Nov. 7, 1967 M. B. STULL 3,351,249

CAPTIVE DISPENSING CLOSURE FOR CONTAINERS

Filed Aug. 19, 1966

Fig. 1

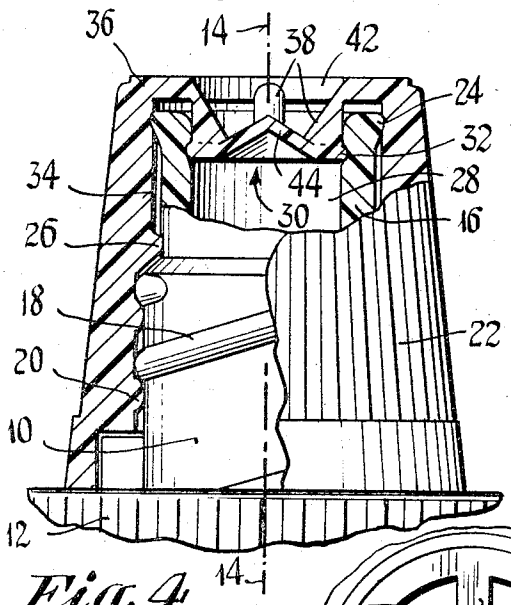


Fig. 2

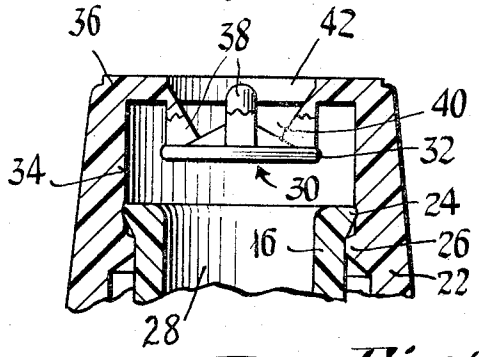


Fig. 3

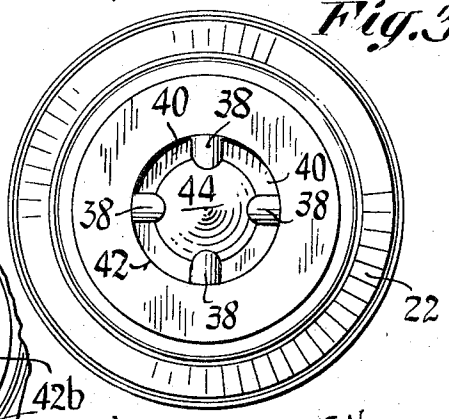


Fig. 4

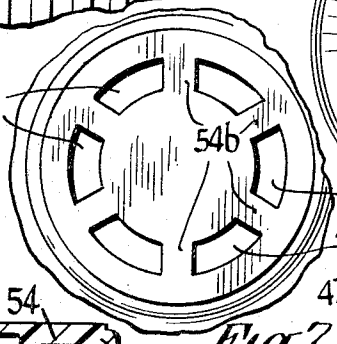
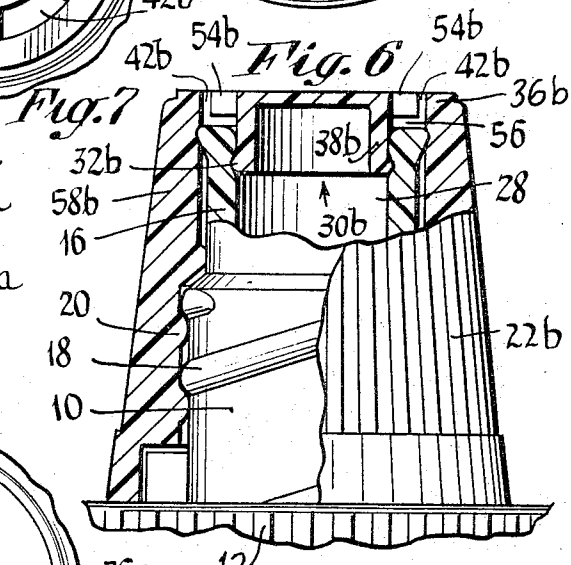


Fig. 7



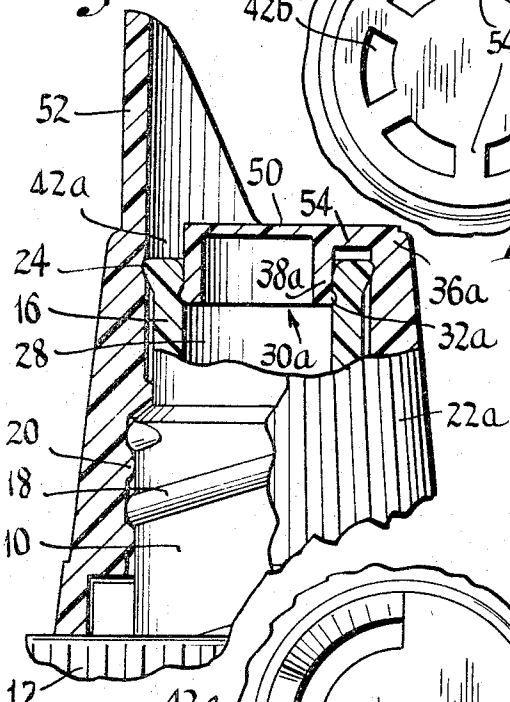


Fig. 5

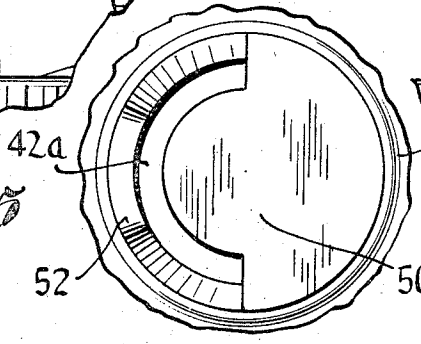


Fig. 6

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CAPTIVE DISPENSING CLOSURE FOR CONTAINERS

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ABSTRACT OF THE DISCLOSURE

A captive-cap type closure constructed for a dispensing container comprising a tubular body member having a central discharge passage, and a screw cap turnably and axially movable on the body member. The screw cap has a transverse top wall and a central sealing plug portion receivable in the passage of the body member to close the same. A perforated annular depending connector wall joins the plug to the top wall of the screw cap, and supports the plug at a level below the top cap wall. The discharge of product occurs through the perforations of the connector wall.

This invention relates to container closures, and more particularly to plastic closures of the captive cap type, embodying a screw cap which if desired may remain permanently on the container while being movable thereon between an open, dispensing position and a closed sealing position.

Objects of the invention are to provide a novel and improved captive closure construction of the above type, which is especially adapted for reliably controlling and dispensing viscous materials in that it provides a relatively large discharge channel while at the same time effecting a tight seal when the cap is in closed position; to provide an improved closure as above characterized, which facilitates precise placement of the substance being dispensed, which facilitates flow-back into the container, which is simple in construction and easily molded, convenient to use, reliable at all times, and economically produceable with the use of but two cooperable parts or components.

Other features and advantages will hereinafter appear.

FIG. 1 is a view partly in axial section and partly in side elevation, showing a closure construction in accordance with the invention, the screw cap being in the closed position.

FIG. 2 is a fragmentary view of the closure of FIG. 1, with the screw cap in the open, dispensing position.

FIG. 3 is a top plan view of the closure construction.

FIG. 4 is a view like that of FIG. 1 but showing a modification of the invention wherein a pouring lip enables precise placement of the dispensed substance to be effected. The screw cap is in the closed position.

FIG. 5 is a fragmentary top plan view of the closure construction of FIG. 4.

FIG. 6 is a view like that of FIG. 1 but showing another modification of the invention.

FIG. 7 is a top plan view of the closure construction of FIG. 6.

Considering first FIGS. 1–3, the closure construction as illustrated therein comprises a closure body member **10** which may constitute the neck part of a container **12**, the member **10** having a main axis **14—14** and comprising a centrally disposed tubular portion **16** extending

along the axis **14—14** and constituting a discharge passage. The tubular portion **16** comprises an upward continuation of the body member **10**, and the latter has external screw threads **18** which are engageable with cooperable internal threads **20** of a screw cap **22** turnably carried on the body member **10** and also movable axially thereon.

The cap **22** may be screwed to a sealing, lower position as illustrated in FIG. 1 under the action of the screw threads **18**, **20** or else to a raised, dispensing position which is indicated in FIG. 2. Details of the screw thread engagement and cooperable stops on the screw cap **22** and body member **10** are not given herein since they form no part of the present invention per se, being explained and illustrated in detail in my Patent No. 3,216,630 dated Nov. 9, 1965, and entitled "Closure for Containers." The screw cap **22** is held captive on the body member **10** by engagement between an annular external bead **24** provided on the tubular portion **16**, which bead is engageable with a cooperable internal annular bead **26** provided in the screw cap **22**.

The body member **10** and the screw cap **22** may be advantageously molded of a relatively soft, yieldable plastic substance such as polyethylene or similar formulations.

In accordance with the present invention there is provided a large-area passage means through the body member **10** and screw cap **22**, by which thick, viscous substances may be readily dispensed from the container **10**, yet the arrangement is such that an effective and tight seal is had to prevent leakage when the cap is in the position of FIG. 1. As shown, the tubular portion **16** has a relatively large bore **28** through which the viscous substance may pass. Further, as provided by the invention, the screw cap **22** has at a level below the top wall thereof, an annular sealing portion **30** which is adapted to be frictionally received in the tubular portion **16** of the body member to seal against the same when the screw cap **22** is in the lower position on the body member **10** as shown in FIG. 1. Preferably, the sealing portion **30** includes an annular external bead **32** which becomes slightly temporarily imbedded in the yieldable plastic substance of the tubular portion **16**, as shown.

Simultaneously with engagement of the sealing portion **30** in the smooth bore **28** of the tubular portion **16**, the annular bead **24** of the latter is engaged with and slightly imbedded in the inner surface **34** of the smooth bore provided in the upper portion of the screw cap **22**.

Between the sealing portion **30** of the screw cap and the peripheral top wall **36** thereof there is a connector means which joins the said portion and peripheral wall. The said connector means includes a depending supporting wall in the form of a plurality of ribs **38** to the bottoms of which the sealing portion **30** is joined. The said connector means thus has at least one discharge passage **40** extending through it, communicating with a large central passage or opening **42** provided in the top of the screw cap **22**.

In FIGS. 1–3 the depending supporting wall constituted of the ribs **38** is shown as having four of the discharge passages **40**, thus providing a large-area path, in conjunction with the large central opening **42** of the screw cap. This construction, together with the relatively large area of the bore **28** of the tubular portion **16** of the body mem-

ber enables the cap construction to readily handle and dispense relatively thick, viscous substances from the container **12**. However, with the screw cap in the FIG. 1 position, an effective and reliable seal is established between the portion **30** of the screw cap and the portion **16** of the body member effectively preventing discharge or leakage.

Preferably, as illustrated, the sealing portion **30** is conical as shown at **44** whereby it is more readily yieldable in response to radially inward forces on the annular bead **32**. Thus its insertion in the tubular portion **16** is facilitated. The conical formation **44** adjoins at its base the discharge passages **40**, and this facilitates flow-back of the viscous substance into the container prior to the closure construction being again sealed. For it will be observed, from an inspection of FIG. 2, that the viscous substance may, first drop downward from the bead **32** and thereafter drop through the bore **28** of the tubular portion **16**, back into the container **12**.

Another embodiment in the invention is illustrated in FIGS. 4 and 5, wherein a spout means is provided to enable a more precise placement of the viscous substance to be had. In this figure, the body member **10** is the same as that already described above. In FIGS. 4 and 5 the screw cap **22***a* has a sealing portion **30***a* provided with an annular external bead **32***a*. The sealing portion **30***a* is located below the top plane of the screw cap **22***a*, and is connected thereto by a depending supporting wall **38***a* which is joined to the transverse top wall **50** of the cap.

In the top wall **50** there is a semi-circular or crescent-shaped discharge passage **42***a* located outside of the depending supporting wall **38***a*. Also, the screw cap **22***a* has a raised, pointed and curved spout **52** surrounding the semi-circular discharge passage **42***a*. The sealing portion **32***a* is connected to the peripheral wall portion **36***a* of the screw cap by an annular top wall portion **54**, together with the depending supporting wall **38***a*.

Considering FIG. 4 it will be seen that with the screw cap **22***a* in the lower position an effective seal is had with the body member **10**, and as seen in FIG. 5 when the screw cap **22***a* is in the raised, dispensing position the viscous substance may flow out through the bore **28** of the tubular portion **16**, and through the semi-circular discharge opening **42***a* in the top wall **50** of the screw cap, being fed directly to the spout **52** which collects the viscous substance into a smaller area.

Yet another embodiment of the invention is illustrated in FIGS. 6 and 7, wherein the body member **10** is the same as that already described above. The screw cap **22***b* has a sealing portion **30***b* provided with an external annular bead **32***b* which engages the inside of the tubular portion **16** of the body member **10**. The sealing portion **30***b* is connected to the top peripheral wall portion **36***b* of the screw cap **22***b* by means of a depending wall portion **38***b* and a transverse annular top wall portion **54***b* which is disposed radially inward of the peripheral top wall portion **36***b*. The transverse top wall portion **54***b* has a plurality of discharge passages **42***b*, said passages being disposed at the upper end of an annular space **56** formed between the depending supporting wall **38***b* and the outer wall **58***b* of the screw cap **32***b*. It will be seen that the said annular space is occupied by the tubular portion **16** of the body member **10**. When the screw cap **22***b* is in the closed position of FIG. 6, the portion **30***b* will seal against the inner wall of the tubular portion **16**, providing an effective stopper. When the screw cap **22***b* is in the raised position, the viscous substance may be discharged through the bore **28** of the tubular portion **16** and thence through the discharge passages or openings **42***b* in the top of the screw cap **22***b*.

It will now be understood that in accordance with the present invention I have provided an improved captive closure construction for a container which is especially adapted for reliably controlling and dispensing thick or viscous substances, such closure construction providing a relatively large discharge channel while at the same time effecting a tight seal when the cap is in the closed position. The improved closure construction when provided with the spout **52**, facilitates a precise placement of the substance being dispensed. The closure construction is simple and easily molded of plastic substance, is convenient to use, and may be economically produced, involving but two simple cooperable parts or components.

Variations and modifications may be made within the scope of the claims, and portions of the improvement may be used without others.

I claim:

1. A captive closure construction for a container, comprising in combination:

(a) a closure body member having a main axis and having a centrally disposed tubular portion extending along said axis and constituting a discharge passage, said tubular portion having an annular top rim provided with a smooth bore,

(b) a screw cap turnably carried on said body member and movably axially thereon,

(c) said screw cap having a peripheral top wall portion, and having at a level below said top wall portion a dished, hollow and imperforate sealing and liquid-blocking portion adapted to engage and be frictionally received in the annular top rim of the tubular discharge portion of the body member to seal against the same when the screw cap is in a lower position on the body member, said dished imperforate sealing portion having an annular, radially inwardly yielding free bottom rim surrounding a central space which is at all times in communication with the space defined by the bore of said annular top rim, said bottom rim being axially slidable in and along said annular top rim,

(d) connector means joining said dished imperforate sealing portion and peripheral top wall portion of the screw cap, said connector means including a supporting wall extending between said portions and to which the sealing portion is joined, said connector means having at least one discharge passage extending through it, to carry substance for discharge from the container when the screw cap is in a raised position on the body member, with its sealing portion removed from the top rim of the body member.

2. A captive closure construction as in claim **1**, wherein:

(a) said supporting wall of the screw cap has a plurality of discharge passages extending through it,

(b) the top of the screw cap having a central discharge opening communicating with said discharge passages.

3. A captive closure construction as in claim **2**, wherein:

(a) said dished imperforate sealing portion is conical and yieldable to facilitate the insertion of the free bottom rim in the tubular portion of the body member.

4. A captive closure construction as in claim **3**, wherein:

(a) the base of the conical portion adjoins the discharge passages, said conical portion thus facilitating flow-back into the container.

5. A captive closure construction as in claim **1**, wherein:

(a) said connector means incluudes a transverse top wall portion disposed radially inward of said peripheral top wall,

(b) said top wall portion having said one discharge passage.

6. A captive closure construction as in claim **5**, wherein:

(a) said screw cap has a spout extending upward from the peripheral top wall thereof at a point adjacent said one discharge passage.

7. A captive closure construction as in claim **1**, wherein:

(a) said top wall portion has a plurality of discharge passages disposed in a circle.

8. A captive closure construction as in claim 7, wherein:

(a) the screw cap has an annular sealing wall portion engageable with the exterior of the tubular portion of the body member,

(b) said annular sealing wall portion and said dished imperforate sealing portion of the screw cap defining a restricting annular space in which the tubular portion of the body member is frictionally received,

(c) said annular space communicating with said plu-

rality of discharge passages and the latter being disposed at the upper end of the annular space.

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WALTER SOBIN, *Primary Examiner.*