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3,233,775

FLEXIBLE PLASTIC PLUG

Filed July 16, 1963

FIG. 1

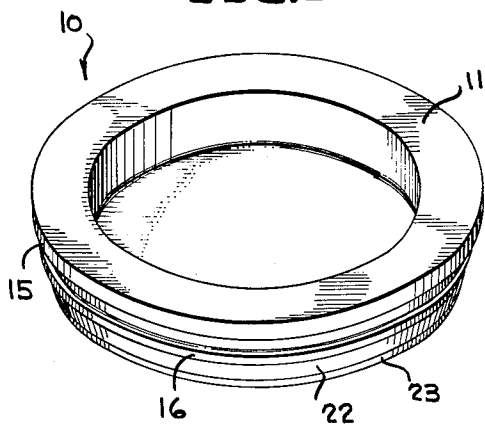


FIG. 2

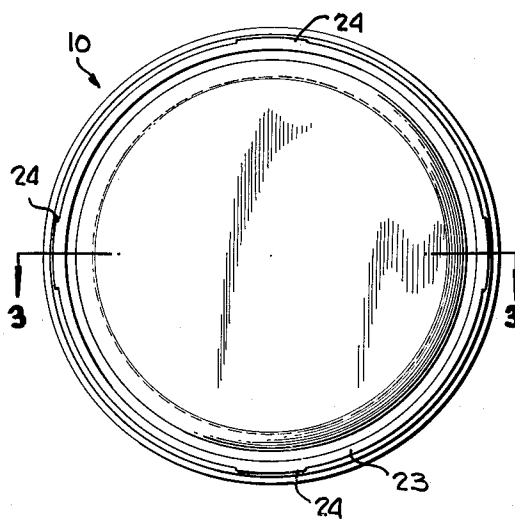


FIG. 3

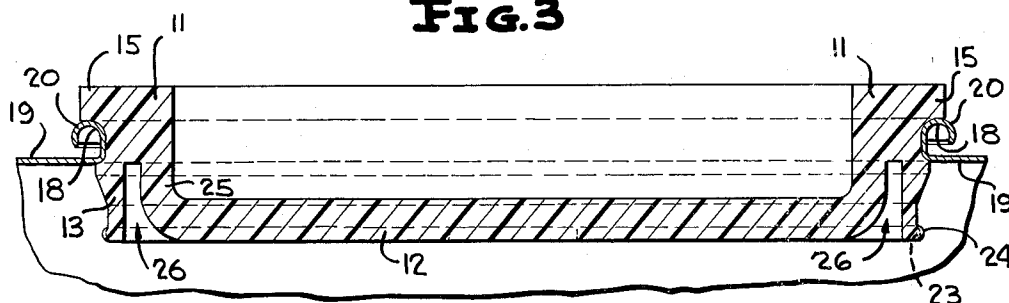


FIG. 4

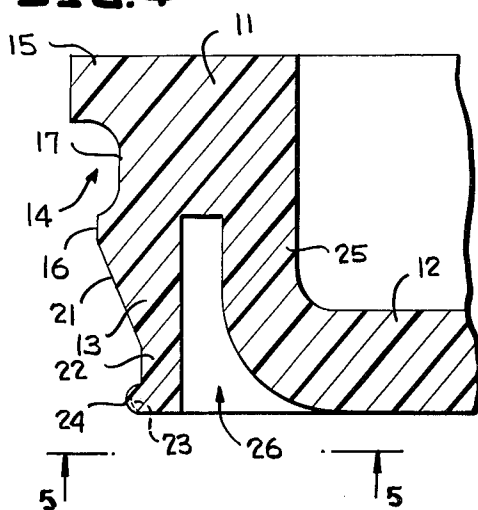
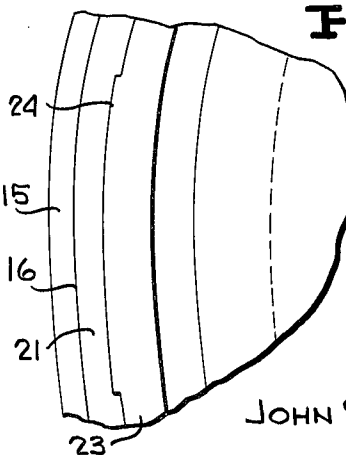


FIG. 5



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3,233,775

FLEXIBLE PLASTIC PLUG

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1 Claim. (Cl. 220-60)

This invention relates to a flexible plug, and more particularly to an improved plastic closure plug for sealing an opening in a container.

It is old in the container art to provide closure plugs for sealing openings in a container. Various types of previously known closure plugs have been found to be deficient in that the closure plugs are subject to displacement as a result of pressure exerted thereon from the interior of the container. The pressure referred to may be in the form of gaseous pressure developed in liquid or other fills, or the pressure may be formed from impact upon the containers because of rough handling. Previously known closure plugs are also objectionable because the plugs have insufficient resiliency to permit easy insertion of the plug within the container opening and also insufficient resiliency to permit the closure plug to conform to a distorted opening caused by deformation of the container.

An object of this invention is to overcome the above mentioned deficiencies by providing a novel flexible plastic plug which is formed of a deformable and resilient material, such as polyethylene or other plastics having similar characteristics, which resists displacement from an opening in a container and is capable of conforming to a distorted opening in a container.

Another object of this invention is to provide a closure plug for sealing an opening in a container, wherein the closure plug comprises a peripheral top portion, a wall portion depending from the peripheral top portion for traversing and closing a container opening, a flange skirt depending from the peripheral top portion and spaced from the wall portion by a peripheral recess, and the peripheral top portion having a circumferential groove formed therein for receiving a portion of a container wall.

Another object of this invention is to provide a closure plug of the character stated wherein the flange skirt includes a projecting seal rib adjacent to the circumferential groove and a tapered portion adjacent to the seal rib.

Another object of this invention is to provide a closure plug of the character stated which includes a cylindrical skirt which is spaced from the seal rib by the tapered portion, and bead means are provided on the cylindrical skirt and spaced from the tapered portion for providing intermediate assembly means for retaining the closure plug within a container wall opening.

Another object of this invention is to provide a closure plug of the character stated wherein a plurality of spaced protuberances are provided on the bead means.

A further object of this invention is to provide a novel closure plug which is sufficiently flexible so as to adapt to the shape of a container opening, even though the container opening becomes distorted, and thereby prevents the closure plug from losing contact with the walls of the container opening.

A still further object of this invention is to provide a closure plug which is substantially reduced in weight, as compared to the weight of previously known closure plugs of the same general type, and thus requires a substantially smaller amount of material.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following de-

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tailed description, the appended claimed subject matter and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view illustrating the novel closure plug.

FIGURE 2 is an inverted plan view illustrating the novel closure plug.

FIGURE 3 is an enlarged vertical cross-sectional view, taken on line 3-3 of FIGURE 2, showing the closure plug mounted in, and sealing an opening in a container wall.

FIGURE 4 is an enlarged fragmentary radial sectional view illustrating details of the novel closure plug.

FIGURE 5 is a fragmentary inverted plan view, taken on line 5-5 of FIGURE 4, illustrating one of the spaced protuberances on a securing bead of the closure plug.

Referring to the drawings in detail, there is illustrated in FIGURE 1 a closure plug, generally indicated by the numeral 10, which closure plug is preferably molded from polyethylene or other similar plastic material.

The closure plug 10 includes a peripheral top portion 11, a closure wall portion 12 for traversing and closing a container opening and depending flange skirt 13 which is integrally connected to the underside of the peripheral top portion 11. The closure plug 10 is preferably peripherally grooved at 14 to provide an outwardly projecting stop flange 15, an outwardly projecting seal rib 16 and an intermediate sealing wall 17. The intermediate sealing wall 17 generally conforms in shape to the mounting opening defining neck or wall portion 18 of a container wall 19 in which the opening is formed, and in this exemplary disclosure, the neck is outwardly turned, or projected externally of the container, and terminates upwardly in an outwardly turned and smoothly rounded portion or curl 20. It is to be understood that the opening in which the closure plug 10 is mounted and which is sealed by the closure plug may be an opening in a top wall, a bottom wall or a side wall of a container.

The depending flange skirt 13 includes a tapered portion 21 depending from the outwardly projecting seal rib 16 and merging into a lead-in dependage or cylindrical skirt 22.

It will be noted that the external diameter of the cylindrical skirt 22 is slightly less than the internal diameter of the container neck 18 and thus can be readily inserted into the neck to present the tapered portion 21 in contact with the rounded, outwardly directed portion 20 of the neck. Then by application of downward pressure against the peripheral top portion 11 and wall portion 12 by any suitable mounting means or device, the closure plug 10 can be forced into the sealing position illustrated in FIGURE 3.

The closure plug 10 is provided at the lower extremity of the cylindrical skirt 22 with an outwardly extending peripheral bead 23. The peripheral bead 23 includes a plurality of circumferentially spaced protuberances 24. The peripheral bead 23 is spaced beneath the tapered portion 21 by the cylindrical skirt 22 such that a groove way is formed to receive the container neck 18 when the closure plug 10 is inserted in an intermediate assembly position. The closure plug 10 can be temporarily secured by engagement of the tapered portion 21 above the container neck 18, and the peripheral bead 23 and protuberances 24 below the container neck. Then when it is desired to complete the assembly and effect the desired sealing of the container, downward pressure on the peripheral top portion 11 and wall portion 12 will force the closure plug 10 into the position illustrated in FIG. 3.

It is an important feature of this invention that the wall portion 12 depends from the peripheral top portion 11 and is integrally connected therewith by a cylindrical de-

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pendage portion 25. As is clearly illustrated in FIGURES 3 and 4, the cylindrical dependage portion 25 is attached to the underside of the peripheral top portion 11 in a plane which extends through the upper extremity of the outwardly projecting seal rib 16, and is spaced from the depending flange skirt 13 to provide a peripheral recess 26.

During insertion of the closure plug 10 into the opening of the container, the tapered portion 21 of the depending flange skirt 13 slides along the opening defining neck 18 and causes the depending flange skirt 13 to be canted slightly inwardly into the region of the peripheral recess 26. Thus, because of the peripheral recess 26, the depending flange skirt 13 has sufficient flexibility to allow the closure plug 10 to be easily inserted into the opening of the container. After the outwardly projecting seal rib 16 has been moved past the opening defining neck 18, the smoothly rounded curl 20 becomes seated within the groove 14 and cooperates with the intermediate sealing wall 17 to completely seal the container opening. An increase in pressure, which may develop in liquid or other fills or may develop from impact loads caused by rough handling, will cause displacement of, or leakage past, previously known closure plugs; however, such displacement or leakage is resisted by the closure plug 10 because an increase in pressure upon the underside of the wall portion 12 will be resisted by the outwardly projecting seal rib 16, and in addition, the closure plug 10 is sufficiently resilient to conform to distortion of the opening in the container.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the spirit and scope of the invention as defined in the appended claimed subject matter.

I claim:

A flexible plastic closure plug for sealing an opening in

a container, said closure plug comprising a peripheral top portion; a cylindrical dependage portion integrally formed with said top portion and connected thereto along an inner bottom portion thereof, a wall portion connected to said top portion by said cylindrical dependage portion, said wall portion being disposed below said top portion; a stop flange integral with said top portion and extending outwardly therefrom to prevent movement of said closure plug through the opening which is to be sealed; a groove formed within said top portion adjacent to said stop flange and shaped to receive a curled portion of a container wall; a depending flange skirt integral with said peripheral top portion, said depending flange skirt being outwardly spaced from said cylindrical dependage portion to define a peripheral recess therebetween; said flange skirt including an outwardly projecting seal rib disposed below said groove and terminating inwardly from said stop flange, the innermost portion of said recess terminating in substantially the same transverse plane as the portion of said seal rib adjacent said groove, a tapered portion extending downwardly from said rib and terminating in a cylindrical skirt, said cylindrical skirt being provided with outwardly extending bead means, and a plurality of circumferentially spaced protuberances on said bead means; said bead means being spaced from said tapered portion for cooperating therewith for retaining the plug in an intermediate assembly position of part-way insertion in the opening of a container.

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