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Paige

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[54] **DISPENSING APPARATUS FOR COLLAPSIBLE TUBE CONTAINER**

[76] Inventor: **David L. Paige,** 1682 Newfield Rd., Columbus, Ohio 43209

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[52] **U.S. Cl.** **222/101**

[51] **Int. Cl.** **B65d 35/28**

[58] **Field of Search** 222/101, 95, 103, 222/92, 105

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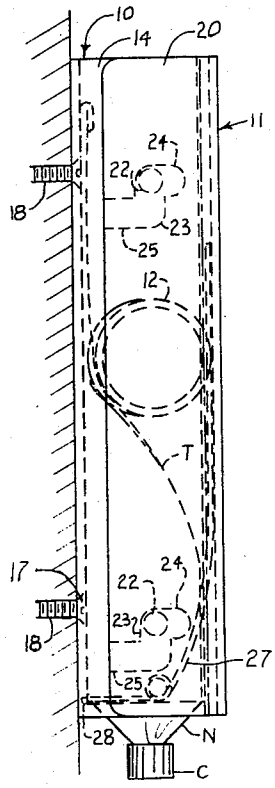
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Primary Examiner—Samuel F. Coleman
Assistant Examiner—Norman L. Stack, Jr.
Attorney—William V. Miller et al.

[57] **ABSTRACT**

A dispensing apparatus for ejecting paste-form substances from a collapsible-tube container is provided having a pair of interfitting, elongated channels assembled to receive a collapsible tube and permit relative limited compressive movement of the two channels. One channel is provided with an end wall for cooperatively engaging an end of the collapsible tube and restraining the tube against longitudinal movement in one direction. A roller positioned within the assembled channels for revolving movement about an axis transverse to the longitudinal axis of the channels is operated on by one of the channels to compress the collapsible tube disposed between the roller and the other channel. This compression expells the contents of the collapsible tube container with the relative movement of the two channels being limited to that for ejecting a predetermined quantity of the contents.

8 Claims, 5 Drawing Figures



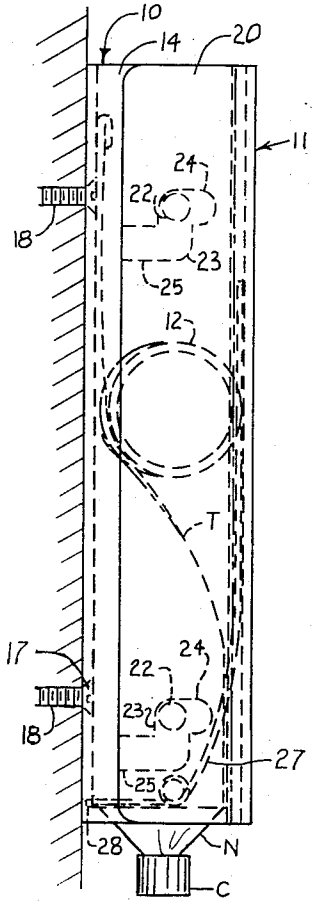


Fig. 1

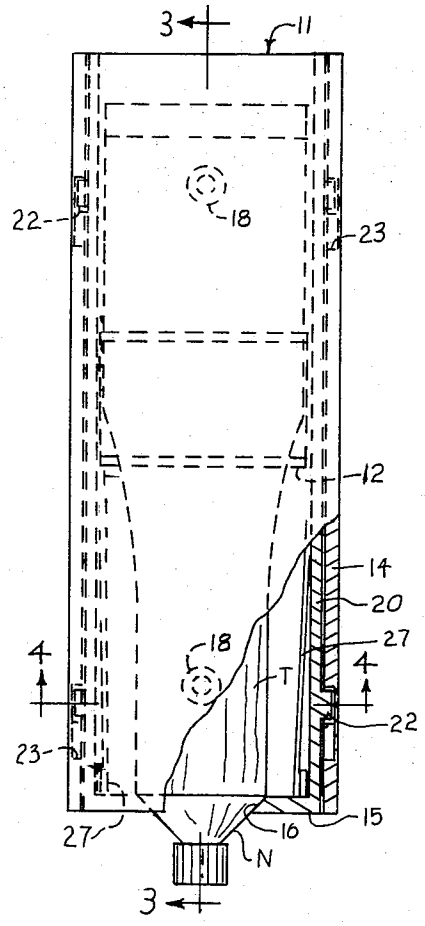


Fig. 2

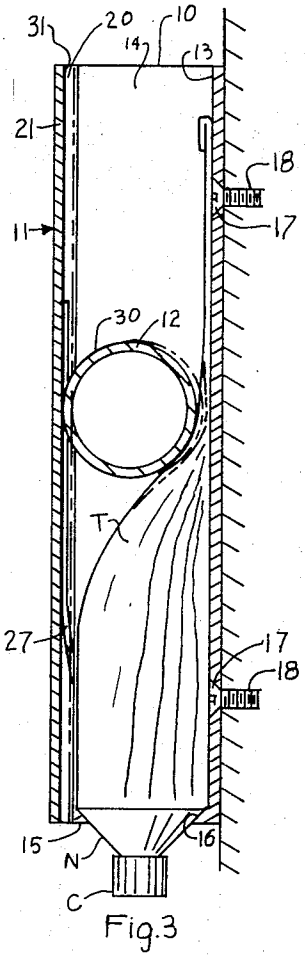


Fig. 3

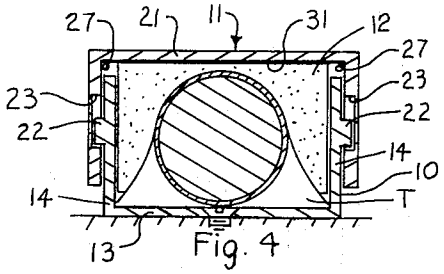


Fig. 4

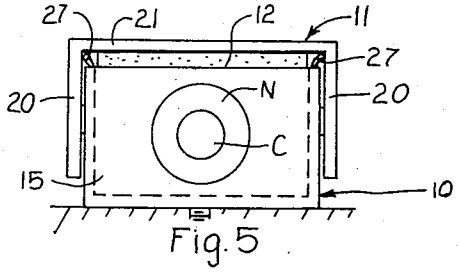


Fig. 5

DISPENSING APPARATUS FOR COLLAPSIBLE TUBE CONTAINER

BACKGROUND OF THE INVENTION

Dispensing apparatus for utilization with collapsible tube containers such as the well known tooth paste tube, has been devised and proposed heretofore. The known apparatus, however, has been of a relatively complex nature requiring components that are difficult to fabricate and assemble into a satisfactorily operable structure. The number of components, in addition to the complexity of fabrication, have combined to limit the commercial feasibility of the known prior art structures.

BRIEF DESCRIPTION OF THE INVENTION

The dispensing apparatus of this invention comprises three main components including a pair of elongated channels assembled to receive a collapsible tube container and a cylindrical roller disposed between those channels for cooperation therewith in collapsing the tube and ejecting the contents. The two channels are assembled to permit limited movement of the channels toward each other in forcing the roller against the collapsible tube container and expel the contents. One channel is provided with an end wall to restrain movement of the collapsible tube in opposition to the operation of the roller in compressing and collapsing the tube. Spring means is provided to normally urge the two channels into a relatively separated configuration in preparation for a succeeding dispensing operation. Mounting of the apparatus on a vertical wall surface results in automatic gravity feeding of the roller into proper position for the next operation in ejecting the contents of the collapsible tube.

Operation of the dispensing apparatus of this invention is relatively simple requiring the application of the compressing force in only one direction. With a collapsible tube container installed between the interfitting channels, a force applied to the outer channel to force the channel into further engagement with the opposite channel results in compression of the roller against the tube and the collapse thereof at the point of engagement. Release of the compressive force permits the biasing spring to return the channels to the maximum separated position thus simultaneously permitting the roller to descend a slight distance between the channels as a result of the additional space created through the immediately preceeding ejecting operation. The two channels are fabricated to interfit in interlocking relationship but readily permit their disassembly to facillitate replacement of the tube-form container. This structure enabling the relatively simple operation in collapsing the tube-form container is also easily and economically fabricated. There are essentially only three major components that are of a relatively simple configuration. The two channels may be readily molded from a suitable thermosetting synthetic resin providing the necessary structural rigidity while the cylindrical roller may also be readily formed by a molding or extrusion operation to interfit between the channels.

These and other objects and advantages of this invention will be readily apparent from the following detailed description of an embodiment thereof and the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the dispensing apparatus of this invention.

FIG. 2 is a front elevational view of the apparatus with a portion of the channels broken away to illustrate the interfitting relationship of the channels.

FIG. 3 is a longitudinal sectional view taken along line 3—3 of FIG. 2.

FIG. 4 is a transverse sectional view taken along line 4—4 of FIG. 2.

FIG. 5 is an end view of the bottom of the apparatus.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

With reference to the drawings it will be seen that the basic structural elements of the dispensing apparatus of this invention comprise a pair of interfitting, channel-for elements designated as the base **10** and cover **11** and a cylindrical roller **12.** The base **10** is formed with a bottom wall **13** and a pair of laterally projecting side walls **14** thus forming an elongated, open top channel which is of a size to receive an elongated, collapsible tube container T such as that normally containing tooth paste. The parallel spacing of the side walls **14** as can be best seen in FIG. **2,** is of a dimension to accommodate the tube when it is in a collapsed configuration as the flattened tube width will be substantially greater than that of the normally circular diameter of the tube when filled. Formed with the base **10** at one end thereof is an end wall **15** which is rigidly interconnected with the side walls **14** and bottom wall **13.** Centrally formed in the end wall **15** is an aperture **16** configured to receive the conically shaped nozzle portion N of a conventionally configured tube. Accordingly, the surface wall of the aperture **16** is conically shaped to conform to that of the nozzle portion of a tube.

The dispensing apparatus of this invention is designed to be mounted and supported on a vertical wall surface with the longitudinal axis of the apparatus vertically oriented. For purposes of mounting, a pair of openings **17** are formed in the bottom wall **13** through which suitable fastening means such as screws **18** may be driven for securing the structure to a suitable wall surface. Preferably, the openings **17** are counter sunk as shown in FIG. **3** to receive the flat head screws **18** shown in FIG. **3** for mounting the apparatus. This results in the exposed surface of the base **10** being smooth and contiguous and thus prevent interference with the collapsible tube positioned within the apparatus. When thus positioned on the wall, a collapsible tube T is positioned in an inverted manner with the nozzle portion N partially extending through the aperture **16** and seated therein for vertical support. A cap C conventionally threaded on the nozzle portion N may be removed for ejection of the contents of the collapsible tube T.

Adapted to interfit with the base **10** is the elongated, channel-form cover **11** having a pair of spaced parallel side wall flanges **20** formed with an interconnecting web **21.** The cover **11** is dimensioned such that the side wall flanges **20** will project along the exterior surfaces of the side walls **14** of the base **10** with the web **21** thus substantially closing the open top of the base. Releasable interlocking of the base **10** and cover **11** is effected by a cooperative pin and slot arrangement formed on the side wall flanges **20** and the side walls

14. Formed on each side wall 14 are a pair of longitudinally spaced pins 22 that are positioned at about the mid-point of the depth of the side walls. These pins 22 project a distance laterally outward from the side wall surfaces and interfit in respective slots 23 formed in the side wall flanges 20. Each slot 23 is relatively elongated with one end opening at the edge of the side wall flange 20 and the opposite end terminating a distance inwardly spaced from the interconnecting web 21. Each slot is also formed into laterally offset but interconnected portions resulting in an inner portion having opposed closed ends and cooperates with the respective pin 22 during normal operation of the apparatus to limit the relative displacement of the base 10 and cover 11. Assembly of the base 10 with cover 11 is effected by positioning the cover with the outer end portions 25 of the slots in alignment with respective pins 22 and then pushing the cover 11 onto the base 10 along a path whereby the pin 22 will first move along the outer end portion 25 of the slot and then laterally upward to the inner end portion 24. In the vertically mounted position of the apparatus it will be seen that the cover 11 is supported vertically by the engagement of the pins 22 with the inner end portions 24 of the slots. When thus assembled, the cover 11 may be laterally displaced relative to the base 10 to the extent determined by the length of this inner end portion 24 of the slots. In this illustrative embodiment the slots 23 do not open through the side wall flanges 20 of the cover and thus present a smooth external surface to prevent injury to the operator.

The cover 11 and base 10 are normally biased to the expanded configuration shown in the several figures by a pair of springs 27. Each spring 27 comprises a length of spring wire having a loop formed at an intermediate point thereof and with one end fixed in a socket 28 formed in the bottom wall 13 of the base at the corner formed by the intersecting end wall 15 and side walls 14. The springs 27 are thus maintained in a relatively fixed relationship to the base 10 and the opposite or free end portion of each spring extends outwardly and upwardly relative to the base and engages the interconnecting web 21 of the cover 11. The operation of the springs 27 are to maintain the cover 11 in the illustrated position shown in full lines in the several figures but permit relative lateral displacement of the cover 11 toward the base 10 to a position as shown in broken lines in FIG. 3.

Compression and collapse of a tube T is effected through operation of the cylindrical roller 12 which may be an open-ended tubular section, positioned between the side walls 14 of the base 10 and which is of a length to extend substantially the distance between the side walls 14. The diameter of the roller is less than the spacing between the bottom wall 13 of the base 10 and the interconnecting web 21 of the cover 11 to accommodate the tube T in the collapsed configuration. When the cover 11 and base 10 are relatively displaced to the compressing position shown in broken lines in FIG. 3, release of a compressive force applied to the cover 11 will then permit relative lateral displacement of the cover to the full line position under the influence of the springs 27. This relative displacement of the cover and base to an expanded configuration results in a greater lateral spacing of the bottom wall 13 and the interconnecting web 21 giving due consideration to the thickness of the flattened portion of the tube T. Thus, the roller 12 may gravitate downwardly between the side walls 14 of the base 10 with this downward movement of the roller 12 limited by the collapsible tube T. Again compressing the cover 11 and base 10 results in the further progressive flatening of the tube T as is diagramatically shown in FIG. 3. Each compressive operation of the cover 11 and base 10 through the roller 12 will result in explusion of a predetermined quantity of the tube's contents through the nozzle portion N assuming that the cap C has been previously removed.

Preferably the surface of the roller 12 is formed to have a relatively high co-efficient of friction to enhance engagement of the collapsible tube thereby preventing upward camming action of the roller during a compression operation. This high co-efficient friction surface may be formed either by roughening the external surface of the rollers or applying a suitable layer 30 of material to the external surface of the roller. Frictional engagement with the intermediate or interconnecting web 21 of the cover 11 may be further enhanced by either coating the internal surface of the web 21 with a layer of material 31 having a relatively high co-efficient friction or by also integrally forming a roughened high-friction surface on the web.

From the foregoing description of the illustrated embodiment of the invention it will be readily seen that the contents of a collapsible tube container may be easily expelled in predetermined amounts by the novel dispensing apparatus through the simple compressing operation of the cover 11 and base 10 in cooperation with the cylindrical roller 12. When the contents of the tube T are completely expelled the cover 11 may be readily removed through reverse movement of the pins 22 through their respective slots 23 thus enabling the roller 12 to be removed along with the emptied and collapsed tube. A filled tube T may then be inserted and positioned within the base 10 as illustrated and the cover 11 then reassembled with the base. The roller 12 may then be dropped through the open end of the interfitting cover and base into cooperative engagement between the interconnecting web 21 of the cover and the tube T.

Having thus described this invention, what is claimed is:

1. A dispensing apparatus for collapsible tube containers comprising:

A. an elongated base having a bottom wall and a pair of longitudinally extending, spaced apart side walls forming an open-topped channel to receive a container, and an end wall disposed in upstanding relationship to said bottom wall and extending transversely between said side walls for cooperatively engaging and supporting a container and restricting axial movement thereof to one direction relative to said base,

B. an elongated, channel-form cover adapted to interfit with said base in assembled relationship and having a pair of longitudinally extending, spaced apart side wall flanges that are each disposed in parallel planar relationship to a respective side wall of said base and means interengaging said side walls and side wall flanges to permit limited relative transverse movement thereof,

C. biasing means interposed between said base and cover to normally urge said base and cover to a relatively separated position, and

D. an elongated roller positioned between said assembled base and cover for free movement longitudinally and transversely thereof, said roller having a surface engageable with said cover to compress a container positioned in the apparatus by relative compression of said base and cover in opposition to said biasing means thereby dispensing the contents thereof.

2. A dispensing apparatus according to claim **1** wherein said roller is formed with an outer surface having a relatively high co-efficient of friction.

3. A dispensing apparatus according to claim **1** wherein said cover includes a web interconnecting between said side wall flanges and having an inwardly facing surface engaging said roller, said inwardly facing surface having a relatively high co-efficient of friction.

4. A dispensing apparatus according to claim **1** wherein said means interengaging said side walls and side wall flanges includes cooperatively engageable pins and slots formed with the respective base and cover.

5. A dispensing apparatus according to claim **4** wherein said pins are formed on said base side walls and project laterally therefrom and said slots formed in said cover side wall flanges include an inner portion of predetermined length extending transversely to the longitudinal axis of the apparatus through which a respective one of said pins may be displaced, said slots each having closed ends to limit relative transverse movement of said cover and base.

6. A dispensing apparatus according to claim **5** wherein said slots each include an outer portion opening at the outer longitudinal edge of the respective side wall flange and communicating with the respective inner portion at the side thereof most closely adjacent said base end wall.

7. A dispensing apparatus according to claim **6** wherein said pins are formed on said base side walls and project laterally outward of said base and said cover side wall flanges extend along the outer surfaces of said base sidewalls.

8. A dispensing apparatus according to claim **7** wherein said slots are formed as grooves in the cover side wall flanges opening at the inwardly facing surfaces thereof.

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