Jan. 3, 1967 J. G. MORAN 3,295,730

ROTARY FLOW CONTROL CLOSURE FOR A CONTAINER

Filed May 27, 1965

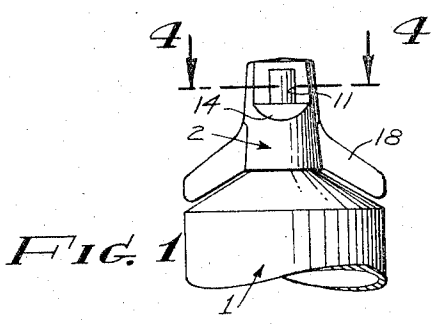


FIG. 1

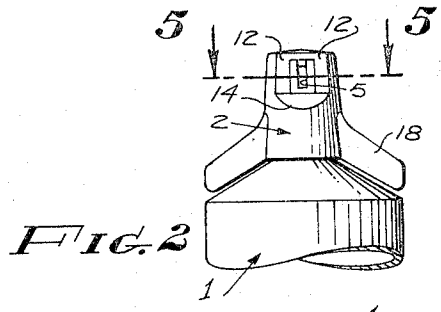


FIG. 2

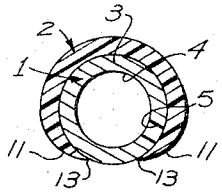


FIG. 4

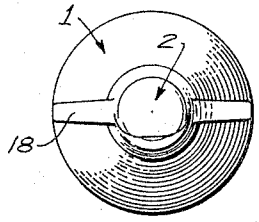


FIG. 3

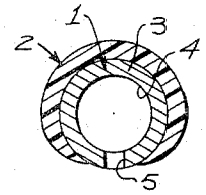


FIG. 5

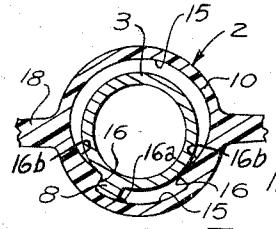


FIG. 7

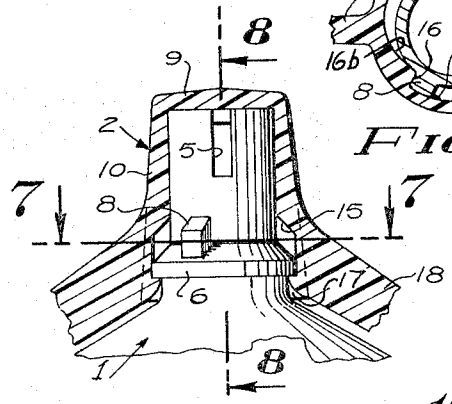


FIG. 6

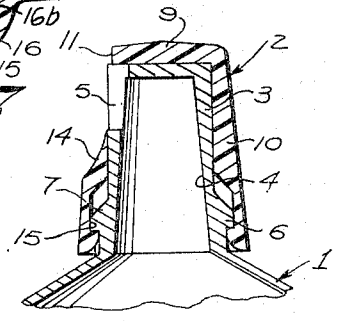


FIG. 8

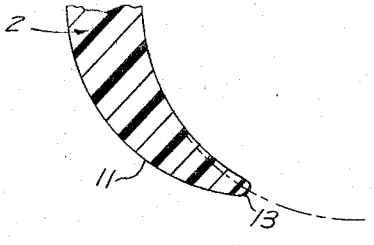


FIG. 10

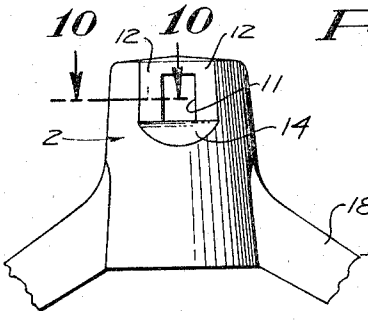


FIG. 9

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ROTARY FLOW CONTROL CLOSURE FOR A CONTAINER

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2 Claims. (Cl. 222—553)

This invention relates to collapsible tubes and valve caps therefor and included in the objects of this invention are:

First, to provide a collapsible tube and valve cap therefor, which is arranged to discharge the semi-fluid contents of the tube laterally and which is arranged to effect a clean-cut-off of the discharging material with a minimum of exposed residue, and wherein any residue which does remain may be readily wiped away so that the tube and cap may remain tidy as the contents is used.

Second, to provide a collapsible tube and valve cap therefor which may be manipulated by one hand to open and close the tube and to discharge its contents.

Third, to provide a collapsible tube and cap therefor which involves only two parts which may be machine assembled thereby providing a product of this type which may be produced at minimal cost.

With the above and other objects in view as may appear hereinafter, reference is directed to the accompanying drawings in which:

FIGURE 1 is a fragmentary view of a collapsible tube showing the valve cap and tube in its closed position.

FIGURE 2 is a similar view showing the valve cap and tube in its open position.

FIGURE 3 is a top view thereof.

FIGURE 4 is an enlarged transverse sectional view taken through 4—4 of FIGURE 1.

FIGURE 5 is an enlarged transverse sectional view taken through 5—5 of FIGURE 2.

FIGURE 6 is an enlarged fragmentary view similar to FIGURE 4 showing the collapsible container and valve core in elevation and showing the valve cap in section.

FIGURE 7 is a transverse sectional view taken through 7—7 of FIG. 6.

FIGURE 8 is a fragmentary longitudinal sectional view taken through 8—8 of FIGURE 6.

FIGURE 9 is an enlarged fragmentary side view of the valve cap.

FIGURE 10 is a further enlarged fragmentary sectional view taken through 10—10 of FIGURE 9 showing one of the side lips which border the opening in the valve cap.

The collapsible tube and valve cap comprises two members; a collapsible tube 1 and a valve cap 2. The collapsible tube may be conventional except that in place of the usual screwthread element, the tube is provided with an extension which forms a valve core 3. The valve core forms internally a socket 4 communicating with the interior of the collapsible tube.

The side wall of the valve core is provided with a longitudinally extending discharge slot 5 which intersects its closed extended end. Near the base end of the valve core the valve core is provided with an annular shoulder 6 forming an extremity of a tapered surface 7 converging toward the extended end of the valve core. Projecting axially from the shoulder 6 toward the extended end of the collapsible tube is a stop rib 8.

The valve cap 2 includes an end wall 9 and an annular side wall 10 conforming to the outer surface of the valve core 3. The side wall of the valve cap is provided with a discharge opening 11 which extends through the margin of the end wall 9. At either side of the opening 11, the side wall forms tapering side lips 12 terminating in relatively thin edges 13 which serves as knife or cutting edges. A line drawn between the edges 13 of the lips 12 is tangent to a circle slightly smaller than the diameter of the valve core so that the valve core protrudes slightly through the opening 11 as shown best in FIGURES 4 and 5.

Below the opening 11 the side wall of the valve cap forms an upwardly tapering portion 14 terminating in a thin edge.

The valve cap 2 is provided with an annular channel 15 which receives the annular shoulder 6 and is of sufficient width to clear the stop rib 8. Formed in the channel 15 are two abutments 16 having spaced shoulders limiting relative movement of the valve core and cap between the open and closed positions shown in FIGURES 4 and 5. Adjacent the shoulder engaged by the stop rib 8 when the cap is in its closed position is a rudimentary boss 16*a* the remote sides of the abutments form cam surfaces 16*b*.

The lower extremity of the valve cap is flared as indicated by 17 and the side walls are provided with laterally directed ears 18.

The collapsible tube including the valve core 3 is molded or formed in the manner of conventional collapsible tubes using a soft metal such as lead or aluminum or an appropriate soft metal alloy. The metal or metal alloy, when having the cross sectional thickness intended for the valve core is relatively rigid.

The valve cap is formed of a plastic material having some elastomeric qualities so that the valve cap may be forced in place over the valve core and in interlock with the annular shoulder 6 so that the valve cap cannot be readily removed once it is fitted in place. The cams or beveled portions 16*b* of the abutments permit the cap 2 to be placed in any circumferential relation to the core. The cap may then be forcibly turned to place the stop rib 8 between the abutment shoulders 16. Once in place, the stop rib is limited to movement between the shoulders. The rudimentary boss 16*a* serves to provide nominal resistance to movement of the cap from its closed toward its open position so that it will not be opened accidentally.

The valve cap is preferably molded so that the side lips 12 normally project slightly radially inward from a circle equal to the diameter of the valve core as indicated in FIGURE 10. Thus, when the valve cap is placed into position on the valve core, the extremities of the lips 12 bear slightly against the surface of the valve core.

By reason of the fact that the lips terminate in thin edges, they tend to cut through a semi-solid ribbon which has been discharged through the slot 11 with the result that a minimum amount of residue remains on the exposed outer surface of the valve core or on the outer surface of the valve cap. Also, by reason of the fact that the lips taper laterally from the exposed surface of the valve core the exposed surface may be readily wiped clean.

In some instances, the exposed surface of the core and the surfaces 12 may be used as an applicator for applying a material pressed through the discharge slot 5.

While a particular embodiment of this invention has been shown and described, it is not intended to limit the same to the details of the construction set forth, but instead, the invention embraces such changes, modifications and equivalents of the various parts and their relationships as come within the purview of the appended claims.

I claim:

1. The combination with a container having a neck member, and a closure having a sleeve member surrounding said neck member, of a means for limiting relative movement of said members, comprising:

(a) an annular external rib on said neck member forming a latching shoulder defining a plane essentially perpendicular to the axis of said neck member and an axially sloping cam surface;

(b) an annular internal rib on said sleeve member forming a latching shoulder defining a plane essentially perpendicular to the axis of said sleeve member and an axially sloping cam surface;

(c) at least one of said members being yieldable whereby said sleeve member may be forced axially over said neck member for mutual engagement of said cam surfaces until said shoulders are moved axially apart from each other thereby to lock said sleeve member against removal from said neck member;

(d) a stop lug formed on one of said axially sloping cam surfaces and extending axially therefrom, said stop lug having essentially radially extending stop surfaces on opposite sides thereof;

(e) and a clearance channel for said stop lug, formed in the other of said members, said clearance channel being interrupted by two stop abutments, said abutments having circumferentially spaced confronting stop shoulders defining essentially radially extending surfaces engageable with the corresponding surfaces of said stop lug to confine said members to relative movement corresponding to the movement of said stop lug between said stop shoulders;

(f) said stop abutments having circumferentially elongated cam surfaces at their circumferentially remote sides; whereby, on assembly of said sleeve member and said neck member, should said stop lug be located other than in the space between the stop shoulders of said abutments, said members may be forceably rotated to place said stop lug between said stop shoulders for retention therebetween, and;

(g) a rudimentary boss disposed adjacent at least one of said stop shoulders for yieldably retaining said stop lug against movement toward the other stop shoulder.

2. A container and closure therefor comprising:

(a) a container including a neck member closed at its extremity, said neck member having a side slot intersecting a margin of its closed extremity;

(b) a closure, including a sleeve member closed at one end, said sleeve member having a side slot intersecting a margin of its closed end;

(c) said slots adapted to register with each other to form a discharge opening for said container, and to move relatively into non-registering relation to seal said container;

(d) an annular external rib on said neck member forming a latching shoulder defining a plane essentially perpendicular to the axis of said neck member and an axially sloping cam surface;

(e) an annular internal rib on said sleeve member

forming a latching shoulder defining a plane essentially perpendicular to the axis of said sleeve member and an axially sloping cam surface;

(f) at least one of said members being yieldable whereby said sleeve member may be forced axially over said neck member for mutual engagement of said cam surfaces until said shoulders are moved axially apart from each other thereby to lock said sleeve member against removal from said neck member;

(g) a stop lug formed on one of said axially sloping cam surfaces and extending axially therefrom, said stop lug having essentially radially extending stop surfaces on opposite sides thereof;

(h) a clearance channel for said stop lug, formed in the other of said members, said clearance channel being interrupted by two stop abutments, said abutments having circumferentially spaced confronting stop shoulders defining essentially radially extending surfaces engageable with the corresponding surfaces of said stop lug to confine said members to relative movement corresponding to the movement of said stop lug between said stop shoulders;

(i) said stop abutments having circumferentially elongated cam surfaces of their circumferentially remote sides; whereby, on assembly of said sleeve member and said neck member, should said stop lug be located other than in the space between the stop shoulders of said abutments, said members may be forceably rotated to place said stop lug between said stop shoulders for retention therebetween.

(j) and a rudimentary boss disposed adjacent at least one of said stop shoulders for yieldably retaining said stop lug against movement toward the other stop shoulder.

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