

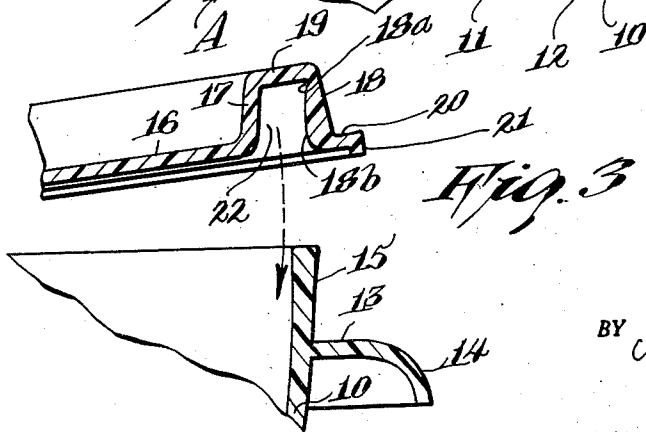
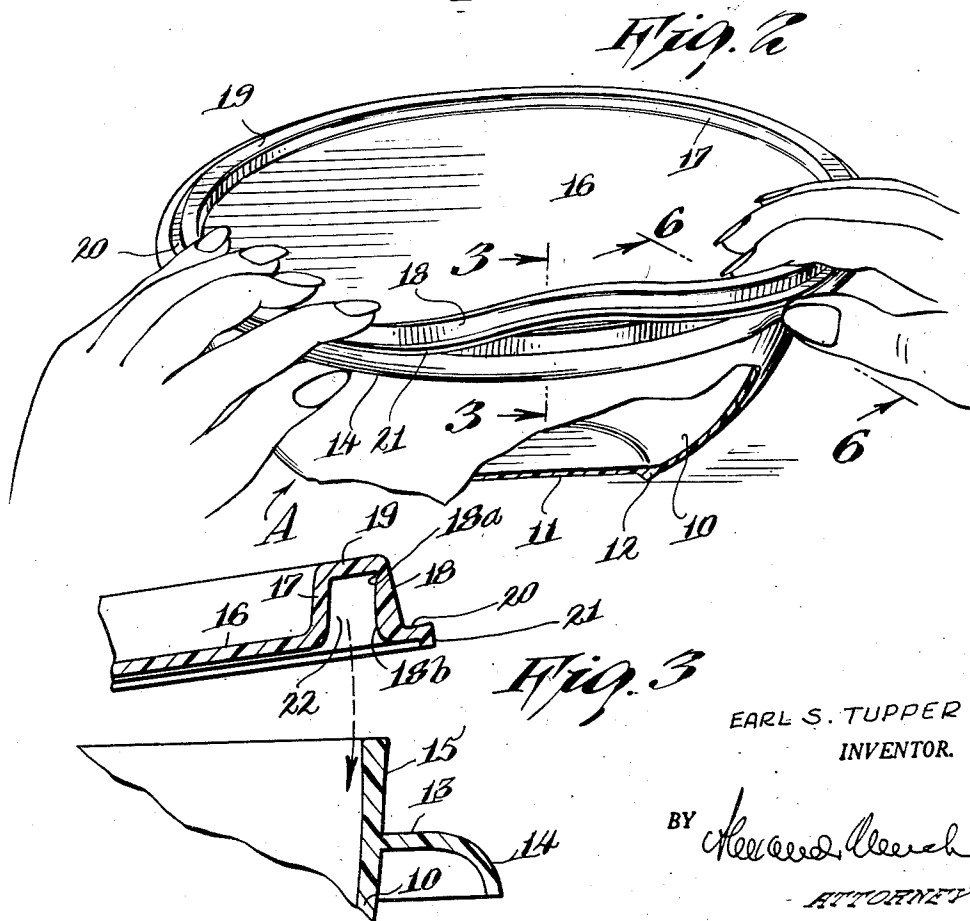
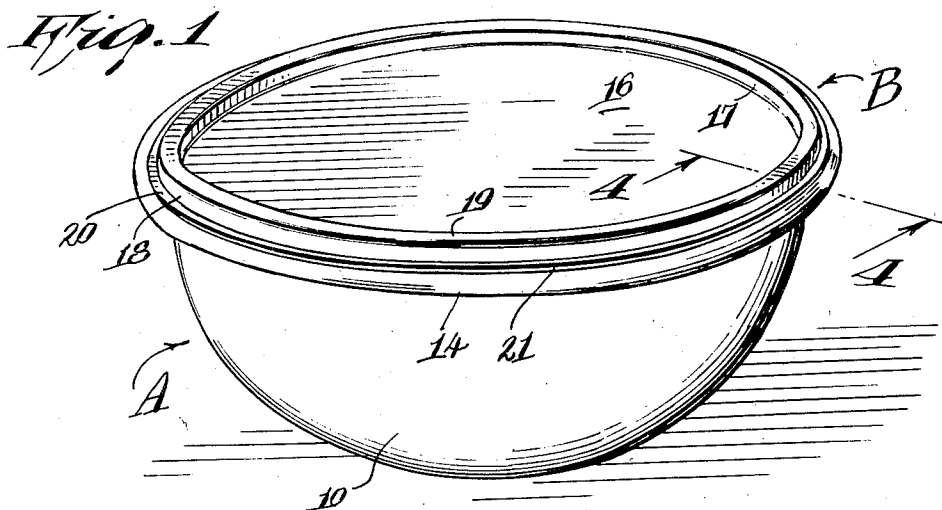
April 23, 1957

E. S. TUPPER
BOWL AND COVER

2,789,607

Filed March 17, 1955

2 Sheets-Sheet 1



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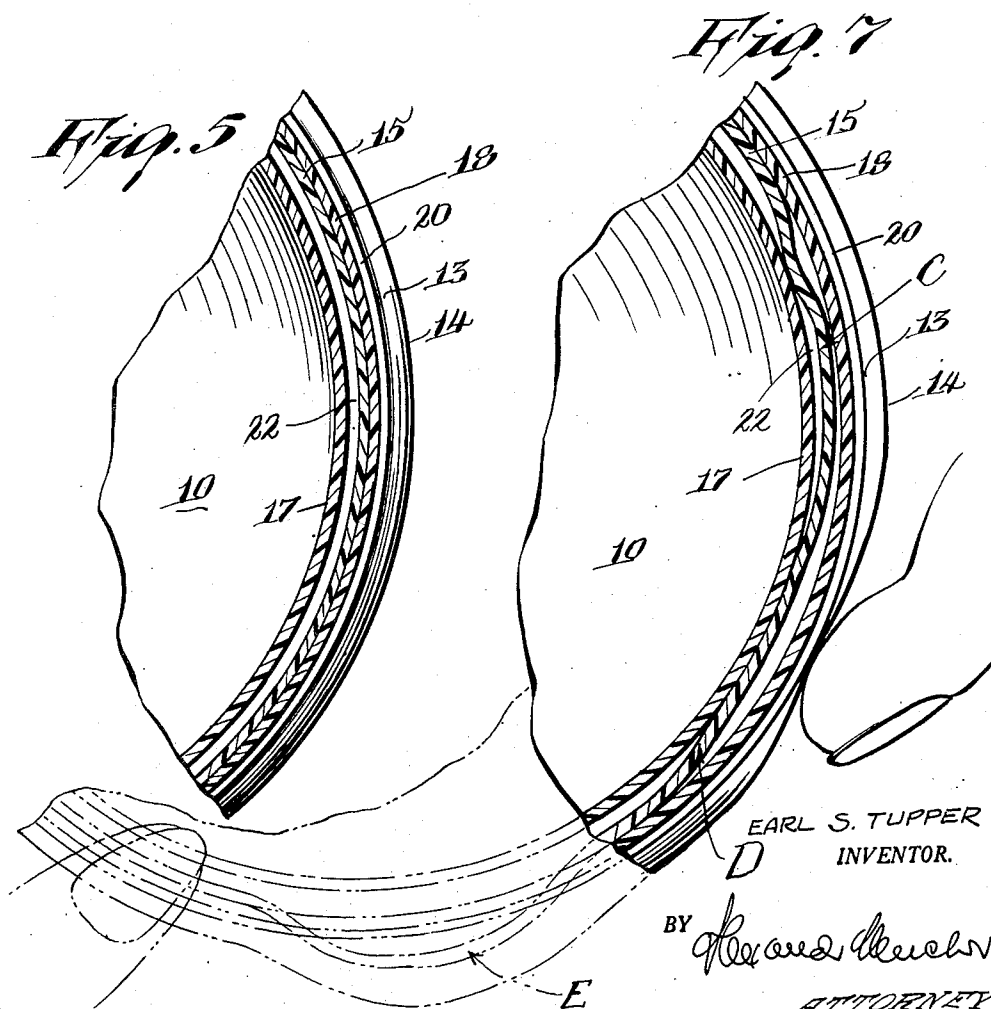
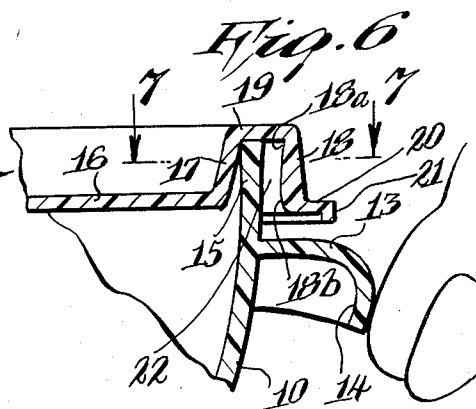
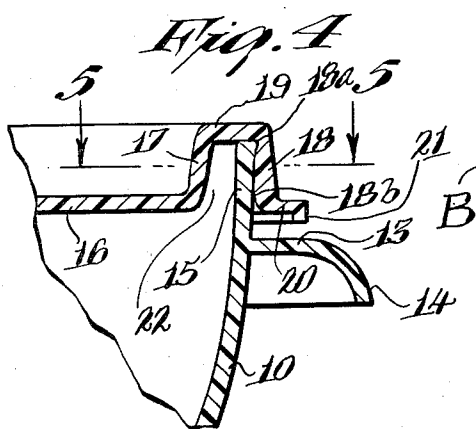
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BOWL AND COVER

Earl S. Tupper, Upton, Mass.

Application March 17, 1955, Serial No. 494,876

3 Claims. (Cl. 150—5)

This invention relates generally to containers and hermetically sealed covers therefor and constitutes an improvement over U. S. Patent No. 2,487,400 issued to the applicant herein on November 8, 1949.

The invention is specifically directed to a container and cover wherein sealing engagement between the container and cover is under positively imposed and live pressure whereby any development of internal pressure within the container or any substantial external pressure thereon will be strenuously resisted by the pressure of the engaging parts whereby the cover member will not only retain its grip and maintain the contents in hermetical sealed condition but will also maintain flat planar position of its central wall.

In order to effectuate the above results, the invention contemplates the use of a container member, which as shown is in the form of a bowl wherein the rim thereof is provided with a peripheral and external flange spaced below the top edge of said rim, the said flange serving the function of reinforcing said rim against easy and local deformation and also as a lever and finger engaging element for depressing the rim portion at a preselected area for engagement with a groove portion of the cover member for purposes of interlocking relationship under tensional and compressive forces.

The invention further contemplates the use of a thermoplastic material which is locally deformable and also resilient whereby the distortion created by the local deformability of a portion of the rim adjacent to the portion depressed for engagement in the cover groove temporarily is accommodated by the width of such groove, so that upon final peripheral engagement of the cover member with the rim of the container, the rim along its periphery is under such positive and gripping engagement with the inner face of the outer wall of the engaging groove that the container and cover are suitable for the roughest treatment. Such pressurized engagement is caused by the return of the container rim to its natural circumference owing to the reinforcing flange structure, and further by virtue of the tension or stretch of the cover central wall induced by reason of the outward pull on the cover groove outer wall by said return. This is made possible both by dimensioning the diameter of the said groove wall inner face to be less than the diameter of the outer face of the rim portion and by the use of locally deformable and of resilient thermoplastic material.

To effectuate the objects of the invention, the resilient and locally deformable thermoplastic material is inert to, does not absorb and is not readily wettable by water, does not soften at operating temperatures below the boiling point of water, is odorless and resistant to chemicals and solvents. Furthermore, the material presents a surface waxy to the touch and frictional to improve sealability and also provides a sterile medium for and is consequently resistant to the development of mildews, microorganisms and insects.

Another feature of the invention resides in the pro-

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vision of a container and closure of the above characteristics which may be molded by any of the conventional methods, such as compression, injection, vacuum forming or blow molding, and which is economical to manufacture owing to gauge reduction by reinforcing elements, which is durable and efficient in operation.

A further feature of the invention is to provide a container and cover therefor which are hermetically sealable and wherein the center wall of the cover is maintained at all times under tension similar to a drum to prevent variations in capacity, to prevent loosening of the cover member by internal changes in pressure or external imposition of forces resulting in a break in the hermetical sealing connection between the cover and the container.

These objects and other incidental ends and advantages of the invention will hereinafter appear in the progress of the disclosure and as pointed out in the appended claims.

Accompanying this specification are drawings showing a preferred form of the invention herein wherein:

Figure 1 is a view in perspective of the container and cover in hermetically sealing relationship.

Figure 2 is a similar view in perspective, partially in section, and showing the operation involved in the final stages of closure by the cover member.

Figure 3 is an enlarged sectional view of Figure 2 across the plane 3—3 thereof.

Figure 4 is an enlarged sectional view of Figure 1 across the plane 4—4 thereof.

Figure 5 is an enlarged sectional view of Figure 4 across the plane 5—5 thereof.

Figure 6 is an enlarged sectional view of Figure 2 across the plane 6—6 thereof.

Figure 7 is an enlarged sectional view of Figure 6 across the plane 7—7 thereof parts being shown in phantom to indicate accommodation within the cover groove width of a distorted area of the container rim areas on depression of a portion thereof for groove engagement.

According to the invention and according to the preferred form shown, the container is shown in the form of a bowl and is generally indicated by letter A, having a side wall 10, a flat bottom 11, and a peripheral bead 12 on the perimeter of said bottom wall for purposes of spacing and insulating the bottom wall from a supporting surface. Bowl side wall 10 is provided with an outwardly extending peripheral flange having a horizontal portion 13 and downwardly curved portion 14, said flange being spaced adjacent to and below the top edge of the bowl rim as indicated by numeral 15.

Bowl rim 15 by virtue of flange 13—14 is maintained in a rigid position and offers resistance to deformation of the rim at any portion thereof and is further resilient. However, any portion of rim 15 is made depressible at any selected area by imposing inward finger pressure on lever acting flange portion 14 for temporary indentation for purposes hereinafter to be described.

Container A is adapted to be hermetically sealed by the closure or cover member generally indicated by letter B, the said closure having a central wall 16 and a peripheral raised and inverted engaging groove having an inner wall 17, an outer wall 18, a top connecting wall 19 and a horizontally disposed flange portion 20 extending from the lower end of groove outer wall 18, the said horizontal flange 20 having a vertically depending skirt 21. Between groove walls 17 and 18 there is provided the groove space 22, said spacing being sufficiently wide to accommodate circumferential distortion at specific areas of rim 15 during the final closing stages of the container as will appear. Outer wall 18 on the inner face and at the upper end thereof may be provided with a peripheral undercut 18a while the lower portion of

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groove outer wall 18 has a thickened portion 18b for further improving the strength of the locking arrangement.

Thus, in applying cover member B to rim 15 of the container, at least one-half the circumference thereof is easily applied to the corresponding half circumference of rim 15 by aligning the cover groove over rim 15. Then by simultaneously exerting downward and sliding finger pressure on groove top wall 19, engagement of rim portion 15 and the cover groove takes place. However, since the normal diameter of the inner face of outer wall 18 of the cover groove is less than the outer diameter of the rim 15 at the greatest diameter thereof, the rim engaging element of the container and the cover groove elements must be respectively reduced and increased at progressive areas for final circumferential engagement.

Accordingly, after the cover member engages the rim at least 180 degrees or more, the cover B is held to the container at spaced terminals of engagement as best shown in Figure 2 wherein the hand shown at the left in the drawing may be regarded as the static grip, while the hand shown at the right of Figure 2 may be regarded as the hand having the dynamic grip. It is to be observed in Figure 2 that while the thumb is pressing inwardly against flange 13-14, rim portion 15 thereat is brought within a section of groove space 22, the inner face of rim portion 15 being made to contact the inner wall portion of groove wall 17 (Figures 6 and 7). When this is done, distortion takes place on each side of this area of depression as best seen in Figure 7, the portion of the rim already engaged within the groove to the right side of this finger pressure area being distorted as indicated by letter C, the distortion being taken up within the groove space 22, while on immediate left side an area of rim distortion within the groove takes place as indicated by letter D and a contiguous area of rim distortion outside of the groove and indicated by letter E takes place substantially to the position of the static left hand. Progressively and with the indentation of each portion of rim 15 toward the static hand, the fingers of the dynamic hand engaging the central wall 16 are made to simultaneously bear downward pressure and slide along the top groove wall 19 until the rim falls within the groove. This process progressively takes place until full closure takes place at which time the outer wall of container rim 15 is in nondistortional circumferential, positive and pressure-engaging contact with the inner face of wall 18 of the groove as shown in Figures 4 and 5. As mentioned, wall 18 at the lower part may be reinforced by a thickened portion as at 18b and is further reinforced by virtue of the horizontal flange portion 20 and the depending skirt portion 21. The outer edge of rim 15 also interlockingly engages undercut 18a. Of course, for removal purposes the flange portion 20 functions for easy removal of the cover member from the container by placing the thumb thereunder with the other fingers of the hand preferably on central wall 16 whereupon the grip between the outer face of rim 15 and the inner face of groove wall 18 is loosened to initiate removal of the cover by a peeling-off type of operation.

Upon full closure between the cover B and the container A, the rigidifying effect on rim 15 by flange 13-14 and the resiliency of the material maintains the circumference of rim 15 under limited compression with respect to the inner face of groove wall 18 which is under limited tension by reason of its resiliency and deformability and by reason of the fact that the normal inner diameter of groove wall 18 is less than the normal outer diameter of rim 15.

Consequently, central wall 16 of the cover when in closed position is mounted like a membrane or drum skin about the equivalent of a strong circular band. By this structure, the cover is resistant to seal breaking by imposition of pressures applied inside of the container due to increase or decrease of pressure therewithin as caused

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by gaseous expansion or contraction therewithin, due to differences of pressure and temperature, and is further resistant to imposition of increased or reduced external pressures or imposition of external and vibratory shocks and blows incurred accidentally, or during storage and transportation. Central wall 16 always remains taut and horizontal and the container and cover form a package which is tantamount to a bouncing ball and which is resistant to seal-break even when the package with contents is purposely abused by relatively strong compression.

It is to be noted that flange 20-21 of the cover when the latter is in sealing position with the container is spaced above container flange 13-14 to enable the thumb to enter the underside of said cover flange for removal purposes. In addition, container flange 13-14 is also effective as a holding means as by inserting the fingers thereunder.

The container and cover are formed of a thermoplastic material of the heretofore described characteristics including polyethylene, treated styrenes, vinyls and derivatives thereof. Moreover, both cover and container may be formed by standard methods including injection, compression, blow-molding and vacuum forming means. Furthermore, the container at least at the rim portion 15 is preferred to be circular in cross-section whereby the tensional and compressive forces are radial.

The invention herein thus contemplates a reusable container and cover which not only in function is the equivalent of a permanently sealed structure but is superior thereto in that the combination may be used for content filling at a filling plant without resorting to sealing equipment.

I wish it understood that minor changes and variations in the material, gauge thereof, method of forming, shape and combination of parts of the invention all may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. A container and hermetically sealable and removable cover engageable therewith, each formed of a locally deformable and resilient thermoplastic material including polyethylene, said container having a side wall circular in section at least at the open rim portion, a peripheral and outwardly extending flange on the rim portion and below the top edge thereof for normally rigidifying said rim portion, said cover having a main top wall and a peripheral, raised and rim engaging edge, said edge having an inner, a selectively spaced outer and top connecting walls to form an inverted groove, the width of said groove being greater than the thickness of the open rim portion of the container, the outer wall having a flange extending outwardly from the base and having a reinforcing peripheral section at the junction with the flange, said outer wall flange being spaced from the first mentioned container flange when the container and cover are in engagement, the outer diameter of the container rim portion exceeding the inner diameter of the groove outer wall at the respective greatest diameters whereby the groove spacing between the inner and outer wall suitably accommodates temporary distorted portions of the rim during progressive and local inward displacement thereof effected by hand pressure on the container flange portions for final sealing engagement under relatively strong opposing pressures between the outer face of the container rim portion and the inner face of the groove outer wall whereby the seal between the cover and container is resistant to rupture by comparative external and internal pressures of impact and by ambient conditions.

2. A container and hermetically sealable and removable cover engageable therewith, each formed of a locally deformable and resilient thermoplastic material including polyethylene, said container having a continuous side wall, a peripheral and outwardly extending flange on the rim portion thereof and below the top edge for normally

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rigidifying said rim portion, said cover having a main top wall and a peripheral, raised and rim engaging edge, said edge having an inner, a selectively spaced outer and top connecting walls to form an inverted groove, the width of said groove being greater than the thickness of the open rim portion of the container, the outer wall having an outwardly extending flange from the base, said outer wall flange being spaced from the first mentioned container flange when the container and cover are in engagement, the outer diameter of the container rim portion exceeding the inner diameter of the groove outer wall at the respective greatest diameters whereby the groove spacing between the inner and outer wall suitably accommodates distorted portions of the rim during progressive and local inward displacement effected by hand pressure on the container flange portions for final sealing engagement under comparatively strong opposing pressures between the outer face of the container rim portion and the inner face of the groove outer wall whereby the seal between the cover and container is resistant to rupture by comparative external and internal pressures of impact and ambient conditions.

3. In a container and hermetically sealable and removable cover therefor both being formed of a locally deformable and resilient thermoplastic including polyethylene, a peripheral edge having inner, a selectively spaced outer and top connecting walls on one of said members

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to form an inverted groove, said outer wall having a thicker gauge than the inner wall and having an outwardly extending reinforcing flange, a rim portion having a smaller thickness than the width of said groove and having a peripheral and outwardly extending reinforcing flange below the rim edge on the other of said members, the outer diameter of said rim portion exceeding the inner diameter of the groove outer wall at the respective greatest diameters whereby the groove spacing between the inner and outer wall suitably accommodates distorted portions of the rim during progressive and local inward displacement effected by hand pressure on the rim portion reinforcing flange portions for final sealing engagement under comparatively strong opposing pressures between the outer face of the rim portion above said reinforcing flange thereof and the inner face of the groove outer wall whereby the seal between the cover and container is resistant to rupture by comparative external and internal pressures of impact and ambient conditions.

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