

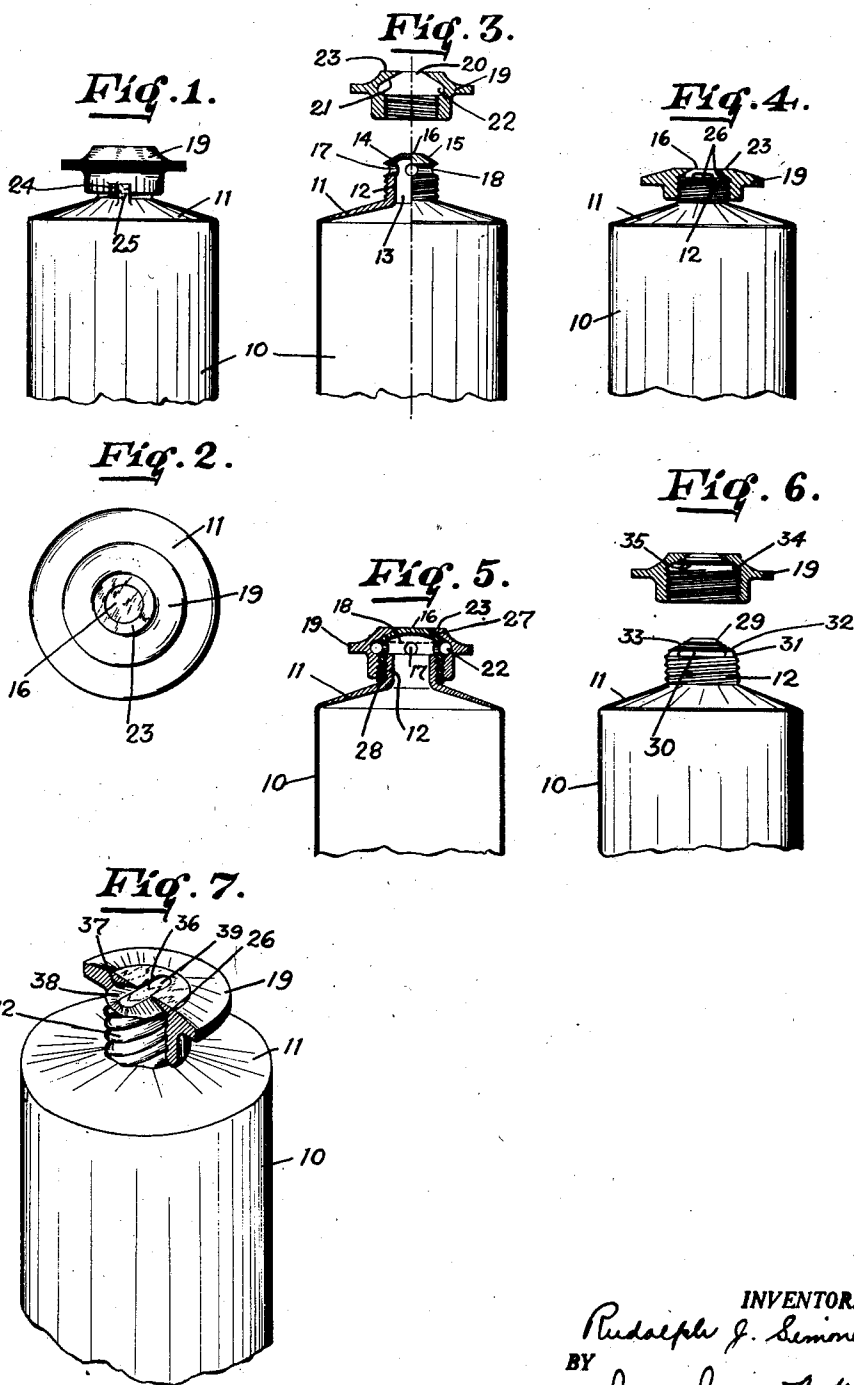
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R. J. SIMONEK

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CLOSURE

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INVENTOR.
Rudolph J. Simonek
 BY *Lucas Simon Anderson*
 ATTORNEYS.

UNITED STATES PATENT OFFICE

RUDOLPH J. SIMONEK, OF NEW YORK, N. Y., ASSIGNOR TO DENNIS KING, OF GREAT NECK, NEW YORK

CLOSURE

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This invention relates to improvements for closures for containers and more particularly with reference to some of its specific features it relates to an improved closure especially adapted for containers of paste like or similar materials adapted to be removed from the containers such as collapsible tubes by extrusion.

It is a general object of the invention to provide an improved closure of the class mentioned which, while being simple and inexpensive in construction, will effectually open and close and seal the container while it is unnecessary to completely remove the closure from its position on the container.

A further object of the invention is to provide an improved closure of the class mentioned which effectually avoids all external crevices, pockets, recesses, corners or like places in which the contents may accumulate during extrusion thereof, or in which dirt or refuse material might accumulate, the exterior surfaces being thus easily maintained in clean and sanitary condition while waste is prevented.

Still another object of the invention is to provide an improved closure of the class mentioned wherein the passageways leading to the exit are automatically kept free to passage of material therethrough, and drying of the material in said passageways or otherwise clogging thereof is effectually prevented.

Another object is to provide an improved closure of the class mentioned adapted for ready application to containers of existing construction such for example as collapsible tubes or the like.

Another object is to provide an improved closure of the class mentioned in which the cooperating closing parts form when in closing position a smooth continuous surface adjacent to the exit opening from which adhering particles of extruded contents may be readily wiped off or otherwise removed thus keeping the container in clean and sanitary condition and preventing waste.

Other objects of the invention will be in part pointed out in the following detailed description of certain illustrative but preferred

embodiments of the invention and will be in part obvious in connection therewith.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a complete understanding of the nature and objects of the invention, reference is had to the following detailed description and to the accompanying drawings in which:

Fig. 1 is a side view of a collapsible tube embodying the invention;

Fig. 2 is a plan view thereof;

Fig. 3 is a central vertical sectional view;

Figs. 4, 5 and 6 are views similar to Fig. 3 but showing respectively slightly modified embodiments of the invention; and

Fig. 7 is an enlarged perspective view of another embodiment of the invention.

Referring to the drawing for a detailed description of the invention, and first to the embodiment thereof shown in Figs. 1, 2 and 3, the invention is shown for illustrative purposes as applied to a container in the form of a collapsible tube having a collapsible body part 10, a head or top part 11 and a neck 12 which may, as shown, be integral with the top part of the container and provided with external threads for the reception of a cap or outer closure member.

As clearly shown in Fig. 3, a passageway 13 leads into the tube neck communicating with the interior compartment of the container through which the container contents may pass when being discharged. As shown, the neck carries an inner closure member or valve part indicated generally at 14, and in Fig. 3, this part is shown as being integral with the container neck. This valve part has an interior recess which may form a continuation of the passageway 13 but is closed at its outer end, this end closure embracing in the embodiment shown, a closure surface 15 preferably inclined to the axis of the container neck and in the form shown being conical, although for some purposes this surface may be spherical or otherwise curved. At its outer part, the closure member embodies a

head or ceiling 16 which preferably has a smooth outer surface lying at an angle to the closure surface 15. Thus, in this embodiment of the invention, the closure member 14 is substantially in the form of a conical frustum or truncated cone of which the smaller base is formed by the head or ceiling 16.

Openings 17 extend through the walls of the valve part 14 communicating with the inner passageway 13 and through which the container contents pass. There may be as many of these openings or ports as desired, four being shown in Fig. 3, and they are preferably equally spaced apart around the closure member whereby the discharging material is equally distributed. A groove or channel 18 may be formed in the valve part 14 preferably extending circumferentially thereof and registering with the ports 17. Both the ports and channel 18 are, as shown, preferably positioned just below the closure surface 15 and therebetween, and the threads of the neck 12.

The outer closure member or cap 19 is shaped and proportioned to fit over the valve part 14 and the container neck, and, as shown, preferably has a lower flange or rim internally threaded for screwing upon the threads of the neck. The pitch of the threads is preferably quite large so as to open the cap to considerable extent with a small degree of cap rotation, less than a single turn being sufficient to open the cap to the desired extent for discharge of the contents. At its outer part is an exit or discharge opening 20 for passage of the material from the container and just below and adjacent said opening is an interior closure surface or seat 21 preferably inclined to the axis of the cap and corresponding in its inclination to that of the closure surface 15 of the valve part, whereby the latter may close tightly against the conical surface 21 to provide a sealing closure for closing the discharge opening from the interior compartment of the container. A circumferential channel or groove 22 is preferably formed in the interior surface of the cap being positioned below said seat 21 and therebetween, and the internal threads of the cap which cooperate with the external threads of the neck for holding the cap in position and adjusting it.

Thus when the cap is in closing position, the channel 22 is in alignment or registry with the channel 18, these two channels thus forming a distribution chamber into which the material passes on its way to the discharge opening 20. By means of this chamber therefore the material may be distributed substantially uniformly over and around the closure surface 15 in passing through the discharge opening 20. This chamber is also proportioned to receive a sufficient amount of material therein so as to effectually prevent clogging, due to the drying out of the material

therein during periods of disuse, or to other similar causes.

As shown, the cap 19 is preferably provided at its outer face with a smooth surface 23 surrounding the discharge opening 20 and preferably extending all the way around said discharge opening and completely up to the edge thereof. The purpose of this surface 23 is to form, in conjunction with the adjacent surfaces 16 of the valve part, a smooth continuous wiping surface from which adhering particles of material from the container, or other refuse may readily be removed. The wiping surfaces 16 and 23 may be and preferably are flat as shown but they may also be otherwise shaped; for example, they may be spherical. Whatever may be their shape, the wiping surfaces are so constructed and relatively arranged that when the cap is in fully closed position, said surfaces lie in smooth continuous extension of each other so as to form in effect a single smooth continuous wiping surface avoiding all corners, recesses, pockets, crevices, and similar places in which the discharging contents or other refuse material might accumulate.

When it is desired to discharge some of the container contents, the cap is partially unscrewed from its closing position on the container neck, thus separating the closure seats 15 and 21 and forming an annular passageway between the distribution chamber 18, 22 and the discharge opening 20. Pressure on the container contents will then cause said contents to be discharged through the discharge opening 20. When the cap is again closed by turning it in reverse direction, the paste or other material between the closure surfaces may be partially squeezed out onto the wiping surfaces 16, 23, so that there may be some adhering particles upon said surfaces. These particles may be readily removed by wiping across the wiping surfaces with an appropriate wiper such as a finger or a rag. Due to the smooth and unobstructed character of the wiping surfaces all adhering material may be readily wiped away at a single stroke, and the closure thus left in clean and sanitary condition.

In opening the closure device for discharging the contents as above described, it is not necessary to entirely remove the cap from the threads of the container neck, and in fact considerably less than a single turn of the cap is ordinarily sufficient to provide a sufficiently large passageway for the discharge of the material. Therefore, in order to hold the cap captive on the tube, a device is preferably provided to limit its turning movement such for example as the lug 24 on the cap which cooperates with the companion lug 25 on the tube. The lug 25 may be deflected outwardly slightly permitting the lug 24 to pass therebeneath when the cap is being initially turned into position upon the tube neck. When the

cap is screwed fully into operative position, the lug 25 is allowed to spring back or is pressed back into position so as to contact with the lug 24. Thereafter, in turning the cap reversely to open the closure, the lug 24 will engage lug 25 to limit the opening movement of the cap to a predetermined extent. However, in turning the cap to closing position, the lugs 24 and 25 will not engage with each other because the closure seats will engage with each other to stop the turning movement and seal the container before the lug 24 is turned a sufficient amount to engage the lug 25.

In the modifications of the invention, as shown in Figs. 4, 5 and 6, the general construction is similar to that already described, and corresponding parts are designated by the same reference numerals. In Fig. 4, however, the discharge openings 26 extending through the walls of the inner closure member or valve part 14 are circumferentially elongated as shown whereby these openings of themselves effect distribution of the material as it passes from the interior of the container to the interior of the cap 19. In this case, as shown, it may be desirable to omit the circumferential channel on the valve part corresponding to the channel 18 of Fig. 3, also that on the cap.

According to the embodiment of the invention shown in Fig. 5, the inner closure member or valve part 27 corresponds in general external contour to the valve part 14 of Fig. 3, but the part 27 is formed separately from the tube neck and has a downwardly extending rim or flange 28 internally threaded so as to be screwed in position upon the threads of the tube neck as shown, or this closure part may be otherwise detachably secured to the neck of the tube. It preferably is shaped to have a tight or pinch fit on the neck of the tube so as to avoid turning when the cap is screwed off or on. The flange 28 is also preferably externally threaded as shown and the cap 19 may be internally threaded and secured in position on these external threads, and functions in a manner to close and open the tube similar to that already described in connection with Fig. 3. Otherwise, the operation of this embodiment of the invention is the same as described in connection with Fig. 3 and will be readily understood by those skilled in the art without further detailed description.

In Fig. 6, the inner valve part 29 is generally similar to that of Fig. 3 or 4 but in this case, the discharge openings 30 leading from the inner compartment of the tube through the walls of said valve part are considerably elongated circumferentially. In this embodiment, the openings 30 are relatively elongated to a greater extent than the openings 26 of Fig. 4, and due to this greater elongation, there may be a less num-

ber of openings, two being shown in this embodiment. Also a distribution channel 31 similar to the channel 18 of Fig. 3 may be employed extending continuously around the valve part 29 in alignment with the openings 30. This distribution channel may function in a manner similar to that described in connection with Fig. 3.

Also in order to form a tighter sealing joint, when the cap 19 is closed, the conical closure surface 32 of the valve part may be formed with one or more circumferential grooves 33 extending fully around said closure surface, and the inner closure seat 34 of the cap may be similarly formed with one or more circumferential ribs 35 extending entirely around the closure seat. The surfaces of these grooves and ribs are preferably inclined to the axis of the tube neck as shown. Thus when the cap is screwed down into closing position, these surfaces will engage with each other so as to form a tight sealing joint.

According to the embodiment of the invention shown in Fig. 7, the cap 19 is generally similar to that disclosed in Figs. 1 and 4, but in this case the discharge or dispensing opening 36 corresponding to the dispensing opening 20 is oblong or elongated in shape and as shown may be oval.

The interior closure seat 37 corresponding to the seat 15 above described is preferably inclined to the axis of the cap and the closure surface 38 of the tube neck is inclined to the axis of said neck and its shape is complementary with that of the seat 37 so as to engage with the latter to form a seal for the dispensing opening 36. The outer end wall or head 39 of the tube neck is preferably flat as shown and oblong to fit in the oblong opening 36, and when the cap is in closed position, the outer surface of this head is adapted to lie flush and in smooth continuation of the adjacent surface of the cap so as to form a smooth and unobstructed wiping surface as described above in connection with the other modifications. At its base, adjacent the tube neck, the inclined closure surface 38 is substantially circular and this surface merges into oblong form at the surface of the head 39.

The outer cylindrical surface of the neck 12 and the adjacent inner surface of the cap are preferably threaded as are the other embodiments described and the thread is preferably double or triple as in the other forms. Also the pitch or inclination of these threads as in the other forms is preferably quite steep so that the inclination thereof with reference to the axis is greater than the inclination of the inclined closure seat 38 and the latter, as shown, is preferably quite flat. With this arrangement, the cap moves rapidly away from seating position upon the neck when turned to open the dispensing

opening and similarly when the cap is turned to closing position the movement toward closing position is relatively very rapid.

Therefore, although the mating closure surfaces are not strictly conical, they the brought into sufficient proximity with each other to satisfactorily seal the dispensing opening when the cap is turned into closing position as shown in the drawing. With this form of closure, the container contents can be dispensed in ribbon form. It will be understood that openings or ports 26 extend through the walls of the neck as in the other embodiments described through which the container contents pass to the interior of the cap.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A closure for containers including, in combination, an outer closure member having an opening for passage of the container contents and having a conical closure seat adjacent said opening, and an inner truncated conical closure part seating against said closure seat, said container having a discharge passageway communicating with the interior of the container and opening into the interior of said outer closure member below said closure seat, said conical closure part having a peripheral channel and said outer closure member having an interior channel registering with said first mentioned channel when the closure is in closed position to provide an interior chamber between the closure members into which said discharge passageway opens.

2. A closure for containers including, in combination, an outer closure member having an opening for passage of container contents, an inner closure member having a passageway communicating with the interior of the container and with said outer closure member, said closure members having complementary closure seats adjacent said opening, said inner closure member having an external peripheral channel into which said passageway opens and said outer closure member having an internal channel registering with said first mentioned channel to pro-

vide an interior chamber between the closure members, a neck for the container, a detaching sealing joint between said neck and said inner closure member and an adjusting connection between said outer and inner closure members for opening and closing said seats.

In testimony whereof I affix my signature.
RUDOLPH J. SIMONEK.

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