

Feb. 20, 1968

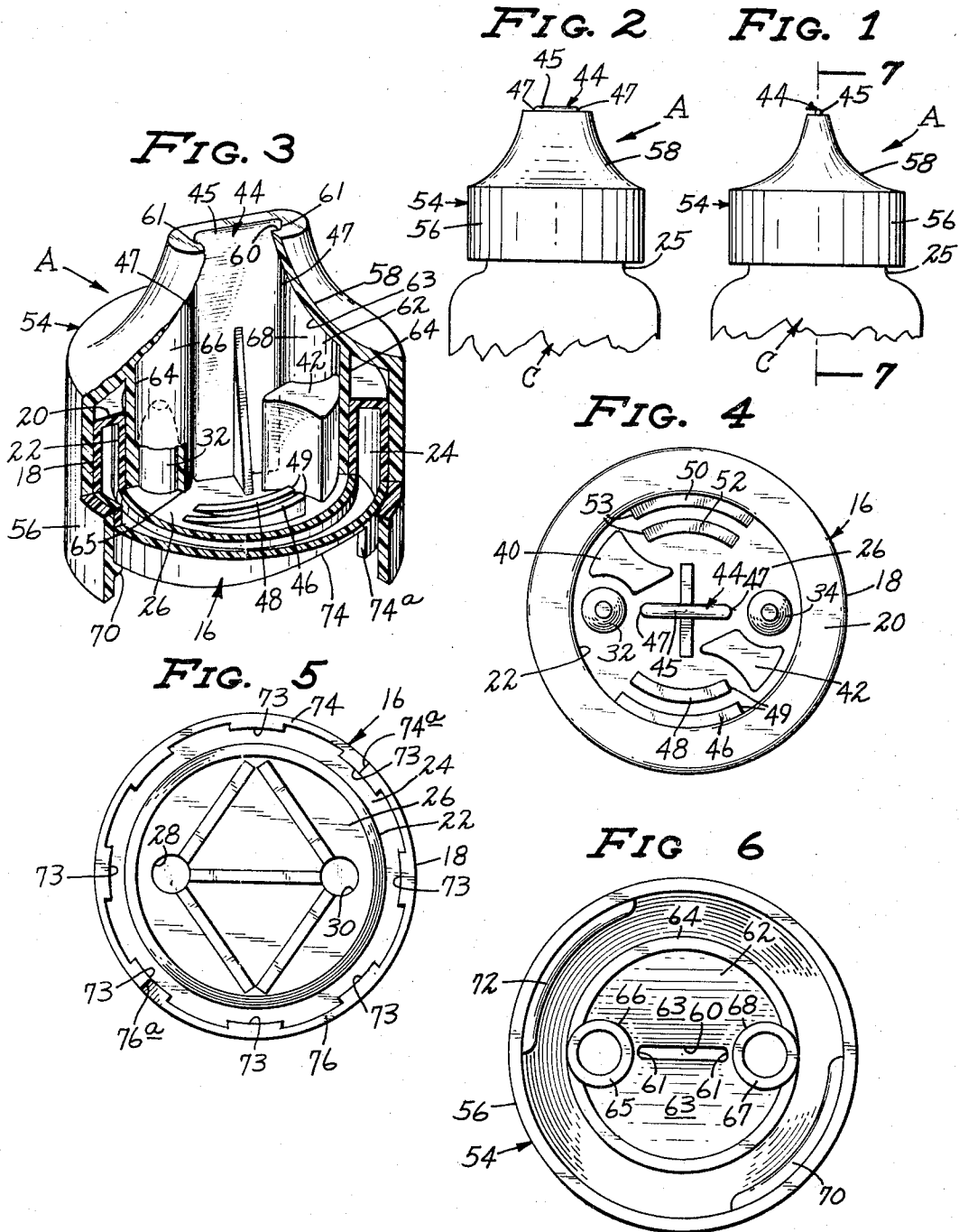
A. J. PORTER ET AL

3,369,707

DISPENSING CAP FOR A CONTAINER

Filed Oct. 14, 1966

2 Sheets-Sheet 1



INVENTORS.
ALVIN J. PORTER
ANTHONY W. MERCHLEWITZ
BY

Caswell, Lagaard & Strick
ATTORNEYS

Feb. 20, 1968

A. J. PORTER ET AL

3,369,707

DISPENSING CAP FOR A CONTAINER

Filed Oct. 14, 1966

2 Sheets-Sheet 2

FIG. 7

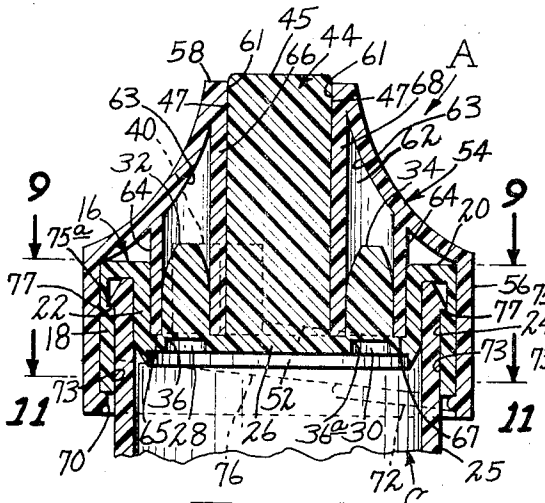


FIG. 8

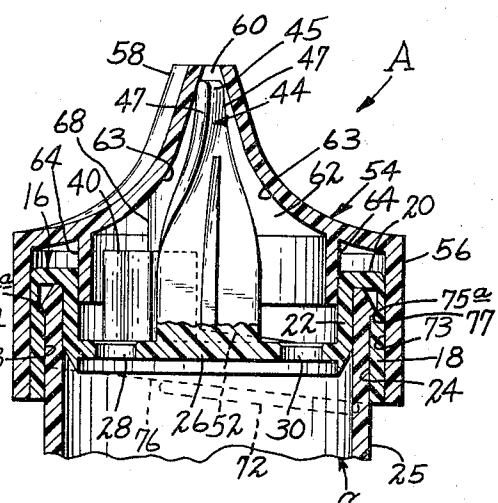


FIG. 9

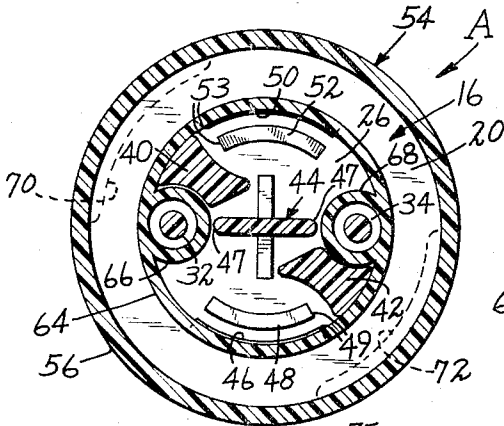


FIG. 10

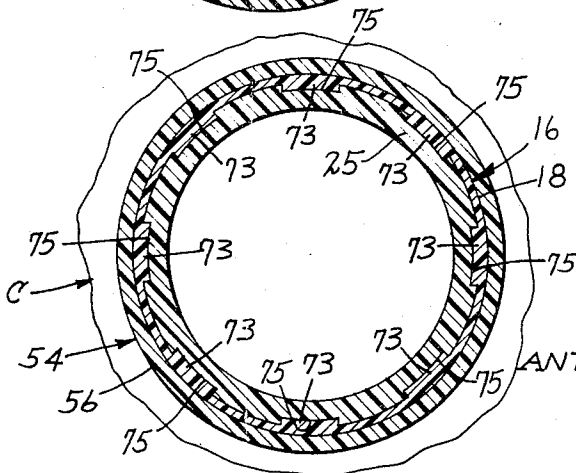
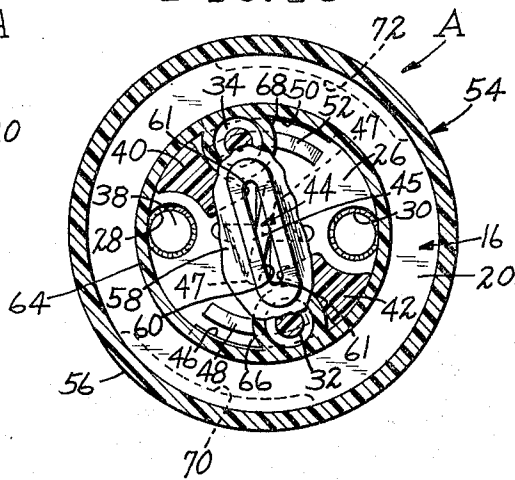


FIG. 11

INVENTORS.
ALVIN J. PORTER
ANTHONY W. MERCHLEWITZ
BY
Casull, Regard & Nicks
ATTORNEYS

1

3,369,707

DISPENSING CAP FOR A CONTAINER

Alvin J. Porter and Anthony Walter Merchlewitz, Minneapolis, Minn., assignors to Products Design and Engineering, Inc., Minneapolis, Minn.

Filed Oct. 14, 1966, Ser. No. 586,706

12 Claims. (Cl. 222-83)

The invention relates broadly to caps for containers and more particularly to a cap which is opened for dispensing of the contents thereof by a rotation of the cap.

The present invention is an improvement over that found in United States Patents 3,149,755 and 3,263,874 and application, Ser. No. 484,063, now Patent No. 3,285,479.

It is an object of the invention to provide a cap for a container having generally an overcap mounted on a base member including a construction whereby the initial rotation of the overcap fractures a frangible sealing member thereby unsealing the cap and further rotation of the overcap causes a further and positive opening of the cap. Rotation of the overcap in the opposite direction effects a positive closing of the cap.

It is a further object of the invention to provide cooperating cam means which provide a positive opening and closing of the cap after the sealing member is fractured.

It will not be here attempted to set forth and indicate all of the various objects and advantages incident to the invention, but other objects and advantages will be referred to in or else will become apparent from that which follows.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing by way of example a preferred embodiment of the inventive idea wherein like numerals refer to like parts throughout.

In the drawings forming part of this application:

FIGURE 1 is a side elevational view of the cap shown in operative position on a container only a portion of the container being shown.

FIGURE 2 is a view similar to FIGURE 1 but rotated ninety degrees.

FIGURE 3 is a perspective view of the cap portions of which are broken away.

FIGURE 4 is a top plan view of the base member of the cap.

FIGURE 5 is a bottom plan view of the base member of FIGURE 4.

FIGURE 6 is a bottom plan view of the overcap portion of the cap.

FIGURE 7 is a sectional view on the line 7-7 of FIGURE 1 with the cap shown in closed position.

FIGURE 8 is a sectional view similar to FIGURE 7 but with the overcap rotated ninety degrees and the frangible sealing members removed thereby placing the cap in open position.

FIGURE 9 is a sectional view on the line 9-9 of FIGURE 7.

FIGURE 10 is a top view with the overcap rotated ninety degrees with respect to FIGURE 9 and in the position of FIGURE 8, portions thereof being in section, other portions being broken away with the cap in open position.

FIGURE 11 is a sectional view on the line 11-11 of FIGURE 7.

Referring to the drawings in detail, the cap A includes the base member 16 which includes the outer annular wall 18. The annular wall 18 terminates at its upper edge in the upper partial wall 20 which terminates at its inner edge in the inner depending annular wall portion 22 concentric with and spaced from the outer annular wall

2

18 thereby forming the annular channel 24. The channel 24 receives the neck 25 of a container C. The lower edge of the inner wall 22 terminates in the support platform 26. The platform 26 has formed on the underside thereof and adjacent the outer edge of the two circular recesses 28 and 30 the purpose of which will be explained hereinafter.

Extending upwardly from the platform 26 and in alignment with each of the recesses 28 and 30 is a frangible plug 32 and 34, respectively. The plugs 32 and 34 and the recesses are identical so that only the plug 32 and recess 28 will be described in detail. The plug 32 is in axial alignment with the recess 28. The diameter of the plug is only slightly greater than the diameter of the recess, and the depth of the recess 28 is such that only a very thin circular portion of the platform 26 as at 36 connects the plug 32 to the platform at the point of the recess 28. It is this thin connection, as at 36, between plug 32 and platform 26 at recess 28 that allows the plug to be broken away from the platform and thereby open the recess 28 as the hole 38, particularly FIGURE 10. The circular connection between plug 34 and recess 30 is designated as 36a and is identical to the frangible connection 36.

Further provided are the spaced stops 40 and 42 which extend upwardly from the platform 26 and which are spaced radially inwardly from the inner annular wall 22. The numeral 44 designates a stopper which extends axially and upwardly from the platform 26, and the cross section of the stopper is substantially rectangular. The stopper is formed with the curved edges 47.

Formed on the upper surface of the platform 26 are a first pair of cam ramps 46 and 48 concentric with the inner wall 22, the center of the ramps being spaced radially from the center of the platform substantially the same distance as the plugs 32 and 34. A second pair of cam ramps 50 and 52 are formed on the upper surface of the platform 26 which are identical to ramps 46 and 48. The high portion of each of the ramps 46 and 48 is at 49, and the high portion of each of the ramps 50 and 52 is at 53. The function of the ramps will be set forth hereinafter.

The numeral 54 designates an overcap which includes the annular outer wall portion 56. The wall portion 56 terminates at its upper edge in the spout portion 58 the outer configuration of which is generally in the form of a truncated pyramid. The spout portion 58 has formed at the upper end thereof the substantially rectangular outlet orifice 60 having the curved ends 61 which fit the curved ends 47 of the stopper 44. Extending downwardly and outwardly from the outlet orifice 60 is the chamber 62 formed of the two tapered planiform side surfaces 63 which terminate at the annular wall portion 56. The tapered surfaces 63 serve as cams which engage the outer end of the stopper 44, the outer end 45 serving as a cam follower, thereby providing a first cam means for opening and closing the cap.

The overcap 54 further includes the inner circular wall 64 axially disposed to and concentric with the outer wall 56. The outer diameter of the wall 22 of the base 16 to allow rotation of the wall 64 within the wall 22. The wall 64 is spaced from the wall 56 to form the annular channel 65, into which the walls 18 and 22 of the base extend for rotation therebetween. Formed on a diameter of the circular wall 64 and at the wall are the spaced pair of cylindrical socket members 66 and 68 which provide shoulder means for removing the plugs 32 and 34 as hereinafter described. The sockets 66 and 68 extend parallel to the axis of the overcap and the distance between the centers of the sockets 66 and 68 is the same as the distance between the plugs 32 and 34 whereby the plugs fit into the sockets when the overcap 54 is positioned upon the base. The outer

wall 56 of the overcap has formed on the inner surface thereof the partial thread formations 70 and 72. The lower edge of the annular wall 18 of the base 16 is formed with the pair of spaced recess inclined cam ramp surfaces 74 and 76 terminating in the stop shoulders 74a and 76a, respectively. The surfaces 74 and 76 are engaged by the partial thread formations 70 and 72, respectively, whereby the overcap is maintained on the base 16 and the overcap 54 is allowed to move axially upwardly and downwardly and upon the base 16 when the overcap is rotated upon the base the partial thread formations 70 and 72 maintaining contact with the ramp surfaces 74 and 76, respectively. As the overcap is rotated upon the base the lower edges 65 and 67 of the socket members 66 and 68, respectively, ride upon the upper edges of the cam ramps 46 and 48 and 50 and 52, respectively, thereby providing a second cam means for assuring axial movement of the overcap upon the base for positive insertion or removal of the stopper relative to the discharge orifice 60. The stopper 44 provides a secondary seal after the fixed seal of the plugs 32 and 34 is broken, and said second seal is a positive one, not one part sliding over an open hole.

The inner surface of the wall 18 is formed with the axially extending spaced ribs 73 which engage in axially extending recesses 75 formed in the neck 25 of the container C and such prohibits rotation of the base 18 on the neck. The ribs 73 stop short of the platform 20 and the top edge 75a of the same are engaged by the annular shoulder 77 of the neck 25 thereby preventing removal of the base from the neck.

The cap A is assembled and operated in the following manner. The overcap 54 is forced downwardly upon the base 16 to a point where the partial threads 70 and 72 snap under and engage the lower edge of the annular wall 18 of the base 16 at the inclined cam ramp surfaces 74 and 76. As the overcap 54 is forced downwardly on the base 18 the plugs 32 and 34 extend within the sockets 66 and 68, respectively. As the overcap 54 bottoms out upon the base 18, the annular shoulder 77 engages the ends 75a of the ribs 73. As the overcap 54 is initially rotated counterclockwise, FIGURES 3, 9, and 10 in particular, the force of rotative movement of the sockets 66 and 68 against the plugs 32 and 34 breaks off the plugs 32 and 34 at the base connections with the platform 26 at 36 and 36a, respectively, thus opening recesses 28 and 30 as flow holes.

As the overcap 54 is further rotated the plugs 32 and 34 are carried with the socket members 66 and 68 and the lower edges 65 and 67 of the socket members 66 and 68, respectively, ride up the ramps 46 and 48 and 50 and 52, respectively, thereby causing the overcap 54 to rise axially upon to base 18 and withdraw the stopper 44 from the outlet orifice 60, particularly FIGURES 8 and 10. When the overcap 54 is further rotated clockwise its axial rise upon the base 18 is additionally further aided and positively caused by the stopper 44, acting as a cam follower, engaging the cam wall surface 63 particularly FIGURES 8 and 10. The rotative limit of the overcap 54 from a closed to an open position is accomplished by the socket member 66 striking the stop 42 and the socket member 68 striking the stop 40. From an open to a closed position, the socket member 66 strikes the stop 40, and the socket member 68 strikes the stop 42. The cap is closed by simply rotating threads 70 and 72 follow down the inclined surfaces 74 and 76, the lower ends of the socket members 66 and 68 follow down the ramps 46 and 48 and 50 and 52, respectively, and the stopper 44 rides up the cam surface 63.

With the cap parts in the positions shown in the open positions of FIGURES 8 and 10 in particular, the contents of container C can pass out the holes formed of recesses 28 and 30, as described, and further flow past the stopper 44 and out the orifice 60.

The invention is not to be understood as restricted to the details set forth since these may be modified within

the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. A dispensing cap for a container comprising in combination:
 - (a) a circular base member,
 - (b) a circular overcap mounted on said base member for relative rotational and axial movement thereon,
 - (c) said overcap formed with a discharge orifice having a substantially rectangular outline,
 - (d) said base member having an internal support wall,
 - (e) a stopper having a substantially rectangular cross-section carried by said support wall and adapted to enter and fill said discharge orifice when said overcap is in its innermost position relative to said base,
 - (f) first cam means formed in said overcap adapted to be contacted by the end of said stopper to cause said stopper to move into and out of said orifice upon rotational movement of said overcap upon said base,
 - (g) plug means carried by said support wall,
 - (h) said support wall having recess means formed therein and in alignment with said plug means,
 - (i) a thin frangible connection between said plug means and said support wall at said recess means,
 - (j) shoulder means carried by said overcap for pressure contact with said plug means to sever the frangible connection between the plug and the support wall upon the initial rotation of the overcap on the base thereby creating a hole at said recess means extending through said support wall,
 - (k) second cam means carried by said support wall adapted to be contacted by said shoulder means to further cause said overcap to move axially on said base and thereby cause said stopper to enter into or be removed from said discharge orifice upon further rotation of said overcap,
 - (l) means for preventing displacement of said overcap from said base member,
 - (m) stop means for limiting the rotational movement of said overcap on said base member, and
 - (n) means for attaching said base member to the neck of a container.
2. The device of claim 1 in which:
 - (a) said internal support wall is radially disposed relative to said circular base member.
3. The device of claim 2 in which:
 - (a) said first cam means includes internal opposed wall surfaces formed internally of said overcap and converging up to said orifice and engaged by the end of said stopper.
4. The device of claim 3 in which:
 - (a) said plug means extends at a right angle to said support wall.
5. The device of claim 4 in which:
 - (a) said shoulder means includes tubular means into which said plug means extends.
6. The device of claim 5 in which:
 - (a) said second cam means includes ramp means formed on said internal support wall adapted to be engaged by said tubular means.
7. The device of claim 6 in which:
 - (a) said means for preventing displacement of said overcap from said base in the relative axial movement includes a helical shoulder formed on said overcap engageable with,
 - (b) a helical recessed shoulder formed on said base member.
8. The device of claim 7 in which:
 - (a) said stop means for limiting the rotational movement of said overcap on said base is formed on said inner support wall for engagement by said tubular shoulder means.

5

9. The device of claim 1 in which:

(a) said first cam means includes internal opposed wall surfaces formed internally of said overcap and converging up to said orifice adapted for engagement with the end of said stopper. 5

10. The device of claim 1 in which:

(a) said second cam means includes ramp means formed on said internal support wall adapted to be engaged by said shoulder means of said overcap.

11. The device of claim 1 in which: 10

(a) said stop means for limiting the rotational movement of said overcap on said base is formed on said inner support wall for engagement by said shoulder means.

12. A dispensing cap for a container comprising in combination: 15

(a) a circular base member,

(b) a circular overcap mounted on said base member for relative rotational and axial movement thereon,

(c) said overcap formed with a discharge orifice, 20

(d) said base member having an internal support wall,

(e) a stopper carried by said support wall and adapted to enter and fill said discharge orifice when said overcap is in its intermost position relative to said base, 25

(f) plug means carried by said support wall,

(g) said support wall having recess means formed therein and in alignment with said plug means,

(h) a thin frangible connection between said plug means and support wall at said recess means, 30

6

(i) shoulder means carried by said overcap for pressure contact with said plug means to sever the frangible connection between the plug and the support wall upon the initial rotation of the overcap on the base thereby creating a hole at said recess means extending through said support wall,

(j) cam means carried by said support wall adapted to be contacted by said shoulder means to cause said overcap to move axially on said base and thereby cause said stopper to enter into or be removed from said discharge orifice upon rotation of said overcap,

(k) means for preventing displacement of said overcap from said base member,

(l) stop means for limiting the rotational movement of said overcap on said base member, and

(m) means for attaching said base member to the neck of a container.

References Cited

UNITED STATES PATENTS

2,769,582	11/1956	Schlicksupp	-----	222-521	X
3,010,619	11/1961	Gronemeyer et al.	----	222-521	
3,149,755	9/1964	Porter et al.	-----	222-541	X
3,175,741	3/1965	Porter	-----	222-521	
3,263,874	8/1966	Porter et al.	-----	222-541	X
3,285,479	11/1966	Porter et al.	-----	222-521	

SAMUEL F. COLEMAN, *Primary Examiner.*