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METHOD OF APPLYING A CLOSURE TO A FILLED CONTAINER

Filed Dec. 29, 1965

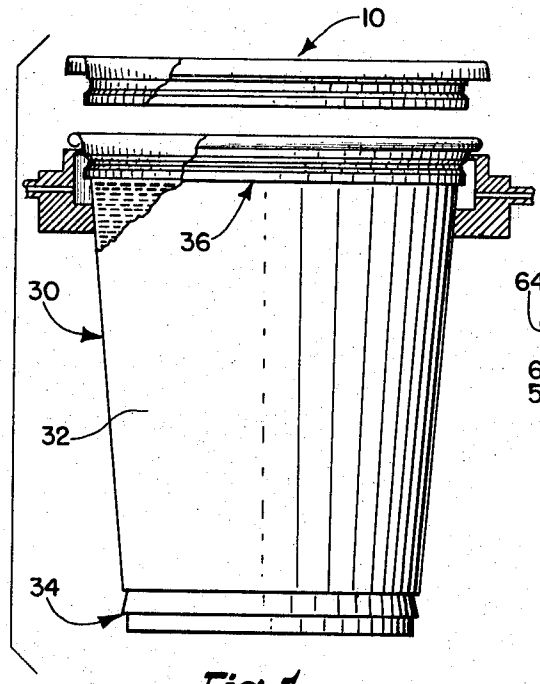


Fig. 1

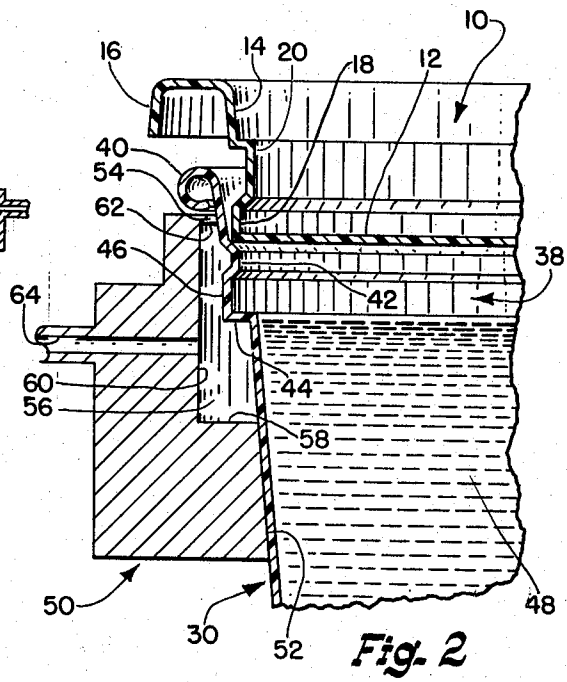


Fig. 2

Fig. 3

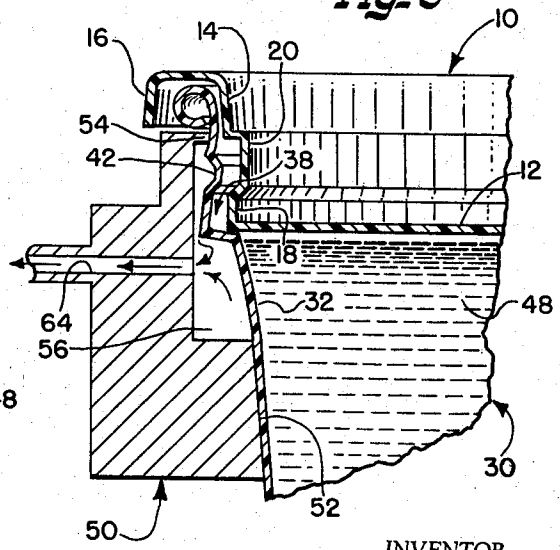
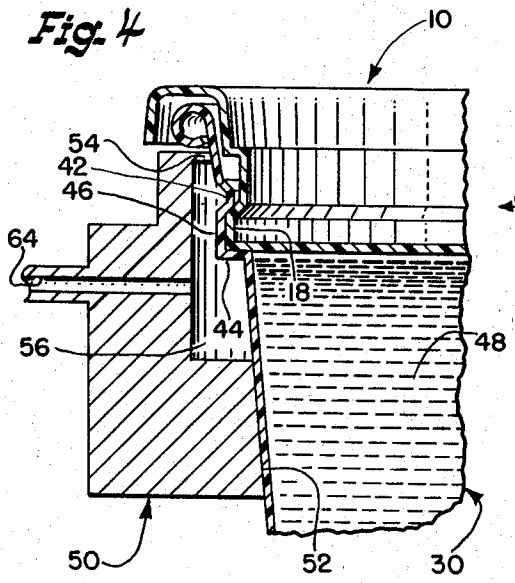


Fig. 4



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METHOD OF APPLYING A CLOSURE TO A FILLED CONTAINER

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The present invention relates to a method for assembling a lid member to a filled container body in a manner to prevent the entrapment of substantial amounts of air in the resulting container package.

It is conventional to provide a hollow container body with an inwardly facing groove or lid seat adjacent the open upper end thereof to receive a closure member having a locking bead which is snapped into the lid seat for retaining the closure member and container body to each other. Upon filling the container body, the locking bead of the lid member is forced or snapped into the inwardly facing groove of the container body to prevent disassembly thereof and thereby protect the container contents.

It will be recognized that the assembly of lids and container bodies of the aforementioned type necessarily will result in the entrapment of a certain amount of air within the container package as the closure locking bead is forced or snapped into the locking groove of the container body. When the container body has been filled to a predetermined level by a food product or the like, the amount of air that can be trapped without causing inadvertent disassembly of the lid member from the container body by fluid pressure displacement becomes critical. It thus becomes important to alleviate this difficulty by either reducing the container contents or the amount of air trapped in the package. The present invention concerns itself with the last mentioned approach.

The primary object of the present invention is the provision of a method for assembling an internally fitting lid of the snap-in variety within an open mouth of a complementary container body without trapping substantial amounts therebetween.

Still another object of the present invention is the provision of a method for rapidly and easily assembling an internally fitting lid within a complementary container body with a minimum amount of force.

A further object of the present invention is the provision of a method for assembling a lid member and container body of the aforementioned variety without subjecting either of the articles to unequal forces or stresses during assembly to each other.

Other and further objects will become apparent from the preferred method of the present invention as illustrated in the drawing, it being recognized that variations thereof within the scope of the present invention are herein contemplated.

Reference is now made to the drawing wherein:

FIG. 1 is a fragmentary side elevational view, partly in section of an internally fitting lid and complementary container body just prior to assembly to each other, the container body resting in a sealing ring which is used in the preferred method of the present invention;

FIG. 2 is an enlarged fragmentary sectional view of the lid member, container body and sealing ring shown in FIG. 1 of the drawings;

FIG. 3 is also an enlarged fragmentary sectional view showing the manner in which the container body is radially enlarged by vacuum established through the sealing ring to permit the lid member to be easily assembled to the container body; and

FIG. 4 is an enlarged fragmentary sectional view showing the lid member and container body after being assembled to one another.

Reference is now made to the drawing for a detailed description of the preferred method of assembly in a lid member and container body to each other. The drawing illustrates the type of lid member and container body, identified **10**, **30** respectively, which can be assembled to each other by the method herein disclosed. Both the lid member **10** and the container body **30** are preferably made from a flexible thermoplastic material such as polystyrene, polyethylene, polyvinyl chloride and other suitable materials. Insofar as the present invention is concerned, however it is only necessary that the container body **30** be made of a flexible material such as the above mentioned thermoplastic materials as will become more apparent hereinafter.

The lid member **10** is of the internally-fitting snap-in variety in the sense that it will be received and retained by the container body **30** adjacent the open mouth thereof. The lid member **10** includes a bottom or end wall **12** which covers or closes off the open mouth of the container body, a peripherally continuous upwardly extending sidewall **14** which terminates at its upper end in a reversely directed radially projecting lip **16**. Generally in the vicinity of the juncture between the bottom wall **12** and the sidewall **14** there is provided a circumferentially continuous locking bead **18** which is radially outwardly offset of at least a portion of the sidewall, and which cooperates with a locking projection provided in the container body as will be set forth more fully hereinafter. An internally formed shoulder or shelf **20** may be provided in the sidewall **14** as desired to provide for the stacking of a plurality of similarly configured lip members **10** as is now conventional in the art.

The container body **30** is hollow in form, and is preferably frusto-conical in shape providing an upwardly and outwardly extending sidewall **32** which extends from the outer extremity of the bottom wall thereof. If desired, a stacking ring construction **34** may be provided generally in the lower body portion of the container to limit the telescopic association of a plurality of similarly configured container bodies **30** with each other much in the same manner as that occur with a stack of lids **10**. Preferably this stacking construction is of the type shown in U.S. Patent No. 3,139,213 dated June 30, 1964 for the reason that it has been found extremely advantageous in thin-wall thermoplastic containers with which the present invention is concerned.

The sidewall **32** of the container body **30** terminates at its open upper end in a rim area **36** which includes a locking groove **38** generally complementary to the locking bead **18** of the lid member **10**, and a rolled over rim **40** of a predetermined smaller size than the radially projecting lip **16** so as to be readily received therein. The locking groove **38**, as best seen in FIG. 2 of the drawing, comprises spaced upper and lower portions **42**, **44** respectively which are separated from each other by short vertical sections **46**. The upper portion **42** of the locking groove **38** has a smaller minimum diameter than the maximum diameter of the locking bead **18** provided on the lid member **10** for retaining the lid member and container body to each other when assembled.

As previously indicated, the present invention concerns itself with the method for assembling a lid member **10** and container body **30** to each other in a rapid and efficient manner without trapping large amounts of air therebetween which can cause inadvertent disassembly of the lid member relative to the container body. Assembling of the lid member **10** to a container body **30** in the conventional manner, that is, relatively moving the parts toward each other by mechanical force or pressure to position them in interfitting relationship, will result in a predetermined amount of air being captured as the parts are assembled. The amount of air that is trapped will

bear directly on the level to which the container is filled as only so much air can be trapped when the container is filled to a predetermined level without inadvertent disassembly of the lid member **10** from the container body **30** taking place as a result of fluid pressure displacement. It has been found that this problem may be overcome in container bodies made of flexible material by radially enlarging at least that part of the container body in the vicinity of its locking projection to enable the smaller, but complementary locking bead of the internally fitting lid member to be readily moved past the locking projection after which the container body is caused to assume its original state to create the desired lid-container locking relationship. Relatively little air will be trapped between the lid and the product contained in the container since it is not until the parts are in their final position that the container body is returned to its initial state.

The preferred method of assembling the lid member **10** and container body **30** employs the sealing ring **50**. The sealing ring **50** is annular in configuration and includes a tapered internal wall surface **52** which corresponds in size and is complementary to a portion of the container sidewall **32** slightly below the rim portion **36** so as to readily support the container body **30** therein as is illustrated in the various figures of the drawing. It will there be recognized that the sidewall **32** of thec ontainer body is preferably not radially contracted by the surface **52**, and this is substantially prevented by the product **48** placed in the container body **30**.

Axially spaced upwardly from the wall surface **52** is a radially inwardly extending flange **54** which is designed to contact the rim area **36** intermediate the locking groove **38** and the rolled over rim **40** as is depicted in FIGS. 2–4. When the container body **30** is thus contacted by the internal wall surface **52** and the flange **54** as above indicated, the ring **50** will effectively seal off the locking groove **38** to enable the establishment of a differential fluid pressure thereacross in radially expanding the same to readily permit the assembly of the lid member and container body.

To permit this radial expansion of the container body in the vicinity of its locking groove, the sealing ring **50**, intermediate the wall surface **52** and the flange **54**, is radially outwardly offset from the portion of the container body to be expanded by an amount sufficient to enable the expansion of the container body as decided. More particularly, the sealing ring **50** includes an inwardly facing recess **56** which is defined by a short horizontal section **58** extending laterally outwardly from the uppermost extremity of the wall surface **52**, a generally vertical wall section **60** extending therefrom, and the lower face **62** of the radially inwardly projecting flange **54**. As above indicated, the recess or hollowed out portion **56** is sufficiently large to accommodate the desired expansion of a locking groove area that is contemplated.

The preferred manner of establishing the differential fluid pressure is by creating a vacuum through the passage way **64** provided in the sealing ring **50**, which passageway opens up into the recess or hollowed out portion **56**. Any suitable means (not shown) may be employed to establish this vacuum as is indicated by the arrows in FIG. 3 of the drawing to evacuate the air from the recess **56** and also expand the locking groove area of the container body as illustrated in FIG. 3. The radial expansion must be sufficient to enlarge the locking projection **42** of the locking groove **38** to enable the locking bead **18** of the lid member **10** to be moved thereby and allow the lid member **10** to be moved to the position within the container body **30** as shown in FIG. 3 of the drawing.

It is important to note that in establishing the differential fluid pressure so as to result in an expansion of the locking groove area, the portion **52** and the flange **54** perform an important function in not only sealing off the area across which the differential pressure is established but in serving as spaced contact points facilitating as well as delineating the area of the container body to be expanded into the recess or hollowed out portion **56**.

After the lid member and container body **10**, **30** respectively are positioned as shown in FIG. 3 of the drawing, the vacuum may be turned off, and this will cause the flexible container body in the area thereof which has been expanded to return to its initial or unstressed state for engaging the lid member in the manner shown in FIG. 4 of the drawng. This is the finally assembled position of the lid member and container body where the locking bead **18** of the lid member is fully received within the locking groove **38** of the container body, the locking projection **42** forming a part of the locking groove **38** overlying the locking bead **18** to retain the lid member and container body in assembled relationship. Although not necessary, the various portions **42–46** of the locking groove **38** are complementary to the locking bead **18** so as to fully contact the same at a plurality of locations. Various locking bead-locking groove constructions such as shown in my aforementioned Patent 3,061,139 dated Oct. 30, 1962 are contemplated by the present invention.

In the preferred method, the lid member is first placed above the open upper end of the container body and supported by the locking projection **42** as is indicated in FIG. 2 of the drawing to thereby restrict the amount of air trapped between the lid member and the product found in the container. Thus, subsequent expansion of the locking groove area of the container body will permit the venting of the air initially trapped between the lid and the product to provide effective locking retention of the lid member and container body without too much concern for fluid pressure displacement and consequent lid disassembly even where the lid member is not initially placed into contacting engagement with the container body as aforementioned, it has been found that the method as disclosed herein alleviates the problem created by conventional assembly.

From the foregoing it will now be appreciated that the present invention discloses a novel method for assembling an internally-fitting snap-in lid member relative to a complementary container body which avoids subsequent fluid displacement of the lid member and enables a greater quantity of product to be placed in the container body. It, of course, will be understood that the specific embodiment of the invention as herein shown and described is for illustrative purposes only. Various changes will no doubt occur to those skilled in the art and are to be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

I claim:

1. The method of assembling a lid member having a radially outwardly projecting locking bead within an open upper end of a flexible container body provided with a radially inwardly extending locking projection of smaller minimum diameter than the maximum diameter of the lid locking bead, comprising the steps of radially enlarging the locking projection of said flexible container body a predetermined amount greater than the maximum diameter of the lid locking bead, relatively assembling the lid member and container body to each other and positioning the lid locking bead axially beneath the locking projection of said container body, and thereafter causing the flexible container body in the vicinity of its locking projection to return to its unstressed state and thereby enable said locking projection to overlie and engage the lid locking bead for retaining said lid member assembled to said container body.

2. The method as set forth in claim **1** wherein said locking projection is radially enlarged by establishing a fluid pressure differential of opposite sides of said flexible container body in the vicinity of its locking projections.

3. The method as set forth in claim **1** wherein said fluid pressure differential comprises a vacuum established on

the exterior of said container body in the vicinity of its locking bead.

4. The method as set forth in claim 3 wherein said vacuum is established by sealing off exterior surface portions of said container body on opposite sides of said locking projection, and then evacuating the air from said sealed off portions.

5. The method as set forth in claim 1 wherein said lid member is first positioned above said container body to enable rapid assembly thereto when said container body is radially enlarged as aforementioned.

6. The method as set forth in claim 1 wherein said

locking projection is the uppermost marginal portion of a radially inwardly facing locking groove generally complementary in shape to the locking bead of said lid member.

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