

[54] **TUBE DISPENSER INCLUDING CONTROL MEANS FOR DISPENSING THE CONTENTS OF THE TUBE**

[76] Inventor: **Peter J. Van Bussel, Peter Breughel**
Dr. 2, Lommel, Belgium, 3900

[22] Filed: **Aug. 22, 1974**

[21] Appl. No.: **499,400**

[52] U.S. Cl. **222/103; 222/105;**

[51] Int. Cl.² **B65D 35/28**

[58] Field of Search 222/103, 105, 97, 556,
222/95, 106

[56] **References Cited**

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Primary Examiner—Robert B. Reeves

Assistant Examiner—John P. Shannon

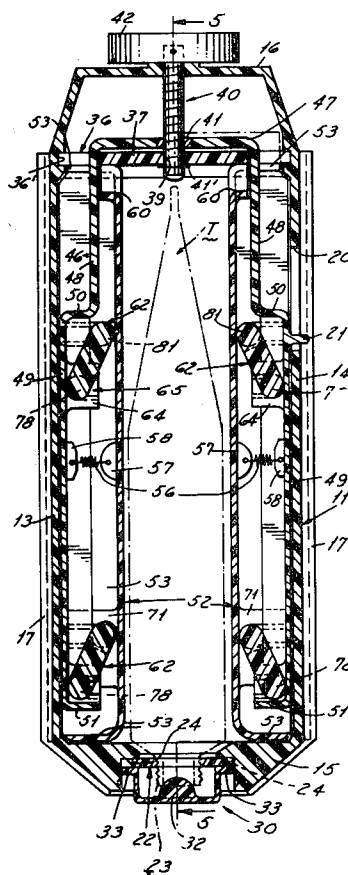
Attorney, Agent, or Firm—Cullen, Settle, Sloman & Cantor

[57] **ABSTRACT**

The dispenser, as fabricated predominately of molded plastic parts, includes an outer box-like housing affording a vertically elongated inner space which re-

ceives an inverted collapsibly deformable tube whose content is to be downwardly dispensed. The usual threaded tube neck is releasably held upright under a crimping grip exerted thereon by an apertured hold-down plate through which the tube neck extends; and a closure cap pivots vertically on said plate to optionally open and seal the neck's dispensing mouth. A slide of inverted U-shape is movable downwardly in the housing space, and vertically spaced pairs of toggle-type hinges are pivoted at their outer ends on up-rights of the slide, the pairs facing one another inwardly from their slide pivots. The inner ends of said toggle hinge pairs are pivotally connected at vertically spaced points to a pair of like tube-squeezing plates, so that on downward movement of said slide, said pairs of toggle hinges will straighten downwardly and inwardly in typical toggle fashion. They thus thrust said plates toward one another to expel a desired content of the tube to be dispensed. The squeeze plates are spring biased outwardly in opposition to said compression movement; and the slide, as pivoted to and outwardly of said plates by the toggle hinges, is actuated downwardly for the dispensing action by a knob-headed screw, which screw threads downwardly into a nut part fixed on an upper cross-piece of the slide. The screw is rotatable in and axially restrained at its bottom by a horizontal partition part in the housing and the screw's knob is downwardly restrained by the top of the housing proper.

20 Claims, 19 Drawing Figures



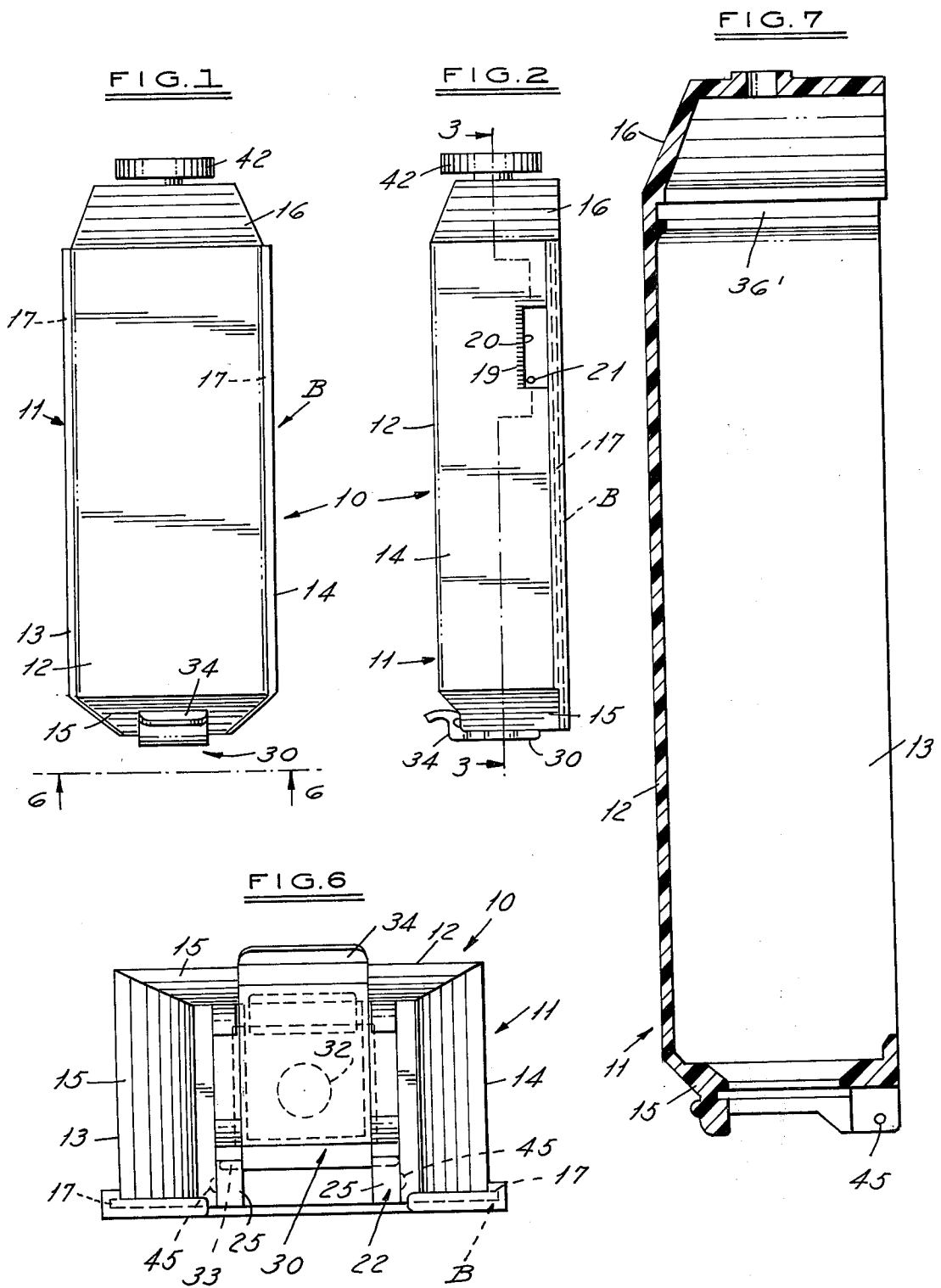


FIG. 3

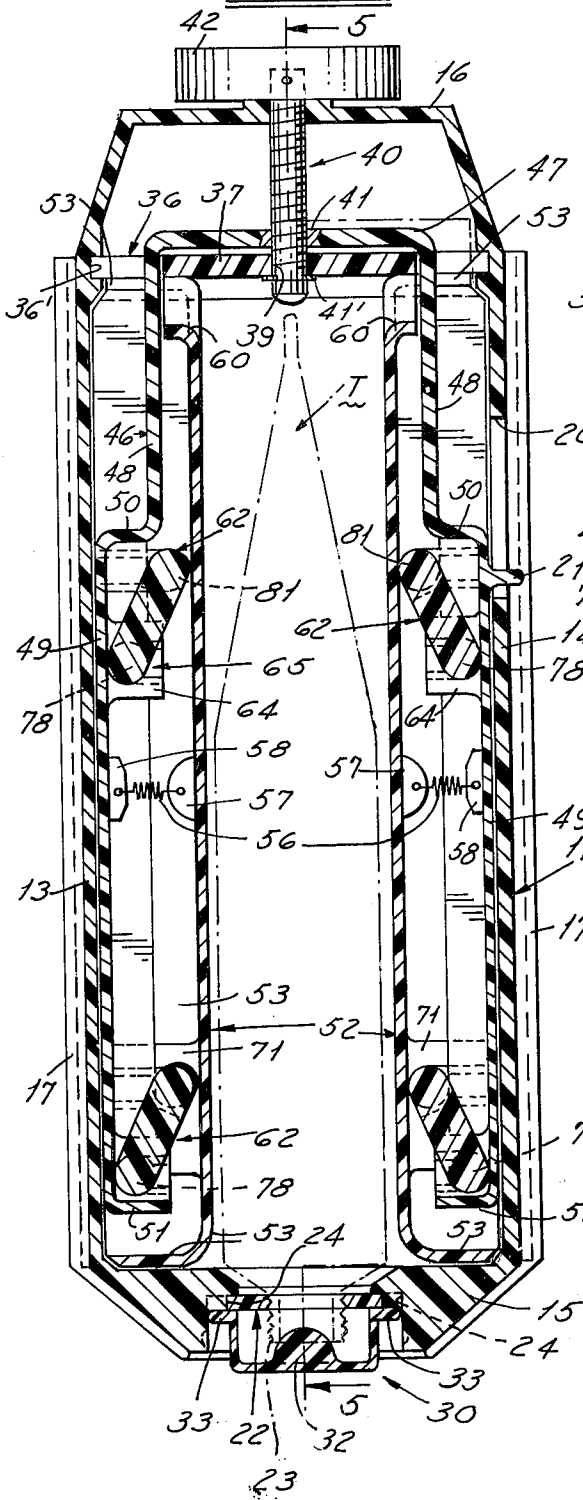


FIG. 4

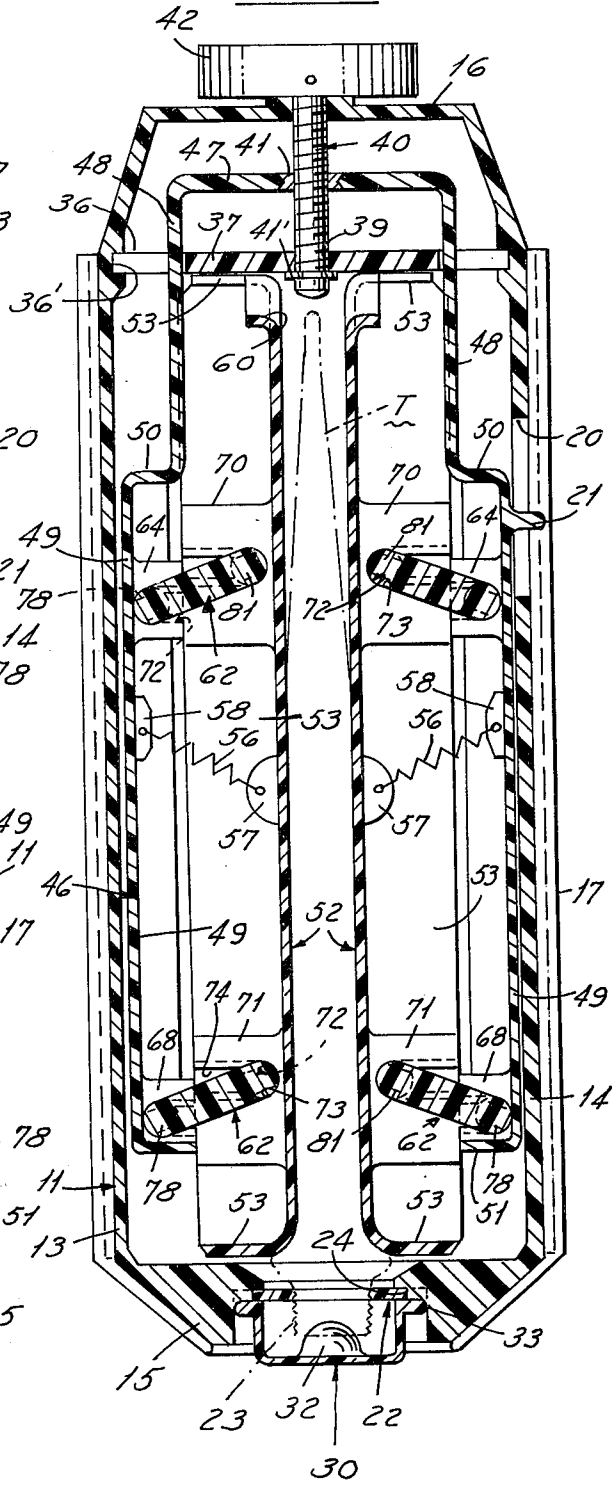


FIG. 5

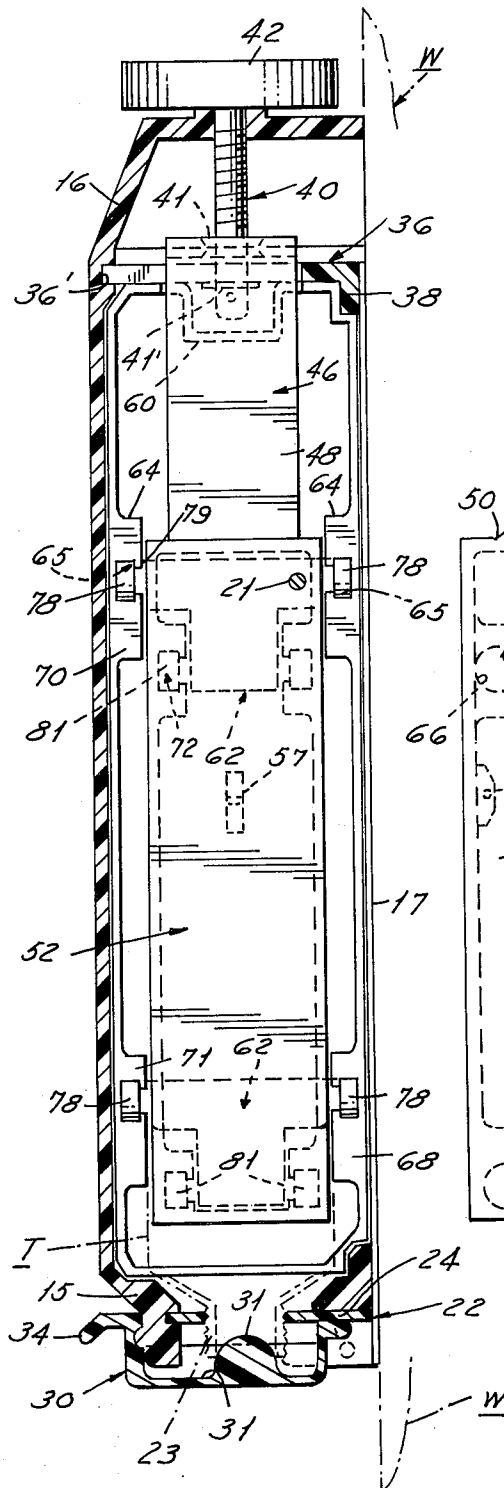


FIG. 8

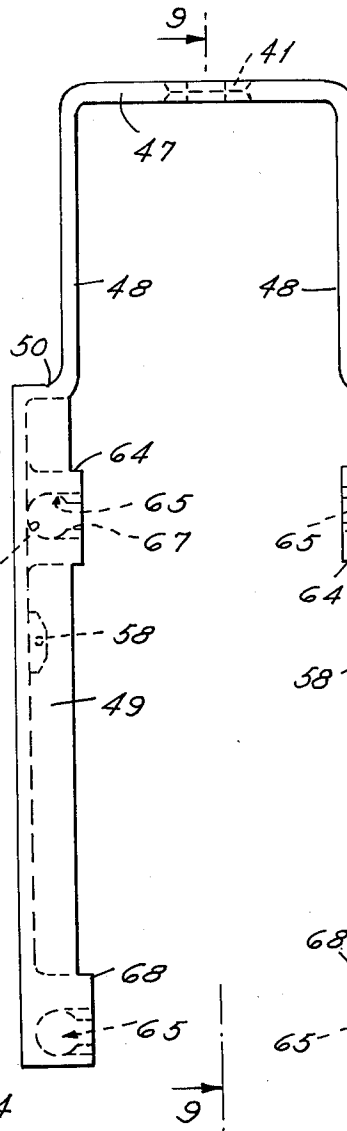
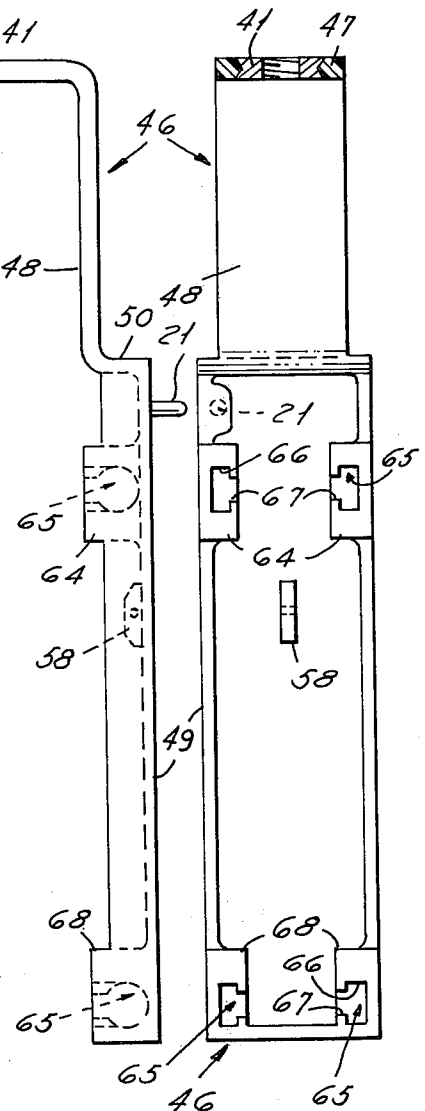
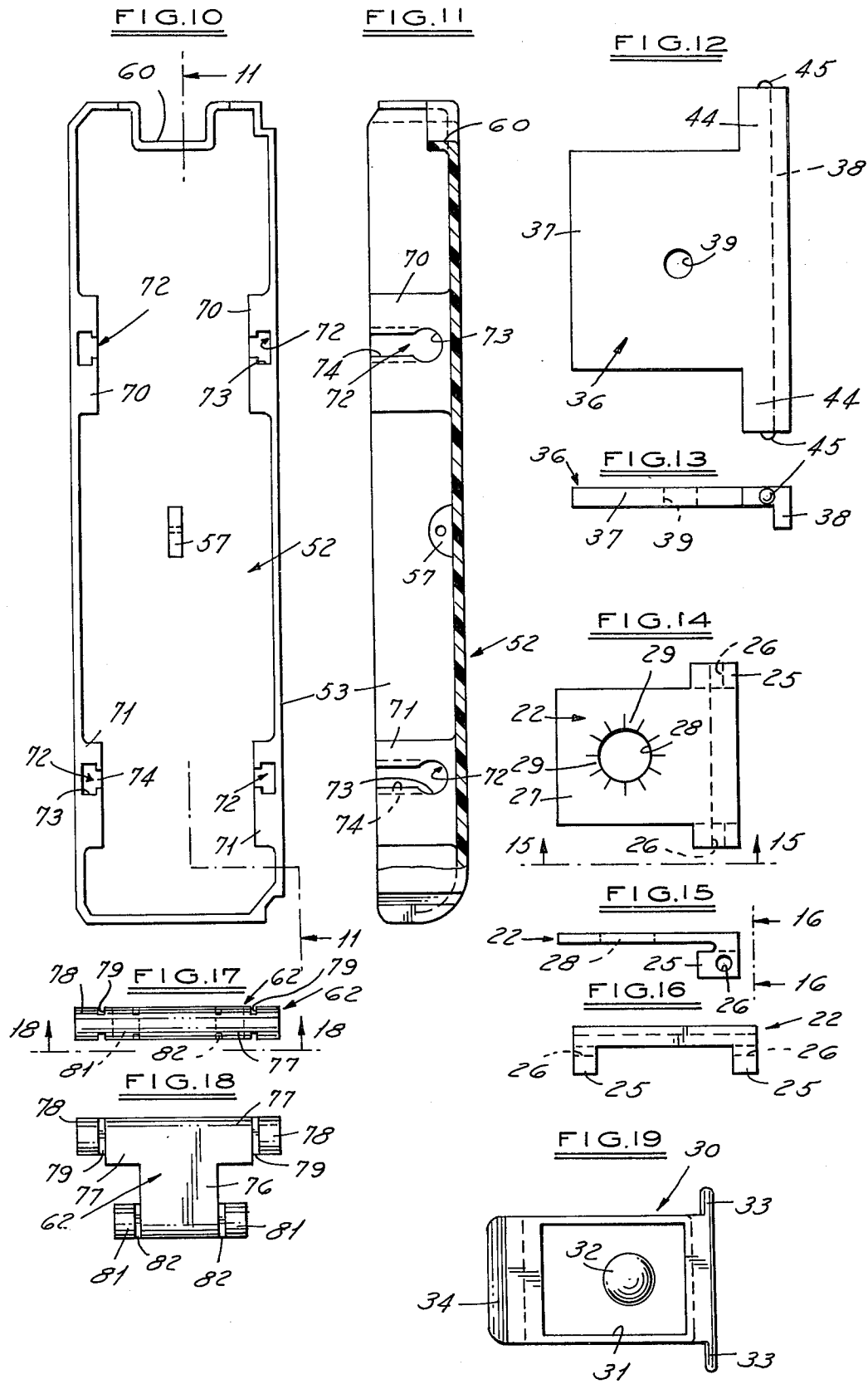


FIG. 9





TUBE DISPENSER INCLUDING CONTROL MEANS FOR DISPENSING THE CONTENTS OF THE TUBE

BACKGROUND OF THE INVENTION - FIELD

The dispenser is adapted to progressively empty the paste, toothpaste, cream or commercial paste content of a well-known type of flexibly and collapsibly deformable metal tube through a threaded tube discharge mouth or spout which is normally sealed by a separate cap. More particularly, the dispenser takes the form of an attractively styled housing adapted in most instances to be fixture-mounted to a bathroom wall, a kitchen wall or the like.

SUMMARY OF THE INVENTION

The invention affords a tube-receiving and manipulating dispenser which is fabricated practically in its entirety of inexpensively molded parts, being comparatively inexpensively assembled and marketed for use; and in such use the dispenser saves time and aggravation such as commonly arises due to a loss of the cap of the container tube, and indeed the entire tube, an unsightly and non-uniform progressive deformation of the same, a drying of its content, etc. The dispensation is done hygienically and without waste, permitting variable metering of the amount as desired; and the point of dispensation is always convenient and the same.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of the improved dispenser;

FIG. 2 is a side elevation thereof suggesting an optional indicator feature;

FIG. 3 is a larger (and substantially actual) scale view of the improvement, being vertically sectioned on a line corresponding to broken line 3—3 of FIG. 2, and also showing internal operating and other components of the device in their positions before dispensing, the dispensed tube being shown fully expanded in dot-dash line;

FIG. 4 is a sectional view similar to FIG. 3, but showing the parts in their position usually following many dispensing operations;

FIG. 5 is a view in vertical central and front-to-rear section on line 5—5 of FIG. 3, showing the device as mounted to a dot-dash depicted wall;

FIG. 6 is a bottom plan of the dispenser, as from a line corresponding to line 6—6 in FIG. 1;

FIG. 7 is a view in central vertical section corresponding to FIG. 5, but showing the dispenser's plastic housing alone;

FIG. 8 is a front elevational view of the operating slide of the device, indicating hinge swiveling and operating nut provisions thereof, also the optional indicator referred to above;

FIG. 9 is a view in central and vertical front-to-rear cross-section on line 9—9 of FIG. 8;

FIG. 10 is a side elevational view of one of the molded plastic tube squeeze plates of the device, i.e., omitting other internal operating features which appear in the generally similar view of FIG. 5;

FIG. 11 is a vertical section on broken line 11—11 of FIG. 10, being partially broken away to better show internal squeeze plate details;

FIG. 12 is a top elevational view of an internal upper cross partition part of the housing, which part rota-

tively journals and axially restrains the operating screw of the dispenser;

FIG. 13 is a side elevation of said partition part;

FIG. 14 is a top plan of the apertured tube holddown plate of the invention;

FIG. 15 is a side elevation from line 15—15 of FIG. 14;

FIG. 16 is a front end elevation from line 16—16 of FIG. 15;

FIG. 17 is an end elevation of one of four identical toggle-type hinge members of the unit, which operate in pairs between uprights of the slide and the squeeze plates of said unit;

FIG. 18 is a view of said hinge member from line 18 of FIG. 17; and

FIG. 19 is a top plan view of the closure cap of the device which, as pivoted on the tube hold down plate of FIGS. 14—16, removably seals the dispensing neck of the tube.

Description of a Preferred Embodiment

FIGS. 1 and 2 illustrate the improved dispenser of the invention, as generally designated by the reference numeral 10, to comprise in general an external housing 11 of generally rectangular, box-like outline, comprising an imperforate rectangular front panel 12, side upright panels 13, 14, a truncated bottom part 15 and another top part or wall, also forwardly truncated in nature, which is designated 16. These parts are integrally molded one piece of a suitable rigid or semi-rigid plastic composition. The rear of housing 11 opposite its front panel 12 is open, as also clearly appears in FIG. 7, and is marginally bordered by integral upright feathered lips 17 at which the housing 11 is adapted to be slidably and removably received in an appropriate mounting bracket member B, as on a bathroom or other domestic wall indicated, for example, in dot-dash line in FIG. 5 and designated W. Other parts of dispenser 10 which appear in FIGS. 1 and 2 are later described in detail, but it may be noted that FIG. 2 suggests an optional indicator feature of the invention, in the form of vertically extending indicia 19 in the end housing wall 14 adjacent a vertically elongated opening 20 of said wall, through which opening an indicator pointer 21 of an operating slide (to be described) of the device extends. This permits a user to observe the approximate extent to which the content of a tube in housing unit has been expelled over a considerable period of time, whereupon the tube may be removed and manually exhausted of its total content, if in order.

Now, referring to FIGS. 3, 4 and 5 of the drawing, they depict internal features of the housing structure 11, also of operating components of the dispenser which are disposed in the housing. Considering these figures, as supplemented by details shown in FIGS. 14, 15, 16 and 19, the housing 11 has mounted in its base or bottom portion 15 a generally rectangular hold-down plate 22 in which the usually externally threaded discharge neck 23 of a conventional toothpaste, shaving cream or like collapsibly deformable tube is disposed. The plate 22 is slidably receivable in transverse grooves 24 in housing part 15, and is, like practically all of the dispenser hereinafter described, preferably molded of the same synthetic plastic composition as the housing 11. Referring specifically to FIGS. 15, 15 and 16, rectangular plate 22 has a pair of projecting side bosses 25 adjacent its rear end, which bosses are

formed to provide trunnion bores 26 for a purpose to be described. Otherwise, the upper rectangular plate portion proper 27 of hold-down member 22 is provided with a circular aperture 28 sized to received the tube neck 23, about which aperture the plate is circumferentially and radially slit to afford flexible fingers 29 integral therewith. These yield individually to permit a manual insertion of the tube neck in hold-down plate 22, thereby crimping the neck to afford a releasable support for the tube, which has been generally designated T and appears in dot-dash line in FIGS. 3, 4 and 5.

As mounted transversely in housing portion 15, the hold-down plate 22 also serves as a pivotal support for a sealing closure cap of the invention, generally designated 30. This cap, as appears in FIG. 19, is of plastic molded to provide a central, upwardly opening recess 31, from which projects a semi- or quasi-spherical dome-like sealing formation 32 which, as appears in FIGS. 3-5, upwardly engages the discharge opening of the tube neck 23 to prevent loss of tube content and prevent its drying. For pivoting the closure 30, the latter has (FIG. 19) a pair of integral, laterally projecting trunnion pins 33; these are receivable in the boss openings 26 of hold-down plate (FIGS. 14-16), enabling closure member 30 to swing in a vertical front-to-rear plane in exposing and closing the tube neck. A snap lip 34 is molded on the forward side of closure cap 30 for convenient manipulation of the latter.

Now referring to FIGS. 12 and 13 in conjunction with FIGS. 3, 4 and 5, the interior of housing 11 is subdivided adjacent its top by a molded plastic partition plate 36 which has a rectangular tongue 37 slidably received in a transverse slot 36' of the housing directly beneath the latter's top formation 16. At its rearward end (right hand in FIG. 5) partition plate 36 is molded to provide a transverse, depending stop tongue 38; and the rectangular body portion 37 of the partition is formed with a circular through-opening 39 which receives and in part journals a vertical rotatable operating screw 40 for the dispenser, further features for the operation of which will be later described. For the present, it suffices to state that the screw, preferably of brass, is threadedly received in a special brass nut 41 imbeddedly molded in a part of an operating slide to be described. The lower end of screw 40 is axially restrained against upward shift by a split washer and cross pin device 41', and the upper end of the screw carries a manipulating knob or hand piece 42, which bottoms downwardly on a top boss of the upper casing portion 16, thereby restraining screw 40 from downward movement and confining it to a rotative threading action alone.

By reference to FIGS. 12 and 13, it is seen that the partition plate 36 carries, just forwardly of its stop formation 38, a pair of side extension bosses 44. These have semi-spherical detent formations 45 molded to project from their outer extremities, said formations snapping into correspondingly shaped recesses (not shown) in the side walls 13, 14 of housing 11, thus releasably securing the partition plate 36 to said housing.

An operating slide of the invention, generally designated by the reference numeral 46, is shown per se in FIGS. 8 and 9, and in combination with other operating components of the dispenser in FIGS. 3, 4 and 5. The slide 46 is molded of the selected plastic in a general inverted U-shaped outline, and it is in an upper hori-

zontal cross piece 47 of said slide that the brass manual actuating nut 41 is molded, being threadedly engaged by the stem of operating screw 40 to cause slide 46 to travel vertically for the intended expulsion of the content of tube T.

The slide presents a pair of like but oppositely oriented, elongated and generally parallel arms 48, which straddle the tongue portion 37 of partition 36, as appears in FIGS. 3 and 4; and each arm has a lower, outwardly 90° offset portion 49 to accommodate operating parts to be described. One of these arm portions carries the pointer 21 previously referred to, which, as projecting through the side opening 20 of housing wall 14, coacts with indicia 19 (FIG. 2) in indicating to the user the extent to which the tube contents have been depleted. The slide arm housing offsets 49 are bounded at their tops by horizontal formations 50, and at their bottoms by similar horizontal offset formations 51.

Other operating components of dispenser 10 are in the form of a pair of like but oppositely oriented, vertically elongated squeeze plates 52 of rectangular outline. These are individually shown in FIGS. 10 and 11, each being molded about its perimeter to afford a 90° outwardly extending continuous boxlike flange 53. Said flange at its top has slidable engagement and restraint (per FIGS. 3 and 4) by the partition plate 36; and at the bottom thereof said flange 53 slides across and directly above the bottom part 15 of housing 11.

Each squeeze plate flange 53 defines a rectangular box-like space accommodating components of certain like toggle-type linkages to be described.

The squeeze plates 52 are biased oppositely outwardly by small coil tension springs 56 having their opposite ends connected to ear formations 57 about midway of the upright length of the plates and at molded anchor formations 58 on the arm portions 49 of slide 46, the anchors 58 being horizontally outwardly of the spring attaching ears 57. Accordingly, as slide 46 is screw-actuated downwardly upon rotation of the screw 40 in one direction, the squeeze plates 52 will be simultaneously brought toward one another (by toggle type means to be described) from the spread positions of the plates 52 appearing in FIG. 3 to their compressed and contracted position of FIG. 4, having over a period of time squeezed the tube T from its full size contour of FIG. 3 to the much compressed contour of FIG. 4.

In order to accommodate the downward movement of slide 46 in this tube collapsing operation, each slide is formed adjacent its top, and somewhat beneath its flanged formation 53, to provide a clearance space 60 accommodating the upper arm portions 48 and cross piece 47 of the slide. It is to be borne in mind that the squeeze plates 52 remain vertically stationary as tube collapsing progresses, partaking only of the inward plate movements, and, of course, their corresponding outward separation as the device 10 is to be reloaded with a replacement tube T. Finally, the operating structure of that device comprises the above-referred to toggle-type means which operatively connects the squeeze plates 52 to the slide 46. For this purpose, the dispenser employs two pairs of toggle hinges, levers, or links 62 which are best illustrated, per se, in FIGS. 17 and 18, being associated between respective sets of squeeze plates and slide arms in the manner again appearing in FIGS. 3, 4 and 5. To this end, each of the slide's arms 48 is formed, adjacent the top of its outwardly offset portion 49, with a molded internal boss formation 64

which presents an inwardly facing keyhole-shaped slot 65 defined by an enlarged trunnion or pivot receiving portion 66 and a restricted throat portion 67. Similarly, each of the slide arm portions 49 is formed adjacent its lower extremity with a generally similar molded boss 68; and the bosses 68 are provided with keyhole type trunnion receiving slots identical to the slots 68 referred to above, hence being designated by corresponding reference numerals.

The two squeeze plates 52, as best appears in FIGS. 4 and 5, are also provided with trunnion receiving formations molded therein for coaction with the hinges, levers or links 62, as the latter are individually molded for the purpose in a manner to be described.

Thus, each plate 52 is molded at a relatively elevated location to provide outwardly extending integral boss 70; and the plates 52 also integrally carry adjacent their bottoms similar bosses 71, also the bosses 70, 71 are molded to afford identical, outwardly opening keyhole shaped slots substantially identical to the slots 65 in bosses 64 of the slide arm portions 49. Thus, squeeze plate bosses 70, 71 in common feature keyhole-shaped slots 72 outlined by a circular inner end 73 which opens outwardly of the boss via a restricted slot portion 74.

Now referring again to FIGS. 17 and 18, the four identical operating toggle hinges or links 62 each features an intermediate body portion 76 bordered at one end by outward offsets 77, each of which terminates in a cylindrical trunnion formation 78, separated from the part 77 by an undercut 79.

The trunnion formations 78 are in operation journaled in the enlarged portions 66 of the keyhole slots 65 of the slide arms 48, the relieved undercuts 79 enabling the assembly of the larger width offset portions of the levers, hinges or links 62 to the slide bosses 64, 68.

Each such hinge 62 also carries at its end opposite the formation 77 a pair of cylindrical trunnions 81 which are separated from the smaller width body 76 of the hinge by an undercut or relief 82; the latter enable the sliding assembly to the lesser width squeeze plates 52 of said trunnions 81, which operate in the enlargements 73 of the keyhole slots 72 in the squeeze plate bosses 70 and 71.

As appears in FIGS. 3 and 4, the respective pairs of upper and lower operating toggle hinges or links 62 are oriented on opposite sides of the pair of squeeze plates 52 in parallel relation to one another in all phases of operation of dispenser 10; that is, in conjunction with the respective plates 52 and slide arms 48 the toggle members 62 operate in parallelogram fashion, being urged by slide 46, against the bias of coil springs 56, from the relatively broken and upright position of the toggles appearing in FIG. 3 to the relatively straightened compressing position thereof shown in FIG. 4. For the rest, the operation of the dispenser has been fully described above, and calls for no repetition.

What is claimed is:

1. A dispenser serving to expel the content of an elongated, collapsibly deformable tube through a discharge opening in a neck of the latter, comprising an elongated housing affording an internal space to receive the tube as oriented longitudinally parallel to the length of said housing, a slide movable longitudinally in the housing, said slide being of U-shaped cross-section and having a pair of generally parallel and elongated arms which are connected by a horizontally extending

cross piece located adjacent to the upper portion of said elongated housing, at least one squeeze member disposed in said housing between and generally parallel to the arms of said slide and at a side of a tube so received in said housing space, and means operatively connecting said slide with said squeeze member and acting in response to a longitudinal movement of the slide to cause said squeeze member to collapsibly deform the tube and expel at least a portion of the content thereof.

2. The dispenser of claim 1, in which there are a pair of said squeeze members in the form of elongated plates paralleling the arms of said slide and further paralleling the tube and disposed at respective opposite sides thereof, said squeeze members being simultaneously actuated by said slide and said connecting means to act compressively against the tube sides.

3. A dispenser serving to expel the content of an elongated, collapsibly deformable tube through a discharge opening in a neck of the latter, comprising an elongated housing affording an internal space to receive the tube as oriented longitudinally parallel to the length of said housing, a slide movable longitudinally in the housing, at least one squeeze member disposed in said housing at a side of a tube so received in said housing space, and means operatively connecting said slide with said squeeze member and acting in response to a longitudinal movement of the slide to cause said member to collapsibly deform the tube and expel at least a portion of the content thereof, said connecting means being a toggle-like hinge linkage having a pivotal connections between said slide and said squeeze member to actuate said member for the collapsible deforming of the tube.

4. A dispenser serving to expel the content of an elongated, collapsibly deformable tube through a discharge opening in a neck of the latter, comprising an elongated housing affording an internal space to receive the tube as oriented longitudinally parallel to the length of said housing, a slide movable longitudinally in the housing, a pair of squeeze members in the form of elongated plates disposed in said housing in parallel relation to and disposed at respective opposite sides of a tube so received in said housing space, and means operatively connecting said slide with said squeeze members and acting in response to a longitudinal movement of the slide to cause said members to collapsibly deform the tube and expel at least a portion of the content thereof, said squeeze members being simultaneously actuated by said slide and said connecting means to act compressively against the tube sides, said connecting means being a toggle-like hinge linkage having pivotal connections between said slide and said squeeze members at longitudinally spaced zones of the latter and the slide to actuate said squeeze members for the collapsible deforming of the tube.

5. The dispenser of claim 4, in which said linkage comprises parallel pairs of longitudinally spaced hinge links each connected at opposite link ends thereof to a squeeze member and to the slide, and acting with the latter and said member in the manner of a collapsible parallelogram.

6. The dispenser of claim 1, said housing including a top wall, and further comprising means to actuate said slide for said longitudinal movement, said actuating means including a rotatable threaded connection between said cross piece of the slide and the top wall of

said housing, which connection is manually operated externally of the housing.

7. The dispenser of claim 2, said housing including a top wall, and further comprising means to actuate said slide for said longitudinal movement, said actuating means including a rotatable threaded connection between said cross piece of the slide and the top wall of said housing, which connection is manually operated externally of the housing.

8. The dispenser of claim 3, and further comprising means to actuate said slide for said longitudinal movement, said actuating means including a rotatable threaded connection between the slide and said housing, which connection is manually operated externally of the housing.

9. The dispenser of claim 4, and further comprising means to actuate said slide for said longitudinal movement, said actuating means including a rotatable threaded connection between the slide and said housing, which connection is manually operated externally of the housing.

10. The dispenser of claim 5, and further comprising means to actuate said slide for said longitudinal movement, said actuating means including a rotatable threaded connection between the slide and said housing, which connection is manually operated externally of the housing.

11. The dispenser of claim 3, and further comprising means in said housing to frictionally grip the neck of the tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze member.

12. The dispenser of claim 4, and further comprising means in said housing to frictionally grip the neck of the tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze members.

13. The dispenser of claim 8, and further comprising means in said housing to frictionally grip the neck of said tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze member.

14. The dispenser of claim 10, and further comprising means in said housing to frictionally grip the neck of said tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze members.

15. A dispenser serving to expel the content of an elongated, collapsibly deformable tube through a discharge opening in a neck of the latter, comprising an elongated housing affording an internal space to receive the tube as oriented longitudinally parallel to the length of said housing, a slide movable longitudinally in the housing, at least one squeeze member disposed in said housing at a side of a tube so received in said hous-

ing space, means operatively connecting said slide with said squeeze member and acting in response to a longitudinal movement of the slide to cause said member to collapsibly deform the tube and expel at least a portion of the content thereof, and further comprising means in said housing adapted to frictionally grip the neck of the tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze member, said frictional gripping means comprising a plate part disposed transversely in said housing and having an aperture adapted to receive the tube neck, said aperture being at least in part defined by flexible crimping components of said plate part which is adapted to yieldably grip the tube neck.

16. A dispenser serving to expel the content of an elongated, collapsibly deformable tube through a discharge opening in a neck of the latter, comprising an elongated housing affording an internal space to receive the tube as oriented longitudinally parallel to the length of said housing, a slide movable longitudinally in the housing, a pair of squeeze members in the form of elongated plates disposed in said housing in parallel relation to and disposed at respective opposite sides of a tube so received in said housing space, and means operatively connecting said slide with said squeeze members and acting in response to a longitudinal movement of the slide to cause said members to collapsibly deform the tube and expel at least a portion of the content thereof, said squeeze members being simultaneously actuated by said slide, connecting means to act compressively against the tube sides, and further comprising means in said housing adapted to frictionally grip the neck of the tube, as oriented longitudinally and downwardly in said housing space, and thereby releasably resist longitudinal movement of the tube relative to said squeeze members, said frictional gripping means comprising a plate part disposed transversely in said housing and having an aperture adapted to receive the tube neck, said aperture being at least in part defined by flexible crimping components of said plate part which is adapted to yieldably grip the tube neck.

17. The dispenser of claim 15, and further comprising a closure element pivotally mounted on said transverse plate part to swing into and out of sealing engagement with the tube's neck at said discharge opening of the latter.

18. The dispenser of claim 16, and further comprising a closure element pivotally mounted on said transverse plate part to swing into and out of sealing engagement with the tube's neck at said discharge opening of the latter.

19. The dispenser of claim 17, in which said closure element presents a hemi-spherical formation for said sealing engagement.

20. The dispenser of claim 18, in which said closure element presents a hemi-spherical formation for said sealing engagement.

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