

Oct. 30, 1962

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3,061,132

CLOSURE AND SEALED PACKAGE

Filed April 19, 1957

3 Sheets-Sheet 1

FIG. 1

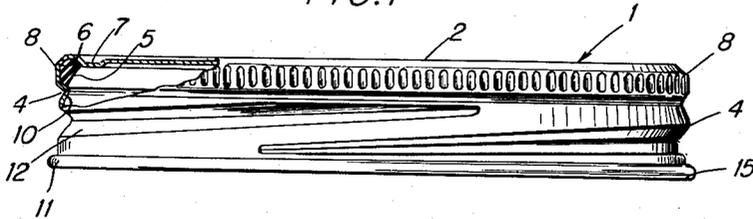


FIG. 2

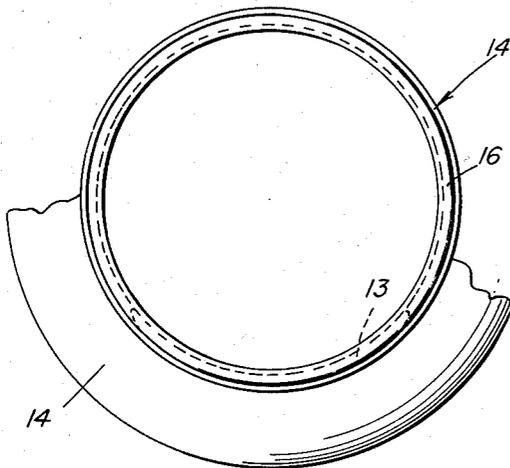


FIG. 4

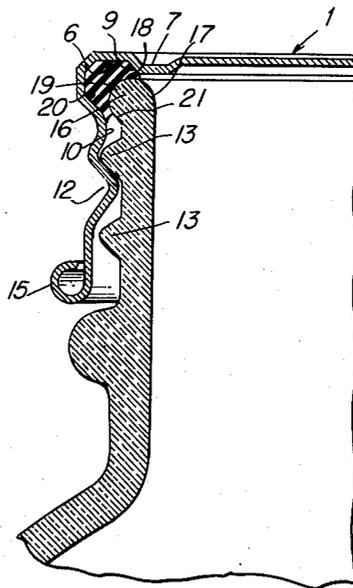
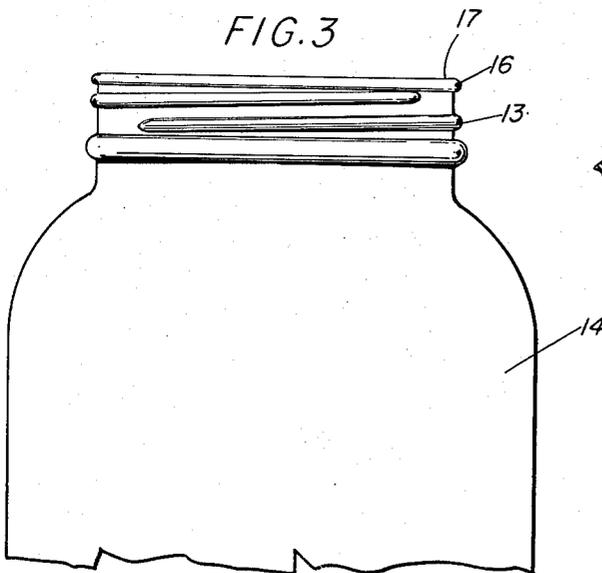


FIG. 3



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FIG. 5

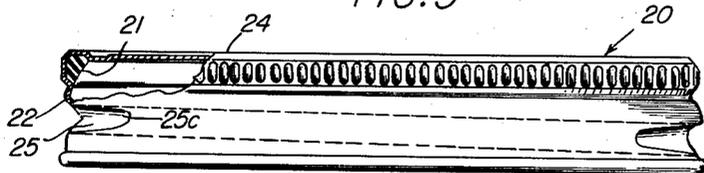


FIG. 6

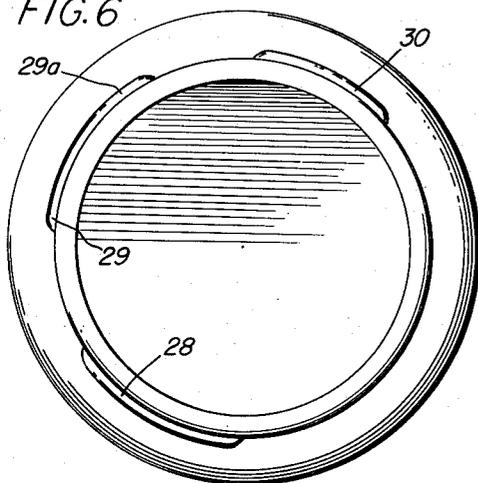


FIG. 8

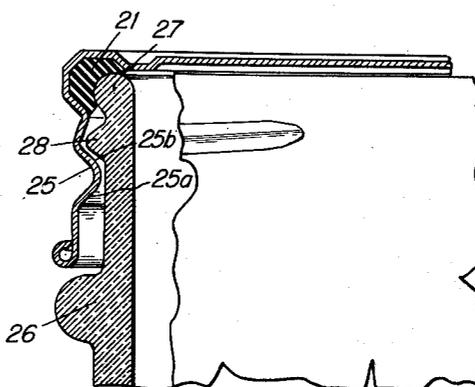


FIG. 7

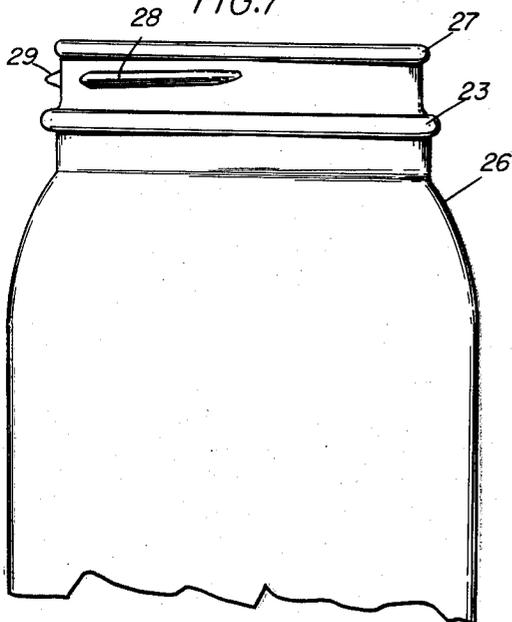
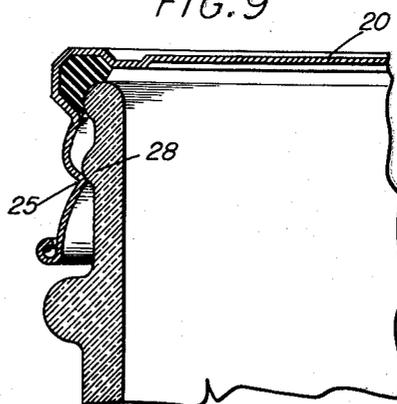


FIG. 9



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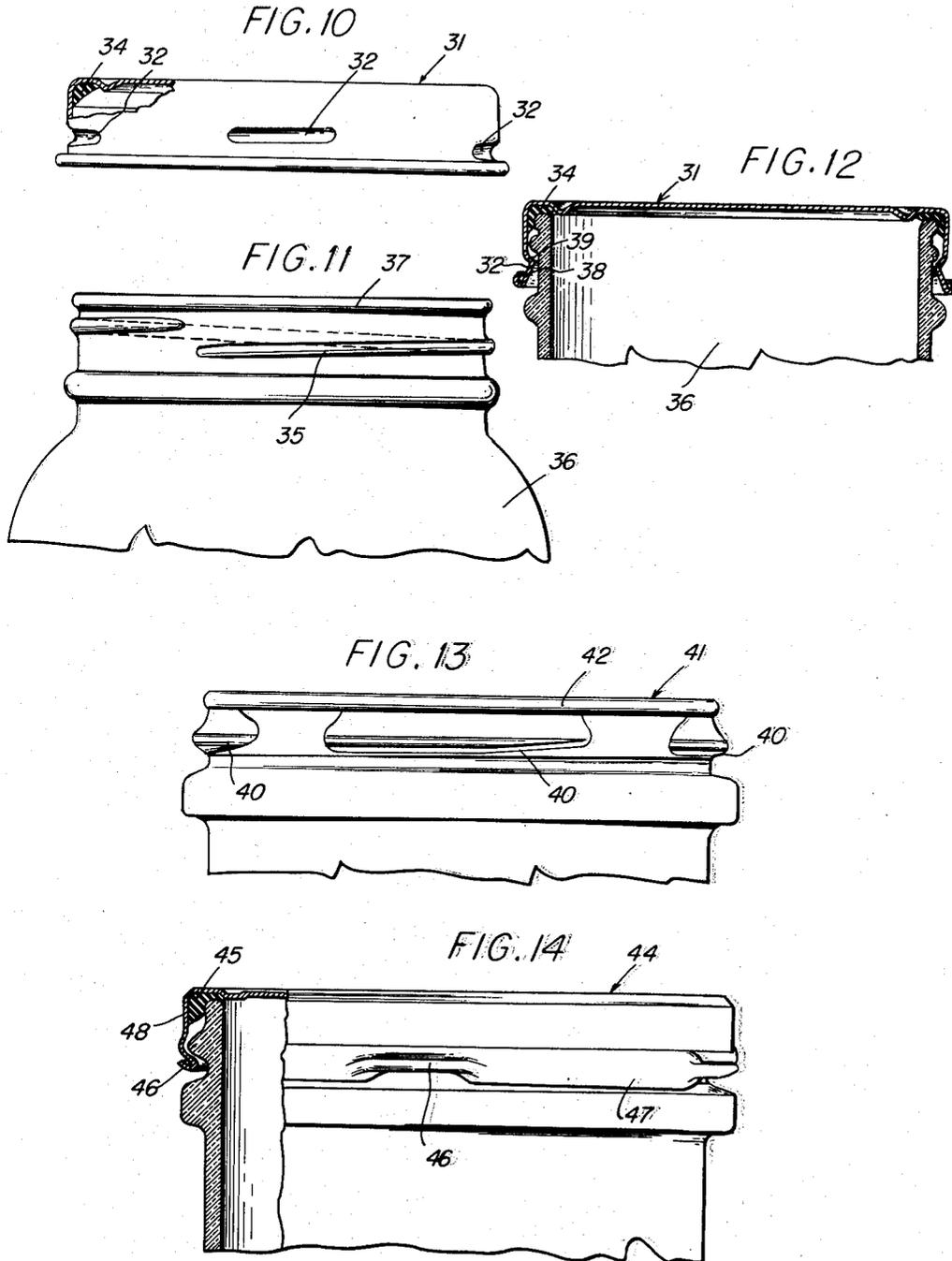
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3 Sheets-Sheet 3



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CLOSURE AND SEALED PACKAGE

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by mesne assignments, to Anchor Hocking Glass Corporation,
Lancaster, Ohio, a corporation of Delaware
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1 Claim. (Cl. 215-44)

The present invention relates to an improved closure and to a cooperating container finish therefor and more particularly to a closure of the screw thread or lug type having an improved sealing gasket therein and to the container finish for the closure.

At the present time closures making use of screw threads or lugs for attachment to containers are provided with a variety of sealing gaskets to insure an airtight or a vacuum seal. In general each of these known types of closures uses a sealing gasket positioned on relatively flexible portions of the closure such as the closure top so that the force applied in vacuum sealing containers with the closures has tended to bend and to distort the closures so that the closure threads and lugs jam on the container threads making the opening of the containers difficult. The closure gasket of the present invention is positioned to take advantage of the relatively rigid corner portion of a shell type closure between the closure top and the closure skirt. In this improved closure the natural channel-like stiffening action of the closure corner supports the gasket formed therein and allows the gasket to be applied against the container finish with great force without warping the closure or jamming the threads. Vacuum closures which use screw threads are presently applied by screwing them tightly onto the containers so that they depend on the thread contact to hold the closure gasket tightly against the sealing surface of the container. This thread contact causes friction between the closure and container threads which tends to impede the removal of the closure. The closure of the present invention combines the improved corner gasket with screw thread or lug fasteners adapted for press-on application in which the vacuum seal holds the closure in place and in which the closure and the container threads preferably are not engaged. This allows the closure to be turned or pried upwardly on the container far enough to break the vacuum without interference between the closure and container threads. Also when removing the closure by the turning off method when the higher portion of the cap thread on the skirt of the cap passes over the interrupted thread or lug on the glass it breaks the vacuum of the package and removal of the closure becomes very easy.

An object of the present invention is to provide an improved closure and a cooperating container finish.

Another object of the present invention is to provide an improved screw or lug type closure for hermetic seals.

Another object of the present invention is to provide an efficient vacuum-seal type of closure.

Another object of the present invention is to provide a relatively easily applied vacuum seal closure.

Another object of the present invention is to provide a vacuum seal screw cap which is adapted for easy and effective reapplication after the initial opening of the container.

Another object of the present invention is to provide an efficient gasket construction using a minimum amount of gasket material.

Another object of the present invention is to provide an improved package having a lug or screw type vacuum sealing closure cap.

Another object of the present invention is to provide a lug or screw type closure which is easily sealed, opened and resealed.

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Another object of the present invention is to provide a lug or screw closure which may be applied in a straight-line sealing machine by the application of downward pressure.

Another object of the present invention is to provide a package having a vacuum-type closure of the lug or screw type which may be applied by a straight-line sealing machine.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claim, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a side elevational view, partially in section, of a closure according to the present invention;

FIG. 2 is a top plan view of a container having a sealing finish in accordance with the present invention;

FIG. 3 is a side elevational view of the container of FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view of the closure of FIG. 1 applied to the container of FIG. 2;

FIG. 5 is a side elevational view, partially in section, of another embodiment of the closure according to the present invention;

FIG. 6 is a top plan view of another embodiment of a container having a sealing finish according to the present invention;

FIG. 7 is a fragmentary side elevational view of the container of FIG. 6;

FIG. 8 is an enlarged fragmentary view of the closure of FIG. 5 applied to the container of FIG. 6;

FIG. 9 is an enlarged fragmentary sectional view generally similar to FIG. 9 showing the closure in its reclosed position after the initial opening of the package;

FIG. 10 is a side elevational view partially in section of another embodiment of the closure according to the present invention;

FIG. 11 is a fragmentary side elevational view of a container showing another embodiment of the container finish in accordance with the present invention;

FIG. 12 is a sectional view showing the closure of FIG. 10 applied to the finish of FIG. 11;

FIG. 13 is a fragmentary side elevational view of a container showing another embodiment of the closure sealing finish in accordance with the present invention; and

FIG. 14 is a fragmentary side elevational view, partially in section, of a lug type closure of the present invention applied to the container of FIG. 13.

FIG. 1 shows a closure 1 having a top 2 and a downwardly depending skirt 4. A cushion or sealing gasket 5 is positioned at the corner between the skirt 4 and the closure top 2. Preferably a cushion or gasket channel 6 is formed in the closure top 2 to receive and retain the upper portion of the gasket 5. The channel 6 is formed by providing a downwardly disposed bead 7 in top 2 spaced from the upper edge 8 of the skirt 4 so that the channel 6 is defined between the upper edge 8 of the skirt 4 and the inner edge 9 (FIG. 4) of the bead 7. The gasket 5 is preferably formed of a solid-flowed gasket material which is applied to the channel 6 by flowing it in a continuous stream around the circumference of the channel 6. Solid-flow gasket materials are commercially available which have a suitable hardness over the range of temperatures encountered in packaging commonly used products so that the gaskets retain the proper amount of resiliency and sealing ability when subjected to either

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heat or cold. One satisfactory material, for example, is a vinylite resin which retains sufficient resiliency when subject to freezing temperatures to provide an airtight seal with the container and at the same time retains sufficient hardness to prevent its melting or flowing out of the channel 6 when used in packaging operations at or near the boiling point of water.

In the preferred embodiments an inwardly facing bead 10 is formed in the closure skirt 4 a slight distance down from the upper portion 8 of the skirt 4 to more clearly define the gasket receiving channel 6 and also to assist in the sealing action when the closure 1 is applied to a container, as will be more fully described below. Between the bead 10 and the lower edge 11 of the skirt 4 an internal thread 12 is formed in the skirt 4 adapted to engage complementary threads 13 on the walls of the mouth of the container 14. The lower edge of the skirt 4 is rolled over or beaded as at 15 to stiffen the lower edge of the closure 1.

FIGS. 2 and 3 show the upper portion of a container 14 having a finish adapted to seat the closure 1. The finish preferably comprises an outwardly directed bead 16 formed at the mouth 17 of the container 14 and adapted to be seated against the gasket 5 of the closure 1 to provide a hermetic seal therewith. Beneath the bead 16 and spaced therefrom is a thread 13 adapted to engage the thread 12 of the closure 1. A straight finish surface omitting bead 16 may be used within the scope of the invention.

The enlarged cross sectional view of FIG. 4 shows the closure of FIG. 1 seated on the container of FIGS. 2 and 3. Closure 1 covers the mouth 17 of the container 14 and has its sealing gasket 5 in sealing contact with the bead 16 of the container mouth. Thus, the gasket 6 contacts both the upper surface 18 and the side surface 19 of the bead 16. The inwardly sloping upper surface 20 of the closure bead 10 confines the gasket 5 so that it tends to flow inwardly around the lower edge 21 of the outer sealing surface 19 of the bead 16 to provide a gripping action between the closure gasket 5 and the container bead 16. Threads 12 of the closure 1 are positioned below the corresponding thread 13 on the container 14 and may be in engagement therewith to help hold the closure 1 in position on the container 14 when the closure is initially applied by being screwed into place. In the initial sealing action, however, the gasket 5 may be used to provide a vacuum seal so that the closure 1 is held in position by the vacuum seal, and the holding action of the threads 12 and 13 is not necessary. Thus, should the closure 1 be forced downwardly during the sealing so that the closure thread 12 is moved below the container thread 13 as the gasket 5 is compressed, the closure 1 will remain in this downward position due to the vacuum within the container. Where the closure 1 is applied by a straight-line sealing machine, as will be more fully described below, rather than by being screwed on, the relative positions of the closure thread 12 and the container thread 13 are not important as the vacuum sealing action of the gasket 5 is relied on for the initial sealing and the threaded connection is used thereafter in resealing the package after the initial opening and the breaking of the vacuum seal.

The location of the gasket 5 in the corner of the closure 1 at the junction of the closure skirt 4 and top 2 places it at a relatively rigid portion of the closure due to the channel like strengthening effect of the adjacent closure skirt 4 and top 2 walls. Extremely high pressure may be applied between the gasket 5 and the container mouth 17 to provide a tight vacuum seal without any bending of the closure cap.

FIG. 5 shows a closure 20 which is another embodiment of the above-discussed closure 1 adapted to provide a closure particularly suited for an initial straight-line sealing machine and for re-use after the initial opening of the package as a screw-type closure. A sealing gasket

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21 is provided between the skirt 22 and the closure top 24 in a manner similar to the above-described gasket 5. Beneath the sealing gasket 21 an interior thread 25 is formed in the skirt 22.

The thread 25 shown in FIG. 5 is designed to cooperate with the container finish shown in FIGS. 6 and 7. The closure 21 and the container 26 differs from the closure 1 and the container 14 respectively of FIGS. 1-3 by having shorter threads to facilitate the sealing of the closure by pressing the closure onto the container. Thread 25 does not completely encircle the closure skirt 22 and preferably is formed on considerably less than the full circumference. A satisfactory thread, designed to cooperate with the closure finish of FIGS. 6 and 7, which will be discussed below, covers about a 270-degree arc on the circumference of the closure skirt 22.

The container 26 in FIGS. 6 and 7 has a bead 27 generally similar to the bead 16 of the above described container 14 which is adapted to engage the gasket 21 of the closure 20 and to provide a vacuum seal therewith. Beneath the bead 27, spaced slightly below it, is an interrupted thread formed of thread sections 28, 29, and 30. In the preferred embodiment of the interrupted thread, which is adapted to cooperate with the closure thread 25, the interrupted thread has three sections spaced at approximately 40 degrees and each comprising an arc of approximately 60 degrees. These thread sections 28-30 are not needed to fasten the closure 20 upon the initial sealing action as the vacuum seal holds the closure 20 in place. The thread sections 28-30 are used after the initial vacuum seal is broken to reseal the container by screwing the closure on. Thus, as shown in FIG. 8, the closure 20 in its initial sealed position with a vacuum seal has a gasket 21 in top and side sealing relationship with the container bead 27, and the closure thread 25 is spaced downwardly from the thread section 30 of container 26. In this case the closure 20 has been applied with a straight-line sealing machine. Since the closure thread 25 is spaced downwardly from the container thread section 30, the closure may be pried upwardly a short distance to break the vacuum seal without chipping the container threads.

FIG. 9 shows the closure 20 after it has been removed from the container 26 and then replaced by being screwed onto the interrupted thread sections 28-30. Closure thread 25 is now in engagement with the thread sections 28-30, and the gasket 21 is in contact with the container bead 27, although the bead 27 is not forced into the gasket 21 to the same extent as it is in the initial seal as shown in FIG. 8.

In its preferred form the lower side 25a of the closure thread 25 has a relatively sharp downward slope to facilitate the straight-line application of closure 20 to the container 26. The steep slope of portion 25a allows the thread 25 to slip relatively easily over any portions of the thread sections 28-30 which it encounters. The upper portion 25b is preferably given only a relative slight downward slope to insure its providing a tight grip with the container threads when the closure is used as a screw closure.

The spacing of the closure gasket 21 and the closure thread 25 is preferably fixed so that in the initial straight-line seal as shown in FIG. 8 the gasket 21 is sufficiently compressed to cover the top, edge, and side surfaces of the container sealing bead 27 to provide a good vacuum seal therewith while the closure thread 25 is spaced below the container threads 28-30. This allows the closure 20 to be reapplied by the user after the initial opening as a screw closure with a relatively small force and still provides for a satisfactory compression of the closure gasket 21 with the closure and container threads in engagement as shown in FIG. 9. Thus, although the reapplied closure 20 is not moved as far down on the container as it was during the initial sealing, a satisfactory airtight seal is obtained between the closure gasket 21 and the container bead 27.

After the closure 20 has been applied by a straight-line sealing action in a vacuum sealing machine, the seal may be broken and the closure removed by rotating the closure 20 so that the forward edge 25c of the thread 25 engages the upper surface 29a of a thread portion 29 to lift the gasket 21 from the sealing bead 27. The closure 20 may also be removed by prying it upwardly by inserting a prying tool between it and container bead 23.

FIGS. 10 and 11 show a closure 31 and a cooperating container finish in which the relative lengths of the threads on the closure and the container have been reversed from the closure and container of FIGS. 5 and 6. Thus, an interrupted thread having spaced thread sections 32 is provided on the closure 31. A thread 35 is formed on the container 36 beneath a sealing bead 37. Sealing bead 37 is generally similar to the sealing bead 16 on the container 14 described above and is adapted to engage gasket 34, of closure 32.

FIG. 12 shows the closure 31 applied to the container 36. The lower side 38 of each of the thread sections 32 is preferably sloped steeply upwardly to facilitate the straight-line sealing of the container, and the upper portion 39 of the thread is given a more nearly horizontal slope to improve the thread holding power in the manner shown on thread 25 of FIG. 8. In FIG. 12 the closure 31 is shown providing a vacuum seal after being applied by straight-line sealing machine.

FIG. 13 shows a lug-type container finish in accordance with the present invention, and FIG. 14 shows a lug-type closure in accordance with the present invention seated thereon. Inclined lug seating surfaces 40 are provided on the container 41 spaced around and beneath a sealing bead 42. The closure 44 is provided with a gasket 45 generally similar to the above-described gasket 5 of closure 1 and having lugs 46 formed on the lower edge 47 of the closure skirt 48.

Both closures 31 (FIG. 10) and 44 (FIG. 14) are adapted for a straight-line or a screw-type sealing action and both are also adapted for resealing after being initially removed from the container by use of their threads or lug seating surfaces. As seen in FIGS. 12 and 14, the initial straight-line sealing action uses the contact between the closure gaskets 34 and 45 and the container sealing beads 37 and 42, respectively to allow for a vacuum seal. The thread sections 32 or the closure lugs 46 do not need to be given any particular orientation with respect to the container finish as they need not engage the container thread 35 or lug seating surfaces 40. Although the closure gaskets are compressed more in the straight-line vacuum sealing than on the subsequent screw action sealing, the upwardly sloping surface of the gaskets is adapted to contact the container sealing beads both when the closure threads are below the container threads as seen in FIGS. 12 and 14 after a straight-line sealing and thereafter when the container has been opened and resealing by using the threads or lugs for fastening the closure on.

It will be seen that the present invention provides improved threaded or lug-type closure which has an improved gasket construction and which is also adaptable for quick initial sealing and for effective, reliable resealing. The improved gasket construction provides a closure which retains its shape even when subjected to extremely

high sealing pressures. The improved gasket also cooperates with the thread or lug-type fastening means to provide for an effective initial vacuum-type sealing and thereafter a relatively tight and easily manipulated reseal when the closure is used as a screw-type closure. Each of the embodiments of the closure gasket and thread combination and the container are also readily adapted to provide for either an initial straight-line sealing or an initial screw-type sealing or a screw-type resealing after the initial removal of the closure.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

In a sealed package having a container with a threaded-type closure engaging means beneath and spaced from its rim and a closure therefore having a top, a depending skirt, a permanently formed threaded-type container engaging means on the skirt and a relatively thick resilient gasket in the corner between said skirt and said top and having its container engaging surface sloping continuously inwardly and upwardly from above said container engaging means on said skirt to said top and adapted to engage and to provide a hermetic seal with the side, edge, and top of the container rim, the improvement which comprises said container engaging means being a continuous screw thread extending about three-quarters of the way around the circumference of said skirt and having a relatively steep slope on its lower portion to facilitate straight-line downward application of the closure over the closure engaging means on the container and having a less steeply sloping upper portion spaced downwardly from said closure engaging means and firmly engaging the lower portion only of the closure engaging means when screwed on, and said closure engaging means comprising an interrupted screw thread having only three spaced sections, all of substantially equal length, two of which are about diametrically opposed and the third being positioned intermediate the other two and widely spaced therefrom, the slope of the upper surface of said sections being substantially the same as said relatively steep slope of the thread on said skirt.

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