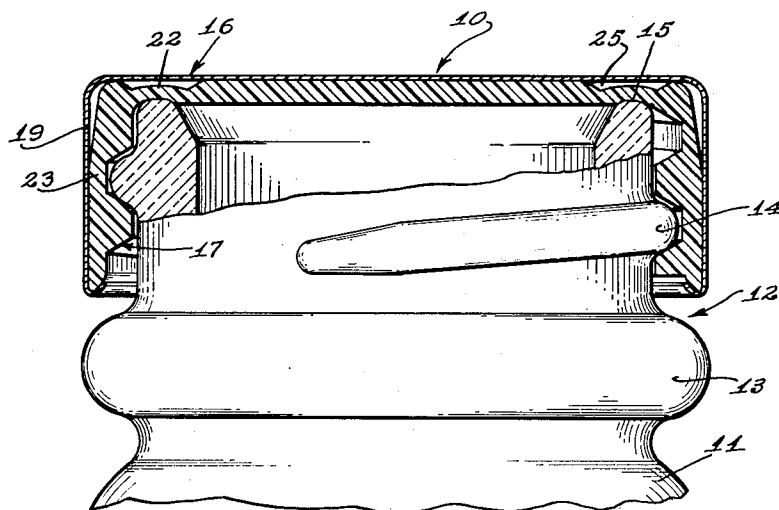


2,744,647

2 Sheets-Sheet 1



Th. I.

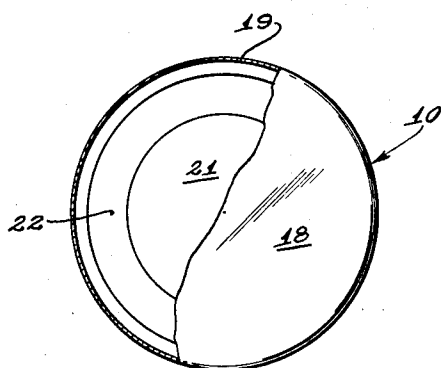
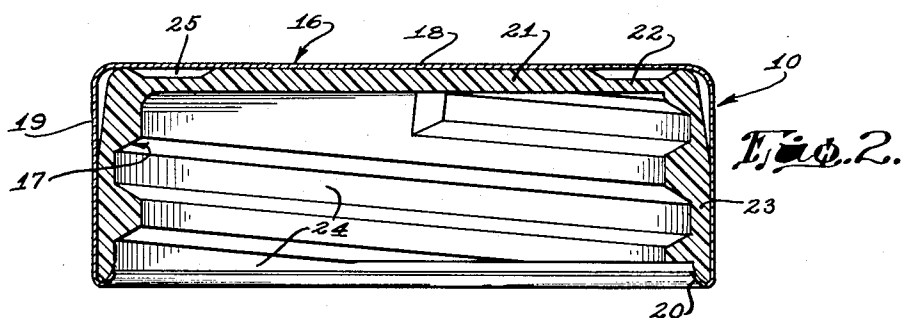


Fig. 3.

Inventors
U. M. WHEATON
F. G. PELLETT

334 Rule and Hoze.

Attorneys

May 8, 1956

J. M. WHEATON ET AL
CLOSURES

2,744,647

Filed Aug. 14, 1951

2 Sheets-Sheet 2

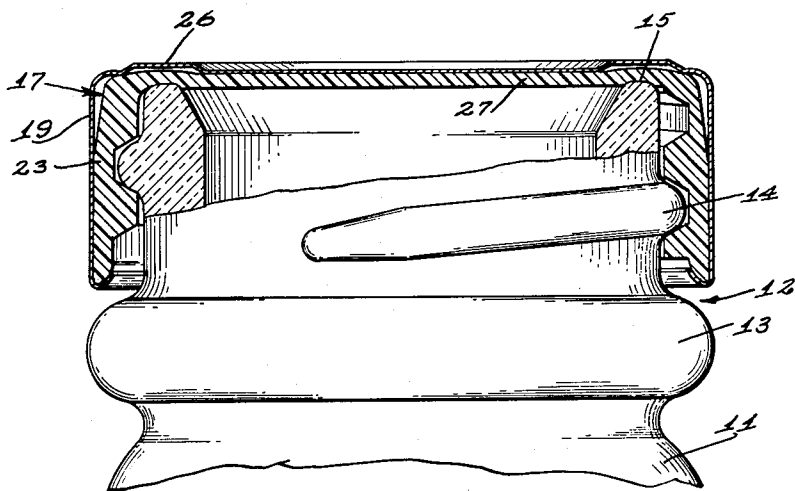


Fig. 4.

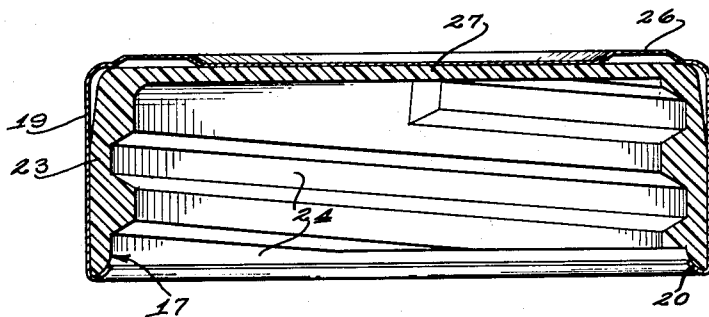


Fig. 5.

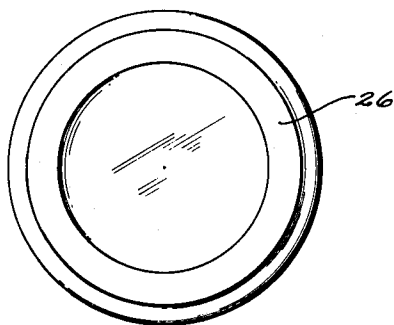


Fig. 6.

Inventors
J. M. WHEATON
F. C. PELLETT

By *Rule and Hoge,*

Attorneys

1

2,744,647

CLOSURES

Jack M. Wheaton and Fred G. Pellett, Toledo, Ohio, assignors to Owens-Illinois Glass Company, a corporation of Ohio

Application August 14, 1951, Serial No. 241,738

4 Claims. (Cl. 215—43)

This invention relates to the sealing of containers and particularly to the construction of closures therefor of the type which are commonly called "double-shell" closures.

Closures of this type generally comprise an inner metal shell having threads formed thereon, enclosed by an outer metal shell formed with threads on the inner surface thereof. A gasket is used to provide an adequate seal.

It is an object of this invention to provide a closure of the double-shell type wherein a satisfactory air, gas and liquid tight seal is obtained without the use of a gasket.

It is a further object of this invention to provide such a closure wherein the inner shell comprises a non-metallic material and wherein an effective seal is obtained by placing the inner shell material which overlies the sealing surface of the container under tension.

Other objects of the invention will appear hereinafter. Referring to the accompanying drawings:

Fig. 1 is a fragmentary part sectional elevational view of a container and the closure which comprises the invention in sealing position on the neck of the container;

Fig. 2 is a sectional view of the closure;

Fig. 3 is a part sectional plan view of the same;

Fig. 4 is a fragmentary part sectional elevational view of a container and a modified form of the closure in sealing position on the neck of the container;

Fig. 5 is a sectional elevational view of the modified form of the closure shown in Fig. 4; and

Fig. 6 is a plan view of the same.

As shown in Fig. 1, the closure 10 is applied to a container 11. The container comprises a neck 12, formed with an annular bead or transfer ring 13 and screw threads 14. The neck is also formed with sealing surface 15.

The closure 10 comprises an outer metal shell 16 and an inner shell or insert 17. The insert 17 is made of a material which is impervious to the action of mold or bacteria and imparts no characteristic odor or taste to products with which it may come in contact. In addition, the material is of the type which is relatively rigid when formed in thick sections and is relatively flexible and resilient when formed in thin sections. We have found that polyethylene is a particularly effective material from which the insert 17 may be formed. Other plastic materials such as vinyl resins having the desired properties, may also be used.

The metal shell 16 includes a flat horizontal panel 18 and a depending marginal skirt 19 normal to panel 18. A lip or locking rim 20 extends inwardly and upwardly from the lower edge of the depending marginal skirt 19.

As shown in Fig. 2, the insert 17 comprises a flat horizontal top portion 21 having an annular depressed portion 22 formed on the top thereof, in position to overlie the sealing surface of the container when the closure is applied to the container. A marginal skirt 23 depends from the flat top portion 21 and is provided with threads

2

24 formed on the interior surface thereof. As further shown in Fig. 2, the thickness of the insert 17 is such that the insert is relatively hard and rigid throughout, except at the relatively thin portions, such as the annular depressed portion 22, where the material is relatively flexible and resilient.

The height of the insert 17 is such that the insert is firmly held within the outer shell 16 and thereby prevented from moving axially. The diameter of the insert is substantially equal to the inner diameter of the metal shell so that the insert is prevented from moving radially by the metal shell.

By this construction, an annular space 25 is provided between the metal shell and the insert directly overlying the sealing surface 15 of the container. When the closure is applied to the neck of a container and screwed into sealing position, the annular depressed portion 22 is flexed upwardly into the space 25. By this action the annular portion 22 of the insert, is placed under tension. An air, gas and liquid tight seal is thereby obtained which is much more effective than would be possible by compressing the same material against the sealing surface. No gasket or liner is needed.

Similar results may be obtained by providing an annular raised portion in the surface of the outer shell rather than an annular depressed portion in the top of the insert. For example, as shown in Figs. 4 and 5, the metal shell is formed with an annular raised portion 26. The skirt 19 and lip 20 of the outer shell remain the same. The insert is formed with a flat horizontal portion 27 which is thinner than the portion 21 in the other form of the invention, the skirt 23 and threads 24 of the insert remaining the same.

In this form of the invention, when the closure is applied to the neck of a container, the flat portion of the insert overlying the sealing surface is flexed upwardly into the space formed by the annular raised portion 26 of the outer shell.

In making the closure, the outer shell 16 and the insert 17 are formed separately and the insert is pushed upwardly into the shell in order to assemble the closure. To facilitate passage of the insert past the lip of the outer shell, the upper portion of the skirt adjacent to the flat portion may be beveled as shown in Figs. 2 and 5.

We have found that the seal obtained by placing the portion of the insert overlying the sealing surface under tension is much more reliable and effective than if the same portion were compressed against the sealing surface.

Modifications may be resorted to within the spirit and scope of the appended claims.

We claim:

1. The combination comprising a closure and a container formed with a neck and an annular sealing surface, said closure comprising a shell formed of rigid material and an insert formed of a material which is flexible and resilient when formed in thin sections, said shell comprising a flat top portion and a depending marginal skirt, said insert comprising a complementary flat top portion and a depending marginal skirt whereby the insert is securely held within said shell, means formed on the interior surface of the skirt of said insert for removably securing the closure to the neck of the container, said insert being formed with an annular depressed portion on the top surface thereof overlying the sealing surface of the container and thereby providing an annular space between the top of the metal shell and the top of the insert, said annular depressed portion being in the form of a web substantially thinner than the adjoining top portion, the web being of greater width than the underlying sealing surface and of substantially

3

uniform thickness throughout its width and being flexed upwardly into said space when the closure is secured to the neck of the container, the said shell forming a means to oppose downward movement of the skirt of the insert as a whole relative the top portion when the closure is moved down on the container neck to sealing position.

2. The combination comprising a closure and a container with a neck and an annular sealing surface formed thereon, said closure comprising a shell having a flat top portion and a depending marginal skirt and an insert having a complementary flat top portion and a depending marginal skirt whereby the said insert is securely held within said shell, said insert having threads formed on the inner surface of the marginal skirt thereof, said insert being formed with an annular depressed portion on the top portion thereof overlying the sealing surface of the container and thereby providing an annular space between the under surface of the top portion of the shell and the upper surface of the top portion of the insert, said annular depressed portion of the insert being in the form of a web substantially thinner than the adjoining top portion, the web being of greater width than the underlying sealing surface and of substantially uniform thickness throughout its width and being flexed upwardly into the annular space when the closure is screwed into sealing position on the neck of the container, the said shell forming a means to oppose downward movement of the skirt of the insert as a whole relative the top portion when the closure is moved down on the container neck to sealing position.

3. A closure comprising a shell formed of rigid material and an insert formed of a material which is flexible and resilient when formed in thin sections, said shell comprising a flat top portion and a depending marginal skirt, said insert comprising a complementary flat top and a depending marginal skirt whereby the insert is securely held within said shell, means formed on the interior surface of said insert for removably securing the closure to the neck of a container, said insert being formed with an annular depressed portion on the top surface thereof in such a position as to overlie the sealing surface of a container to which the closure may be attached, said depressed portion being in the form of a web substantially thinner than the top portion, the web being of greater width than the underlying sealing surface and of substantially uniform thickness throughout its width thereby providing an annular space between the top of the metal shell and the top of the insert into

4

which the annular depressed portion may be flexed, the said shell forming a means to oppose downward movement of the skirt of the insert as a whole relative the top portion when the closure is moved down on the container neck to sealing position.

4. A closure comprising a shell having a flat top portion and a depending marginal skirt and an insert having a complementary flat top portion and a depending marginal skirt whereby the said insert is securely held within said shell, said insert having threads formed on the inner surface of the marginal skirt thereof, said insert being formed with an annular depressed portion in the top portion thereof in such a position as to overlie the sealing surface of the container to which the closure may be attached, said depressed portion being in the form of a web substantially thinner than the top portion, the web being of greater width than the underlying sealing surface and of substantially uniform thickness throughout its width thereby providing an annular space between the under surface of the top portion of the shell and the upper surface of the top portion of the insert into which the annular depressed portion may be flexed, the said shell forming a means to oppose downward movement of the skirt of the insert as a whole relative the top portion when the closure is moved down on the container neck to sealing position.

References Cited in the file of this patent

UNITED STATES PATENTS

30	55,438	Fox	June 5, 1866
	1,882,995	Scofield	Oct. 18, 1932
	1,898,342	Cuthbert	Feb. 21, 1933
	2,005,933	Carter	June 25, 1933
	2,138,376	Griswold	Nov. 29, 1938
35	2,181,799	Carvalho	Nov. 28, 1939
	2,262,021	Lockwood	Nov. 11, 1941
	2,398,553	Nyden	Apr. 16, 1946
	2,447,581	Keith	Aug. 24, 1948
40	2,582,489	Kruger	Jan. 15, 1952
	2,586,775	Benner	Feb. 26, 1952
	2,617,553	Lay	Nov. 11, 1952

FOREIGN PATENTS

45	509,876	Great Britain	July 25, 1939
	729,823	Germany	Dec. 23, 1942
	901,128	France	Oct. 30, 1944