

Jan. 9, 1962

D. W. MORROW ET AL

3,016,172

CONTAINER CLOSURE

Filed April 3, 1958

2 Sheets-Sheet 1

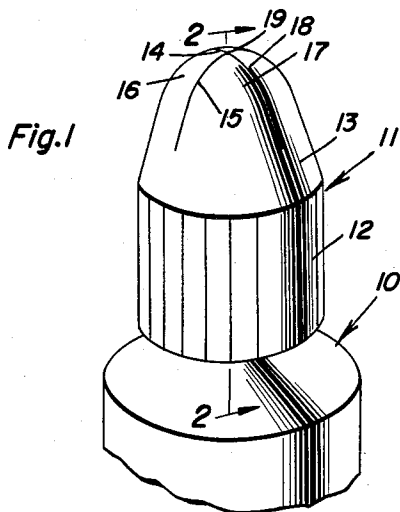
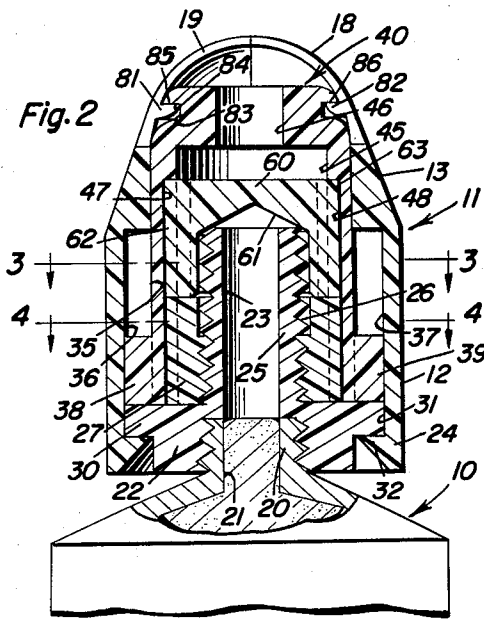
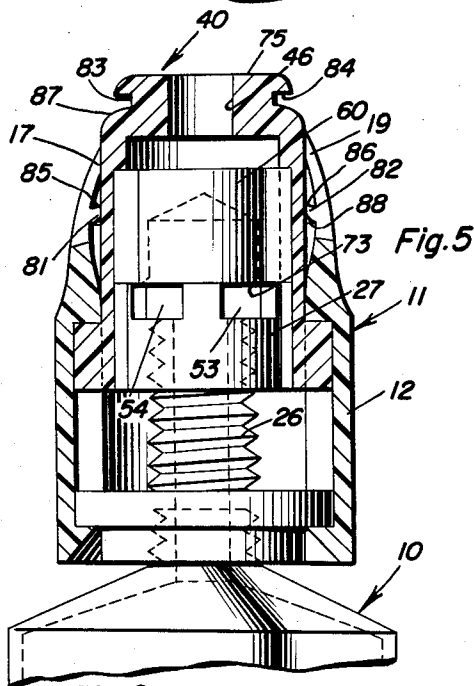
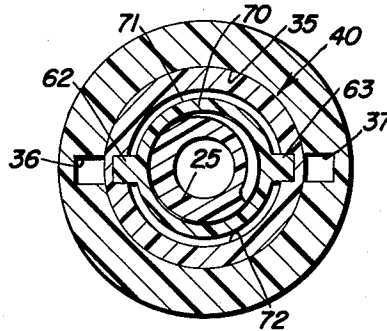
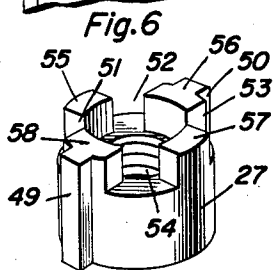
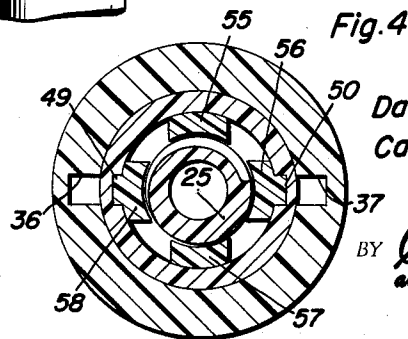


Fig. 3



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2 Sheets-Sheet 2

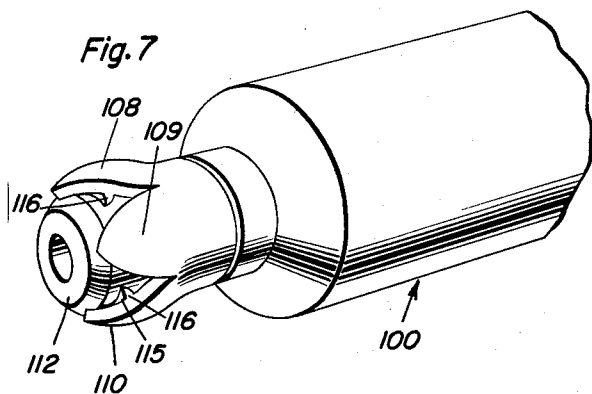


Fig. 8

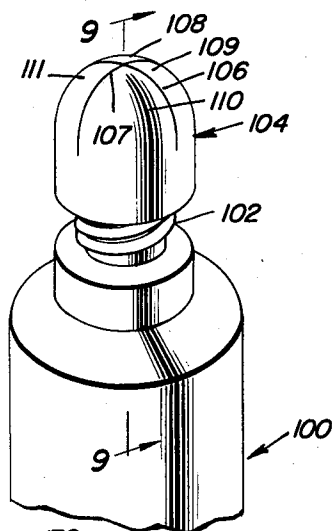
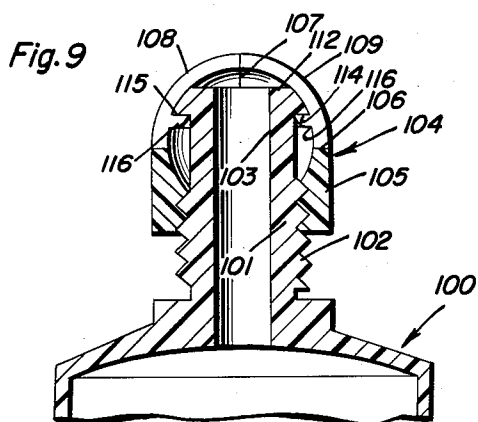
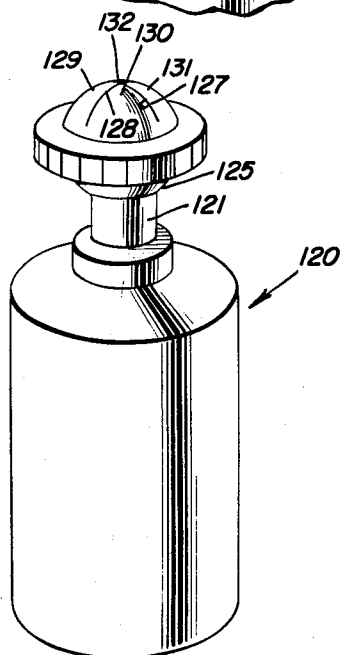
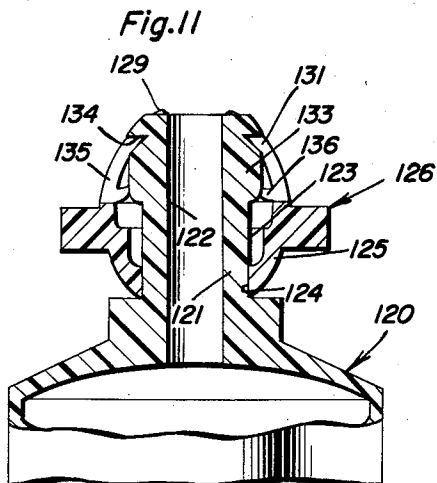


Fig. 10



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CONTAINER CLOSURE

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This invention relates in general to dispensing mechanisms and pertains more particularly to a novel type of closure for containers and the like.

As an example of the utility of this invention, it will be appreciated that such containers as oil paint containers and the like are normally provided with screw cap closure elements threadably engaged on the discharge necks thereof. It frequently occurs that such caps become lost or misplaced so that the tube or container remains open when unused. This usually results, initially, in at least some portion of the paint or the like oozing from the container and, secondly, in a drying out of the paint or the like in the discharge neck thereof. Ultimately, this may cause plugging of the discharge neck and in any event results in a messy and inconvenient condition. It is therefore of primary concern in connection with this invention to provide a novel closure cap or discharge assembly for containers such as oil paint tubes or the like in which the closure cap element thereof is not physically removed or separated from the rest of the assembly to permit dispensing of the material therefrom. Consequently, the cap cannot be lost or misplaced and will at all times remain with the container assembly.

Another object of this invention is to provide a device of the character described incorporating the principle of a closure cap provided with a resilient nose portion having a slit or slits therein providing a plurality of petals or petal-like portions thereof which are normally disposed in closed or folded position such as to effect a closure for an associated discharge member but which petals are, at the same time, capable of being unfolded to permit exposure of the discharge member for dispensing the contents of an associated container, tube or the like.

Still another object of this invention is to provide a device of the character described utilizing a cap member in association with a discharge member wherein the cap encloses and contains the discharge member and wherein such elements are relatively longitudinally movable with respect to each other to selectively effect covering and uncovering of the discharge member.

A further object of this invention is to provide improvements in container closures incorporating a discharge neck, and in association therewith, a closure cap, in which the closure cap is provided with a slit or slits dividing a resilient nose portion thereof into a plurality of petal-like portions and in which the discharge neck and the cap are longitudinally movable relative to each other whereby in one position the discharge neck will be projected through the nose portion to unfold the petal-like portions thereof and permit discharge of the contents of an associated container and in another position the discharge neck will be withdrawn relative to the nose portion to permit the petal-like portions thereof to close and effect a cover for the discharge neck.

Still another object of this invention is to provide an improved container closure assembly employing a discharge member and a cap disposed thereover and including a nose portion which is resilient and is divided into a plurality of petals or petal-like portions which may selectively unfold and close in response to longitudinal relative motion between the cap and the discharge member and in which the cap and discharge member are provided with engageable abutment means serving to forcibly close the petals or petal-like portions of the cap in one

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position of the cap and discharge member with respect to each other.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view showing a container closure constructed in accordance with this invention and illustrating the closed position thereof;

FIGURE 2 is an enlarged sectional view taken substantially along the plane of section line 2—2 in FIGURE 1 and illustrating details of the component parts of the container closure assembly, illustrating the same in closed position;

FIGURE 3 is a horizontal transverse section taken substantially along the plane of section line 3—3 in FIGURE 2 and illustrating the manner in which the component parts are interengaged for cooperative association with each other;

FIGURE 4 is a horizontal transverse sectional view taken substantially along the plane of section line 4—4 in FIGURE 2 illustrating further details of the container closure;

FIGURE 5 is a view similar to FIGURE 2 but illustrating the position of parts when the elements are in the open position;

FIGURE 6 is a perspective view of one of the component parts shown in FIGURES 1—4 inclusive;

FIGURE 7 is a perspective view of a modified form of the invention showing the same in open position;

FIGURE 8 is a perspective view of the assembly shown in FIGURE 7 but illustrating the assembly in closed position;

FIGURE 9 is an enlarged vertical section taken substantially along the plane of section line 9—9 of FIGURE 8 and illustrating the details of construction of the assembly and the position of parts thereof when in the closed position;

FIGURE 10 is a perspective view of a further modification of this invention and illustrating the closure assembly in closed position; and

FIGURE 11 is an enlarged section taken through the modification illustrated in FIGURE 10 but showing the component parts in open position.

Referring at this time more particularly to FIGURE 1, reference numeral 10 indicates in general a container which is adapted to contain a supply of fluent material such as oil paint or the like and which may take any convenient or conventional form. For example, the container 10 may be in the form of a deformable tube, such as is commonly employed for the dispensing of oil paints or this container may take any other desired form.

The improved closure assembly is illustrated in FIGURE 1 and designated therein generally by the reference character 11 and will be seen to include as an essential component part thereof a cap 11a having a generally cylindrical skirt portion 12 and a generally conical nose portion 13. The nose portion is first formed of one integral imperforate piece and is later provided with a plurality of slits 14 and 15 which in this specific form are shown in perpendicularly crossed relationship and which extend downwardly throughout a substantial portion of the nose portion 13 and which slits divide the nose portion 13 into a plurality of petals or petal-like portions 16, 17, 18 and 19. The cap, or at least the nose portion 13 thereof in the region of the various petals is formed of resilient material such that these petal portions are capable of being forced open from the normally closed position illustrated in FIGURE 1 to a position such as is illustrated in FIGURE 5 to open the discharge assem-

bly for dispensing the contents of the container 10. Due to the inherent resiliency of the petals 108, 109, 110, 111 and their naturally curved shape, these petals always tend to return to the closed position illustrated in FIGURE 1. However, if these petals are forced open to such an extent that they are flexed beyond their elastic limit, they will not return of their own accord to a fully closed position when released. Also, if a paste or some other foreign material becomes lodged between the petals, this will also prevent the petals from being closed of their own accord. For example, if the container 10 contains toothpaste, it is apparent that this toothpaste could become lodged within the slits 15 to prevent the petals from closing. Accordingly, the petals are provided with additional means for forcing them to the closed position as explained more in detail below.

As can be seen most clearly in FIGURE 2, the container 10 is provided with a discharge nipple 20 provided with a discharge passageway 21 and which is externally threaded so as to mount the container closure assembly 11. For this purpose, the assembly 11 is provided with a base element 22 having a passageway 23 therethrough and provided with a threaded counterbore 24 adapted to engage upon the nipple 20 and mount the assembly on the container. The passageway 23, of course, forms a continuation of the passageway 21 and the base element 22 includes a longitudinally forwardly or upwardly projecting stem portion 25 which is externally threaded as indicated by the reference character 26 and which threadably receives a nut assembly 27 thereon.

The base element 22 is provided with an annular flange 30 which is rotatably received within the enlarged bore portion 31 of the cap 11a and which bore portion is formed preferably in a skirt portion 12 thereof, the cap 11a having, at the lower end of its skirt 12, an inwardly extending rib 32 seating under the flange 30 in the manner illustrated. The cap 11a is thus rotatable with respect to the base element 22 and, by virtue of this rotation, as will be presently apparent, the nut 27 is fed longitudinally back and forth on the stem 25 to effect opening and closing of the petals 16, 17, 18 and 19.

As can be seen most clearly in FIGURES 2 and 3, the cap is provided with a uniform main bore 35 which intersects, at its lower end, the enlarged bore portion 31, forming a step therewith to feed upon the upper surface of the flange 30 and longitudinally fix the cap relative to the base element 22.

Additionally, this portion of the cap is provided with a pair of diametrically opposed keyways 36 and 37 receiving therein the diametrically opposed ears 38 and 39 rigid or integral with the rearward or lower end of the discharge member indicated generally by the reference character 40. It is to be noted that the height or length of the ears 38 and 39 is substantially less than the length of the keyways 36 and 37 such that relative longitudinal motion is permitted between the discharge member 40 and the cap assembly. The discharge member 40 is provided with an enlarged interior portion 45 and a smaller discharge passageway 46, the portion 45 being provided with a pair of diametrically opposed notches 47 and 48 receiving therein the diametrically opposed and radially projecting key portions 49 and 50 disposed on opposite sides of the nut member 27. The nut member, as is best shown in FIGURE 6, is castellated at its forward or upper end providing a series of circumferentially spaced notches or slots 51, 52, 53 and 54 and with the upper ends of the intermediate portions 55, 56, 57 and 58 forming a seat upon which the secondary cap member 60 is engaged. The secondary cap 60 is provided with a blind bore 61 which normally engages over and closes the upper open end of the stem 25 and this secondary cap is provided with a pair of diametrically opposed keys or ears 62 and 63 seating in the upper portions of the keyways 47 and 48. The main body portion 70 of the secondary cap is provided with an exterior surface 71 which is of slightly

less diameter than the inner surface 72 of the discharge neck. This effects a discharge passageway therearound when the parts are in the position illustrated in FIGURE 5.

In FIGURE 5, it will be seen that the cap has been turned sufficiently to thread the nut 27 such that the bottom edge 73 of the secondary cap 60 is above the level of the upper end or forward end of the stem 25 so that the notches 51-54 inclusive will permit material from the container 10 to flow outwardly therethrough and between the surfaces 71 and 72 above described and thence outwardly through the discharge passageway 46 of the discharge assembly 40. At the same time, the threading of the nut 27 longitudinally forwardly of the stem 25 will effect relative longitudinal movement between the discharge member 40 and the cap such that the tip end 75 of the discharge member will have been projected through the nose of the cap to unfold or spread apart the petals 16, 17, 18 and 19 thereof so as to, in effect, uncover the discharge end of the member 40.

Thus, it will be seen that there are two sealing actions attained in the form of the invention above described. First, a seal or closure is effected by virtue of the resilient petals 16, 17, 18 and 19 and secondly there is a seal or closure effected by the secondary cap member 60, both being effective when the parts are in the position illustrated in FIGURE 2. When, however, the parts are in the position illustrated in FIGURE 5, after the nut 27 has been threaded forwardly on the stem 25, both of the sealing assemblies will be rendered ineffective and the contents of the container 10 may be dispensed as desired.

As an aid in effecting a proper closing action of the petals 16, 17, 18 and 19, the interior of the cap may be provided, on the inner surface portions of the petals 16, 17, 18 and 19 with inwardly projecting abutment means in the form of co-extensive but interrupted ribs, such as those indicated by the reference characters 81 and 82 in FIGURES 2 and 5. It is to be understood that there is one such rib associated with each of the petals 16, 17, 18 and 19 inclusive. The tip end of the discharge member is provided with an annular groove 83 which, when the parts are in the position illustrated in FIGURE 2, provide a surface 84 for abutting against the forward faces 85 and 86 of the ribs 81 and 82 on the various petals to forcibly close the same. At the same time, the rear face of the groove 83 may be rounded as indicated by the reference character 87 and the ribs 81 and 82 may be provided with rounded rear faces 88 such that a camming action is obtained between the portions 87 and 88 to aid and assist in the unfolding or opening of the petals 16-19 inclusive.

Referring at this time more particularly to FIGURES 7-9 wherein a modified form of the assembly is shown it will be seen that the reference character 100 indicates in general a tube, container or the like having a discharge neck 101 thereon. At least an intermediate portion 102 of the discharge neck is externally threaded and of course the neck is provided with an internal passageway 103 communicating with the interior of the container 100 to permit discharge of the fluent material therefrom. Surrounding the forward end of the discharge neck 101 is a cap assembly indicated generally by the reference character 104 and which includes an internally threaded skirt portion 105 and a rounded nose portion provided with slits 106 and 107 crossing each other in the manner illustrated best in FIGURE 8 and which divides the nose portion of the cap into a plurality of petal-like members 108, 109, 110 and 111. The rearward or bottom end of the skirt 105 is internally threaded so as to be received on the threaded portion 102 of the discharge neck 101 and when forwardly positioned relative thereto as is illustrated best in FIGURE 9, the open discharge end 112 of the discharge neck is contained within the cap assembly 104 with the petals thereof closed and sealing off the discharge passageway 103. To more

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effectively perform the closing and sealed interengagement of the petal members, the open discharge end 112 of the discharge neck may be enlarged as illustrated in FIGURE 9 and provided with an undercut 114 presenting a surface engageable with the forward faces 115 of rib elements 116 formed on the inner surfaces of the petals 108-111 inclusive. Thus, when the parts are in the position illustrated in FIGURE 9, the petals are forcibly held in their closed position. When, however, the cap 104 is threaded rearwardly or downwardly on the discharge neck 101, the relative longitudinal movement effected thereby between the cap 104 and the discharge neck will force the discharge neck to project or protrude through the petals and of course open the same thereby forcing the assembly to assume the position as is illustrated in FIGURE 7 wherein the discharge end 112 of the neck is exposed or uncovered to permit discharge of the contents of the container 100 therethrough.

A further modification of the invention is illustrated in FIGURES 10 and 11 of the drawings. In these FIGURES, it will be seen that the container 120 is provided with a discharge neck 121 provided with a discharge passageway 122 and which neck is provided with a uniform diameter intermediate portion 123 snugly but slidably receiving the skirt opening portion 124 of the skirt 125 of the cap assembly indicated generally by the reference character 126. The cap, similar to the previous form of the invention above described, is provided with slits 127 and 128 dividing the same into a plurality of petals 129, 130, 131 and 132 which selectively opens or unfolds and close to cover or expose the discharge neck 121 as is illustrated in FIGURES 10 and 11. The discharge neck is provided with an enlarged portion 133 preventing complete withdrawal of the cap therefrom and just forwardly thereof is provided with an annular groove 134 cooperable with the ribs 135 on the interior faces of the petals to effect a forcible closing of the petals. In this form of the invention, the cap is of course merely slid longitudinally with respect to the discharge neck 121 to effect the closing and opening of the assembly.

From the above, it will be readily apparent that the principles of this invention employ a relative longitudinal movement between the discharge neck member and an enclosing or outer cap member wherein the cap member is provided with a resilient nose portion provided with a slit or slits dividing the nose portion into a plurality of separable or expandible petals or petal-like portions against the interior surface of which the discharge member or neck is adapted to be forced to open these petals and uncover or expose the open discharge end of the neck member. That is to say, when the cap is disposed in a forward position relative to the discharge neck or member, the petals will be closed to cover the discharge end of the neck or member and when the cap is in a position rearwardly with respect to the discharge member or neck, the petals will be unfolded, opened or separated to expose or uncover the open discharge end of the discharge neck or member.

To more effectively assure the complete and proper closing of the petals or petal portions of the cap, the same may be provided with abutment means engaging with stop or abutment means on the discharge neck or member when the two such members are in their relative forward position which will effect a forcible closing action upon the petals.

It is to be understood that this invention is not necessarily limited to use in conjunction with fluent materials as a means to dispense the same. For example, it is perfectly conceivable that the principles of this invention may be utilized to provide means selectively covering or exposing a solid object such as a stick of lipstick, an ink applying brush, or the like. The essence of the invention will be seen to reside in the establishment of petal-like member and associated parts so that the petal-like portion function to selectively cover and expose a

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specific object, the neck of a fluent material container in the specific forms shown in the drawings and described above.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A container assembly comprising a hollow body having a discharge neck, a closure assembly longitudinally movable with respect to said neck and including a one piece cap having a forward end normally covering the open end of said neck when the cap is in a forward position relative to said neck, said forward end of the cap being slit to allow the same to open and uncover said open end of the neck when the cap is moved rearwardly with respect thereto, the slit portion of said cap being provided with abutment means on its inner surface, and said neck being provided with stop means engageable with said abutment means to forcibly close the slit portions of the cap when the cap is in a forward position relative to the neck.

2. A container assembly comprising a hollow body provided with a discharge end and a one piece cap therefor in which the discharge neck may be uncovered without requiring physical separation of the cap from the neck, said cap being longitudinally movable with respect to said neck between forward and rearward positions relative thereto, said cap being resilient and provided with a nose-like forward end normally covering the open end of said neck, and said nose-like portion being provided with at least one slit permitting the same to open and expose the open end of the neck when the cap is moved to a rearward position relative to the neck, the slit portion of said cap being provided with inwardly projecting peripheral abutment means on its inner surface, and said neck being provided with outwardly projecting flanged stop means engageable with said abutment means to forcibly close the slit portions of the cap when the cap is in a forward position relative to the neck.

3. A container for dispensing fluent materials, comprising a body for holding a supply of a fluent material, a discharge neck on said body for dispensing material therefrom, and a one piece cap assembly for selectively covering and uncovering the open end of said discharge neck, said cap assembly being longitudinally movable with respect to said neck between said first and second positions thereon to respectively cover and uncover the open end of said discharge neck, said cap being formed of resilient material and including a nose portion having at least one slit therein to permit the nose portion to unfold and close in response to longitudinal relative movement of the cap on the neck, the slit portion of said cap being provided with inwardly projecting peripheral abutment means on its inner surface, and said neck being provided with outwardly projecting flanged stop means engageable with said abutment means to forcibly close the slit portion of the cap when the cap is in a forward position of the neck.

4. A closure assembly for containers adapted to contain a supply of a fluent material, comprising an outer one piece cap member and an inner discharge member disposed within said cap, said cap and discharge members being mounted on said container, said cap having a resilient nose portion normally covering the open end of said discharge member and said nose portion being provided with at least one slit dividing the nose portion into a plurality of separable petals, and means for effecting relative longitudinal movement between said cap and said discharge member without effecting removal of either physically from said container to selectively project and

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withdraw said discharge member relative to the nose portion of said cap to unfold and fold said petals, ribs defining flat upper surfaces formed on the interior surfaces of said petals, an annular groove defining a flat upper surface formed in said discharge member, said ribs receivable in said groove with said flat surfaces in abutting relationship sealing said petals when said cap is moved forwardly with respect to said member.

5. A closure assembly for utilization with a hollow body having a discharge neck having an open end, said closure assembly including a one piece cap having a forward end, said cap positioned on said hollow body above said discharge neck, said forward end of the cap being provided with slits to allow the same to open and uncover said open end of the neck, means carried by said hollow body for longitudinal movement with respect to the cap for opening said cap, ribs defining flat upper surfaces formed on the interior surfaces of said cap and extending between the slits in the forward end, an annular groove defining a flat upper surface formed in said neck, said ribs receivable in said groove with said flat surfaces in abutting relationship sealing said cap when said cap is moved forwardly with respect to said neck.

6. The container assembly comprising a hollow body having a discharge neck having an open end, a closure assembly positioned adjacent to said neck and including a one-piece cap having a forward end normally covering the open end of said neck, said forward end of the cap being slit to allow the same to open and uncover said open end of the neck, means carried by said hollow body for longitudinal movement with respect to said cap for opening said cap when said neck is moved forwardly relative to said cap, ribs defining flat upper surfaces

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formed on the interior surfaces of the forward slit portions of the cap, an annular groove defining a flat upper surface formed in said neck, said ribs receivable in said groove with said flat surfaces in abutting relationship sealing said cap when said cap is moved forwardly with respect to said neck.

7. The combination defined in claim 5 wherein said means includes a cam surface carried by an annular member connected by thread means to said neck, said member encircling an end of the neck and serving as an extension thereof, spline means drivingly connecting the member to said cap whereby the rotation of the cap causes rotation of the member while permitting axial movement between the cap and member, and said thread means causes the member to move axially with respect to the hollow body.

8. The combination defined in claim 5 wherein said means comprises a cam surface on the open end of the neck and a rearward end of said cap is connected to said neck by thread means whereby rotation of said cap causes relative axial movement between the cap and neck for opening and closing the forward end of the cap.

9. The combination defined in claim 5 wherein said cap is axially slidable on said neck and an annular flange is fixed to the outer surface of the cap.

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