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Remarks:
Claim 16 is deemed to be abandoned due to non-payment of the claims fee (Rule 45(3) EPC).

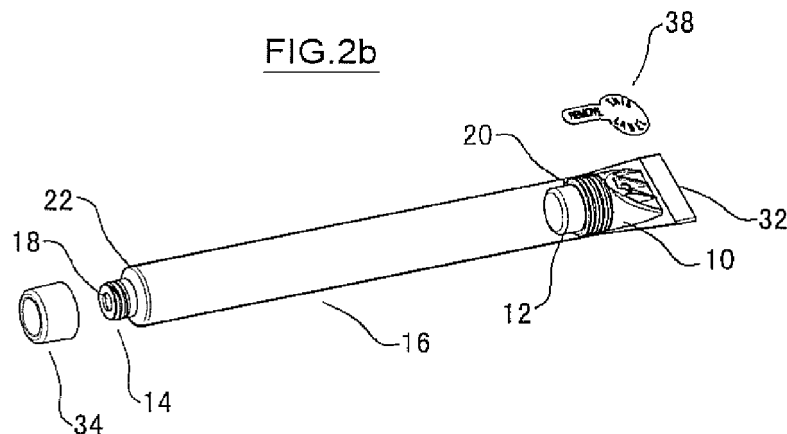
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(54) **Pinch tube with internal piston dispensing extractor**

(57) A viscous liquid dispensing device for a tubular reservoir includes an internal piston wedge having a head dimensioned to seat within the orifice of a dispensing

nozzle as the piston wedge is moved forwardly from a sealed closure end of the reservoir towards the dispensing nozzle by a pinching action of the thumb and index finger upon a tail of the piston wedge.

FIG.2b



Description**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] NONE

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Research and development of this invention and Application have not been federally sponsored, and no rights are given under any Federal program.

REFERENCE TO A MICROFICHE APPENDIX

[0003] NOT APPLICABLE

BACKGROUND OF THE INVENTION**FIELD OF THE INVENTION**

[0004] This invention relates to disposable viscous liquid dispensing devices and, more particularly, to a new and improved device for extracting such viscous liquids as flowable candy or confectionery products, medicinal preparations and toothpaste from tubular reservoir containers.

DESCRIPTION OF THE RELATED ART

[0005] As is well known, flexible plastic tubes have been used for many years as a reservoir container for a wide variety of viscous liquid products. As is also well known, such containers have proven popular primarily because of their convenience and cost as compared with other types of packaging possibilities. While improvements have been made over the years to these containers, for the most part, the tubes employed have remained substantially the same. One concern that subsists, however, is the amount of product/content that remains at the time of discarding the container -- oftentimes as much as twenty percent of its initial filling. A second concern is the recycling issues associated with the premature container discarding, which affects the environment.

[0006] Several attempts have been made to improve the problems associated with the wasted product/content remaining in the tube. Most focus on "add-on" type devices -- in the form of "tube squeezers" or "keys" to assist in the removal of the product/content. Such "add-ons" obviously increase manufacturing costs.

[0007] Common to these "tube squeezers" or "keys" are their attachment and utilization externally, from outside the tube. Essentially, the idea is to flatten the tube by sliding or rolling up the "add-on" as far toward the nozzle opening of the tube as it can go. Unfortunately, however, such "add-ons" stop working before reaching the shoulder of the nozzle because the shape and rigidity of the tube's shoulder limits movement beyond the

shoulder to the nozzle opening and, thus, the ability of the tube to completely flatten. A good percentage of the product/content then remains inside the tube at its discarding.

5 [0008] The suggested dome-shaped tube squeezer type of "add-on" will be understood to be pushed along the length of the tube from its sealed end towards the semi-rigid shoulder and nozzle. Typically, the maximum sliding range is only some 80-85% the length of the tube, besides being unable to flatten the spacing along its side edges. The alternatively utilized key-shaped squeezer "add-on" inserted over the sealed end of the tube and wound and rolled in an upwards fashion suffers the same problems as it approaches the rigid shoulder adjacent the nozzle's opening. Additionally, it exhibits the further disadvantages of frequently being lost, being unwieldy in use, and being unsightly in appearance due to the key's outward projection from the tube itself. The premature discarding of the tube container thus continues, and contributes to a greater accumulation of non-reusable trash.

OBJECTS OF THE INVENTION

25 [0009] It is an object of the present invention, therefore, to provide a new and improved manner of extracting viscous liquids from their reservoir container tube enclosures.

30 [0010] It is another object of the invention to provide a viscous liquid dispensing container which allows for the extraction of its product/content leaving as little residue as possible.

35 [0011] It is an object of the present invention, also, to provide a viscous liquid dispensing device whose appearance in no ways detracts from that of a plastic tube reservoir in which the viscous liquid is contained.

SUMMARY OF THE INVENTION

40 [0012] The present invention offers a new tube system employing an internal device to extract the product and reduce the amount of its contents otherwise left inside of the tube, as contrasted with the external "add-ons", which define the prior art. As will be seen, an internal piston here operates as a "wedge", sliding up all the way from the sealed end of the tube beyond its nozzle's shoulder and to the nozzle opening. With the piston conforming in shape and dimension to the inside wall of the tube, with the piston being of a rigid fabrication and with the wall exhibiting an elasticity consistent with its being of a soft plastic manufacture, the wall of the tube offers a resiliency to stretch over the rigid piston. Once the piston is inserted into the tube in this manner, not only will the wall of the tube shrink back, but all areas of the piston will continue to press against the tube's inner wall. The tube's product content can then go nowhere, but forward, out through the nozzle's opening. And, with a viscous liquid product content, since it will act as a self lubricant for the piston, no additional lubrication would be

required for the sliding movement to dispense or extract the flowable candy, medicinal preparation, toothpaste, etc.

[0013] In a first aspect of the invention to be described, the piston wedge will be seen to be utilized with the standard type of tubular reservoir container commonly employed. In a second aspect of the invention, the piston wedge will be seen to be utilized in a new and different tubular reservoir container construction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and other features of the present invention will be more clearly understood from a consideration of the following description, taken in connection with the accompanying drawings, in which:

FIGURES 1a-1d are views helpful in an understanding of the piston-wedge constructed in accordance with the teachings of the invention;

FIGURES 2a-2d are views helpful in an understanding of the manner of inserting the piston-wedge of FIGURES 1a-1d into a cylindrical tubular reservoir-container system of the type used in conventional viscous liquid dispensing arrangements, in accordance with a first aspect of the invention;

FIGURES 3a-3f are illustrative views of system components helpful in an understanding of the piston extracting concept in accordance with the second aspect of the invention; and

FIGURES 4a-4f are assembly views helpful in an understanding of the interrelationship between the component parts of FIGURE 3a-3f, the piston-wedge of FIGURES 1a-1d and the optional airway hole cover-up labelling of FIGURES 2a and 2b in providing a leak-resistant dispensing system according to the second aspect of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] The piston-wedge (or simply "piston"), constructed in accordance with the conventional cylindrical tube of FIGURES 2a-2d and with the alternative cylindrical tube configuration of FIGURES 4a-4f, is shown by reference numeral 10 in FIGURE 1a-1d. A head of the piston is shown at 12, and its size and shape conform with the diameter of the tube's nozzle orifice opening (shown at 18 in FIGURE 2b). Such correspondence will allow all or most of the product/content of the tube 16 to be pushed by the piston out from the tube's nozzle 14 once inserted into the tube and moved forwardly along. A shoulder of the piston 10 is shown at 20 in FIGURE 1a, which bears against and is stopped by the semi-rigid shoulder of the tube shown at 22 in FIGURE 2b. Reference numeral 24 in FIGURE 1a identifies a series of rings (3 in FIGURE 1a) slightly larger in diameter than the inside diameter of the tube 16 of FIGURES 2a-2d, typically fabricated of a soft plastic. The rings 24 are what allows

the product content in the tube to only move forwardly and out the tube 16 through the nozzle orifice opening 18, and insures that virtually none of the product is left behind when pushing the piston forward by a pinching action. The first ring (the one closest to the head 12) pushes the product out of the orifice 18, possibly, however, leaving a small residual amount. The second ring serves as a back-up, and collects and pushes forward any residue that may have been left behind the first ring. The third ring (furthest from the head 12) operates the same way as the second ring to push forward any remaining residue. This dispenses or extracts all the product content confronted by the piston 10 in moving along internally of the tube. By having the rings 24 of larger diameter than the inside diameter of the tube, essentially no residue will collect at the inner wall of the tube.

[0016] Reference numeral 26 in FIGURE 1a identifies a plurality of tracks or channels (3 in number) which allows the piston 10 to have a reduced surface and contact area. Having these tracks or channels allows a user to pinch the piston its forward movement with less force or drag than would otherwise be the case. As the tracks or channels 26 reduce the amount of contact area with the inner wall of the tube 16, they additionally allow the piston 10 to be hollow, as shown at 28 in the sectional view of FIGURE 1c. The result is a saving in plastic in the manufacture of the piston 10, and in reducing its overall weight.

[0017] (In these respects, it will be understood that FIGURE 1a is a perspective top and front view of the piston 10, FIGURE 1b is a perspective front view of the piston, and FIGURE 1c is a perspective front sectional view of the piston.)

[0018] Consistent with this, FIGURE 1d represents a side view of the piston 10. By having its tail end 30 "dome-shaped", the piston is allowed to move forwardly along the tube 16 towards the nozzle 14 in an easy manner. Such "dome-shape" also conforms to the bottom end 32 of the tube 16 after it is sealed (FIGURE 2b). This configuration allows the piston 10 to fit at insertion as far down the tube as possible, with the shape of the tail end 30 additionally serving to conform to a user's thumb and index finger for a pinching motion to follow. As such, a pinching by the thumb and index finger allows the piston 10 to move along the tube 16 in this "pinch tube system" of utilization. (Reference numeral 34 in FIGURE 2a identifies the standard screw on cap for the reservoir container tube 16.)

[0019] In a preferred manner of this construction, the material of choice for the piston 10 is High Density Polyethylene (HDPE), whose properties allow the piston to be rigid. While attractive for its smooth non-stick type surface so as to allow the piston to glide easily along the tube length, other resins might alternatively be employed – e.g. Polyethylene (PE), Low Density Polyethylene (LDPE), Linear Low Density Polyethylene (LLDPE), Polypropylene (PP), and Nylon. However, use of such materials will be appreciated to possibly increase the

pinch force for movement slightly, but would still function in a satisfactory manner. Therefore, having a piston of a rigidity, yet of a material manufacture of reduced friction, is preferable for use in order to be glided forwardly easily and smoothly, with little grab. (As will also be appreciated, such piston would not generally require any added lubrication to function in a gliding manner with a viscous liquid product content, as the product/content in the tube itself would act as a self-lubricant when contacting the first of the rings 24, i.e., the one closest to the head 12.)

[0020] The manner of utilizing the piston wedge of FIGURES 1a-1d with a commonly used type of soft plastic reservoir/container tube can best be understood from FIGURES 2a-2d. In the exploded view of FIGURE 2a, reference numeral 10 identifies the piston and reference numeral 16 identifies a soft plastic tube container -- preferably made from Polyethylene (PE). Reference numeral 36 identifies an optional airway hole to permit airflow to the tube 16 after the piston 10 is pinched upwards and forwardly. Without such airway hole, the tube 16 behind the piston 10 would tend to flatten during the pinching in dispensing the product/content and somewhat hinder the gliding movement. A label 38 is shown to cover-up the airway hole 36 intended to keep the system sealed off during transportation and storage, but removed when the dispensing or extraction is to take place.

[0021] In FIGURE 2b, the piston 10 is inserted and pushed in from the bottom opening of the tube 32. The piston head 12 (FIGURE 1a) is selected of the same diameter as the nozzle opening 18 and the shoulder of the piston 20 conforms in size and shape to the semi-rigid shoulder of the nozzle 22. The bottom end of the tube 32 is sealed closed after the piston 10 is inserted in the tube 16. The cap 34 couples with the screw threads 40 of the nozzle 14.

[0022] In the sectional and magnified view of the pinch-piston, tube system of FIGURE 2c, the piston 10 is pushed forward as far as it will go, as at 42. As more clearly shown in the magnified sectional view of the assembly in FIGURE 2d, the shoulder of the piston 20 bears up against the shoulder of the tube 22, and the head of the piston 12 extends through the nozzle orifice opening 18 at 46. Reference numeral 44 identifies a view of the sectioned tube 16, and the screw-on cap 34 assembles them to the nozzle 14 at 48. The head of the piston 12 meets up with an inner sealing ring 50 of the cap 34, leaving the only possibility of remaining product/content to be in and around the cavity of the sealing ring.

[0023] As shown in FIGURES 2c and 2d, the piston 10 reaches all the way to the nozzle opening 18, leaving no space in the tube for product/content to remain.

[0024] Product/content may be added to the tube system of this aspect of the invention in one of two ways: a) the piston 10 is pushed into the open bottom end of the tube 32, the bottom end is sealed, the viscous liquid product is added to the tube 16 from the nozzle opening 18 and the cap 34 is screwed onto the nozzle 14; or b) the cap 34 is screwed onto the nozzle 14, the viscous liquid

product is filled from the open bottom end of the tube 32, the piston 10 is pushed into the tube 16 through the bottom end 32, and the bottom end 32 is then sealed. In either event, the shape of the sealed bottom end of the tube and of the tail end of the piston 30 conform to one another. Once the bottom end 32 is sealed and the cap 34 is in place, the piston 10 then becomes a part of the tube, and cannot be removed unless the user intentionally cuts open the tube with a sharp object such as a knife or scissor. In this manner a pinched-piston, tube system is provided.

[0025] To add to the dispensing-extracting advantages offered through the use of the internal piston wedge of FIGURES 1a-1d, a second aspect of the present invention employs a new and different reservoir/container dispensing tube. Component parts utilized in the construction of this tube are shown in FIGURES 3a-3f. FIGURES 3a, 3b and 3c respectively show a perspective top view, a sectioned top view and a perspective bottom view of a snap ring fitting 60. FIGURES 3d, 3e and 3f, correspondingly, show a perspective top view, a sectioned top view and a perspective bottom view of a flip cap closure fitting 62. A fastening ring of the snap ring 60 is shown at 64, is convex, and conforms with a fastening ring 66 of the flip cap closure 62 which is concave. An opening of the flip cap closure 62 is shown at 68, and receives a cap closure sealing ring 70, which snaps into it. A living hinge 72 joins the top of the flip cap closure 62 (i.e., the right portion of FIGURE 3d) with the base of the flip cap closure 62 (i.e., the left portion of FIGURE 3d) while a pull tab 74 serves to open the flip cap closure 62 after the sealing ring 70 snaps into the opening 68. Reference numeral 76 in the sectioned top view of FIGURE 3e identifies a closure channel to position the tube of this aspect of the invention to accept the final assembly of the flip cap closure 62, the tube, and the snap ring 60 together. Such assembly is illustrated more specifically with reference to the various views of FIGURES 4a-4f.

[0026] Referring to FIGURE 4a, the piston 10 of FIGURES 1a-1d is shown at 82, a shoulder-less, nozzle-less, different type of cylindrical tube 80 is shown as having an open bottom end 84, an open top end 86, an optional airway hole 88 and an optional airway hole cover-up label 90 (similar to the airway hole 36, and cover-up label 38 of FIGURES 2a and 2b). FIGURE 4a also shows the snap ring 60 of FIGURES 3a-3c and the flip cap closure 62 of FIGURES 3d-3f. Once the tube 80 is filled with its viscous liquid product content, either through the open bottom end 84 or the open top end 86, the piston 82 is inserted through the open bottom end 84 and the open bottom end is then sealed.

[0027] FIGURE 4b illustrates the piston 82 inserted inside the tube 80, with the snap ring 60 being placed externally over the tube 80 and moved approximately one third of the way down from its open top end 86 towards its now sealed bottom end 84. The optional airway hole label 90 is applied to cover the optional airway hole 88.

[0028] In FIGURE 4c, the flip top closure 62 is pushed

into the open top end 86 of the tube 80 -- followed by the snap ring 60 being moved up from its one-third position to fasten together with the flip top closure 62 as in FIGURE 4d. As with the aspect of the invention shown in FIGURES 1a-1d and 2a-2d, the tube 80 is fabricated of a soft plastic (preferably Polyethylene) while the piston 80 is fabricated of a smooth, non-sticking, rigid plastic (preferably High Density Polyethylene).

[0029] FIGURES 4e and 4f illustrate a sectional view of the assembly with the piston 82, the tube 80, the snap ring 60 and the flip top closure 62 in position after the piston 82 is pinched up from the sealed bottom end of the tube. With this construction, the head of the piston 12 reaches all the way to the top of the flip cap closure 62, which together with the slightly larger diameter rings of the piston, allows for only a fractional amount of product/content to remain in the closed-off tube.

[0030] FIGURE 4f illustrates a magnified sectional view of this, and shows at 94 the top of the tube's wall sandwiched between the snap ring's fastening ring 64 and the flip top closure's fastening ring 66 in forming a tight fit with the tube 80 in acting as a sealing gasket between the snap ring 60 and the flip cap closure 62. Additionally, at the area of the two fastening rings 64 and 66, the wall of the tube 80 conforms to the contour of the fastening rings 64 and 66 so as not to allow the possibility of leakage. This also serves to strengthen the bond between the parts, making them virtually undetachable. A leak resistant and non-removable assembly results, along with the further advantage of eliminating any use of adhesives, welding, heat sealing or other means to attach the components together as exist with the standard, conventional type of tubular reservoir container construction. A savings of manufacturing cost and time thus results as well.

[0031] FIGURE 4f, furthermore, illustrates the end of the tube 96 fitting into the channel 98 of the snap ring fitting 60 (FIGURE 3c), the snap ring 60 assembled with the tube 80 and the flip cap closure fitting 62, and the pushing and fitting together of the top end of the tube 86 with the channel of the cap closure 76 (FIGURE 3e). A new tube and closure system thus results, with the internal dispensing, extracting piston wedge glided forwardly by the thumb and index finger pinching action to drive substantially the entire viscous liquid product content out the tube.

[0032] As with the embodiment of the first aspect of the invention described with respect to FIGURES 2a-2d, the viscous liquid product content could be added to the tube through an open bottom end before the piston is inserted and the open bottom end then sealed, or through an open top end after the piston is inserted and the bottom end sealed. The piston head 12 is of a length to extend through the closure cap opening 68 once its shoulder 20 contacts the bottom edge of the cap, at 100.

[0033] While there have been described what are considered to be preferred embodiments of the present invention, it will be readily appreciated by that modifications

can be made by those skilled in the art without departing from the scope of the teachings herein. For example, while the preferred construction of the piston drive of the invention is shown as being cylindrical in shape, the piston can be fabricated in other shapes as well -- such as oblong, oval, triangular, squarewhatever is needed to conform to the internal sectional arrangement of the tube employed, and to the tube opening. Additionally, other types of internal closure fitting, snap ring combinations may be employed, again depending upon the cross-sectional configuration of the tube utilized with the internal drive system and upon the opening configuration. And, likewise, the convex-concave relationship between the snap-ring fitting and flip cap closure fitting rings 64 and 66 can be reversed, and the fastening between them still be the same. For at least such reasons, therefore, -- and whether one considers the pinch tube internal piston construction of FIGURES 1a-1d and FIGURES 2a-2d, or the sandwich-type tube, snap ring/closure cap arrangement of FIGURES 3a-3f and 4a-4f -- resort should be had to the claims appended hereto for a true understanding of the scope of the invention.

Claims

1. A viscous liquid dispensing device comprising:

a tubular reservoir adapted to contain a viscous liquid having a sealed closure at a first end, a nozzle at a second end with a first shoulder and an orifice for dispensing viscous liquid from the reservoir, and an openable cap for said nozzle; a piston wedge within the reservoir adjacent said first end having a body and a head of predetermined dimension and size extending forwardly from a second shoulder; with the head of the piston wedge being of a dimension and size to seat substantially within the nozzle orifice when said piston wedge is moved from said first end of said reservoir towards said second end of said reservoir; and with the piston wedge being of a rigid plastic fabrication and with the tubular reservoir being of a soft plastic fabrication.

2. The viscous liquid dispensing device of Claim 1, also including at least one ring about the body of said piston wedge of a shape conforming to the internal cross-section of said tubular reservoir, and of a size slightly larger thereof.

3. The viscous liquid dispensing device of Claim 2, including 3 spaced-apart rings about the body of said piston wedge, each of conforming shape to the internal cross-section of said tubular reservoir, and each of equal, slightly larger size thereof.

4. The viscous liquid dispensing device of Claim 1, with the piston wedge having a tail conforming in shape to the closure at said first end of said tubular reservoir.
5. The viscous liquid dispensing device of Claim 4, with the tail of said piston wedge including at least one channel of reduced surface and contact area extending forwardly of said tail.
6. The viscous liquid dispensing device of Claim 5, including 3 spaced-apart channels extending forwardly of said tail.
7. The viscous liquid dispensing device of Claim 3, also including an airway hole on a wall surface of said tubular reservoir.
8. The viscous liquid dispensing device of Claim 7, additionally including a cover-up label for opening and closing said airway hole.
9. The viscous liquid dispensing device of Claim 1 wherein the head of said piston wedge is of a length to extend forwardly from said second shoulder through said nozzle orifice when said piston wedge is moved from said first end forwardly to bear said second shoulder of said piston wedge against said first shoulder of said nozzle.
10. The viscous liquid dispensing device of Claim 9 wherein said piston wedge is fabricated of High Density Polyethylene and wherein said tubular reservoir is fabricated of Polyethylene.
11. The viscous liquid dispensing device of Claim 10, also including one of a flowable candy or confectionery product, medicinal preparation or toothpaste within the tubular reservoir between the head of the piston wedge and the shoulder of the nozzle.
12. In a viscous liquid dispensing device, the improvement comprising:
 - a cylindrical tubular reservoir adapted to contain a viscous liquid having a sealed closure at a first end, a nozzle at a second end with a first shoulder and an orifice for dispensing viscous liquid from the reservoir, and an openable cap for said nozzle;
 - a piston wedge within the reservoir adjacent said first end having a body and a head of circular cross-section and size extending forwardly from a second shoulder;
 - with the head of the piston wedge seating substantially within the nozzle orifice when said piston wedge is moved from said first end of said reservoir towards said second end of said res-
- ervoir; and
- with the piston wedge being of a rigid plastic fabrication and with the cylindrical tubular reservoir being of a soft plastic fabrication.
13. The viscous liquid dispensing device of Claim 11, also including at least one ring encircling the body of said piston wedge of a shape conforming to the internal cross-section of said cylindrical tubular reservoir, and of a diameter slightly larger thereof.
14. The viscous liquid dispensing device of Claim 12, including 3 spaced-apart rings encircling the body of said piston wedge each of which is of a shape conforming to the internal cross-section of said cylindrical tubular reservoir, and each of equal, slightly larger diameter than that of said reservoir.
15. In a viscous liquid dispensing device having a cylindrical tubular reservoir adapted to contain a viscous liquid having a sealed closure at a first end; a nozzle at a second end with a first shoulder and an orifice dispensing the viscous liquid out the reservoir, and an openable cap for said nozzle, the improvement comprising positioning a piston wedge internally within said reservoir with a head dimensioned to seat within the orifice of the reservoir as the piston wedge is moved forward from the sealed closure by the pinching of a tail of the piston wedge until a rigid shoulder of the piston wedge bears against a semi-rigid shoulder of the nozzle within the reservoir.
16. The improvement of Claim 11 for a cylindrical tubular reservoir of soft plastic fabrication, including a plurality of rings encircling a piston wedge of rigid plastic fabrication of slightly larger diameter than the internal diameter of the cylindrical tubular reservoir so that the resilience of the soft plastic reservoir allows the plurality of rings to extend internally to the internal wall surfaces defining the shape of the reservoir.

FIG.1a

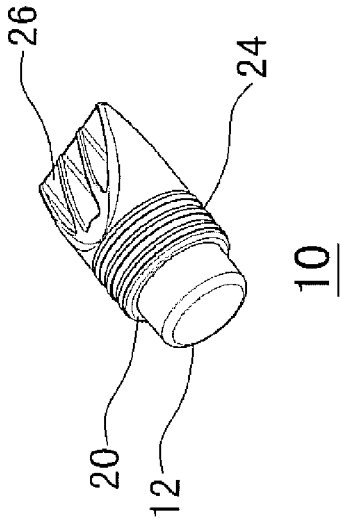


FIG.1b

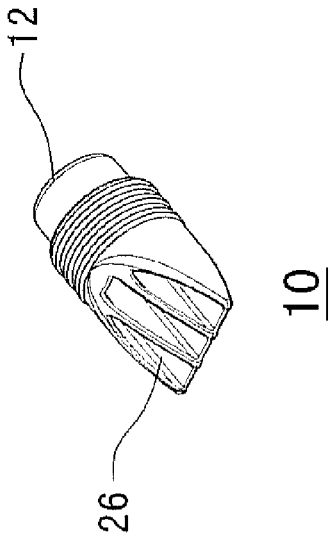


FIG.1c

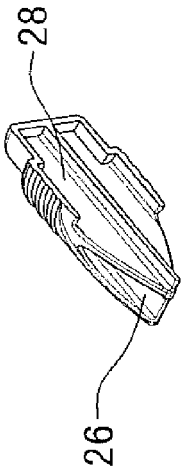
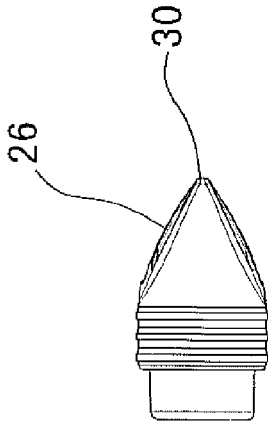


FIG.1d



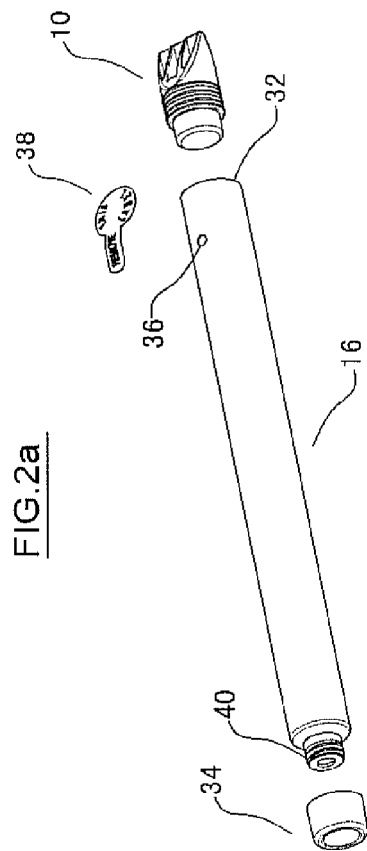
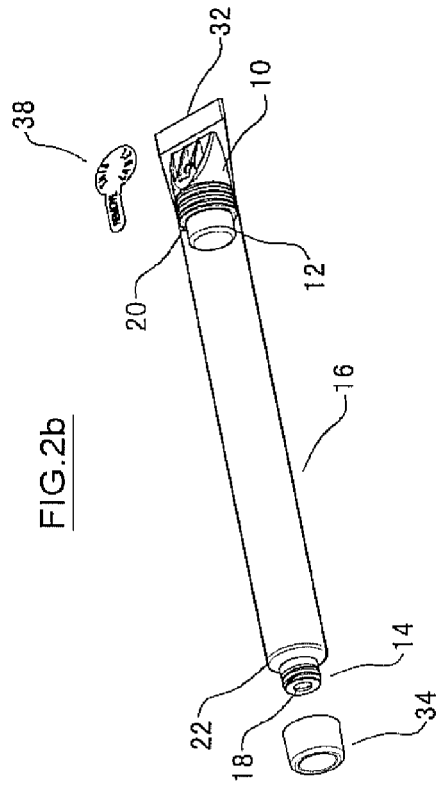


FIG.2d

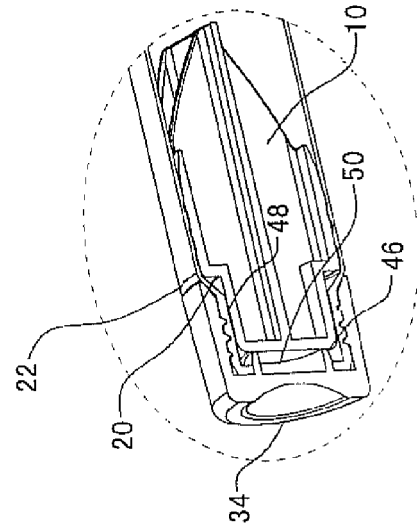


FIG.2c

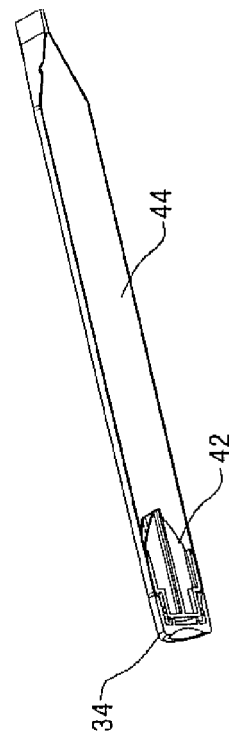


FIG.3a

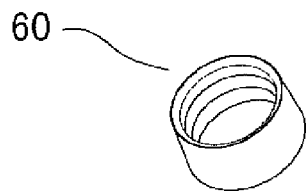


FIG.3d

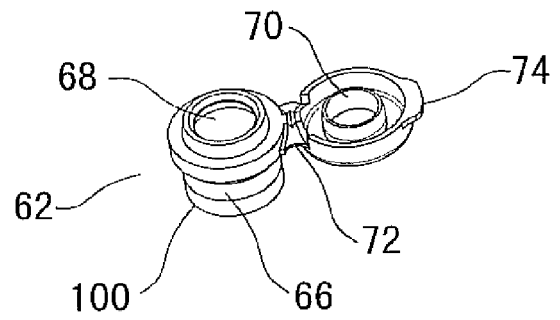


FIG.3b



FIG.3e

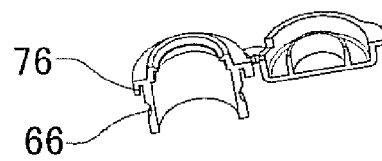


FIG.3c

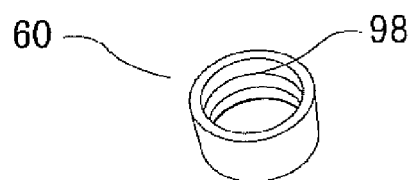
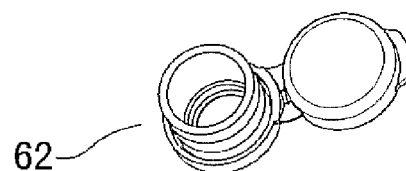
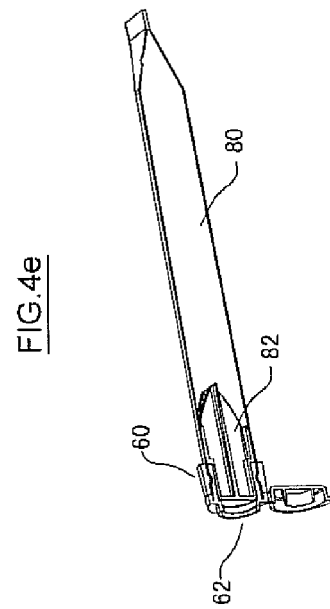
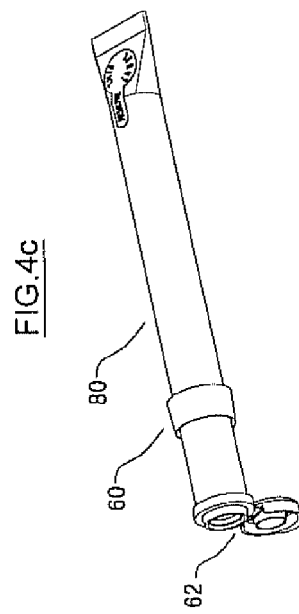
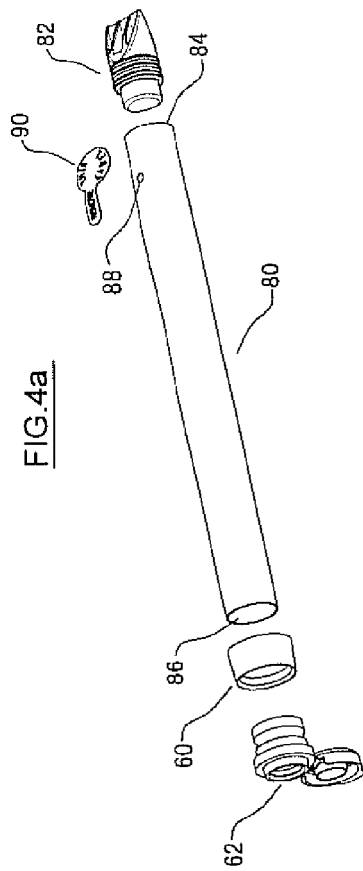
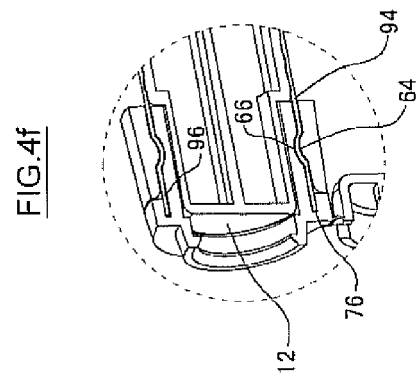
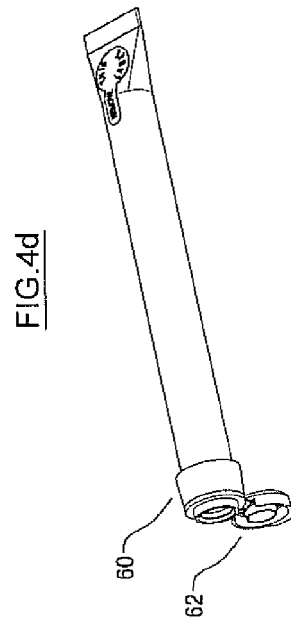
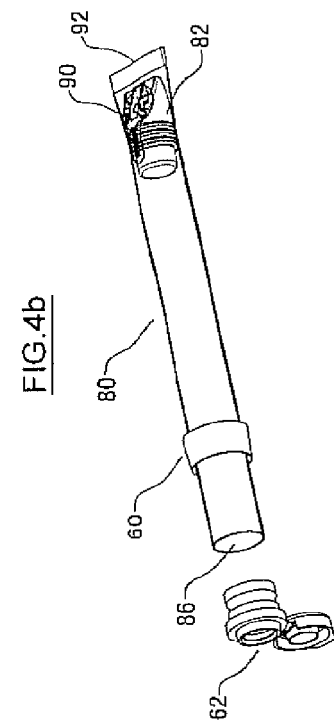


FIG.3f







EUROPEAN SEARCH REPORT

Application Number
EP 12 16 2955

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2004/039685 A1 (FERRARIN ENZO [IT]) 13 May 2004 (2004-05-13)	1,2,4,5,9-13,15	INV. B65D35/30
Y	* page 7, line 4 - line 9 *	3,14	
A	* figures *	6-8	

Y	GB 1 050 837 A (DUNCAN WARK) 7 December 1966 (1966-12-07)	3,14	
	* page 2, line 70 - line 74 *		
	* page 2, line 109 - line 112 *		
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