Feb. 5, 1935. W. R. SMITH ET AL 1,989,713

DISPENSING DEVICE

Filed Sept. 26, 1930 2 Sheets-Sheet 1

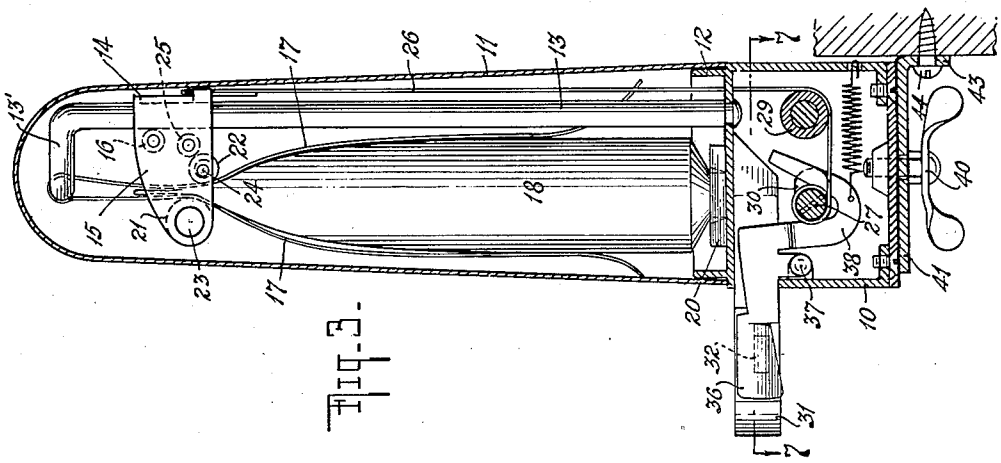


Fig. 3.

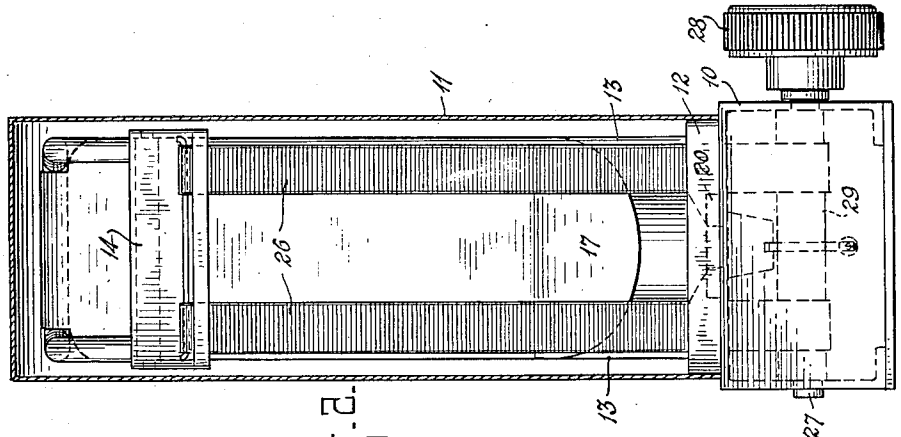


Fig. 2.

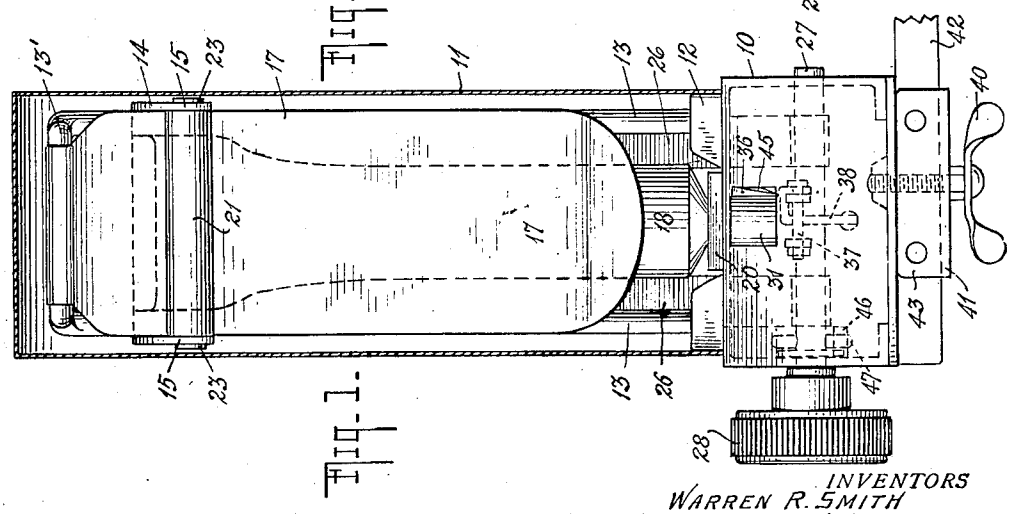


Fig. 1.

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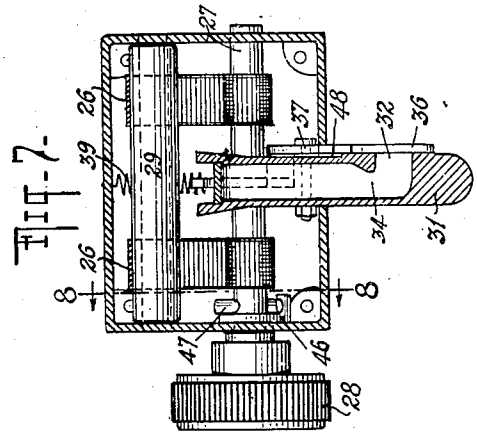


Fig. 7.

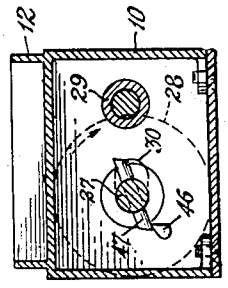


Fig. 8.

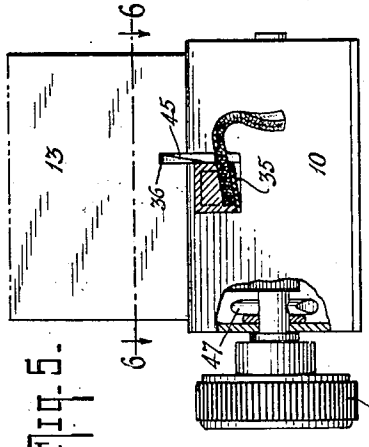


Fig. 5.

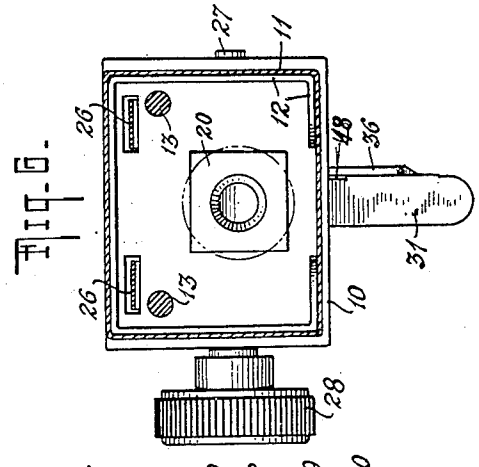


Fig. 6.

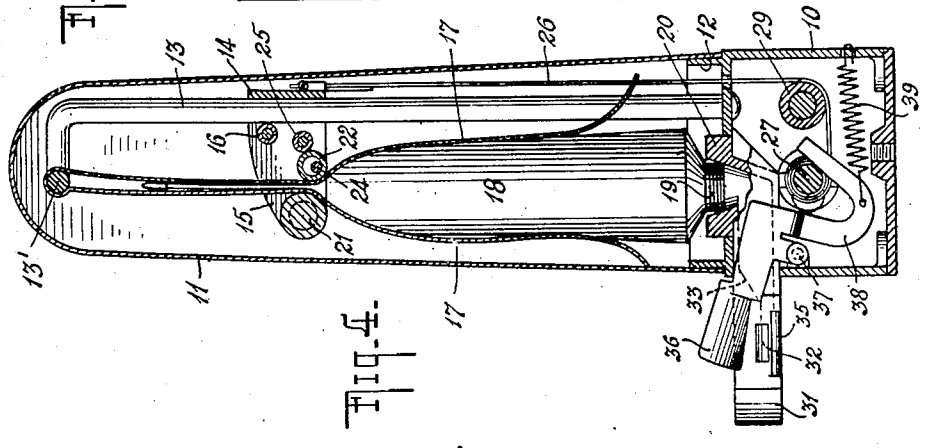


Fig. 4.

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UNITED STATES PATENT OFFICE

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DISPENSING DEVICE

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Application September 26, 1930, Serial No. 484,480

15 Claims. (Cl. 221—60)

Our invention relates to dispensing devices and more particularly to dispensing devices for pasty materials such as toothpaste, shaving cream, and the like, which appear upon the market in a tube formed of flexible or pliable material.

It is an object of the invention to provide a dispensing device of this character which is simple and compact in construction and neat in appearance, and is capable of being utilized in the home and also in public places, such as hotels, Pullman cars, etc. It is also an object of the invention to provide a dispensing device wherein all of the contents of a collapsible tube can be efficiently removed in a simple manner in any desired or requisite portions. It is a further object of the invention so to construct the discharge portion of the device that the same remains free of the material being dispensed so that danger of clogging is avoided. The present invention has also in view the provision of a device of the character indicated wherein a predetermined quantity of material can be discharged upon simple rotation of a knob in one direction. The invention also aims to provide a construction which can be employed with tubes of different sizes and of different manufacture.

More specifically, it is an object of the invention to provide a squeezing mechanism for the collapsible tube which is so constructed that it readily passes over the thickened bottom end portion of the tube and is also capable of thoroughly squeezing the remaining portion of the tube so as to cause no wastage of material; to provide a discharge nozzle for the pasty material which is so constructed that the material is caused to move in an upwardly inclined direction before it is cut off whereby curling of the rod or ribbon of material is prevented so that, in the case of toothpaste, it can be readily received upon a toothbrush and the quantity discharged be easily ascertainable; to provide a mechanism wherein the squeezing device for the collapsible tube and the cut-off knife at the discharge end of the device are both set into operation upon simple rotation of a knob; and so to arrange and construct the various parts forming our improved device that they may be contained within a small and well proportioned casing which is pleasing to the eye and can be easily mounted either upon a shelf or upon a wall bracket.

Other objects of the invention will appear from the following description and the features of novelty will be set forth in the appended claims.

A preferred embodiment of the invention is illustrated by way of example on the accompanying drawings wherein

Fig. 1 is a front elevation, partly in section, of a toothpaste dispensing device embodying the features of the invention; Fig. 2 is a rear elevation of the device, partly in section; Fig. 3 is a side view thereof in central section; Fig. 4 is a view similar to Fig. 3 but showing the parts in the operative, discharging position; Fig. 5 shows a front view, partly in section, of the discharge nozzle in the act of delivering a ribbon of tooth paste; Fig. 6 illustrates a horizontal section on the line 6—6 of Fig. 5; Fig. 7 shows a horizontal section through the nozzle and associated parts on the line 7—7 of Fig. 3; and Fig. 8 is a vertical section illustrating the stop mechanism for the operating shaft.

The improved device comprises a casing which is preferably formed of two sections 10 and 11, the section 11 being removably mounted upon the section 10 and frictionally engaging ribs or flanges 12 integral with, or welded or otherwise secured to the casing section 10. Two standards 13 are fixed upon the upper plate of the casing 10 and are connected at their upper ends by a forwardly extending bail 13'. The standards 13 serve to guide a slide 14 of U-shaped form and having arms 15, the front face of the standards 13 engaging a roller 16 carried upon a rod whose ends are fixed in the arms 15.

From the bail 13' there depend a pair of flexible or pliable plates 17, which may be made of thin sheet metal, such as brass, and may be integral with each other, the plates being preferably secured in any suitable manner, as by soldering, to the bail 13'. Between the plates 17 a tube 18 of toothpaste, shaving cream or other pasty material is designed to be positioned, the neck or nozzle 19 of the tube being wedged within a tapered opening in a boss 20 projecting above the top surface of the casing 10. This tapered opening is capable of receiving the necks of collapsible tubes of different sizes and forms a liquid tight and sanitary seal therewith.

The flexible plates 17 are urged against the collapsible tube 18 to squeeze the contents thereof towards the nozzle 19 by means of two rollers 21 and 22 which are mounted upon shafts 23 and 24, respectively, the ends of such shafts being journalled in the arms 15. The roller 21 is larger than the roller 22 and is mounted upon its shaft without play, while the bore in roller 22 is considerably larger than the external diameter of the shaft 24 for a purpose to be described hereinafter. The arms 15 of the slide 14 also have

journalled therein the shaft of a roller 25 which is arranged to be engaged by the roller 22 in the manner set forth hereinbelow.

The slide 14 is pulled downward to effect discharge of predetermined amounts of material from the tube 18 by means of the following mechanism: Two tapes 26 are connected at one end to the opposite ends of the slide 14 at the rear of the standards 13, (see Figs. 3 and 4) the other ends of the tapes being attached to a shaft 27, journalled in opposite walls of the casing 10. One end of the shaft extends exterior of the casing 10 and is provided with a knob 28. Before reaching the shaft 27 the tapes first pass under a guide roller 29 mounted in the sides of the casing 10. The openings in the side walls of the casing 10 within which the shaft 27 is received are elongated horizontally, as shown at 30, for a purpose to appear hereinafter.

The paste extruded from the tube 18 passes into a channel in a nozzle 31 which extends forwardly of the casing as shown in Figs. 3 to 7, and terminates into opening 32 at the side thereof. The channel preferably decreases in height toward the opening as shown at 33 (Fig. 4); there is also a horizontal constriction near the opening, as indicated at 34 (Fig. 7); so that the pressure upon the paste is directed along the axis of the opening 32 and as a result the paste flows out of such opening in a plane perpendicular to the plane on the paper as seen in Fig. 7. In order to prevent the ribbon or rod of material exuding from the opening 32 from curling underneath the nozzle 31, the bottom wall of the nozzle is bent upwardly at an angle of about ten degrees to the horizontal, as shown at 35 (Fig. 5).

The ribbon or rod of pasty material discharged by the nozzle 31 is cut off by a knife 36 which is pivoted at 37 within the casing 10, the knife having integral therewith a U-shaped portion 38, which is slightly offset from the plane of the knife, as best shown in Figs. 1 and 7. The portion 38 straddles the shaft 27 and has connected thereto a spring 39 which urges the knife 36 into the nozzle closing position shown in Fig. 3.

The device may be provided with any suitable means for mounting the same upon a wall or shelf or other support. In the example illustrated the bottom wall of the casing 10 is provided with a threaded opening designed to receive a thumb nut 40 which passes loosely through a clamping plate 41. The apparatus can thus be mounted upon a shelf 42 which is received between the bottom wall of the casing 10 and the clamping plate 41 (Fig. 4). The latter may be provided with an angular portion 43 having a hole therein for receiving screws 44 whereby the apparatus may be mounted upon a wall as shown in Fig. 3.

In the operation of the device the knob 28 is rotated in a clockwise direction, as viewed in Fig. 8. The shaft 27 is thus rotated for an angular distance until the rollers 21 and 22 engage the thicker portion the the tube 18. Thereupon the resistance to the movement of the slide 14 becomes sufficiently great to cause the shaft 27 to move rearwardly in its elongated bearing slots 30 until it reaches the position shown in Fig. 4. During this movement the shaft 27 urges the free arm of the U-shaped portion 38 rearwardly, thereby oscillating the knife 36 to raised position against the action of the spring 39. As the knob 28 continues to be rotated the tapes 26 are rolled up on shaft 27 and the slide 14 moves downwardly, the paste simultaneously being discharged through the opening 32 in an upwardly directed stream as shown in Fig. 5; when the desired quantity of paste has been discharged upon the tooth-brush or other paste-receiving object the knob is released, whereupon the tension in the tapes 26 is relieved and the U-shaped end of the knife 36 returned to its raised position by the spring 39. Simultaneously the shaft 27 is moved into the forward end of the bearing slots 30 and the knife 36 is lowered across the opening 32 thereby cutting off the strip of exuded material. The knife 36 is preferably beveled as indicated at 45 this bevel contributes, together with the upward inclination 35 of the bottom wall of the nozzle at the discharge opening, toward producing a clean cut so that no material sticks to the knife or to the nozzle. Due to the fact that the paste is extruded in an upwardly directed stream, it flows a considerable distance away from the nozzle before it tends to curl backwards. By receiving the paste upon a tooth-brush or other object as it flows out of the nozzle the operator can prevent the paste from coming into contact with the bottom of the nozzle and the latter is thus kept clean and sanitary. As the tube 18 is held in a vertical position the liquid therein, and particularly any oil present, tends to flow toward the nozzle and keep the material there in a soft condition, so that no hardening occurs at the nozzle outlet even should the device be unused for considerable periods of time.

To prevent the shaft 27 from being rotated in the wrong direction, i. e. in the direction in which the tapes 26 are unwound from the shaft, I provide a fixed stop 46 (Fig. 8) extending from the inner wall of the casing 10, which stop is engaged by a pin 47 fixed to the shaft 27. The action of the squeeze rollers 21 and 22 is such that the tube 18 is squeezed or collapsed by a wiping action which produces complete collapse of the tube and thus avoids wastage of material. This peculiar wiping action is due to the fact that the roller 22, that is, the shell thereof which has free movement with respect to its shaft, is smaller than the roller 21 and is so mounted that it exerts pressure on the tube in advance of the roller 21; the roller 22 thus tends to bend the tube toward or wipe the tube around the other roller. By this action the amount of pressure necessary to extrude the material from the tube is reduced and the danger of bursting of the tube eliminated. As shown in the drawings the external diameter of roller 22 is approximately half that of roller 21. The roller 25 tends to urge the roller 22 toward the tube as the slide 14 is lowered and prevents its assuming an ineffective position.

If desired, the nozzle may be so formed as to provide a free space 48 (Figs. 6 and 7) between it and the knife, through which space liquid and other matter traveling past the knife may escape and thus be prevented from entering the casing 10.

It will be noted that upon operation of the knob, the shaft 27 first moves rearwardly and effects raising of the knife before any considerable pressure has been exerted on the tube. This arrangement insures that the discharge opening will be exposed before pressure is applied to the tube, as otherwise the tube may be ruptured.

To replace the tube, the casing 11 is removed and the knob pushed rearwardly to cause the pin to clear the stop, whereupon the slide may be pulled upwardly and the exhausted tube removed.

We claim:

1. In a dispensing device for collapsible tubes, the combination of a slide, guiding means for said slide, an operating shaft, flexible means con-

nected to said slide and to said shaft, a pair of pressure rollers on said slide adapted to receive a collapsible tube therebetween, one of said rollers comprising a shell of smaller diameter than the other roller, and a shaft of considerably smaller external diameter than the internal diameter of the shell, the rollers being so mounted that during the compression of a tube their common tangent at the bottom thereof is substantially perpendicular to the axis of the tube, and a roller positioned adjacent to said smaller roller and operative to urge the shell of the latter toward the tube during the movement of the slide.

2. In a dispensing device for collapsible tubes, means for compressing a collapsible tube comprising a movable support, a pair of pressure rollers mounted on said support and positioned to receive such tube therebetween, one of said rollers comprising a shell of smaller diameter than the other roller, and a shaft of considerably smaller external diameter than the internal diameter of the shell, the rollers being so mounted that the smaller roller exerts pressure on the tube in advance of the larger roller during the compression of the tube, and a roller positioned adjacent to said smaller roller and operative to urge the shell of the latter toward the tube during the movement of the slide.

3. In a dispensing device for collapsible tubes, in combination, a casing within which a collapsible tube is adapted to be positioned, pressure mechanism for squeezing said tube, a nozzle for discharging the material extruded by said pressure mechanism, a closure for said nozzle, and a shaft operatively associated with said closure and pressure mechanism to open said closure on initial rotation and then on further rotation to operate said pressure mechanism to effect extrusion of the contents of the tube.

4. In a dispensing device for collapsible tubes, in combination, means for compressing a collapsible tube, a nozzle for discharging the material extruded by said compressing means, a closure for said nozzle, and means including a rotatable shaft for operating said compressing means and arranged to effect opening of said closure during the initial rotation thereof and before it has produced compression of the tubes.

5. A dispensing device for collapsible tubes, comprising, in combination, a casing, a slide, a pair of vertical standards in said casing for guiding said slide, pressure rollers on said slide arranged to receive a collapsible tube therebetween and operable upon downward movement of the slide to compress the tube, a pair of flexible members connected at one end to said slide, a shaft journalled in elongated slots in said casing, the other ends of said members being connected to said shaft, a metallic plate having a tapered opening for receiving the neck of the tube, a nozzle communicating with said opening and extending forwardly of the tube at right angles thereto, a discharge opening in the side of said nozzle, a knife normally closing said discharge opening, and means for operating said knife.

6. A dispensing device for collapsible tubes, comprising, in combination, a casing, a slide, a pair of vertical standards in said casing for guiding said slide, a pair of plates in front of said standards adapted to receive a collapsible tube therebetween, pressure rollers on said slide and engaging said plates, a pair of flexible members connected at one end to said slide, a shaft journalled in elongated slots in said casing, the other ends of said members being connected to said shaft, a metallic plate having a tapered opening for receiving the neck of the tube, a nozzle communicating with said opening and extending forwardly of the tube at right angles thereto, a discharge opening in the side of said nozzle, a knife normally closing said discharge opening, and means operative upon initial rotation of said shaft and prior to the compression of the tube to move said knife from in front of the discharge opening.

7. In a dispensing device for collapsible tubes, the combination of a support, a slide mounted on said support, an operating shaft, flexible means connected to said slide and to said shaft to effect movement of the slide upon rotation of said shaft, and means on said slide arranged to exert a wiping pressure against a tube positioned on said support to cause discharge of the contents thereof.

8. In a dispensing device for collapsible tubes, the combination of a support, a slide mounted on said support, an operating shaft, flexible means connected to said slide and to said shaft to effect movement of the slide upon rotation of said shaft, and a pair of pressure rollers on said slide adapted to receive a collapsible tube therebetween and operative upon movement of the slide to move along the tube and exert a wiping pressure thereagainst to cause discharge of the contents thereof.

9. The combination as set forth in claim 8, wherein said rollers are of unequal size.

10. The combination as set forth in claim 8, wherein said rollers are of unequal size, and are so positioned that the smaller roller exerts pressure against a point on the tube in advance of the larger roller.

11. In a dispensing device for collapsible tubes, means for exerting a wiping pressure upon a collapsible tube so as to compress the tube without winding the same, comprising a movable frame, pressure members on said frame arranged to receive a tube therebetween and to engage continuously the opposite sides thereof, one of said members positioned to exert pressure on the tube in advance of the other member, and means whereby said frame may be moved longitudinally of the tube to cause said pressure members to compress the tube therebetween.

12. In a dispensing device for collapsible tubes, means for exerting a wiping pressure upon a collapsible tube so as to compress the tube without winding the same, comprising a movable frame, pressure members on said frame arranged to receive a tube therebetween and to engage continuously the opposite sides thereof, one of said members positioned to exert pressure on the tube in advance of the other member, and movable relatively to the other member, and means whereby said frame may be moved longitudinally of the tube to cause said pressure members to compress the tube therebetween.

13. In a dispensing device for collapsible tubes, in combination, means for supporting a collapsible tube, means for compressing said tube, and a nozzle adapted to communicate with said tube and having a lateral discharge opening to cause the material extruded from the tube to be directed transversely of said nozzle, whereby a brush may be held below said nozzle and transversely thereof to receive a continuous strip of discharged material, the bottom wall of said nozzle being inclined upwardly toward said opening so that the discharged material is prevented from curling into contact with the outer surface of the nozzle.

14. The combination as set forth in claim 8 wherein one of said rollers is movable vertically relatively to the other roller.

15. In a dispensing device for collapsible tubes, in combination, means for compressing a collapsible tube, a nozzle for discharging the material extruded by said compressing means, a closure for said nozzle, mechanism for operating said closure and compressing means in a manner to cause said closure to open before any excessive pressure has been exerted on the tube by the compressing means, and including a rotatable shaft connected with the compressing means to operate the latter, and being arranged to effect opening of the closure before the shaft has been rotated sufficiently to place the contents of the tube under excessive pressure, and means for returning said closure to closed position.

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