

Oct. 26, 1965

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3,214,064

DISPENSER FOR COLLAPSIBLE TUBES

Filed March 9, 1964

2 Sheets-Sheet 1

FIG. 1.

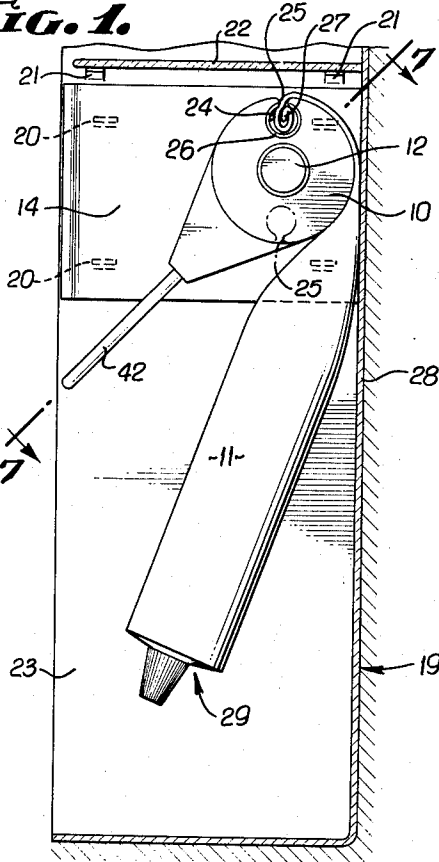


FIG. 2.

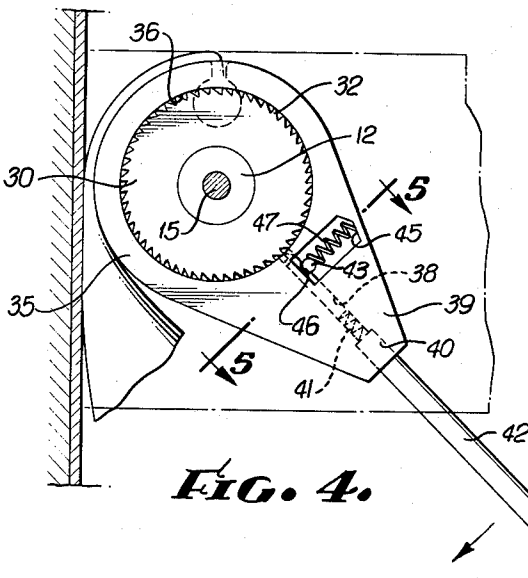
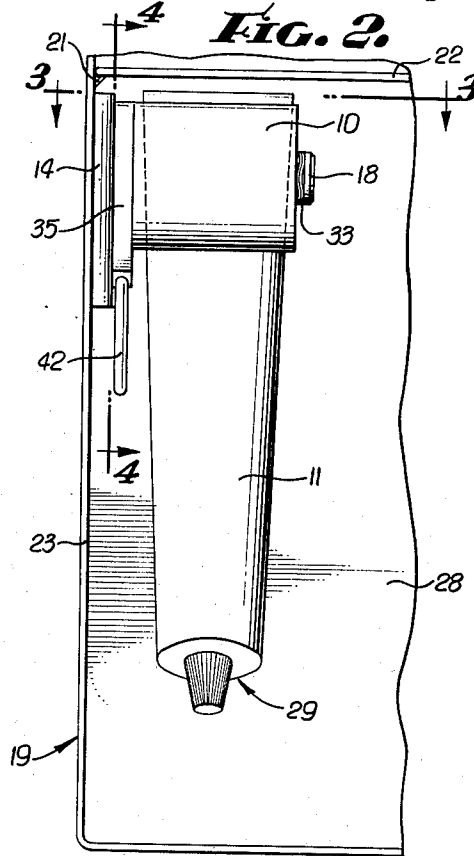


FIG. 3.

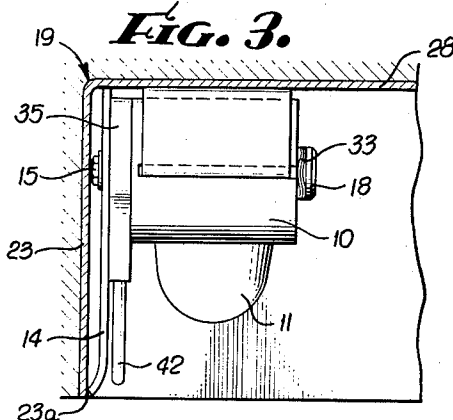


FIG. 4.

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FIG. 8.

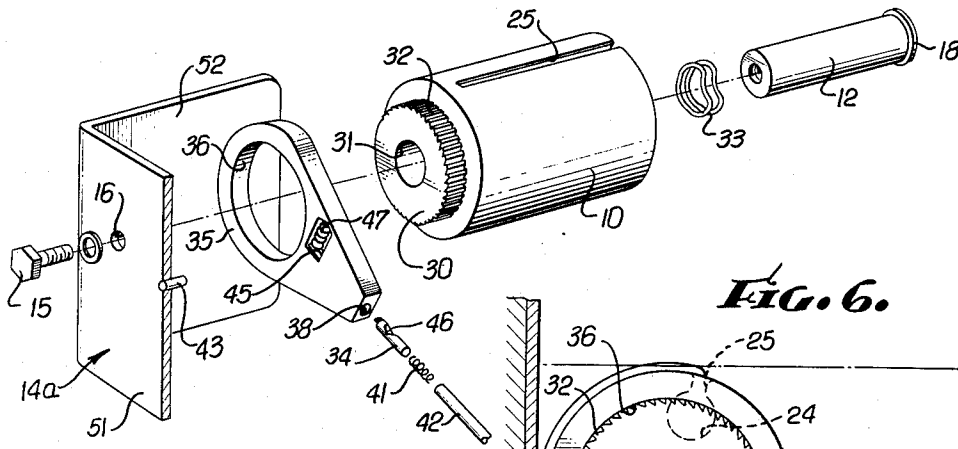


FIG. 6.

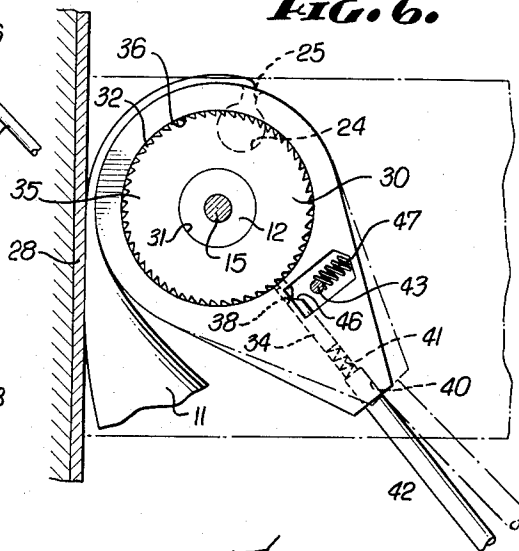


FIG. 7.

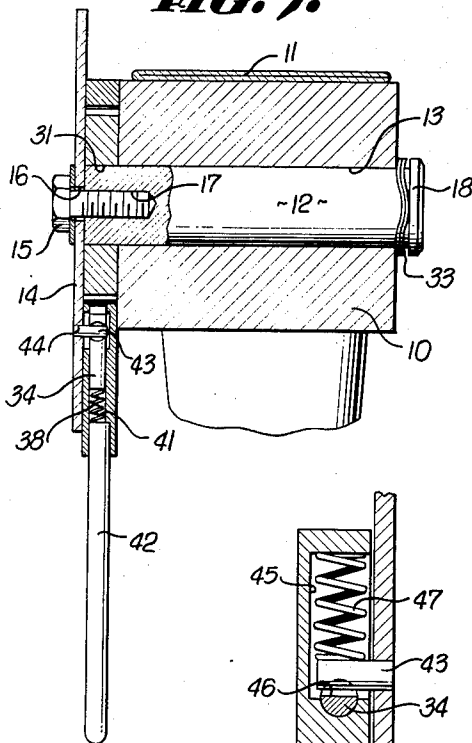


FIG. 5.

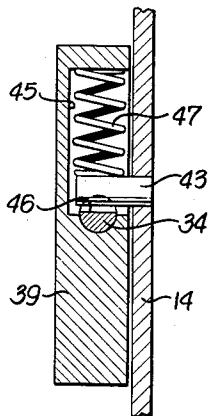
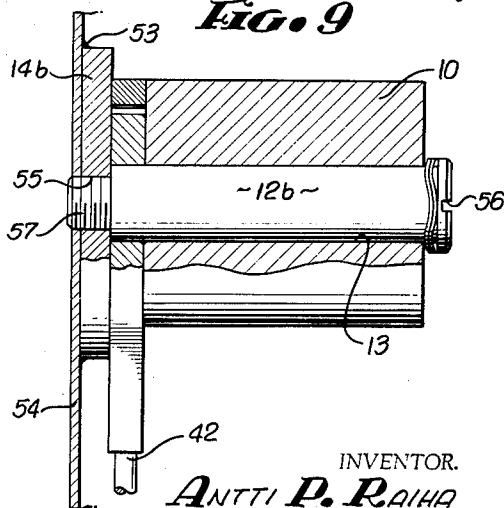


FIG. 9



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DISPENSER FOR COLLAPSIBLE TUBES

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17 Claims. (Cl. 222—100)

This invention relates to a device for dispensing material from a collapsible tube, such as a toothpaste tube.

A great many devices for this purpose have been proposed, yet none has ever proved commercially practical. Most prior devices are extremely complicated, and consequently expensive. Furthermore, most prior devices require certain manipulations for installation and removal of the tube, manipulations simply too bothersome for average individuals to tolerate.

The primary object of this invention is to provide a dispensing device that comprises only a few simple parts and that makes possible the installation and removal of a tube without even touching the device itself. All that is required for installation is to insert the crimped edge of the tube into a slot. All that is required for removal is to pull the head of the tube down and then move the tube laterally until it clears the slot.

Another object of this invention is to provide a device of this character that is operated by the simple manipulation of pushing a lever against a stop.

Another object of this invention is to provide a device of this character in which the only exposed parts are a windup roller and an operating lever, thus providing a device which is easily cleaned and maintained.

Another object of this invention is to provide a device of this character that can readily be installed in a standard medicine chest or the like. For this purpose, in one embodiment of this invention, a bracket mounting the operative parts of the device is provided with spring fingers co-operable with the usual slotted strips of the medicine cabinet.

Another object of this invention is to provide a device of this character that in another embodiment of this invention includes a simple mounting plate that can be incorporated in a wall of a medicine chest.

Another object of this invention is to provide a device of this character that conveniently utilizes the medicine chest or other wall as one of the operative pressure plates past which the tube is carried for creating an internal tube pressure for dispensing purposes.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of several embodiments of the invention. For this purpose, there are shown a few forms in the drawings accompanying and forming part of the present specification, and which drawings, unless as otherwise indicated, are true scale. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

FIGURE 1 is an end elevational view of apparatus incorporating the present invention, the lower corner of a medicine chest at which the device is installed being shown in section;

FIG. 2 is a front elevational view of the apparatus shown in FIG. 1, a part of the medicine chest also being illustrated;

FIG. 3 is a top plan view of the device with the medicine chest shown in section, the section plane being indicated by line 3—3 of FIG. 2;

FIG. 4 is an enlarged sectional view taken along the plane corresponding to line 4—4 of FIG. 2;

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FIG. 5 is an enlarged fragmentary sectional view taken along a plane corresponding to line 5—5 of FIG. 4;

FIG. 6 is a sectional view, similar to FIG. 4, but illustrating the mechanism in alternate positions, one of which is shown in phantom lines;

FIG. 7 is an enlarged axial sectional view taken along a plane corresponding to line 7—7 of FIG. 1;

FIG. 8 is an exploded pictorial view illustrating the components of the apparatus but in combination with the different mounting brackets; and

FIG. 9 is an axial sectional view similar to FIG. 7 but illustrating another modified bracket structure that may be incorporated in the side wall of a medicine chest.

In FIG. 1 there is illustrated a roller 10 upon which the collapsible tube 11 is wound. The roller 10 is mounted for rotation upon a bearing pin 12 (see also FIG. 7). Thus the bearing post 12 extends with running clearance through an axial bore 13 formed in the roller 10. One end of the bearing post 12 is mounted upon a supporting bracket plate 14 by the aid of the cap screw 15. The cap screw 15 extends through an aperture 16 in the bracket plate 14 and engages threaded recess 17 formed in the end of the bearing post 12. The other end of the bearing post 12 has a head 18 that overlies the edges at the outer end of the roller bore 13 and thus confines the roller upon the bearing post 12.

The bracket plate 14 has provisions on the side opposite the post for mounting in a conventional medicine cabinet 19. For this purpose, the bracket 14 has a series of clips 20 (FIG. 1), at least some of which are resilient, for releasably engaging the usual slotted bracket 21 mounted at the side wall of the medicine chest 19. The bracket 14 is conveniently situated beneath a shelf 22 at the lower left hand corner of the medicine chest 19 as shown in FIGS. 1 and 2. The bracket plate 14 has its outer end curved in order to merge smoothly toward the frontal edge 23a of the side wall 23 of the cabinet 19.

The roller 10 has a substantial diameter so as to provide a circumference not significantly less than the length of the usual collapsible tube 11. The roller 10 may be made of wood, metal or plastic material. Extending inwardly from the outer end surface of the roller and adjacent the periphery thereof is an elongate cylindrical or other keyhole recess 24 that parallels the axis of the roller 10. The recess 24 communicates with the periphery of the roller 10 through a restricted slot 25. The recess 24 may be lined by a split sleeve 26 if desired.

The crimped end 27 of the collapsible tube 11 is adapted to be inserted into the keyhole recess 24 when the recess 24 is located downwardly and away from the cabinet walls, as indicated in phantom lines. Lateral movement of the tube 11 readily accomplishes the installation. Since the crimped end has an effective dimension greater than the width of the slot 25, the tube 11 is thus suspended from the roller 10. When so suspended, the roller 10 is rotated angularly in a counterclockwise direction as viewed in FIG. 1 so as to carry the end of the tube 11 past the rear wall 28 of the medicine cabinet 19. The bracket 14 is so situated as to orient the periphery of the roller 10 from the rear wall 28 with the desired clearance. Accordingly, as the roller 10 is moved angularly, the contents of the tube become pressurized and are dispensed through the head 29 of the tube 11. When so pressurized, the tube 11 assumes a downward and outward angle of repose, indicated in FIG. 1, by virtue of the configuration of the wall 28 and the periphery of the roller 10. By the time the roller has completed one revolution with respect to the point of tangency with the rear wall 28, substantially the entire length of an "economy" size tube has been traversed by the roller periphery. The roller diameter is adequate to ensure this result.

In order angularly to move the roller 10, a ratchet structure is provided. Affixed to the inner end of the roller 10 by suitable means (not shown) is a ratchet wheel 30. Optionally the ratchet wheel 30 may be made integrally with the roller. The ratchet wheel 30 has a central aperture 31 that forms an extension of the roller aperture 13 and fits the inner end of the bearing post 12. The ratchet wheel 30 has a diameter somewhat less than the diameter of the roller 10. Ratchet teeth 32 extend entirely about the entire periphery of the wheel 30. The ratchet wheel 30 with the roller 10 are urged into frictional engagement with the bracket plate 14 by the aid of a spring washer 33 located beneath the bearing post head 18. The effective length of the post 12 is slightly greater than the apertures 31 and 13 to prevent the washer 33 from being entirely flattened.

In order to operate the ratchet wheel 30, a pawl 34 is provided. The pawl 34 is mounted upon an operating lever 35 having a thickness corresponding to that of the ratchet wheel 30. The lever 35 fits with running clearance over the ratchet wheel 30, the lever having a circular aperture 36 in which the ratchet wheel 30 is received. The pawl 34 is accommodated at the inner end of an elongate aperture 38 that extends radially outwardly from the ratchet wheel aperture 36. The pawl aperture 38 is formed in a radial projection 39 of the lever 35. The end of the pawl aperture is enlarged as at 40.

The pawl 34 is made of cylindrical stock material to fit the cylindrical aperture 38. The pawl has a wedge-shaped tooth adapted to fit the ratchet teeth 32. One face of the pawl tooth extends radially of the ratchet wheel to engage the radial faces of the ratchet teeth 32, while the other side of the pawl tooth slopes so as to slide over the sloping faces of the ratchet teeth 32.

In order to urge the pawl 34 toward the ratchet teeth 32, a small compression spring 41 is provided. This compression spring 41 is accommodated in the aperture 38 and is held therein by the inner end of the handle extension 42 which is press-fitted in the aperture enlargement 40. As the lever 35 is angularly reciprocated about the axis of the roller of the ratchet wheel 30, the pawl accordingly moves the wheel 30 in a clockwise direction as viewed in FIGS. 4 and 5, and the tube 11 is squeezed.

A pin 43, in addition to other functions hereinafter to be described, serves angularly to orient the pawl 34 so that its tooth is situated appropriately for engagement with the ratchet teeth 32. Thus the faces of the pawl tooth must be oriented parallel to the opposed ratchet tooth. The pin 43 is press-fitted in an aperture 44 of the bracket plate 14 and projects into a generally rectangular, laterally opening recess 45 (FIGS. 4 and 5) formed in the lever projection 39 and in the side thereof facing the bracket plate 14. The recess 45 is entirely concealed when the parts are assembled, the bracket plate 14 serving as a closure. One end of the recess 45 intersects an intermediate portion of the pawl aperture 38 so as to expose the shank of the pawl 34. The other end of the recess 45 is closed. As the lever 35 is moved angularly in a counterclockwise direction as viewed in FIGS. 4 and 5 (and corresponding to releasing movement of pawl 34) the pin 43 is engaged by the shank of the pawl 34. A V-slot 46 formed in the side surface of the pawl 34 seats on the pin 43 and thus determines the appropriate angular orientation of the pawl 34 about its axis. Should the pawl rotate slightly from this orientation, the return movement of the lever 34 causes appropriate correction.

The pin 43 is so situated relative to the V-slot 46 that a retracting movement of the pawl 34 is effected whenever the pawl engages the side of the pin 43. Thus one side of the V-slot 46 engages the pin to cause the pawl to retract as the V-slot moves to seat upon the pin. This retracting movement of the pawl 34 is accompanied by a slight compression of the spring 41.

The lever 35 is normally held at an angular position in which the pin 43 engages the pawl. For this purpose a small compression spring 47 is accommodated in the laterally opening lever recess 45. One end of the compression spring 47 engages the end of the recess 45 and the other end of the compression spring 47 engages the pin 43. Accordingly, the spring 47 exerts a torque on the lever 35 tending to rotate the lever in a counterclockwise direction against the stop pin 43 as viewed in FIGS. 4 and 5. In this position the end of the handle 42 is located adjacent the plane of the medicine cabinet opening, and as illustrated in FIG. 1.

The lever 35 can be moved angularly away from the pin 43 by operation of the handle 42, as shown in FIG. 6. The handle 42 in this instance is moved inwardly and downwardly of the cabinet 19. As soon as the handle 42 is moved slightly, the V-groove 46 of the pawl 34 is released and the compression spring 41 urges the pawl outwardly to engage the ratchet wheel 30. Thereupon a driving connection is effected between the lever 35 and the ratchet wheel 30, and the roller 10 is accordingly moved angularly to cause the tube 11 to be squeezed.

Such angular motion of the lever 35 away from the stop pin 43 is limited by the permissible free travel of the compression spring 47. Accordingly, for each stroke of the lever 42 a certain quantity of material is expressed from the tube 11. As soon as the lever 35 is released, the spring 47 causes return movement. The roller 10 and the tube 11 remain in the position to which they have been advanced by virtue of the friction washer 33, the pawl 34 being entirely retracted.

Accordingly, the tube 11 can be removed from the roller 10 simply by pulling it downwardly. The pawl 34 offers no restraint. Ultimately the recess 24 in which the crimped end 27 of the tube is contained moves to the phantom line position. The tube simply can be slid outwardly and discarded. No part of the device need be touched, much less manipulated, to accomplish the removal of the tube 11.

The periphery of the lever 35 conforms in contour to that of the roller 10. All of the operating parts are neatly contained and concealed and the device is readily cleaned and maintained.

The bracket structure 14a shown in FIG. 8 is of L-shaped configuration. One arm 51 of the bracket mounts the bearing post 12 as well as the stop pin 43. The other arm 52 of the bracket may be mounted upon a wall or any other suitable support, and serves in place of the rear wall 28 of the medicine cabinet to define a restricted space through which the tube is pulled. A decorative cover, or the like (not shown), can be provided.

In the form of the invention illustrated in FIG. 9, the bracket 14b is welded as at 53 to the side wall 54 of a medicine cabinet. In this instance the bearing post 12b is provided with a reduced threaded extension 57 that engages the threaded aperture 55 of the plate 14b. The stop pin is also mounted on the bracket 14b. To facilitate the rotation of the post 12b, its head may be provided with a suitable slot or other noncircular recess as at 56 for engagement by a suitable tool.

The inventor claims:

1. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having means for detachably engaging the crimped end of a collapsible tube; an actuating member; mounting means confining the member for reciprocating movement in a fixed path; means forming opposite limits to the movement of said member; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means operated by return movement of the

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member to said one limit to cause disengagement of the driving connection to free the roller for return movement; and friction means restraining the roller against angular movement about its axis.

2. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having a keyhole slot extending along its periphery and opening at one end thereof for detachably engaging the crimped end of a collapsible tube; the said one end of said keyhole slot being exposed for insertion and removal of the crimped end of a collapsible tube; an actuating member; means mounting the member for movement in a path between limits; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means entirely disengaging the driving connection upon return movement of the member to said one limit to free the roller for return movement; and friction means restraining the roller against angular movement about its axis.

3. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having means for detachably engaging the crimped end of a collapsible tube; a lever; mounting means confining the lever for movement about the axis of the roller; means defining opposite limits to the angular movement of the lever; a spring urging the lever toward one limit; ratchet members between the lever and the roller for moving the roller in one direction upon movement of the lever away from said one limit; means operated by return movement of the lever to its said one limit for retracting one of the ratchet members to clear the other ratchet member to free the roller for return movement; and friction means restraining the roller against angular movement about its axis.

4. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having a keyhole slot extending along its periphery and opening at one end thereof for detachably engaging the crimped end of a collapsible tube; the said one end of said keyhole slot being exposed for insertion and removal of the crimped end of a collapsible tube; a lever; mounting means confining the lever for movement about the axis of the roller; means defining opposite limits to the angular movement of the lever; a spring urging the lever toward one limit; ratchet members between the lever and the roller for moving the roller in one direction upon movement of the lever away from said one limit; means operated by return movement of the lever to its said one limit for retracting one of the ratchet members to clear the other ratchet member to free the roller for return movement; and friction means restraining the roller against angular movement about its axis.

5. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having means for detachably engaging the crimped end of a collapsible tube; an actuating member; means mounting the member for movement in a path between limits; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means entirely

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disengaging the driving connection upon return movement of the member to said one limit to free the roller for return movement; friction means restraining the roller against angular movement about its axis; and a reaction member spaced close to the periphery of the roller and defining therewith a restricted space corresponding substantially to twice the wall thickness of the tube and past which the tube is carried for squeezing the tube as the roller is rotated.

6. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having a keyhole slot extending along its periphery and opening at one end thereof for detachably engaging the crimped end of a collapsible tube; the said one end of said keyhole slot being exposed for insertion and removal of the crimped end of a collapsible tube; an actuating member; means mounting the member for movement in a path between limits; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means entirely disengaging the driving connection upon return movement of the member to said one limit to free the roller for return movement; friction means restraining the roller against angular movement about its axis; and a reaction member spaced close to the periphery of the roller and defining therewith a restricted space corresponding substantially to twice the wall thickness of the tube and past which the tube is carried for squeezing the tube as the roller is rotated.

7. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having means for detachably engaging the crimped end of a collapsible tube; an actuating member; means mounting the member for movement in a path between limits; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means entirely disengaging the driving connection upon return movement of the member to said one limit to free the roller for return movement; friction means restraining the roller against angular movement about its axis; and means for mounting the bracket on a medicine chest, or the like, for disposing the roller periphery adjacent a wall of the medicine chest for defining therewith a restricted space past which the tube is carried for squeezing the tube as the roller is rotated.

8. In apparatus for dispensing material from a collapsible tube: a support; a windup roller mounted on the support for angular movement about its axis; said windup roller having a circumference approximately equal to the length of a usual collapsible tube; said windup roller having a keyhole slot extending along its periphery and opening at one end thereof for detachably engaging the crimped end of a collapsible tube; the said one end of said keyhole slot being exposed for insertion and removal of the crimped end of a collapsible tube; an actuating member; means mounting the member for movement in a path between limits; the member being biased normally to move toward one limit; a one-way driving connection between the member and the roller and operative to move the roller when the member is moved from said one limit; means entirely disengaging the driving connection upon return movement of the member to said one limit to free the roller for return movement; friction means restraining the roller against angular movement about its axis; and means for mounting the bracket on a medicine chest, or the like, for disposing the roller periphery adjacent a

wall of the medicine chest for defining therewith a restricted space corresponding substantially to twice the wall thickness of the tube and past which the tube is carried for squeezing the tube as the roller is rotated.

9. In apparatus for dispensing material from a collapsible tube; a mounting bracket; a bearing member carried by the bracket; a roller projecting axially from the bracket and mounted by the bearing member for rotation about its axis; said roller having a keyhole slot extending along its periphery and opening at the end of the roller opposite the bracket; said roller having a ratchet wheel at the other end thereof; an operating lever fitted about said ratchet wheel; said lever having an aperture intersecting the ratchet wheel; a pawl in the aperture; a spring urging the pawl to engage the ratchet; stop means carried by the bracket for determining opposite limits to the lever stroke; a spring urging the lever in a direction opposite the ratchet driving direction and to one limit; cam means for retracting the pawl to clear the ratchet wheel when the lever is at said one limit for releasing the roller; and friction means for releasably restraining said roller against angular movement.

10. In apparatus for dispensing material from a collapsible tube; a mounting bracket; a bearing member carried by the bracket; a roller projecting axially from the bracket and mounted by the bearing member for rotation about its axis; said roller having provisions for releasably engaging the crimped end of a collapsible tube along the periphery of the roller; said roller having a ratchet wheel at the end of the roller adjacent the bracket; an operating lever fitted about said ratchet wheel; said lever having an aperture intersecting the ratchet wheel; a pawl in the aperture; a spring urging the pawl to engage the ratchet; stop means carried by the bracket for determining opposite limits to the lever stroke; a spring urging the lever in a direction opposite the ratchet driving direction and to one limit; cam means for retracting the pawl to clear the ratchet wheel when the lever is at said one limit for releasing the roller; and friction means for releasably restraining said roller against angular movement.

11. The combination as set forth in claim 10 in which said stop means comprises a pin mounted on the bracket and entering a lateral recess in the lever.

12. The combination as set forth in claim 10 in which said stop means comprises a pin mounted on the bracket and entering a lateral recess in the lever and in which said lever urging spring is a compression spring accommodated in said lateral recess and engaging at opposite ends, the pin and one end of the recess.

13. The combination as set forth in claim 10 in which said stop means comprises a pin mounted on the bracket and entering a lateral recess in the lever and in which said lever urging spring is a compression spring accom-

modated in said lateral recess and engaging, at opposite ends, the pin and one end of the recess and in which said lateral recess intersects said aperture at the other end of the recess to expose the shank of said pawl, said pawl shank having a lateral slot forming the cam means, the cam means reacting upon said pin when the lever is at said one limit to accomplish said pawl retraction.

14. The combination as set forth in claim 10 in which said stop means comprises a pin mounted on the bracket and entering a lateral recess in the lever and in which said lever urging spring is a compression spring accommodated in said lateral recess and engaging, at opposite ends, the pin and one end of the recess and in which said lateral recess intersects said aperture at the other end of the recess to expose the shank of said pawl, said pawl shank having a lateral slot forming the cam means, the cam means reacting upon said pin when the lever is at said one limit to accomplish said pawl retraction, said aperture being cylindrical, the slot in the pawl shank also orienting the pawl at about the axis of the cylindrical aperture.

15. The combination as set forth in claim 10 in which said stop means comprises a pin mounted on the bracket and entering a lateral recess in the lever and in which said lever urging spring is a compression spring accommodated in said lateral recess and engaging, at opposite ends, the pin and one end of the recess and in which said lateral recess intersects said aperture at the other end of the recess to expose the shank of said pawl, said pawl shank having a lateral slot forming the cam means, the cam means reacting upon said pin when the lever is at said one limit to accomplish said pawl retraction, said aperture being cylindrical, the slot in the pawl shank also orienting the pawl at about the axis of the cylindrical aperture, said tube engaging provisions comprising a keyhole slot extending along the periphery of the roller and opening at the end of the roller opposite the bracket.

16. The combination as set forth in claim 15 in which said bracket has a part extending substantially tangent to the roller periphery to form therewith a restricted space past which said tube is carried for squeezing the tube as the roller is rotated.

17. The combination as set forth in claim 15 in which said aperture is closed by a handle forming an extension of the lever.

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