portion of said ratchet wheel projecting from said body member to provide ready manipulation thereof by the operator.

3. The dental floss cleaning tool of claim **1** wherein said body member includes a pair of compartments one for each of said supply and take-up spools whereby to isolate one spool from the other.

4. The dental floss cleaning tool of claim 1 wherein said body member includes a pair of compartments one for each of said supply and take-up spools whereby to isolate one spool from the other, said projections each having a groove therein for receiving the dental floss to prevent contact of the floss by the user's hands or mouth except in the area where it is suspended across the projections.

5. The dental floss cleaning tool of claim 1 wherein said body member includes a pair of compartments one for each of said supply and take-up spools whereby to isolate one spool from the other, said spools being arranged for axial removal from said shafts for replacement, and a cover on said body member arranged to be opened for access to said spools.

* * * * *