

April 22, 1969

M. B. STULL

3,439,842

PUSH-PULL DISPENSING CAP

Filed Jan. 4, 1968

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Fig. 1

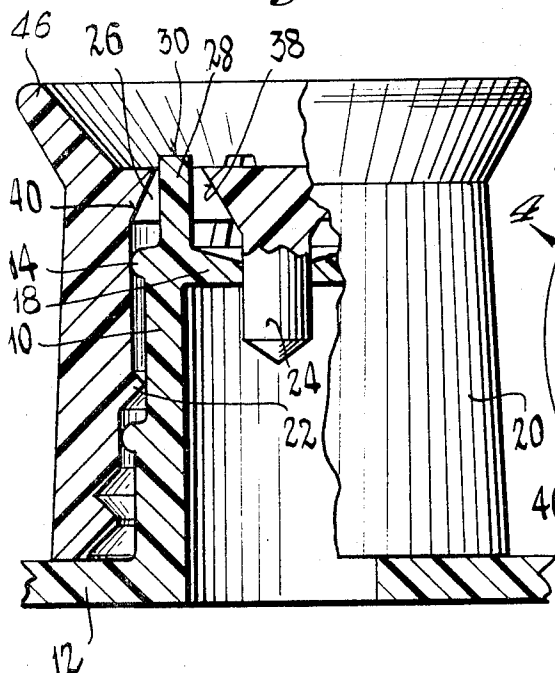


Fig. 3

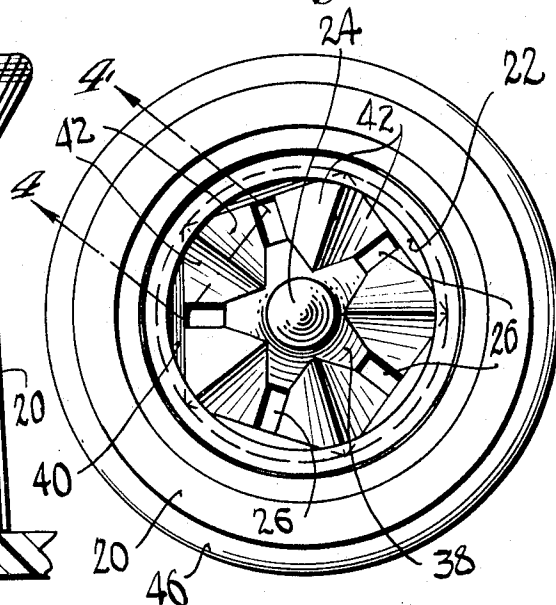


Fig. 2

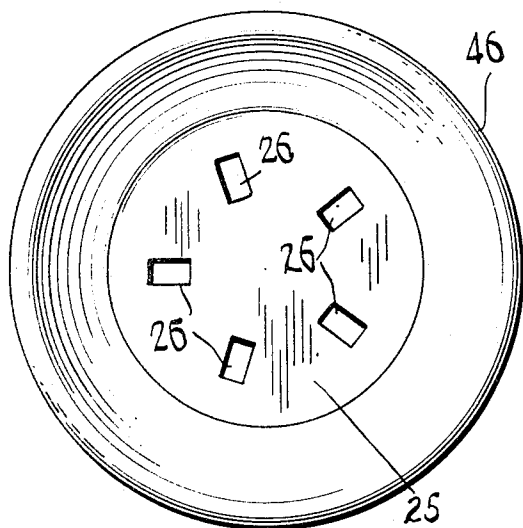
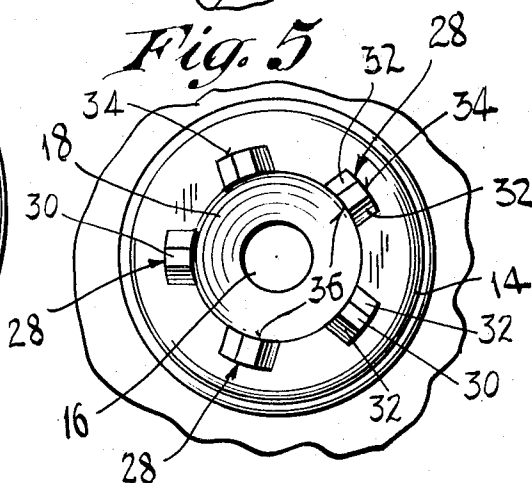


Fig. 4



Fig. 5



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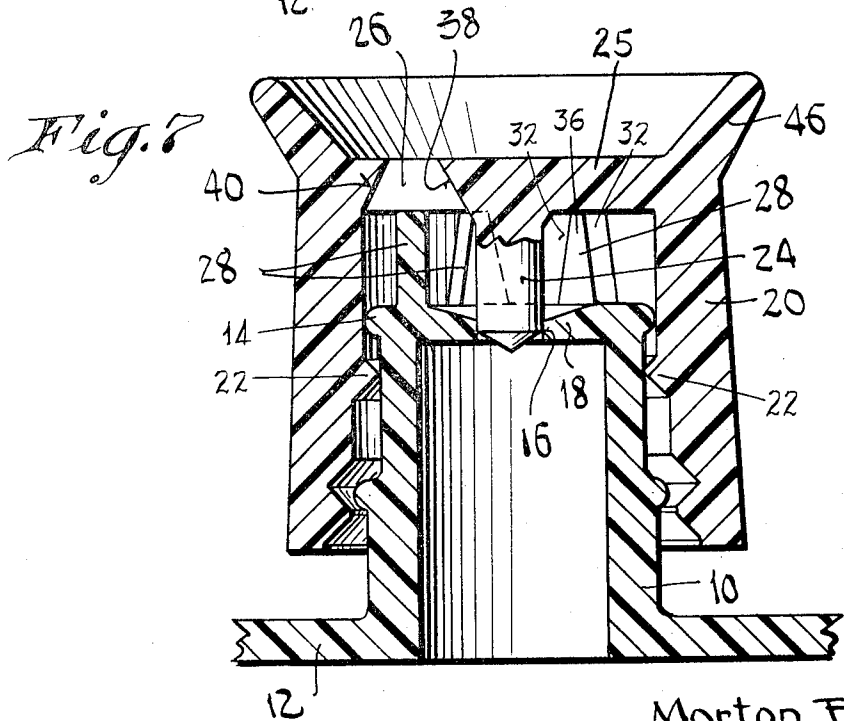
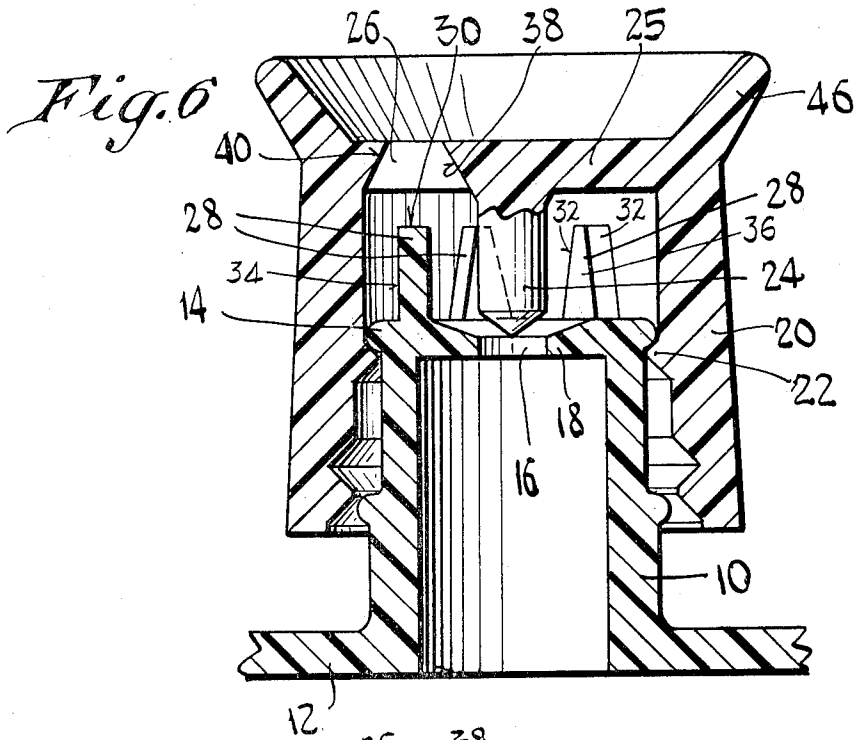
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Sheet 2 of 2



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PUSH-PULL DISPENSING CAP

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Filed Jan. 4, 1968, Ser. No. 695,779

Int. Cl. B65g 3/12; B08b 9/08

U.S. Cl. 222-196.3

8 Claims

ABSTRACT OF THE DISCLOSURE

A push-pull dispensing cap comprising a tubular spout member having a central discharge opening, and a captive cap axially movable on the spout member and having an internal depending peg adapted to enter and close the spout opening. The cap has a plurality of discharge passages in its top wall, arranged around the center thereof, and the spout member has similarly arranged upstanding projections adapted to occupy the passages when the cap is shifted to its closed position.

Cross references to related applications and patents

(1) Copending application of Morton B. Stull, Ser. No. 602,004 filed Dec. 15, 1966 and entitled "Dispensing Closure Cap."

(2) Copending application of Morton B. Stull, Ser. No. 605,805 filed Dec. 29, 1966 and entitled "Dispensing Closure Cap."

(3) Copending application of Morton B. Stull, Ser. No. 611,325 filed Jan. 24, 1967 and entitled "Dispensing Closure Cap."

(4) Copending application of Morton B. Stull, Ser. No. 652,915 filed July 12, 1967 and entitled "Reclosable Dispensing Cap."

Background of the invention

This invention relates to push-to-close, pull-to-open dispensing caps. A prior patent revealing this type of cap, No. 2,998,902 discloses a central discharge opening in the cap, closed by a peg on the spout member when the cap is pushed closed. The spout member has a series of discharge openings surrounding the peg, and under certain conditions of use where the cap is left open, the openings of the spout member could have hardened product collect in them, which ultimately defeats the functioning.

Summary

The above shortcoming of prior push-pull caps is obviated by the present invention, and one object of the invention is to provide a novel and improved push-to-close, pull-to-open dispensing cap construction wherein the likelihood of hardened product collecting in the discharge openings is greatly minimized if not completely eliminated.

This is accomplished by a unique construction comprising spout and cap members which have complementary sets of discharge openings and stopper or projecting portions adapted to enter said openings and to physically, forcibly dislodge hardened particles of the product being dispensed. The spout member is illustrated as having a single opening and a plurality of projecting portions whereas the cap member has a plurality of openings and a single projecting portion or stopper. Cooperable means are provided on the members, to minimize the likelihood of obstruction to the push or closing movement of the cap member, as well.

Other objects and advantages of the invention reside in a cap construction as above, wherein the members are of simple and economical construction, small and compact, readily molded at low cost, easily assembled initially

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and easily operated by the consumer, and effective and reliable in their functioning.

In the drawings:

FIG. 1 is a view partly in side elevation and partly in vertical section, of a push-pull dispensing cap assemblage as provided by the invention. The parts are shown in the closed or sealed position, a portion of the cap base being omitted.

FIG. 2 is a top plan view of the captive cap portion of the cap assemblage.

FIG. 3 is a bottom plan view of the captive cap of the assemblage.

FIG. 4 is a fragmentary section, taken on the line 4-4 of FIG. 3.

FIG. 5 is a top plan view of the spout portion or member of the cap assemblage, portions of the base being omitted.

FIG. 6 is an axial sectional view of the dispensing cap assemblage, showing the parts in the open or dispensing positions.

FIG. 7 is an axial sectional view like FIG. 6, but showing the sealing condition of the captive cap when its inward movement has been obstructed by abutment of projections on the spout portion with inside wall portions of the cap member.

As shown, the present cap construction comprises a spout member 10 of generally tubular configuration, carried by a base portion 12 which may be the top wall of a screw cap, or the top wall of a press fit or clinched-on closure, etc. The spout portion 10 is devoid of external threads, inasmuch as the present cap construction is of the push-pull type. Instead, the spout member 10 has at its upper end an external annular detent bead 14 constituting in effect a lip portion of the member. Located inwardly of the bead 14 is a central discharge opening 16 provided in a transverse top or end wall 18 of the spout.

The spout member 10 carries a captive cap 20 in the form of an inverted cup, said cap being axially or vertically movable on the spout between a raised dispensing position as shown in FIG. 6, and sealing positions as illustrated in FIGS. 1 and 7. The cap 20 is maintained on the spout member 10 by means of an internal annular bead 22 disposed in the bore of the cap, said bead being cooperable with the external lip 14 as seen in FIG. 6 to prevent withdrawal of the cap 20 upwardly from the spout member 10.

The spout 10 and cap 20 are preferably constituted of molded plastic substance, and one or both of said members may be resilient or yieldable to enable the cap to be pressed onto the spout initially. For this operation, the cooperable sloping surfaces of the beads 14 and 22 will have a camming effect, causing a slight spreading of the cap or contraction of the spout as the cap is forced downward. Such assembly is usually effected by machine, in a manner well understood.

In accordance with the present invention, the spout and cap members are provided with complementary sets of discharge openings and stopper or projecting portions adapted to enter said openings and to physically, forcibly dislodge hardened articles which may form from the product being dispensed. Thus there is insured a proper dispensing action of the cap at all times. One of such openings is the center discharge opening 16 of the spout 10. Cooperable with this discharge opening is a depending peg or stopper portion 24 extending downward from the transverse top wall 25 of the cap 20. A slight interference fit is provided, whereby an effective seal is established when the stopper 24 occupies the discharge opening 16, regardless of whether or not the stopper is deeply seated in the opening or else occupying a more shallow position. The deep seated position of the stopper 24 is illustrated

in FIG. 1, whereas the more shallow position is shown in FIG. 7.

The transverse top wall 25 of the cap 20 is provided with a plurality of discharge passages 26, shown in FIG. 2 as being roughly of rectangular cross section. A total of five such passages is provided preferably, and co-operable therewith are five upstanding projections 28 provided on the upper end of the spout member 10, equispaced within the bead or lip 14. Preferably the upstanding projections 28 have a tapered configuration, with relatively small top surface areas 30 which are also of rectangular configuration as seen in FIG. 5. The upstanding projections 28 have sloping opposite side walls 32 and opposite curved side surfaces 34, 36 the latter surfaces 36 being at the interior as seen in FIG. 5.

The discharge passages 26 in the top wall 25 of the cap 20 are tapered, generally in the same sense as the tapered projections 28 of the spout member. That is, the passages 26 have sloping inner and outer side walls 39, 40 respectively, and sloping walls 42. Also, it is seen that the upstanding projections 28 fit loosely in the discharge passages 26 of the cap.

By such organization there is greatly minimized the possibility of the cap 20 remaining hung up on the spout 10 due to the projections 28 having an abutting relationship with the underside of the top wall 25 of the cap 20. Such abutting relationship is illustrated in FIG. 7, and it will be noted that even for such generally undesirable condition the sealing stopper 24 is still accommodated in the discharge opening 16 of the spout member 10 whereby there is prevented discharge of the product from the spout.

It will now be understood that the cooperable discharge openings and projections or stopper members of the parts serve an important function in enabling any hardened particles of the product to be dislodged from such openings each time that the cap 20 is pressed or shifted downward to the closed position illustrated in FIG. 1. Accordingly, there is very little likelihood that product having the tendency to air-harden will ultimately impair the dispensing function of the cap, if ordinary precautions are taken to close the cap to the FIG. 1 position each time that dispensing of the product is completed.

Referring to FIG. 6 it will be seen that an adequate discharge passage is provided by the central opening 16 of the spout and plurality of passages 26 of the cap. When the cap 20 is placed into the sealing position shown in FIG. 1, the stopper 24 will dislodge the product from the opening 16, and the projections 28 will dislodge product from the passages 26. A simple wipe of the top surface 25 of the cap 20 with a cloth after each use will remove product from such surface, whereby the cap can always function effectively in its dispensing action.

The cap 20 has a flared annular lip 46 surrounding the discharge passages 26 whereby the top portion of the cap constitutes a shallow saucer adapted to contain a small quantity of product which has passed through the passages. For certain types of applications, it may be desirable to have available a small quantity of the product, as made possible by such configuration. However, the shallow saucer-like configuration of the top of the cap does not make for difficulty when the user desires to wipe the cap clean. The annular lip 46 may serve a useful function in distributing and spreading the product as it is discharged through the passages 26.

It will now be seen from the foregoing that I have provided a novel and advantageous cap construction wherein the members are of simple and economically molded configuration, being small and compact, readily molded at low cost and easily initially assembled and easily operated by the consumer. The dispensing cap is seen to be effective and reliable in its operation.

I claim:

1. A push-pull captive dispensing cap construction comprising, in combination:

- (a) a tubular spout member having at its outer end a smooth exterior annular sealing lip and having a discharge opening in said end,
- (b) a captive cap movably carried by said spout member, having a bore engaged with and slidable along said sealing lip whereby the cap is axially movable between advanced and retracted positions on said member, wherein the improvement comprises:
- (c) said cap having an interior stopper peg depending from its top wall, and receivable in the discharge opening of the spout to close the same, and further having a plurality of discharge passages in said top wall, disposed about the center thereof,
- (d) said spout having a plurality of upstanding projections disposed about said discharge opening and receivable in said discharge passages.

2. A closure as in claim 1, wherein:

- (a) the upstanding projections of the spout have a loose fit in the discharge passages of the cap, and are adapted to dislodge hardened material from said passages.

3. A closure as in claim 1, wherein:

- (a) the cap top wall has wedge-shaped portions between the discharge passages thereof to guide the spout projections into said passages and to minimize the likelihood of the projections abutting said wall.

4. A closure as in claim 3, wherein:

- (a) the stopper peg is sufficiently long to enable it to occupy the discharge opening of the spout member when the projections of the latter are in abutting relation with the top wall of the cap.

5. A closure as in claim 1, wherein:

- (a) the cap has an annular flared top lip surrounding said discharge passages and constituting a shallow saucer adapted to contain a small quantity of product which has passed through the passages.

6. A closure as in claim 1, wherein:

- (a) the upstanding projections of the spout are tapered, with their small portions uppermost,
- (b) said discharge passages of the cap being tapered in the same sense as the tapered projections of the spout member.

7. A closure as in claim 6, wherein:

- (a) the discharge passages each have four sloping walls.

8. A closure as in claim 1, wherein:

- (a) the upstanding projections of the spout member and the discharge passages of the cap are of substantially rectangular cross section.

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WALTER SOBIN, *Primary Examiner*.

U.S. Cl. X.R.

222—480, 514, 525, 545