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3,473,698

TUBE WINDING DEVICE

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FIG. 1

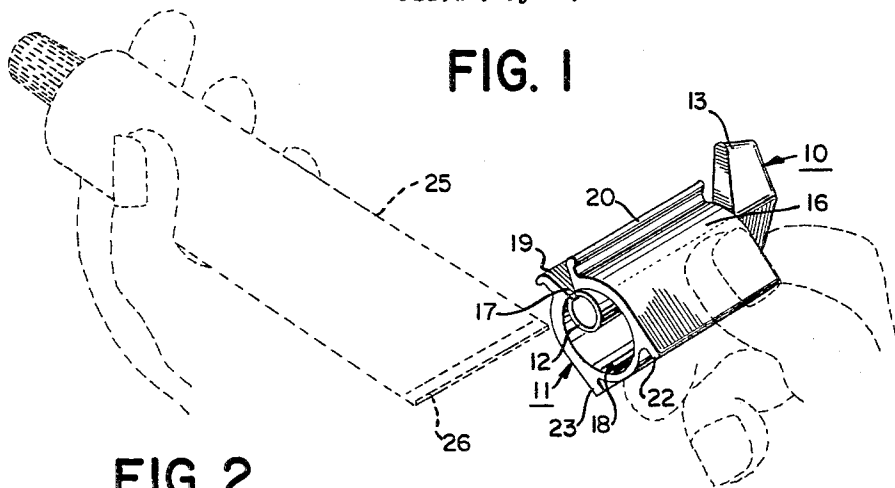


FIG. 2

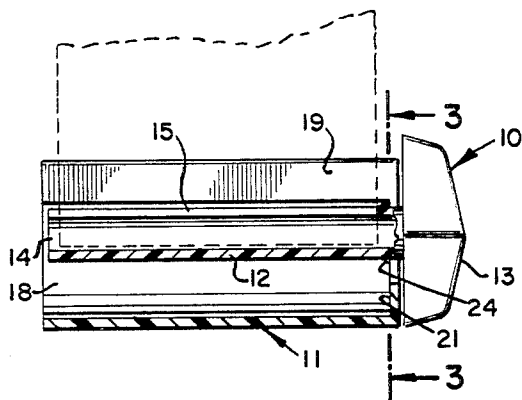


FIG. 3

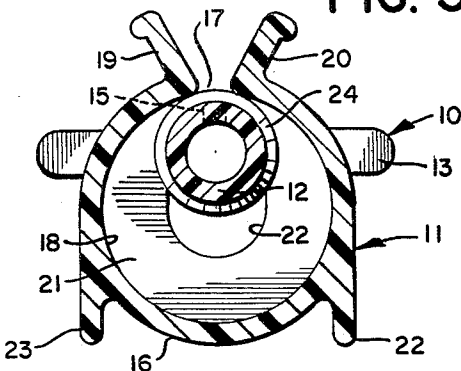


FIG. 4

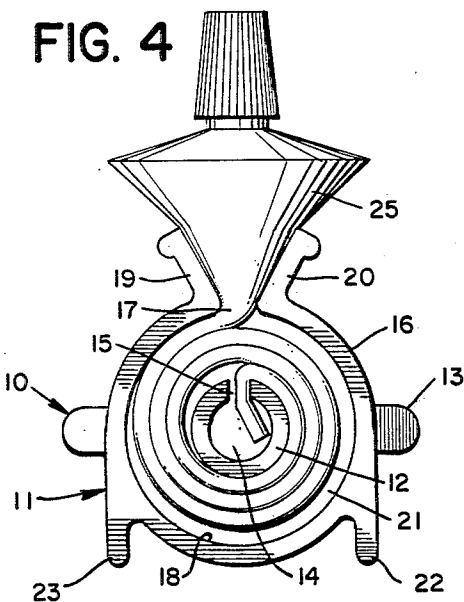
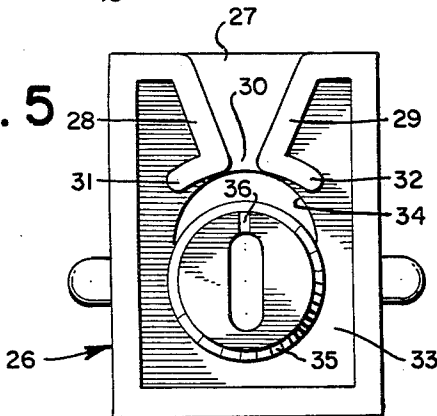


FIG. 5



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1

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TUBE WINDING DEVICE

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11 Claims

ABSTRACT OF THE DISCLOSURE

A collapsible tube contents expelling device having a winding key located within a housing containing a slot in its surface for insertion of a flexible tube. The winding key is movably mounted in the housing to allow it to be located adjacent to the slot in the housing during initial insertion of the tube. The winding key and the housing are both open at the same end to permit removal of the evacuated tube without unrolling of the tube.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to dispensing apparatus and more particularly to a dispensing device for extracting the contents of collapsible tubes.

Description of prior art

Collapsible tubes are generally incapable of being completely evacuated due to improper squeezing of the tube by the user and distortion of the tube as the contents are removed. A large quantity of material purchased by the consumer is retained within the tube after the user has attempted to manually evacuate the tube and cannot be removed without opening the tube in a manner not intended by the manufacturer. The opening of a tube by tearing or cutting results in a mess and eliminates further protection of the contents of the collapsible tube.

In the past there have been a number of devices known in the art for dispensing material from a collapsible tube. These devices, however, have inherently been defective and have been incapable of providing the necessary combination of desirable factors. Many dispensers have contained a rigid exterior cabinet to completely enclose the tube, so that although the tube becomes smaller in overall size as the contents are expelled, the cabinet size remains fixed, thereby reducing the amount of useable space in a medicine cabinet or other storage compartment. Other prior art devices have included complicated mechanical linkage systems which are prone to breakage and expensive to manufacture. Other of the prior art devices are incapable of reuseable applications and consequently are expensive.

SUMMARY OF THE INVENTION

The invention of the within application overcomes the above disadvantages and provides an inexpensive reuseable dispensing device of limited displacement and low manufacturing cost. The device of this application consists of two pieces. A hollow outer holder, which may be of any desired shape, is provided with a slotted aperture, open at one end, along one of its sides of sufficient width and length to receive a collapsed tube. One end of the holder is closed except for a slot designed to receive a roller element of circular cross-section which engages the end of the tube. Both the roller element and the holder can be removed from the tube without unwinding the compressed tube. The opposite end of the housing is open, thereby allowing the tube to be removed after complete dispensing of the contents without disassembly of the device.

2

DESCRIPTION OF THE DRAWINGS

The invention will be described in greater detail below and in the drawings in which:

FIGURE 1 is a perspective view showing a collapsible tube and the dispensing device;

FIGURE 2 is a partial cross-section of the dispensing device showing a collapsible tube inserted;

FIGURE 3 is a cross-section along line 3—3 of FIGURE 2;

FIGURE 4 is an end view from the open end of the dispensing device showing a collapsible tube completely rolled into the dispensing device; and

FIGURE 5 is an end view from the open end of a second embodiment of the invention.

DESCRIPTION OF THE PROPOSED EMBODIMENT

Referring to FIGURES 1, 2 and 3, the dispensing device consists of two elements; a winding element 10 and a holder 11. Both elements may be formed by injection molding or other suitable molding techniques from synthetic materials such as, for example, polypropylene, polystyrene, cellulose acetate, cellulose nitrate or various other compounds. Further, the device may be made of metal if so desired.

The winding element 10 consists of a roller shaft 12 of substantially circular cross-section having a handle 13 integrally attached at one end. Shaft 12 is hollow and is open at end 14. A U-shaped slot 15 is provided in the surface of the shaft and extends from near handle 13 to end 14 so that the end of a compressible tube placed in the slot can be slipped out of the open end.

The finger engaging handle 13 may be of any suitable configuration, including a pair of oppositely disposed finger engaging surfaces as shown in FIGURE 2.

As shown in FIGURES 1, 2 and 3, the holder 11 is of a generally hollow shape, including a substantially cylindrical outer surface 16. A slot 17 is provided in the surface 16 of holder 11 and is open at one end. The slot is of sufficient length so that the closed end of a compressible tube will fit in it. Slot 17 communicates with the bore 18 of the holder.

Affixed to the outer edges of slot 17 are two lips or flanges 19 and 20 which converge toward slot 17. The lips or flanges 19 and 20 serve the functions of compressing the tube being emptied as it passes through slot 17. In addition, the flanges prevent the tube from rupturing as it would if it were permitted to bend back and forth at the slot 17. Also, the flanges tend to straighten the tube, removing kinks and facilitating discharge of the tube. The flanges also tend to orient the tube with regard to the housing thereby permitting the entire unit to be stored vertically as will be explained below.

Holder 11 is further provided with a fixed end wall 21 at one end of the holder. End wall 21 is provided with a slot 22 which extends from a point near slot 17 to the middle of end wall 21. The opposite end of the holder is open or may be provided with a removable end wall (not shown) which can be used to prevent contaminants from entering, but which is capable of opening to remove a compressed tube. The removable end wall will also reinforce the strength of holder 11.

A pair of legs 22 and 23 support holder 11 so as to align slot 17 horizontally when the unit is placed on a flat surface. This will permit the unit with a flexible tube attached to be stored in a vertical position thereby reducing the amount of space necessary in a medicine cabinet.

Referring to FIGURES 2 and 3, shaft 12 is further provided with a projection 24 spaced from handle 13 by a distance corresponding to the thickness of end wall 21.

Projection 24 is resilient when force is applied from the direction of the handle to insert shaft 12 through the end wall, but tends to be non-resilient when force is applied in the opposite direction. The handle and shaft combination 13 and 12 is inserted through slot 22, so that projection 24 is on the inside surface of end wall 21. The projection 24 will fold or compress to pass through the slot and when inside will retain the winding element 10 in position.

Although a projection 24 is shown, an annular groove of a width slightly greater than the end wall 21 can be substituted in shaft 12. In this case the diameter of the shaft will be slightly larger than slot 22 so that upon insertion of the shaft, the end wall will bend inwardly and snap into the annular groove. The unit will then function in the same manner as with projection 24. It is seen in FIG. 2 that projection 24 serves to both act as a snap-in retaining means, as well as means for maintaining substantial perpendicularity between shaft 12 and end wall 21.

In operation, shaft 12 is rotated around its longitudinal axis and moved laterally in slot 22 until slot 15 is aligned in close proximity with slot 17. The collapsible tube used in connection with this device normally includes a soft deformable body 25 and a closed lower end 26 which is crimped or provided with a clip. The tube is engaged with the winding element 10 by inserting the end 26 through slot 17 into bore 18 until the tube end engages slot 15 in shaft 12. This results in the positioning of the tube body 25 within slot 17 so that subsequent rotation of the handle 13 results in compressing the tube to expel the contents thereof. When the tube has been completely exhausted it assumes the condition shown in FIGURE 4. The device may then be disengaged from the exhausted tube by sliding the exhausted tube out of the open end of the housing while in a rolled condition. After disengagement, the device may be reused. The device thereby has the advantage of being easily reused without requiring unrolling of the tube or disassembly of the device.

The provision of slot 22 in the end wall permits the engagement of the shaft with a completely full tube by placing the slot 15 in close proximity to the crimped end of the tube. Further, placement of slot 22 in its particularly advantageous location permits the entire tube to be rolled into the interior of the compressing element while allowing the winding element 10 to move toward the center of the housing as the tube is fully exhausted. Provision of a slot in the end wall therefor permits easy initial placement of the collapsible tube in the device and automatic compensation for the increased thickness of the winding element and evacuated tube as the tube is compressed.

A second embodiment of the invention is shown in FIGURE 5. The exterior housing 26 is formed generally in a box shape to facilitate printing of advertising material. An aperture 27 is provided in one wall of the box and extends the length of the housing. The aperture is open at one end and is of sufficient length to accommodate the width of a compressible tube.

A pair of compressing surfaces 28 and 29 are mounted interior of opening 27 and form a narrow passage 30 through which the compressed tube may pass. A pair of arc-shaped guide members 31 and 32 are disposed on the ends of surfaces 28 and 29 and assist in compressing the tube and aligning it on the tube winder 35.

Housing 26 is further provided with a single end wall 33. A slot 34 is formed in wall 33 to permit the winding element 35, which is of the same general configuration as the winding element of the first embodiment, to move either toward or away from slot 30. Winding element 35 is provided with a slot 36 which receives the crimped end of a collapsible tube. The slot 36 of the shaft is aligned with slot 30 during insertion of the tube so that the end of the uncompressed tube can be gripped by the winding device.

A second removable end wall (not shown) may be provided across the open end of the housing 26. The end wall will retain the unit in a sanitary condition but can be

removed when it is desired to remove the fully compressed tube. In addition, the removable end wall will provide dimensional stability while the unit is in use.

In operation, turning of the tube winder 35 with a tube in place will result in a progressive compression of the tube. The tube will be initially compressed by the tapered compressing surfaces 28 and 29, shown in FIG. 5. Continued turning of the tube winder will result in the portion of the tube which was initially compressed being forced to pass around and against either of the corners created by the surfaces of guide members 31 and 32, depending upon the direction of rotation of the tube winder 35. These surfaces of guide members 31 and 32 provide secondary compression means which further compress the initially compressed tube portions, as is readily seen in FIG. 4. FIG. 4 further discloses the fact that as the tube portions which have been evacuated, as just described, are wound upon the tube winder, these wound tube portions provide surfaces against which successive portions of the same tube are pressed against.

After compression of the tube and expulsion of the contents, the tube is removed from the device in the same manner as in the first embodiment. The tube is merely moved toward the open end of the device and slipped out of the two slots, i.e., slot 30 in the housing and slot 36 in the shaft. The device is then ready to receive a second tube of material to be dispensed.

It should be obvious from FIGS. 1-5 that both of the embodiments described above include the feature of the ability of tube winding elements 10 and 35 to be rotated either in the clockwise direction or counterclockwise direction. This enables the user to have a choice of directions in which he may turn the handle of this invention in dispensing the contents of a tube.

The device of this application is highly useful and provides a simple efficient device for expelling the contents of tubes without waste and with a minimum of effort on the part of the user. The device requires no more than ordinary skill to operate and may be manufactured at an extremely low cost. Due to the lack of necessity for metallic parts, the device is free from rust and corrosion throughout its useful life. Further, it can be easily cleaned to maintain a sanitary condition while in use. In addition, the device only requires two parts which are permanently joined thereby reducing the possibility of malfunction and increasing the life expectancy of the unit.

It is to be understood that the invention disclosed herein is merely one embodiment and that the scope of protection is that accorded by the accompanying claims.

What is claimed is:

1. Portable apparatus for use with collapsible flexible tubes which have open and closed ends, comprising a housing defining a bore therein and further including a wall disposed at one end of said bore, an end of said bore opposite said wall being open, a pair of relatively immovable spaced elongated first compression surfaces integral with and held rigid by said wall, said first compression surfaces extending at an angle with respect to one another, second compression surfaces communicating with said first compression surfaces, said second compression surfaces defining an elongated opening therebetween of a length sufficient to accommodate a collapsible flexible tube, said opening communicating with said bore, said opening extending along an axis which extends within a longitudinal plane of symmetry of a portion of said housing including said first compression surfaces, said plane of symmetry extending between said first compression surfaces, said wall being formed with a slot therethrough having a longitudinal axis extending within said plane of symmetry, a tube winding element comprising an elongated shaft portion ending through said slot and rotatable clockwise or counter-clockwise within said bore from a generally central position within said bore to a position substantially adjacent said second compression surfaces when said tube winding element is in an assembled position, said

5

shaft portion including holding means for releasably receiving the closed end of a tube, means at an external end of the shaft portion for rotating said shaft, and projection means cooperating with said shaft for enabling unremovable insertion of said shaft portion through said slot, said projection means further maintaining substantial perpendicularity of said shaft with respect to said wall during rotation of said shaft.

2. Portable apparatus according to claim 1, wherein said shaft portion within said bore is hollow throughout its length.

3. Portable apparatus according to claim 2, wherein said means for releasably receiving the closed end of a tube comprises a shaft slot formed by said shaft portion and communicating with the hollow thereof, said shaft slot extending substantially the length of said shaft portion within said bore.

4. Portable apparatus according to claim 3, wherein said shaft slot and the hollow of said shaft portion both extend to an end of said shaft portion opposite said rotating means.

5. Portable apparatus according to claim 1, wherein said projection means comprises a flange extending from said shaft portion at a distance from said rotating means the magnitude of which is slightly larger than the thickness of said wall.

6. Portable apparatus according to claim 1, wherein said rotating means comprises a handle.

7. Portable apparatus according to claim 1, wherein said first compression surfaces are disposed within said housing.

8. Portable apparatus according to claim 1, wherein said first compression surfaces are disposed outside said housing.

9. Portable apparatus according to claim 1, further comprising means for permitting said housing to stand upright when a tube is engaged therewith.

10. Portable apparatus for use with collapsible flexible tubes which have open and closed ends, comprising a housing defining a substantially cylindrical bore and further including a pair of rigid, relatively immovable spaced elongated flanges extending at an angle with respect to one another from said bore, said flanges being of a length sufficient to accommodate a collapsible flexible tube and including first compression surfaces extending at said angle with respect to one another, second compression surfaces forming a continuation of said first compression surfaces and defining generally rounded spaced edges which define a first opening in communication with said substantially cylindrical bore, a rigid wall integral with said flanges for holding the flanges in substantially fixed relationship with respect to one another, said wall extending substantially perpendicular with respect to and defining an end of said substantially cylindrical bore, said wall defining a

6

slot therethrough which extends along an axis extending within a longitudinal plane of symmetry of said housing which extends between said flanges; and a tube winding element adapted to be permanently snapped into and being cooperable with said housing, comprising an elongated hollow shaft extending within said bore when said tube winding element is in an assembled position and defining a longitudinally extending aperture through a surface thereof, said shaft extending through said slot and being laterally restrained by portions of said wall defining the slot, holding means for releasably engaging the closed end of a collapsible flexible tube when said tube winding element is in said assembled position, said holding means including shaft edges defining said aperture, said aperture extending to one end of said shaft, means disposed external of said wall when said tube winding element is in said assembled position and being integral with said shaft for rotating the shaft within said bore, projection means integral with said shaft for enabling assembly of said tube winding element into said assembly position and preventing removal of the tube winding element after assembly, said projection means including a projection of the shaft extending radially therefrom, said projection engaging interior surface portions of said wall when said tube winding element is in said assembled position, said projection means further maintaining perpendicularity of said shaft with respect to said wall during rotation of the shaft within said bore.

11. Portable apparatus according to claim 10, further comprising a collapsible flexible tube having an open end and a closed end, said tube extending in contact with said first and second compression surfaces through said first opening and in wrapped configuration around said shaft during use of said portable apparatus such that the closed end of said tube engages said holding means, said tube extending such that it is collapsed to a transverse dimension less than the magnitude of said first opening.

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