United States Patent [19]

Miller

[11] **3,762,612**

[45] **Oct. 2, 1973**

[54] **DUAL SEAL POUROUT FITMENT AND CLOSURE COMBINATION**

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[73] Assignee: **Owens-Illinois, Inc.,** Toledo, Ohio

[22] Filed: **Jan. 31, 1972**

[21] Appl. No.: **222,160**

[52] **U.S. Cl.** **222/479,** 222/484, 222/545, 222/547

[51] **Int. Cl.** **B67d 3/00**

[58] **Field of Search** 222/479, 570, 568, 222/484, 545, 547; 215/DIG. 1, 73

[56] **References Cited**

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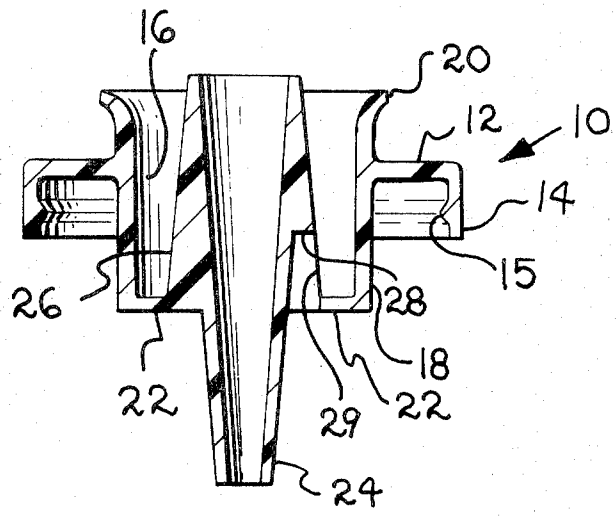
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Primary Examiner—Robert B. Reeves
Assistant Examiner—H. Grant Skaggs, Jr.
Attorney—A. J. Steger et al.

[57] **ABSTRACT**

A one-piece pourout fitment and a closure member, in combination with a liquid containing container, incorporating an improved sealing configuration. A pourout fitment is fabricated in one piece and includes a disc-shaped member having a central opening, a peripheral bottle neck engaging member, an axial, hollow, pouring tube defining the periphery of the central opening, and an axial hollow, vent tube, concentrically located with respect to the pouring tube and connected thereto by a plurality of ribs. The upper portion of the pouring tube is outwardly flared and terminates in a substantially vertical section. The closure member has an upper panel and a depending skirt with interior, bottle neck engaging threads molded therein. An annular sealing groove is defined by annular projections depending vertically downward from the closure upper panel. The inner wall of the sealing groove is tapered to match the flare of the upper portion of the pouring tube. The outer wall of the sealing groove is substantially vertical. In operation, the pourout fitment member is engaged on the neck of a bottle. The closure member is then engaged with threads on the bottle neck. When the closure member is fully engaged, the bottle contents are sealed due to the engagement of the flared portion of the pourout fitment with the tapered inner wall of the sealing groove and the vertical end portion of the flared portion of the pourout fitment with the substantially vertical outer wall of the sealing groove.

2 Claims, 7 Drawing Figures



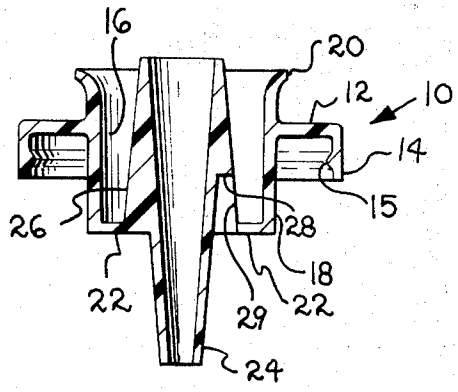


FIG. 1

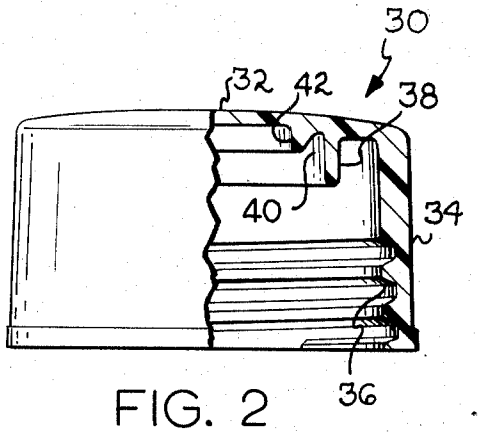


FIG. 2

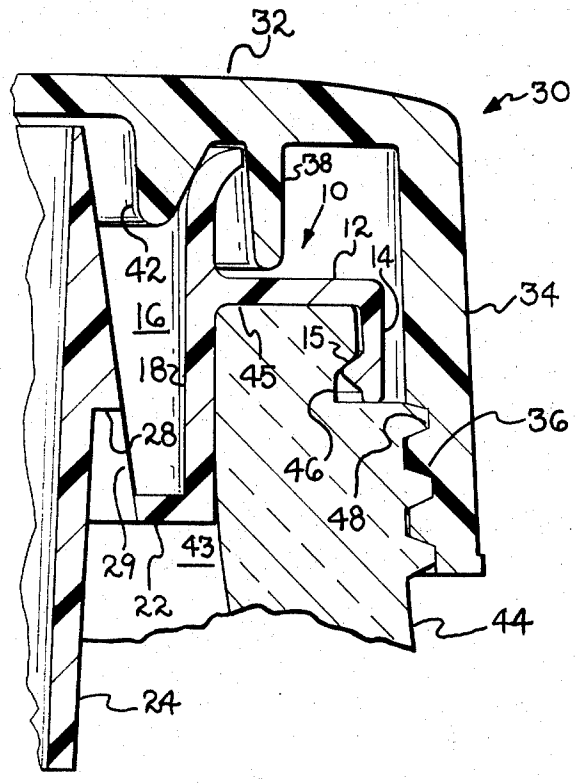


FIG. 4

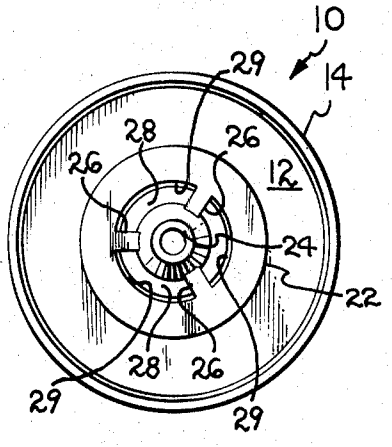


FIG. 3

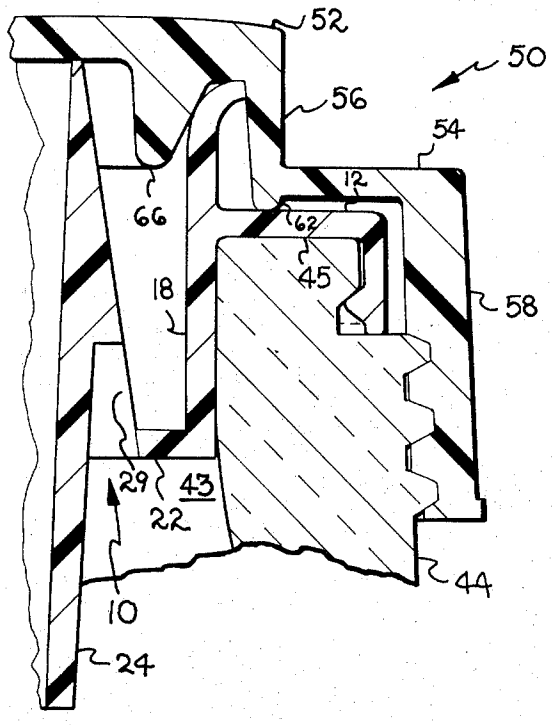


FIG. 7

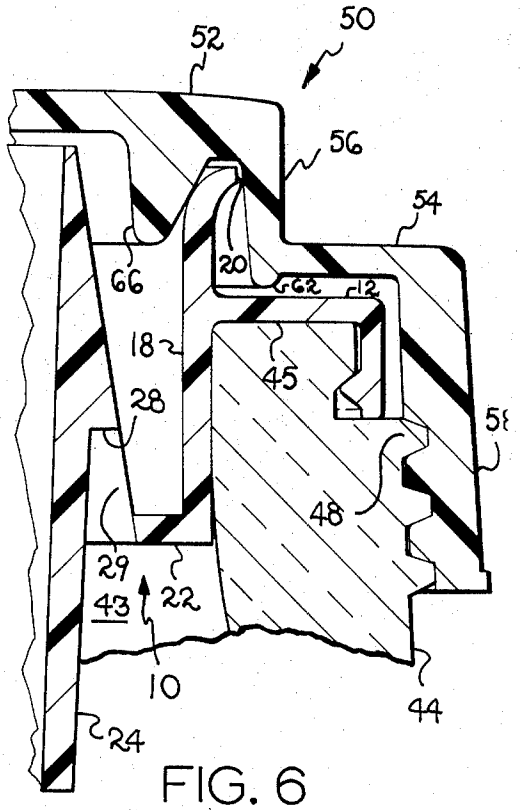


FIG. 6

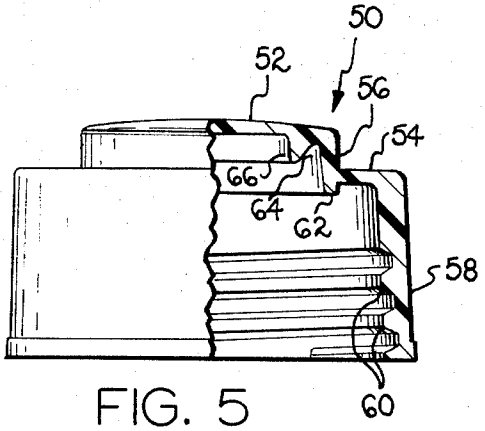


FIG. 5

DUAL SEAL POUROUT FITMENT AND CLOSURE COMBINATION

BACKGROUND OF THE INVENTION

This invention relates generally to pourout fitments. More particularly, this invention relates to a combination of a pourout fitment, a closure, and a liquid containing container. Most specifically, this invention relates to a pourout fitment which is sealed by engagement of two sections of an integral pouring tube by a sealing groove formed as a part of the closure member.

One of the recurrent problems with the use of pourout fitments is the difficulty of sealing the contents of a bottle on which such a fitment is placed. Most of such fitments have a closure member which is threaded on the bottle in an attempt to seal the fitment. Such seals have not been completely successful, thus leading to some leakage if the bottle is inverted or shaken with the closure member in place. If, on the other hand, the seal has been adequate, it has often been necessary to make the pourout fitment in two or more pieces to obtain the proper liquid pouring characteristics. Typical of the patents illustrating the prior attempts to solve this problem are U.S. Patent Nos. RE. 24,695 and 3,319,842. The present invention incorporates an effective two-point seal on a one-piece pourout fitment which exhibits excellent pouring characteristics.

SUMMARY OF THE INVENTION

This invention is the combination of a one-piece pourout fitment, a closure member, and a bottle adapted to contain a liquid. The fitment, while made as a unitary structure, is made up of a number of elements, including the following: a disc element having a central opening; an annular bottle neck engaging portion attached to the periphery of the disc element; an axial, hollow pouring tube defining the periphery of the central opening and extending vertically above and below the disc element, the upper portion of the pouring tube being flared and terminating in a substantially vertical portion, the lower portion of the pouring tube terminating in an inwardly directed flange; and a tapered, axial, hollow vent tube having a maximum outside diameter less than the inside diameter of the pouring tube and being located concentrically with respect to the pouring tube, the vent tube being integrally connected to the flange at the lower portion of the pouring tube by a plurality of ribs, thus defining a plurality of openings to allow the escape of a liquid within the bottle. The bottle has an upper neck portion with a rim defining a liquid pouring opening. A fitment engaging groove is located just below the rim. The pourout fitment is placed in position on the bottle neck, with the pouring and vent tubes entering the opening and the annular neck engaging portion entering the groove to hold the fitment in position. The neck portion of the bottle has external threads formed thereon below the fitment engaging groove. The closure member is adapted to seal the fitment and thus prevent escape of any liquid when it is in place. As is the case with the fitment, the closure member is molded as a unitary structure, but has several parts, including the following: a substantially horizontal top panel; a depending skirt attached to the top panel and having interior threads for selective engagement with the threads on the bottle neck; and an annular sealing groove defined by annular projections depending downwardly from the top panel, the inner wall of the groove being tapered, with the outer wall of the groove being substantially vertical. In operation, the closure member is placed over the pourout fitment positioned on a bottle neck, and the two sets of threads are engaged. This action also places the upper, flared portion of the pourout tube in the sealing groove. As the threads are fully engaged, the upper, flared portion of the pourout fitment sealingly engages the tapered wall of the sealing groove, and the vertical end portion of the upper, flared portion of the pourout tube sealingly engages the vertical wall of the sealing groove.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevation view, in cross section, of the pourout fitment of the present invention;

FIG. 2 is an elevation view, partially cut away, one one embodiment of the closure member of the present invention;

FIG. 3 is a bottom view of the pourout fitment of the present invention;

FIG. 4 is an elevation view, in cross section and on an enlarged scale, of the pourout fitment and closure member of the present invention in position on the neck portion of a container;

FIG. 5 is an elevation view, partially cut away, of a second embodiment of the closure member of the present invention;

FIG. 6 is an elevation view, in cross section and on an enlarged scale, of the pourout fitment of the present invention in position on a container neck with the closure member of FIG. 5 partially engaged; and

FIG. 7 is a view similar to FIG. 6, except that the closure member of FIG. 5 is shown fully engaged in a sealing position.

DETAILED DESCRIPTION OF THE DRAWINGS

FIGS. 1 and 3 illustrate the one-piece pourout fitment **10** of the present invention. The cross-sectional view of FIG. 1 illustrates the essential features of the pourout fitment **10**. The fitment is constructed beginning with a disc-shaped upper member **12**. Attached to the periphery of the disc **12** is a downwardly depending, annular, bottle neck engaging member **14**. The bottle neck engaging member **14** has a continuous bead **15** formed on its interior surface. The bead **15** is adapted to engage a groove formed in the upper portion of a container to hold the pourout fitment **10** securely in position in the opening of a container. A centrally located opening **16** is provided completely through the disc member **12**. The periphery of the opening **16** is defined by an integral, axial, hollow, pouring tube **18**. The pouring tube **18** is flared at its upper extremity and terminates in a slightly flattened vertical portion **20**. The lower extremity of the pouring tube **18** terminates in an inwardly directed flange **22**. The flange **22** is integrally connected to a hollow, axially disposed, vent tube **24** by a plurality of rib members **26**. It may be seen that the vent tube **24** tapers through substantially its entire length, and has an offset upper region defined by a flow-diverting ledge **28**. It is readily apparent from FIG. 1 that the outside diameter of the vent tube **24** is less than the diameter of the pouring tube **18**, thereby creating a tapered space between the vent tube **24** and the pouring tube **18** through which liquid may pass. Liquid is allowed to enter this space through a plurality of openings **29** defined by

spaces between the ribs 26 (see FIG. 3). FIG. 3 perhaps more clearly illustrates the path followed by a liquid which is dispensed by the pourout fitment 10. The openings 29 between the ribs 26 may readily be seen in FIG. 3. In addition, the connection of the flange 22 to the vent tube 24 by the ribs 26 is clearly seen in FIG. 3.

A closure 30 adapted for use with the pourout fitment 10 may be seen in FIG. 2. The closure 30 has a top panel 32 and an integrally formed depending annular skirt 34. The annular skirt 34 is provided with threads 36 on the interior of its lower portion to allow engagement with the threaded portion of a container. Spaced radially inward from the annular skirt 34 is a depending annular ring 38, integrally attached to the top panel 32. Adjacent the annular ring 38 is a sealing groove 40, one of whose sides is defined by the inner wall of the annular ring 38. The other wall of the sealing groove 40 is defined by the tapered outer wall of a downwardly depending annular bead 42 integrally formed with the top panel 32. As will be shown with reference to FIG. 4, the taper of the outer wall of the annular bead 42 substantially matches the flare of the upper portion of the pouring tube 18.

With reference to FIG. 4, the pourout fitment 10 is shown in position on the neck portion 44 of a container. The neck 44 terminates in a rim portion 45, defining an opening 43 into the container. The neck 44 of the container has an upper groove 46 adapted to engage the bead 15 on the annular engaging member 14. This engagement of the annular member 14 in the groove 46 firmly attaches the pourout fitment 10 to the container neck 44. Also on the container neck 44 are a series of external threads 48 adapted to engage the corresponding threads 36 of the closure 30. FIG. 4 shows the closure 30 in a position just prior to its final engagement with the threads 48. That is, the pourout fitment 10 has not yet been completely sealed. As may be seen, the outer tapered surface of the annular bead 42 sealingly contacts the upper flared portion of the hollow pouring tube 18. It may also be appreciated that as the closure 30 is rotated into its final seated position, the flattened vertical portion 20 of the upper flared portion of the hollow pouring tube 18 will sealingly engage the inner wall of the annular ring 38. The annular ring 38 itself seats on the upper disc member 12 of the pourout fitment 10 to limit the engagement of the closure 30 with the neck 44 of the container. Thus in operation, the pourout fitment 10 being placed on a container filled with liquid, may allow the contents of the container to be poured from the container with a minimum of splashing or gurling due to air lock conditions. This is accomplished by allowing air to enter the container through the vent tube 24 when the container is tipped to pour out the contents. The liquid contents pass through the openings 29 and impact on the flow-diverting ledge 28, thereby slowing the flow of liquid from the container. The liquid contents then follow the tapered opening between the pouring tube 18 and the vent tube 24. As contents are removed from the container by this method, their volume is replaced by incoming air through the vent tube 24.

Turning now to FIG. 5, a somewhat different configuration of the closure member 30 is illustrated. It should be understood that the fitment 10 described previously may be utilized with this modified closure 50. The closure member 50 has an upper, substantially horizontal top panel 52 and a lower, substantially horizontal panel 54 which is substantially parallel with the upper panel 52. The upper panel 52 and the lower panel 54 are integrally connected as a unit by a vertically extending, annular wall 56. An annular skirt 58 depends from and is integrally attached to the lower panel 54. The interior of the lower portion of the annular skirt 58 is provided with threads 60 for engagement with corresponding threads on a container. Integrally molded with the lower surface of the lower panel 54 is a downwardly depending annular bead 62. The annular bead 62 serves much the same purpose as the annular ring 38 in the embodiment shown in FIG. 2; that is, the annular bead 62 limits the engagement of the pouring tube 18 with a sealing groove 64 formed in the closure member 50. In the embodiment shown in FIG. 5, the sealing groove 64 has its outer wall defined by the inner wall of the annular vertical wall 56. Its inner wall is defined by the outer tapered wall of a downwardly depending annular sealing bead 66 integrally attached to the upper panel 52, the sealing bead 66 being radially inwardly spaced from the annular wall 56.

FIG. 6 illustrates the closure member 50 partially engaged with the neck portion 44 of a container. It may be seen that the flared upper portion of the pouring tube 18 engages the tapered outer wall of the annular bead 66. Thus, the sealing process begins as the closure 50 is initially engaged with the threads 48 on the bottle neck 44.

FIG. 7 illustrates the closure 50 completely seated and sealed with respect to the pourout fitment 10. It may be seen that the lower panel 54 is not in contact with the upper surface of the disc member 12, but rather the annular bead 62 contacts the upper surface of the disc member 12 and thus provides a limit of the sealing engagement of the flared upper portion of the pourout tube 18 and the tapered wall of the annular sealing bead 66. In addition, the vertical upper portion 20 of the pourout tube 18 is in sealing engagement with the inner wall of the annular wall 56.

What I claim is:

1. A liquid pourout fitment and removable screw closure in combination with a bottle adapted to contain a liquid, said bottle having an exteriorly threaded neck portion for selectively applying the closure thereto, said neck portion having a rim defining an opening for said bottle and defining an annular snap-on groove intermediate the rim and said threads; said fitment comprising, a disc element having a centrally located opening therethrough and an annular bottle neck engaging member on the periphery of said disc, an integral, axial, hollow pouring tube surrounding the periphery of said opening and extending vertically above and below the plane of said disc element, said pouring tube bieng outwardly flared at its upper extremity, said flared portion terminating in a substantially vertical end portion, and having an inwardly directed flange at its lower extremity, a tapered, axial, hollow vent tube having a maximum outside diameter less than the inside diameter of said pouring tube and being located concentrically with respect to said pouring tube, said vent tube being integrally connected to said inwardly directed flange by a plurality of rib members to thereby define a plurality of openings to allow escape of a liquid within said bottle, said tapered vent tube having an upper portion defined by an outside diameter tapering toward said pouring tube and terminating at a location intermediate said in-

wardly directed flange and said upper extremity of said pouring tube, and a lower portion, integrally connected to said upper portion, defined by an outside diameter tapering away from said pouring tube and terminating at a point below said inwardly directed flange, the outside diameter of said lower portion being less than the outside diameter of said upper portion at the point of connection of said upper and lower portions, the difference in outside diameters of said upper and lower portions serving to define a flow diverting ledge, the inside diameter adjacent the smallest outside diameter of said upper portion to a second inside diameter, smaller than said first inside diameter, adjacent the termination of said lower portion of said vent tube; said screw closure comprising, a skirt portion formed with threads on its interior surface for securing said closure to the threads of the said bottle neck, a substantially horizontal top panel integrally connected to said skirt, a downwardly depending annular ring integrally connected to said top panel radially, inwardly spaced from said skirt, an annular, downwardly depending bead radially, inwardly spaced from said downwardly depending annular ring, said bead being attached to the interior surface of said top panel, said bead having a diameter greater than the outside diameter of said vent tube, the outer wall of said bead being tapered to match the flare of the upper portion of said pouring tube, and an annular sealing groove, said sealing groove having its outer wall defined by said downwardly depending annular ring and its inner wall defined by the outer wall of said downwardly depending bead, the width of said sealing groove being such that upon engagement of said closure and said fitment, the outer wall of said bead will sealingly engage the inner flared wall of said pouring tube and the inner wall of said annular ring will sealingly engage the vertical end portion of said flared upper extremity of said pouring tube, the engagement of said fitment and said closure being limited by the abutment of said disc element of said fitment and said downwardly depending annular ring.

2. A liquid pourout fitment and removable screw closure in combination with a bottle adapted to contain a liquid, said bottle having an exteriorly threaded neck portion for selectively applying the closure thereto, said neck portion having a rim defining an opening for said bottle and defining an annular snap-on groove intermediate the rim and said threads; said fitment comprising, a disc element having a centrally located opening therethrough and an annular bottle neck engaging member on the periphery of said disc, an integral, axial, hollow pouring tube surrounding the periphery of said opening and extending vertically above and below the plane of said disc element, said pouring tube being outwardly flared at its upper extremity, said flared portion terminating in a substantially vertical end portion, and having an inwardly directed flange at its lower extremity, a tapered, axial, hollow vent tube having a maximum outside diameter less than the inside diameter of said pouring tube and being located concentrically with respect to said pouring tube, said vent tube being integrally connected to said inwardly directed flange by a plurality of rib members to thereby define a plurality of openings to allow escape of a liquid within said bottle, said tapered vent tube having an upper portion, defined by an outside diameter tapering toward said pouring tube and terminating at a location intermediate said inwardly directed flange and said upper extremity of said pouring tube, and a lower portion, integrally connected to said upper portion, defined by an outside diameter tapering away from said pouring tube and terminating at a point below said inwardly directed flange, the outside diameter of said lower portion being less than the outside diameter of said upper at the point of connection of said upper and lower portions, the difference in outside diameters of said upper and lower portions serving to define a flow diverting ledge, the inside diameter of said vent tube tapering uniformly from a first inside diameter adjacent the smallest outside diameter of said upper portion to a second inside diameter, smaller than said first inside diameter, adjacent the termination of said lower portion of said vent tube; said screw closure comprising a skirt portion formed with threads on its interior surface for securing said closure to the threads of said bottle neck, an upper, substantially horizontal panel, a lower, parallel, substantially horizontal panel integrally connected to said skirt, said upper and lower panels being integrally attached by a vertically extending annular wall, an annular, downwardly depending sealing bead radially, inwardly spaced from said annular wall attached to the interior surface of said upper panel, said bead having a diameter greater than the outside diameter of said vent tube, the outer wall of said bead being tapered to match the flare of the upper portion of said pouring tube, a downwardly depending, annular engagement bead integrally formed on the lower surface of said lower parallel panel, and an annular sealing groove, said sealing groove having its outer wall defined by said annular wall and its inner wall defined by the outer wall of said annular, downwardly depending sealing bead, the width of said sealing groove being such that, upon engagement of said closure and said fitment, the outer wall of said sealing bead will sealingly engage the inner flared wall of said pouring tube and the inner wall of said annular wall will sealingly engage the vertical end portion of said flared upper extremity of said pouring tube, the engagement of said fitment and said closure being limited by the abutment of said disc element of said fitment and said downwardly depending, annular engagement bead formed on the inner surface of said lower, parallel panel.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,762,612 Dated October 2, 1973

Inventor(s) IRA H. MILLER

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 2, line 17, "one" should be --of--. Col. 4, line 54 of claim 1, "bieng" should be --being--. Col. 5, line 11 of claim 1, after "diameter" insert --of said vent tube tapering uniformly from a first inside diameter--. Col. 6, line 17 of claim 2, after "upper" insert --portion--.

Signed and sealed this 19th day of February 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.