Nov. 17, 1942. T. F. E. FUCHSLOCHER 2,302,540

CLOSURE CAP

Filed April 15, 1940 2 Sheets-Sheet 1

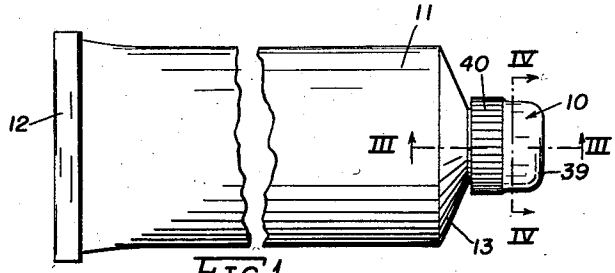


FIG. 1.

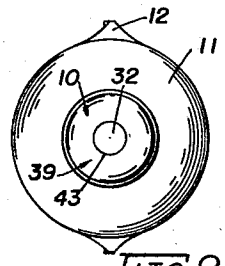


FIG. 2.

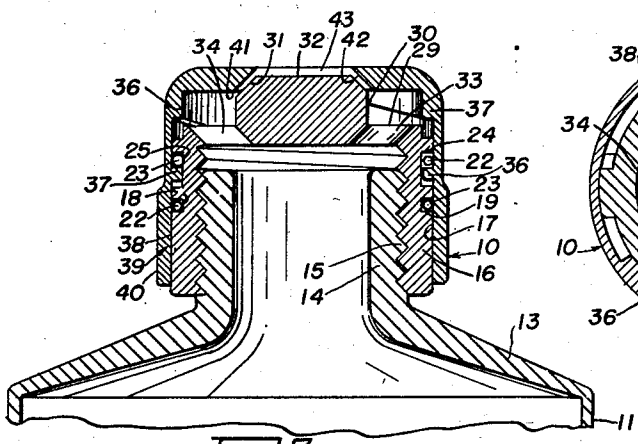


FIG. 3.

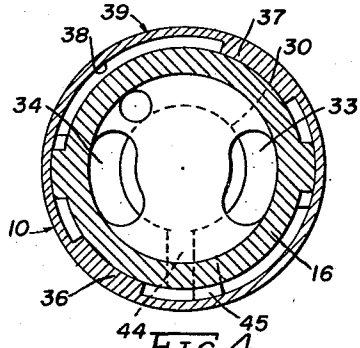


FIG. 4.

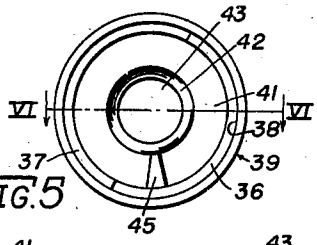


FIG. 5.

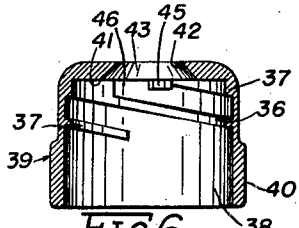


FIG. 6.

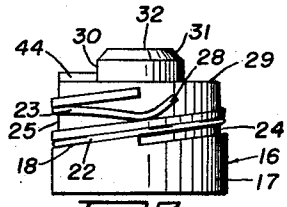


FIG. 7.

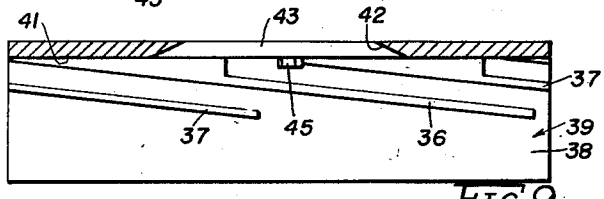


FIG. 9.

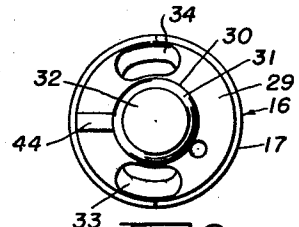


FIG. 8.

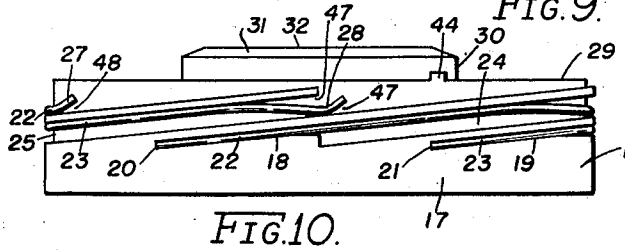


FIG. 10.

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CLOSURE CAP

Filed April 15, 1940 2 Sheets-Sheet 2

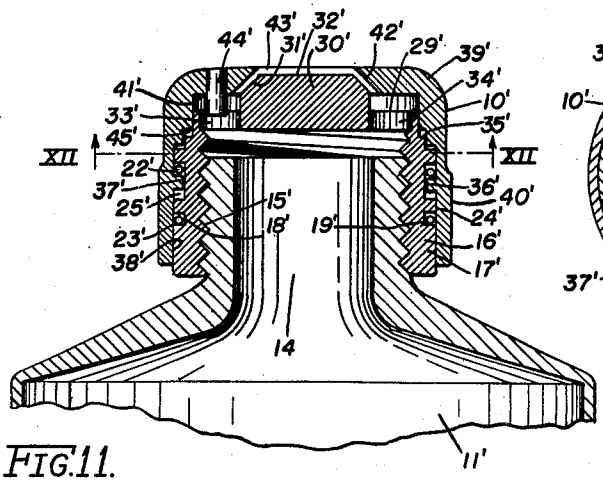


FIG. 11.

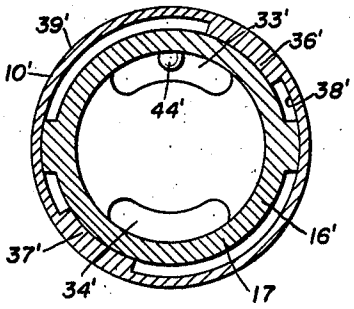


FIG. 12.

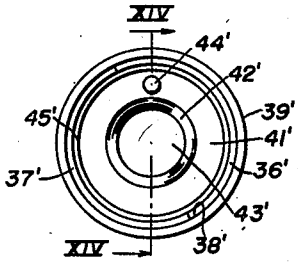


FIG. 13.

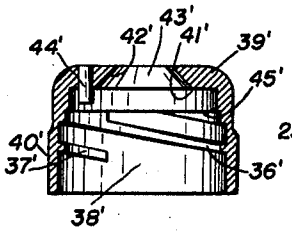


FIG. 14.

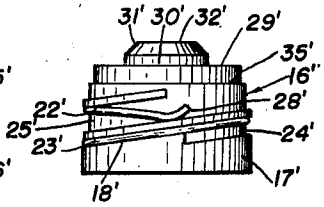


FIG. 15.

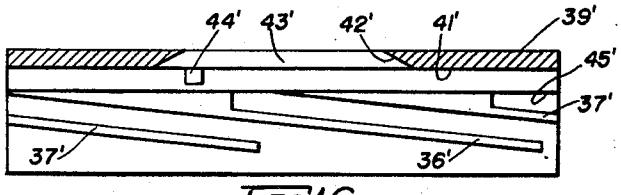


FIG. 16.

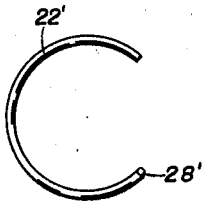


FIG. 18.

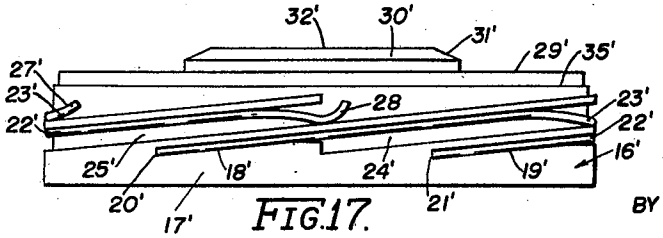


FIG. 17.

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UNITED STATES PATENT OFFICE

2,302,540

CLOSURE CAP

Theodor F. E. Fuchslocher, Van Nuys, Calif., assignor, by direct and mesne assignments, of twenty-two per cent to Hildegard Moser Behrens, Los Angeles, Calif., twenty-two per cent to Gertrude S. Tenderich, Denver, Colo., and twenty-two per cent to Harry C. Alberts, Chicago, Ill.

Application April 15, 1940, Serial No. 329,659

11 Claims. (Cl. 221—60)

This invention relates to improvements in closures for dispensing tubes and more particularly to closure caps for collapsible tubes of the type generally used to dispense plastic substances such as tooth paste, shaving cream and cosmetic preparations, although certain features thereof may be used with equal advantage for other purposes.

It contemplates more especially the provision of a simple and inexpensive self-closing cap structure that is readily associated with the discharge end of containers such as collapsible tubes and similar dispensers.

Numerous types of automatic closures for collapsible tubes and the like have heretofore been proposed, but these have either been too expensive in construction to warrant their general adoption or were so designed by necessity or otherwise to expose the internal operating elements to the contents which was found highly undesirable from a self-closing operating standpoint. The internal operating members must be simple and comprise few parts that are uninfluenced by the deposit of the contents thereon or between the coacting elements which would impede their normal operation and preclude dependable closing over an extended period of use. To the end of eliminating these undesirable characteristics, the coacting elements must be simple in construction and so arranged as to serve their intended function without being hampered or impaired by contact with the contents.

In the present embodiment, the coacting elements are rendered self-closing by a spring mechanism that is entirely free from contact with the contents that is discharged through the closure. To this end, an improved structure has been provided whereon the automatic self-closing spring expedient cannot come in contact with the contents and the closure is so constructed as to render it possible to cast, mold or stamp the component elements from metallic as well as plastic compositions. Accordingly, a very dependable and inexpensive closure structure has been provided that will be self-closing and simultaneously seal the contents against exposure. These are the primary requirements of a closure cap for containers which are ordinarily destroyed after the contents have been exhausted.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide an improved automatic self-sealing closure cap for dispensing tubes of the collapsible or conventional type.

Still another object is to provide an improved self-sealing closure cap constituting an independent unit adaptable for threaded connection to the discharge neck of standard collapsible or conventional dispensing containers.

A further object is to provide a simple and improved automatic closure unit for dispensing tubes that is responsive to the alternate external application and relaxation of pressure on the contents of the tube to effect self-closing without subjecting the actuator to the contents.

A still further object is to provide an improved automatic closure cap comprising relatively few parts of simple construction that facilitates the ready assembly thereof with the tube on a mass production scale, and is provided with a self-closing spring expedient that is concealed from exposure to the contents.

Still a further object is to provide an improved automatic closure unit for a dispensing tube that is capable of being locked against accidental discharge of the contents during the non-use thereof.

An additional object is to provide a novel self-closing spring means in conjunction with a container closure that will effectively close the discharge opening without impairment from exposure to the contents.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:

Figure 1 is a plan view of a dispensing tube assembled with a closure cap embodying features of the present invention.

Figure 2 is a side view of the assembled tube and closure cap shown in Figure 1.

Figure 3 is an enlarged fragmentary sectional view in elevation taken substantially along lines III—III of Figure 1 showing the structural details of the closure cap embodying features of the present invention.

Figure 4 is an enlarged fragmentary sectional view of the closure cap taken substantially along lies IV—IV of Figure 1.

Figure 5 is a bottom view of an external cap member constituting an element of the closure structure shown in Figures 1 and 3.

Figure 6 is a sectional view in elevation of the external cap member shown in Figure 5.

Figure 7 is a front view in elevation of the valve member constituting a complement of the external cap member shown in Figures 5 and 6.

Figure 8 is a plan view of the valve member shown in Figure 7.

Figure 9 is a flat development of the cap members shown in Figures 5 and 6.

Figure 10 is a flat development of the valve members shown in Figures 7 and 8.

Figure 11 is a fragmentary sectional view in elevation of a modified closure cap embodying features of the present invention.

Figure 12 is a sectional view taken substantially along line XII—XII of Figure 11.

Figure 13 is a bottom view of an external cap member constituting an element of the closure structure shown in Figures 11 and 12.

Figure 14 is a sectional view in elevation of an external cap member taken substantially along line XIV—XIV of Figure 13.

Figure 15 is a front view in elevation of a valve member constituting a complement of the external cap member shown in Figures 13 and 14.

Figure 16 is a flat development of the cap members shown in Figures 13 and 14.

Figure 17 is a flat development of the valve member shown in Figure 15.

Figure 18 is a plan view of a spring member shown in operative association with the valve member in Figures 15 and 17.

The structure selected for illustration comprises a closure unit 10 assembled with a cylindrical content dispensing tube 11 of the collapsible or pliable type generally used for dispensing semi-liquid pastes and creams such as tooth paste, shaving cream and cosmetic preparations. The collapsible or pliable tube 11 is made of suitable flexible metal well known in the art having one end 12 closed in the usual manner by crimping with the opposite end 13 terminating in a centrally disposed open discharge neck 14 externally threaded as at 15 to receive the correspondingly internally threaded closure unit 10 as will appear more fully hereinafter.

The tubular discharge neck 14 may be of any size and threads 15 thereon may conform to the type presently used on tooth paste, shaving cream or other popularly used contents marked in collapsible containers 11. In the present embodiment, the closure unit 10 consisting of an internally threaded cylindrical member 16 that is threaded to correspond with and serve as a complement of the external threads 15 on the container neck 14 for engagement therewith. As shown, the internally threaded cylindrical valve member or sleeve 16 has its periphery 17 provided with pairs of parallel spaced spiral grooves 18 and 19 preferably of double or triple pitch that are cut, molded, stamped or otherwise impressed therein depending upon the dictates of commercial practice.

It should be noted that the starting extremities 20 and 21 of the grooves 18 and 19 are horizontally aligned and diametrically opposed in location around the periphery of the wall 17 and the grooves 18 and 19 emerge therefrom for a partial turn to assume the width and depth corresponding with the dimensions of wire spring members 22 and 23, respectively, lodged therein for the relative distance corresponding substantially to a 90° arc or one-quarter segment. This is defined herein generally as a sector of the entire surface extent of the cylindrical valve body 16. Beyond the sector, the grooves 18 and 19 emerge into correspondingly shaped wider grooves 24 and 25 that extend for substantially the entire surface extent of the valve body periphery 17 to provide an overlap beyond the initial narrow grooves 18 and 19 for reasons that will appear more fully hereinafter.

The wire springs 22 and 23 are helically shaped to define a substantially circular configuration and each terminates in downwardly directed upwardly extending hooks 27 and 28 so as to engage the lower surface of the wide grooves 24 and 25 to hold the remaining portion of the springs 22 and 23 against the upper surface thereof to provide a reciprocal limit of movement commensurate with the width of the wide grooves 24—25 less the diameter of the comparatively thinner wire springs 22—23 as will appear more fully hereinafter.

As shown, the valve body 16 terminates upwardly in a peripheral shoulder 29 which merges with an upstanding peripheral wall 30 provided with an upwardly inclined valve surface or seat 31 terminating in a flat circular tip or head 32 positioned axially of the cylindrical sleeve 16 that may be termed a valve member. In order to permit the passage of the container contents through the valve member 16, a plurality of arcuate openings 33 and 34, in this instance two, are provided in the shoulder 29 outside of the upstanding wall 30 with its inclined valve surface or seat 31, but extend proximate to the peripheral wall 30. This arrangement of openings 33—34 extends for a substantial portion of the circumference of the flat shoulder 29 so that the desired volume of contents can be extruded therethrough by subjecting the collapsible container 11 to manual pressure and further rolling the enclosed end 12 in the customary manner to discharge the contents through the tubular neck 14 thereof.

As shown, the wide spiral grooves 24—25 in the peripheral surface 17 of the valve body 16 cooperate with correspondingly shaped projecting ridges 36 and 37 formed in the interior cylindrical wall 38 of a cap member 39 having an external diameter corresponding with the exterior diameter of the valve member 16 for relative rotation therebetween and to provide a close fitting closure therefor. The cap member 39 has an exteriorly knurled annular peripheral shoulder 40 to enable the manual finger grasp thereof for imparting convenient rotation thereto as will appear more fully hereinafter. The inner wall 38 extends upwardly for a distance commensurate with the exterior smooth cylindrical wall 17 of the valve member 16 so as to constitute a complement thereof. To this end, the inner top surface 41 of the cap 39 is provided with an upwardly inclined conical seat 42 corresponding to and serving as a complement of the valve seat 31 so as to present close fitting contacting surfaces to close the content passage openings 33—34 when the valve member 16 and the cap member 39 are in engaging contact between their smooth conical seats 31—42. The conical seat 42 in the cap member 39 terminates in a circular opening 43 that extends axially therethrough to receive the correspondingly shaped head 32 of the valve member 16 to serve as a fitting closure therefor in conjunction with the conical surfaces 31—42 which merge downwardly therefrom.

In order to retain the valve member 16 and the cap member 39 in assembled relation while permitting their radial as well as reciprocal relative displacement against the urge of the circular wire spring member 22—23, the shoulder 29 of the valve member 16 is provided with a radial lug 44 that cooperates with a correspondingly shaped lug 45 that depends from the interior top surface 41 of the cap member 39. As a result, the valve member 16 is screwed into the cap member 39 so that the wide helical grooves 24—25

receive the correspondingly shaped narrower threads or convolutes 36—37 on the interior wall 38 of the cap member 39 until the radial lugs 44—45 engage each other. Thereupon, the valve member 16 is axially displaced outwardly against the axial urge of the springs 22—23 and within the limits of the free space in the wide grooves 24—25. This movement is relative to the cap member 39 so that the lug 44 will be disposed below and out of the plane of the lug 45 to permit the former to become lodged behind the latter as at 46 (Figure 6) and thus preclude their separation. The closure 10 is dismantled by following a reverse procedure and thus effecting the axial relative displacement between the valve member 16 and cap member 39 against the axial urge of the springs 22—23 within the limits of the free space in the wide grooves 24—25 until the lugs 44—45 are displaced from each other's path and permit free convolute or spiral displacement until separated.

It will be observed, therefore, that the wire springs 22—23 will tend to displace the cap member 39 downwardly so that it tends at all times to normally engage the valve tip 32 so that the inclined and complemental valve seat surfaces 31—42 will be normally in engaging contact to close the openings 33—34 in the valve member 16 and the axial opening 43 in the top of the valve member 39. This axial urge imparted by the wire spring members 22—23 is occasioned by virtue of the fact that the complementally shaped ridges or tongues 36—37 extending inwardly from the interior cylindrical wall 38 of the cap member 39 ride in the grooves 24—25 above the wire springs 22—23 and below the upper wall of the grooves 18—19.

This is rendered posssible by the downwardly directed and upwardly inclined hook extremities 27—28 of the spring member 22—23 which permit entrance of the internally projecting cap or convolute ridges 36—37 therebelow as at 47 within the wide grooves 24—25, and below the springs 22—23 to normally urge the cap downwardly upon the valve member 16 with the valve seats 31—42 in contacting engagement. As a result, the downwardly projecting spring extremities 27—28 impart a downward urge upon the cap member convolute ridges 36—37 so that the cap member 39 tends to engage the valve tip 32 so that the inclined and complemental valve seat surface 31—42 will be normally in engaging contact to close the openings 33—34 in the valve member 16 and the axial opening 43 in the top of the cap member 32.

It will be apparent, therefore, that the downwardly directed spring extremities 27—28 will ride the convolute ridges 36—37 in the cap member 39 and serve to permit relative rotation thereof with the valve member 16 so that the complemental closure members 16—39 will normally be in contacting engagement to serve as an automatic closure and discharge orifice in the neck 14 of the container 11. With the position occupied by the wire spring members 22—23 in grooves 18—24 and 19—25 between the convolute ridges 36—37 in the adjacent cylindrical surface 38 of the cap member 39, these actuator elements are totally confined against contact with or exposure to the contents of the container 11 which is extruded through the passages 33—34 and through the cap member opening 43 free from the complemental grooves 18—24 and 19—25 as well as the springs 22—23 constituting the actuating elements which are not impaired by the contents. This is important in that the spring members 22—23 are always free to exert the same influence regardless of the condition of the contents and without contact therewith.

Consequently, the working parts are not "frozen" by the contents of the container 11 after the extended use of the closure members 16—39 while the contents is discharged in increments over interrupted intervals of time. It will be observed, therefore, that when the contents of the container 11 is expelled in increments by external pressure on the walls of the container 11 and by rolling its closed edge 12, the contents will tend to pass through the arcuate openings 33—34 and abut against valve seat surface 42 of the cap member 39, thereby tending to elevate the latter from its valve seat 31 to provide a passage therebetween (Figure 3).

This separating displacement between the complemental valve members and cap member is afforded or permitted by the grooves 24—25 being substantially wider than the internal convolute ridge 36—37 together with the diameter of the springs 22—23, thereby providing space within which axial displacement is possible for a distance sufficient to provide the necessary opening between the cooperating valve seats 31—42. When the pressure on the container 11 has been released or relaxed, the wire spring extremities 27—28 will return the complemental valve member 16 and cap member 39 to their initial closed position with contacting engagement re-established between the valve seats 31—42, thereby closing the passage openings 33—34 and the central discharge opening 43.

So that accidental pressure on the walls of container 11 will not accidentally extrude the contents while the container 11 is being carried in a suit-case or otherwise packed for shipment, locking against any relative separation between the valve member 16 and cap member 39 is effected by merely rotating the latter in a clockwise direction (viewed from Figure 2) relative to the valve member 16. This relative rotary displacement is effected with a fractional turn commensurate with the maximum free space 46 between the lugs 44—45 and serves to bring the valve seat 31 tightly against the valve seat 42 in tight frictional engagement owing to the fact that the cooperating spiral or convolute grooves 24—25 ride in and against the convolute cam edges of the ridges 36—37 to bring the cap member 39 down against the valve member 16 in an extreme position.

In this extreme position, the camming edges of the grooves 24—25 and ridges 36—37 in the valve member 16 and cap member 39 assume a position that precludes any further relative reciprocal movement between the complemental members 16—39. As a result, there cannot be any separation between the valve seats 31—42 by any further external application of pressure on the container 11. To further permit the separation of the valve engaging surfaces 31—42 when desired to continue the normal use of the container 11 for the discharge of the contents therefrom, all that is necessary is to turn the cap member 39 in a counterclockwise direction (viewed from Figure 2) so as to return the parts to their initial position and provide for relative displacement therebetween within the limits controlled by the width of the grooves 24—25 relative to the thickness of the springs 22—23 and convolute ridges 36—37.

In the modified embodiment shown in Figures

11 to 18 inclusive, the closure cap 10' is provided with a depending pin 44' that is substituted for the complemental lugs 44—45 in the previously described embodiment (Figures 5 to 10 inclusive). The pin 44' is pressed into the cap 10' to depend downwardly therein for registry with either of the arcuate openings 33' or 34' to determine the rotary displacement commensurate with the arcuate extent of the openings 33' or 34' in the peripheral shoulder 29' of the valve member or sleeve 16'. The arcuate extent of the openings 33' or 34' serves to limit the rotary movement or displacement of the closure cap 10' effective to bring the valve seat 31' tightly against the valve seat 42' in tight frictional engagement owing to the cooperating spiral or convolute grooves 24'—25'.

As in the previously described embodiment, the arcuate convolute grooves 24'—25' ride in and against the convolute cam edges of the ridges 36'—37' to bring the cap member 39' down against the valve member 16' in an extreme position. By resorting to the depending pin 44', it will be observed that the cap member 39' may be assembled with the valve member 16' in any position of registry between the convolute grooves 24'—25' of the ridges 36'—37' in that the pin 44' will register with either the arcuate opening 33' or 34'. In the previously described embodiment, the complemental members must be assembled in a predetermined position so that the cooperating lugs 44—45 will be in the path of each other. This entails a great deal of time, possible error and renders the production thereof more costly. The springs 22'—23' (Figures 15 and 18) are identical with those shown in conjunction with the previous embodiment and function in the same manner to return the parts to their initial positions and render them self-closing.

In order to more effectively preclude the contents of the container 11' from gaining access to the springs 22'—23' or the cooperating grooves 24'—25' and ridges 36'—37', the horizontal peripheral shoulder 29' of the valve body 16' merges upwardly with an upstanding peripheral wall 30' provided with an upwardly inclined valve surface or seat 31' terminating in a flat tip or head 32'. Now, then, the horizontal peripheral shoulder 29' merges downwardly with an outwardly extending peripheral shoulder 35' which is in externally stepped relation therewith to merge with the external peripheral cylindrical wall 17' of the valve member 16'.

In consequence thereof, an additional bearing surface is provided that serves to preclude the contents from entering between the coacting walls of the valve member 16' and cap member 39' that is externally shaped to serve as a complement thereof. To this end, the inner top surface 41' of the cap member 39' is provided with an upwardly inclined conical seat 42' corresponding to and serving as a complement of the valve seat 31' so as to present close fitting contacting surfaces to close the content passage openings 33'—34' when the valve member 16' and the cap member 39' are in engaging contact between the smooth conical seats 41'—42'. The conical seat 42' of the cap member 39' terminates in a circular opening 43' that extends axially thereof to receive a correspondingly shaped head 32' of the valve member 16' to serve as a fitting closure therefor in conjunction with the inner top surface 41' and conical surface 42' to merge downwardly therefrom.

The interior of the cap member 39' is provided with an annular shoulder 45' adjacent to the inner top surface 41' to serve as a complement of the peripheral shoulder 29' on the valve member 16'. The annular shoulder 45' communicates with the somewhat larger inner cylindrical wall 38' of the cap member 39' to serve as a complement of the valve member 16' which is in close fitting contact therewith to provide stepped confronting bearing surfaces serving to confine the springs 22'—23' in between the complemental helical grooves 24'—25' and corresponding ridges 36'—37' on the valve member 16' and cap member 39', respectively. With this arrangement, it will be apparent that the straight formation of the complemental bearing walls between the valve member 16' and cap member 39' will effectively preclude the entrance of any contents therebetween to impair or affect the relative operation thereof responsive to the urge of the springs 22'—23'.

It will be apparent from the foregoing description that a comparatively simple, dependable and inexpensive closure cap construction of the automatic closing type has been provided with a minimum number of parts and without the normal impairment created by the exposure thereof to the contents of the container 11 as such as discharged therefrom. The locking feature described supra is also of importance and eliminates the undesirable possibility of leakage when the container 11 is not used incidental to the application of pressure externally thereto.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any of the features thereof, and nothing herein shall be construed as limitations of the invention, its concept or structural embodiment as to the whole or any part thereof, except as defined in the appended claims.

I claim:

1. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting means on the adjacent walls of said closure members to provide positive screw rotary and reciprocal movement therebetween, and spring means confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means being disposed between said interconnecting means and serving to render said closure members self-closing upon release of content pressure in said container.

2. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being comple-

mental interconnecting helical means on the adjacent walls of said closure members to provide positive rotary and reciprocal movement therebetween, and spring means cooperating with said interconnecting means and confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means being disposed between said interconnecting means and serving to render said closure members self-closing upon release of content pressure in said container.

3. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting helical means on the adjacent walls of said closure members to provide positive rotary and reciprocal movement therebetween, and a plurality of helical wire spring means cooperating with said interconnecting means and confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means being disposed between the said interconnecting means and serving to render said closure members selfclosing upon release of content pressure in said container.

4. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting helical groove and thread means on the adjacent walls of said closure members to afford rotary and reciprocal movement therebetween, and a plurality of helical wire spring means in said helical groove interconnecting means and confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means serving to render said closure members selfclosing upon release of content pressure in said container.

5. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting helical groove and thread means on the adjacent walls of said closure members to afford rotary and reciprocal movement therebetween, and a plurality of helical wire spring means in said helical groove interconnecting means and confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means serving to render said closure members self-closing upon release of content pressure in said container, certain portions of said helical groove means being wider than said wire spring members to permit commensurate reciprocal displacement between said closure members under the influence of said spring means.

6. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting helical groove and thread means on the adjacent walls of said closure members to afford rotary and reciprocal movement therebetween, a plurality of helical wire spring means in said helical groove interconnecting means and confined between said walls for concealment from the contents passing through the interior of said tubular closure members, and angular extremities on said spring means to render said closure members self-closing upon release of content pressure in said container, certain portions of said helical groove means being wider than said wire spring members to permit commensurate reciprocal displacement between said closure members under the influence of said spring means.

7. In a device of the character described, the combination with a container having a discharge end, of complemental tubular closure members including a valve confronting a valve seat and discharge opening controlled therewith, said closure members having telescopically associated walls surrounding the discharge end of said container for operative connection therewith, said closure members being adapted to open said discharge opening by application of pressure on the contents of the container, there being complemental interconnecting means on the adjacent walls of said closure members to provide positive rotary and free reciprocal movement therebetween, spring means confined between said walls for concealment from the contents passing through the interior of said tubular closure members, said spring means being disposed between said interconnecting means and serving to render said closure members self-closing upon release of content pressure in said container, and means for normally limiting the rotary relative movement between said closure members to a fractional turn for precluding their complete separation and affording rotary locking engagement therebetween.

8. In a closure for containers, the combination with tubular telescopic members having internal passages for the valved discharge of substances therethrough, of cooperating valve seats on said members for controlling the discharge of substances through said passages, complemental helical means axially spaced on the adjacent walls between said closure members to rotatively and reciprocally connect said closure members together, and helical wire members comprising a fractional convolution disposed between said axially spaced helical means.

9. In a closure for containers, the combination with tubular telescopic members having internal passages for the valved discharge of substances

therethrough, of cooperating valve seats on said members for controlling the discharge of substances through said passages, complemental helical groove and rib connecting means axially spaced on the adjacent walls between said closure members to rotatively and reciprocally connect said closure members together, and spring means in said grooves between said rib means to impart a relative axial urge between said members.

10. In a closure for containers, the combination with tubular telescopic members having internal passages for the valved discharge of substances therethrough, of cooperating valve seats on said members for controlling the discharge of substances through said passages, said cooperating valve seats being adapted to open the discharge passages by application of pressure on the contents of the container, complemental helical groove and rib connecting means on the adjacent walls between said closure members, said groove means being wider than said ridge means to rotatively and reciprocally connect said closure members together, and spring means in said groove means between the walls of said telescopic members to render said cooperating valve seats self-closing upon release of the content pressure in said container.

11. In a closure for containers, the combination with tubular telescopic members having internal passages for the valved discharge of substances therethrough, of cooperating valve seats on said members for controlling the discharge of substances through said passages, complemental helical groove and rib connecting means on the adjacent walls between said closure members, said groove means being wider than said ridge means to rotatively and reciprocally connect said closure members together, and a plurality of fractional turn helical spring wire members in said groove means for flexing to permit reciprocal separation of said valve seats responsive to the pressure passage of the substances through said passages.

THEODOR F. E. FUCHSLOCHER.