

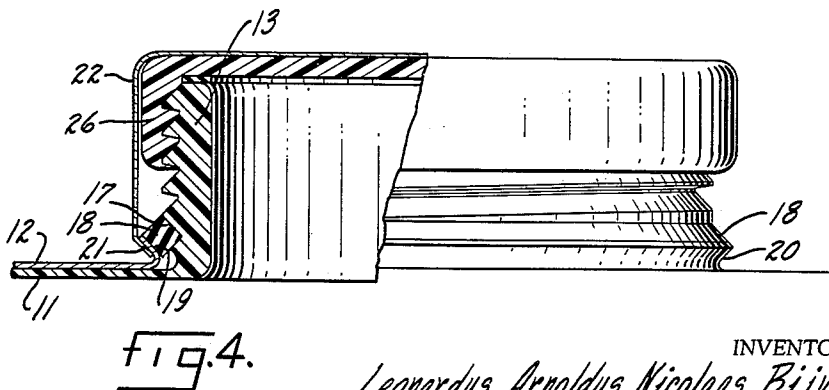
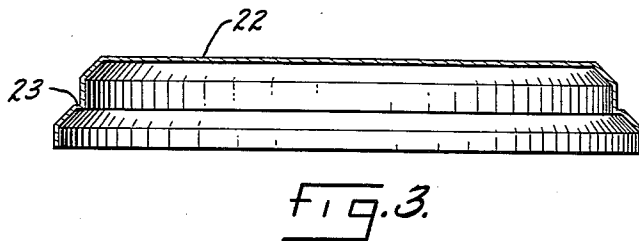
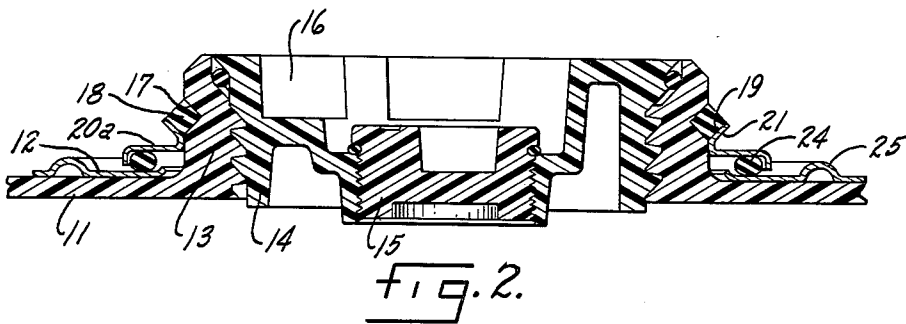
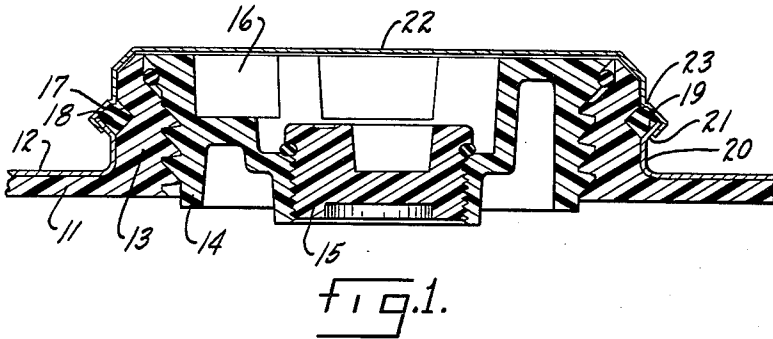
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SHIPPING CONTAINER

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1

3,086,679

SHIPPING CONTAINER

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The present invention relates generally to shipping containers having a non-metallic inner shell or liner and, more particularly, to such containers in which the liner includes one or more inlet or outlet necks projecting outwardly through corresponding openings formed in an outer shell or overpack.

It is a general aim of the present invention to provide an improved closure construction for shipping containers having non-metallic liners. A related object of the invention to provide a shipping container construction in which relative axial movement between the neck of a non-metallic liner and the outer shell or overpack is inhibited.

In another of its aspects, it is an object of the invention to compensate for the shrinkage inherent with molded non-metallic liners used in shipping containers.

Another object of the invention is to provide a shipping container having a liquid tight seal interposed between the neck of a non-metallic liner and the surrounding outer shell or overpack so as to prevent seepage of liquids into the overpack and about the liner.

A more specific object of the invention is to provide a novel seating arrangement for metallic seal caps conventionally employed with shipping containers having non-metallic liners.

These and other objects and advantages of the invention are attained by the construction and arrangement shown by way of illustration in the accompanying drawing in which:

FIGURE 1 is a vertical cross sectional view of a portion of a container embodying the features of the present invention and illustrating the container with a seal cap in place;

FIG. 2 is a cross sectional view, similar to FIG. 1, of a slightly modified form of closure construction for shipping containers also embodying the features of the present invention and with the seal cap removed;

FIG. 3 is a cross sectional view of an exemplary seal cap for use with the shipping container closure constructions shown in FIGS. 1 and 2 illustrating the cap prior to installation on the containers; and,

FIG. 4 is an elevational view, partly in section, of a slightly modified form of shipping container closure construction also embodying the features of the present invention.

While the invention has been illustrated and will be described with particularity in connection with preferred embodiments thereof, it will be understood that it is not intended to limit the invention to these specific embodiments. On the contrary, it is intended to cover such equivalent and alternative constructions as may be included within the spirit and scope of the appended claims.

Referring first to FIG. 1, there is illustrated a portion of a shipping container embodying the features of the present invention and having an inner shell or liner 11 mounted within an outer shell or overpack 12. As the ensuing description proceeds, those skilled in the art will readily appreciate that while the present invention is not directed to particular materials for the manufacture of shipping containers, it is, nevertheless, advantageously applicable to such containers in which the liner 11 is made of a thermoplastic such, for example, as polyethylene,

2

while the outer shell or overpack 12 is made of a more rigid material, for example, sheet steel or other sheet metal, plywood, fiber, or other natural or synthetic materials.

To provide for loading and unloading such containers, the liner 11 includes a neck 13 projecting through an opening in the outer shell 12 (or a lid therefor), the neck having internal screw threads positioned to be coupled with external screw threads formed on a closure plug 14. The screw threads are of the buttress type which is particularly advantageous when the neck and the plug are made of polyethylene or similar material having cold flow tendencies. The closure plug 14 carries an inner plug 15 which may be removed in order to mount the tap or stopcock in the screw threaded opening so obtained. To facilitate plug removal, the closure plug 14 is formed with tool engaging recesses 16 positioned to receive a spanner tool or the like for screwing or unscrewing the plug.

In accordance with one of the important aspects of the present invention, provision is made for securely locking the neck 13 of the non-metallic liner 11 to the outer shell or overpack 12 in a fixed axial position while at the same time providing a liquid tight seal in the vicinity of the junction of the neck and the outer shell. To accomplish this, the neck 13 has formed therein a circumferential groove 17 which serves as a seat for reception of a resilient locking and sealing ring 18. A flange or bushing member 20, integral with the overpack wall or lid, surrounds the neck 13 of the liner 11 and terminates in an upwardly facing flared, annular surface 19 which is in intimate sealing contact with the lower and outer edge of the locking and sealing ring 18. Those skilled in the art will readily appreciate that the ring 18 cooperates with the groove 17 on the one hand and the annular surface 19 on the other hand to securely hold the neck 13 in a fixed axial position relative to the outer shell 12. At the same time a liquid tight seal is provided at the neck between the liner 11 and the overpack 12, thereby preventing seepage of liquid into the space between the inner shell and the overpack.

The flange or bushing member 20 also provides a downwardly facing annular shoulder 21 which is engaged by the lower skirt portion of a seal cap 22 when the skirt portion is turned inwards and beneath the shoulder 21. The seal cap is formed with a circumferential ridge 23 (FIGS. 1 and 3) and the depth of the top portion of the cap is so dimensioned in relation to the height of the neck portion above the groove 17, that the ridge 23 bites into the locking and sealing ring when the cap 22 is applied to the closure neck and its lower skirt portion is turned inwards into tight engagement with the shoulder 21. In this manner, it is unnecessary to provide an additional liquid tight seal in the seal cap as is required in conventional closure constructions.

In keeping with the present invention, provision is made for compensating for the shrinkage inherent in non-metallic molded liners made, for example, of polyethylene or similar moldable material. It is particularly essential to compensate for liner shrinkage when the liner includes more than one inlet or outlet neck 13 which must project through respective openings formed in a shipping container overpack 12. To this end, a slightly modified form of closure construction is shown in FIG. 2 wherein a separate annulus or collar 20a, similar to the flange or bushing 20 (FIG. 1), rests on the outer wall or lid of the overpack 12 and a resilient packing ring 24 is interposed between the overpack and the collar 20a. The opening in the overpack through which the neck 13 projects has a larger diameter than the outer diameter of the neck, thereby permitting of lateral displacement of the neck in relation to the bordering edge of the open-

ing. As in the embodiment of the invention shown in FIG. 1, the ring 18 serves the dual function of maintaining the liquid tight integrity of the container while insuring that the liner 11 and the overpack 12 remain in fixed axial positions relative to one another. In the exemplary form of FIG. 2, the overpack wall or lid is formed with an annular reinforcing ridge 25 surrounding the opening through which the neck 13 projects. While no seal cap 22 is shown in FIG. 2, it will be clear that such a cap can be utilized here if desired.

Turning to FIG. 4, a modified form of the invention is shown in which the neck 13 of the liner 11 projects through an opening in the outer shell 12 and is closed by means of a screw cap 26 rather than a screw plug such as the plug 14 shown in FIGS. 1 and 2. The neck 13 has formed thereon external screw threads which cooperate with internal screw threads formed in the screw cap 26. Here, the seal cap 22 includes a simple cylindrical skirt portion, the lower edge of which is turned inwards and beneath the annular shoulder 21.

I claim as my invention:

1. A shipping container for the storage and transportation of goods comprising, in combination, a hollow outer shell, said shell having an opening formed therein, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening, means associated with said outer shell defining an annular flange surrounding said neck, said flange terminating in an outwardly projecting, flared, annular shoulder, said neck having an external circumferential groove formed therein juxtaposed to said shoulder, the upper surface of said annular shoulder defining with said circumferential groove an annular seat, and a resilient locking and sealing ring mounted within said seat and in intimate contact with said groove and said shoulder whereby said liner neck is axially fixed relative to said outer shell.

2. A shipping container for the storage and transportation of goods comprising, in combination, a hollow outer shell, said shell having an opening formed therein, an annular flange integral with said shell surrounding said opening, said flange terminating in an outwardly flared annular shoulder, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening and through said flange, said neck having an external circumferential groove formed therein and juxtaposed to said shoulder, the upper surface of said annular shoulder defining with said circumferential groove an annular seat, and a resilient locking and sealing ring mounted within said seat and in intimate contact with said groove and said shoulder whereby said liner neck is axially fixed relative to said outer shell.

3. A shipping container for the storage and transportation of goods comprising, in combination, a hollow outer shell, said shell having an opening formed therein, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening with freedom for limited lateral movement therein, a collar surrounding said neck, sealing means interposed between said collar and said outer shell, said collar having an outwardly flared annular shoulder, said neck having an external circumferential groove formed therein juxtaposed to said shoulder, the upper surface of said annular shoulder defining with said circumferential groove an

annular seat, and a resilient locking and sealing ring mounted within said seat and in intimate contact with said groove and said shoulder whereby said liner neck is axially fixed relative to said outer shell.

4. A shipping container for the storage and transportation of goods comprising, in combination, a hollow outer shell, said shell having an opening formed therein, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening, means associated with said outer shell defining an annular flange surrounding said neck, said flange terminating in an outwardly projecting, flared, annular shoulder, said neck having an external circumferential groove formed therein juxtaposed to said shoulder, a locking and sealing ring received within said groove and in intimate contact with the upper surface of said shoulder, and a seal cap mounted on said neck, said cap having a downwardly extending skirt, a circumferential ridge formed in said skirt, said ridge adapted to intimately engage said sealing ring when the lower portion of said skirt is turned inwardly into engagement with the lower surface of said shoulder.

5. A shipping container for the storage and transportation of goods comprising, in combination, a hollow outer shell, said shell having an opening formed therein, an annular flange integral with said shell surrounding said opening, said flange terminating in an outwardly flared annular shoulder, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening and through said flange, said neck having an external circumferential groove formed therein and juxtaposed to said shoulder, a locking and sealing ring received within said groove and in intimate contact with the upper surface of said shoulder, and a seal cap mounted on said neck, said cap having a downwardly extending skirt, a circumferential ridge formed in said skirt, said ridge adapted to intimately engage said sealing ring when the lower portion of said skirt is turned inwardly into engagement with the lower surface of said shoulder.

6. A shipping container for the storage and transportation of goods comprising, in combination, a hollow shell, said shell having an opening formed therein, a non-metallic liner received within said shell, said liner having a neck projecting outwardly through said opening with freedom for limited lateral movement therein, a collar surrounding said neck, sealing means interposed between said collar and said outer shell, said collar having an outwardly flared annular shoulder, said neck having an external circumferential groove formed therein and juxtaposed to said shoulder, a locking and sealing ring received within said groove and in intimate contact with the upper surface of said shoulder, and a seal cap mounted on said neck, said cap having a downwardly extending skirt, a circumferential ridge formed in said skirt, said ridge adapted to intimately engage said sealing ring when the lower portion of said skirt is turned inwardly into engagement with the lower surface of said shoulder.

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