Dec. 27, 1938. W. S. TUCKER 2,141,572

CLOSURE DEVICE FOR COLLAPSIBLE TUBES

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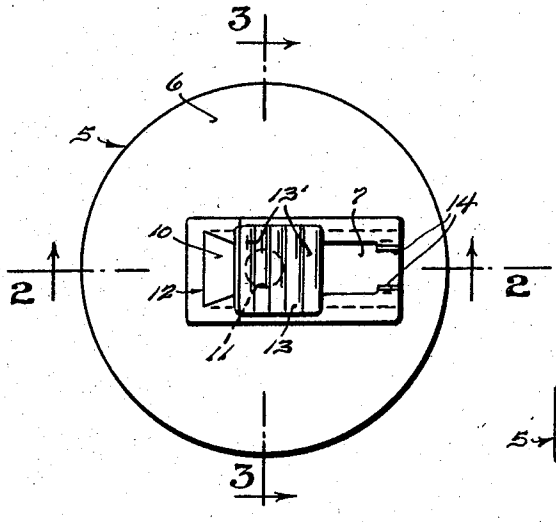


Fig. 1.

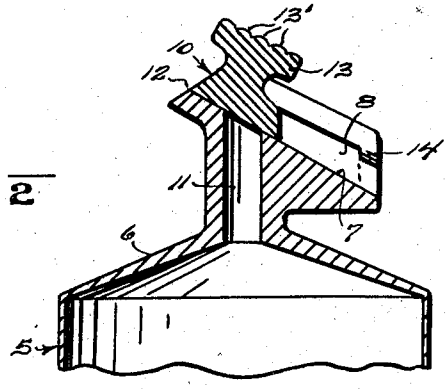


Fig. 2.

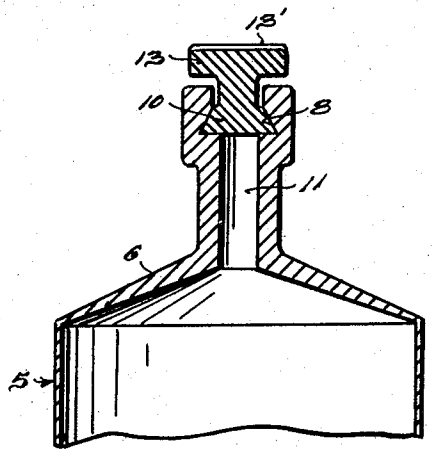


Fig. 3.

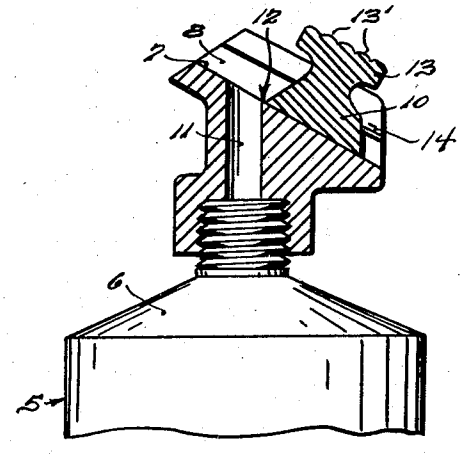


Fig. 4.

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CLOSURE DEVICE FOR COLLAPSIBLE TUBES

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5 Claims. (Cl. 221—60)

This invention relates to closure devices for dispensing containers such as the collapsible tubes commonly used with paste-like or semi-liquid materials, a type of container for which numerous developments have been presented to replace the generally used screw cap. These many developments have in most instances claimed non-removability and a number of the structures have aimed to eliminate, by wiping skirts, excess residual deposit about the discharge opening. Still other arrangements have presented as one object the provision of means, generally a spring-closing plunger, by which operation of the closure may be effected with one hand. It is by reason of prohibitive manufacturing cost that few of the developments heretofore conceived have found any appreciable usage.

It is my object to provide an improved form of sliding closure valve for this character of container and particularly to provide a closure which most effectively achieves each of the several advantages referred to above and which additionally obtains these ends with structure which is simple, inexpensive to produce, and especially durable, structure which, moreover, most advantageously adapts itself to being formed either as a permanent part of the container or as a detachable fitting.

The invention consists in the novel construction, adaptation, and combination of parts hereinafter described and claimed.

In the drawing:

Figure 1 is a top plan view illustrating a preferred embodiment of the invention as applied to the conventional collapsible tube.

Figs. 2 and 3 are longitudinal vertical and transverse vertical sections taken on the respective section lines 2—2 and 3—3 of Fig. 1; and

Fig. 4 is a sectional view similar to Fig. 2 to illustrate the manner in which the closure fitting is formed for detachable engagement with the ordinary type of tube providing a threaded discharge neck.

A collapsible tube with which the present invention is designed for use is designated in the drawing by the numeral 5, the tube being shown fragmentarily but being of that character universally used as a container for shaving and skin creams, tooth pastes, greases, paints and other materials of similar physical characteristics, the act of pressing the walls of the tube serving to extrude the material through a discharge neck which extends as an axial prolongation from the thickened relatively rigid end wall 6 of the tube.

According to the present invention as I illustrate the same in Figs. 1, 2, and 3, a valve body is carried above the tube wall 6 and this body may be molded or in any other suitable or desired manner formed as an integral part of the tube. Located to lie at an oblique angle relative to the axial line of the tube, said valve body in its upper surface provides a valve slide which is formed as a dove-tail channel presenting a floor 7 bordered laterally by side walls 8 which converge inwardly. The valve 10, guidably supported for slide movement longitudinally of said channel, is of the gate character and longitudinally is of wedge form tapering slightly, the channel side walls 8 having a similar taper with the progressive diminution thereof being in the direction of the slide's upper extremity. 11 indicates a bore leading from the interior of the tube to a discharge port located centrally of the channel floor in proximity of the upper end.

Through a location of the valve's forward wall in retrogressive relation to the port-closing underside of the same I provide a most effective wiping edge represented at 12, 13 designating a finger-actuated knob integral with the valve and extending therefrom through the thoat of the slide channel, said knob being provided with transverse surface ribs 13' to facilitate the engagement of the operator's finger. The oblique-angular path of travel of said valve permits the operator, with his forefinger, to readily move the valve-actuating knob while grasping the tube between the thumb and the remaining fingers of one hand. The valve, preferably, is of aluminum composition while the lead which desirably is utilized in forming the channeled body permits the rear extremities of the channel side walls, following introduction of the valve, to be indented as at 14 in a manner to secure the valve against dislodgment from the slide.

In Fig. 4 is represented an arrangement in which the valve assembly is detachable, a threaded socket concentric with the bore 11 engaging the male threads formed on the neck of the conventional tube.

The contents of the tube act as an effective lubricant for the valve which, in use, is retracted by the operator's forefinger to the position shown in Fig. 4, it being noted that no obstruction is present to interrupt the flow of the material as the same is extruded under the action of pressing the tube. Following discharge of the desired amount, the valve is advanced into the position shown in Fig. 2, the wiping edge removing residual material from the channel floor and the wedge action as between the valve and the chan-

nel side walls frictionally resisting dislodgment of the former from its port-closing position in which the port is effectively sealed.

It is obvious that the invention might be modified in many respects without departing from the spirit thereof, it being my intention that no limitations be implied excepting as the same may necessarily be introduced to the following claims to distinguish over the prior state of the art.

What I claim, is:

1. Closure mechanism for a collapsible tube comprised of a valve body provided with a surface channel having a port in the wall thereof communicating with the interior of the tube, and a gate valve fitting said channel for slide movement into and from lapping relation to the port, said valve-way together with the valve having a longitudinal taper acting to obtain a wedge action of the valve in the port-lapping travel of the same.

2. Closure mechanism for a collapsible tube comprised of a valve body provided with a valve-way having a port in the wall thereof communicating with the interior of the tube, and a gate valve slidably fitting said valve-way for movement into and from lapping relation to the port, said valve-way and valve being transversely of a dove-tail configuration and having a longitudinal taper whereby to obtain a wedge action of the valve in the port-lapping travel of the same.

3. Closure mechanism for a collapsible tube of the described character providing a duct for the discharge of the tube contents, said mechanism comprising the combination of a gate valve, a body member formed with a surface channel expanded at its base to form a valve-way by which to slidably support the valve, the floor of said channel being formed with a port arranged to communicate with the discharge duct of the tube and said valve-way, together with the valve, having a longitudinal taper in the direction of said port to obtain a wedge action of the valve in the port-lapping travel thereof, the lateral ribs which define a reduced throat leading to said valve-way being terminally crimped following introduction of the valve to provide rear stops which coact with the forward taper of the valve-way for securing the valve against dislodgement from the valve-way, and means comprising a knob extension projecting from the valve through said reduced throat to permit finger-actuation of the valve.

4. A collapsible tube comprised of the combination of a compressible container having a surface channel at one end, acting as a valve-way, which is located at an oblique angle to the axial line of the tube, said valve-way having a wall port in proximity of the upper end of the same communicating with the interior of the tube, and a gate valve supported in the valve-way for sliding movement into and from lapping relation to the port, the valve having a knob extension projecting through the throat of the channel of which the exposed surface is transversely milled to obtain a finger grip for actuating the valve longitudinally of the valve-way, said valve and the valve-way therefor being formed with upwardly diminishing depth to obtain a wedge action of the valve in the port-lapping travel of the same.

5. A closure device for the purpose described comprised of the combination of a gate valve and a supporting body channeled to provide a valve-way by which to slidably support the valve for longitudinal movement, said body in the floor of the channel providing a port lapped by the underside of the valve in the longitudinal travel of the valve, the forward wall of the valve being disposed to lie in retrogressive relation to said port-lapping underside to define an advanced tip between the same operating as a wiping edge for removing residual material from the channel floor, the channel being formed with a longitudinal taper to obtain increasing pressure as between the valve and the channel progressively with the longitudinal port-lapping travel of the valve.

WILMON STEVENS TUCKER.