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CLOSURE OR LID

Filed June 20, 1962

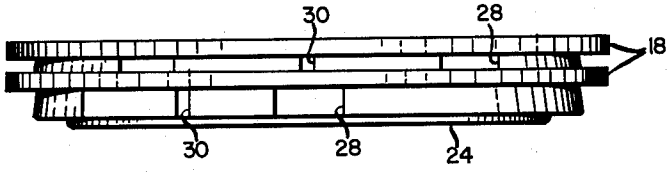


Fig. 1

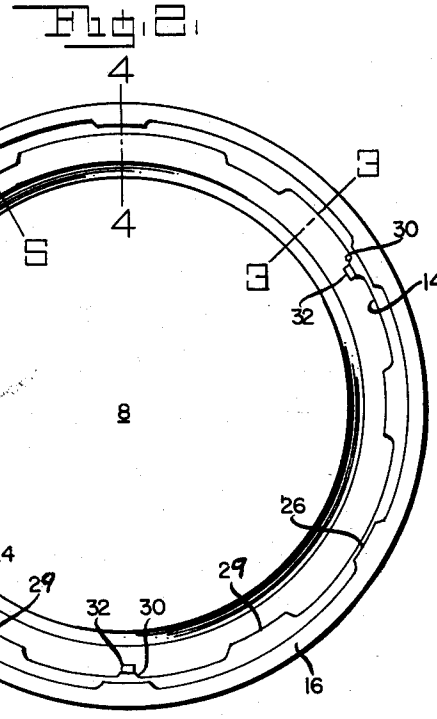


Fig. 2

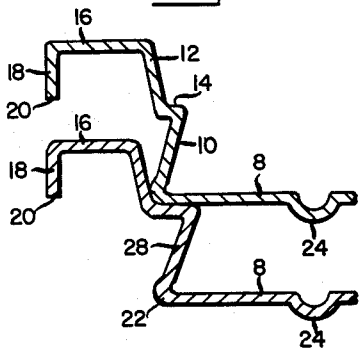


Fig. 3

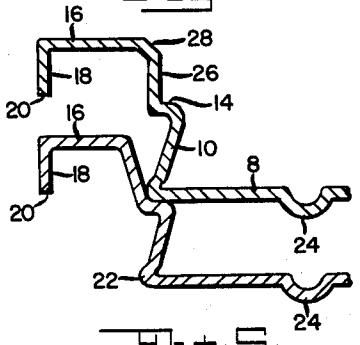


Fig. 4

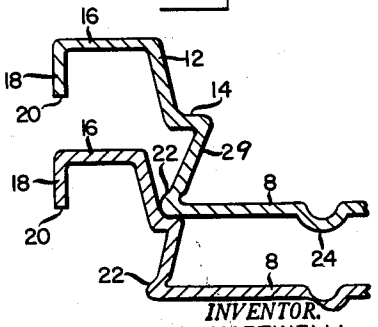


Fig. 5

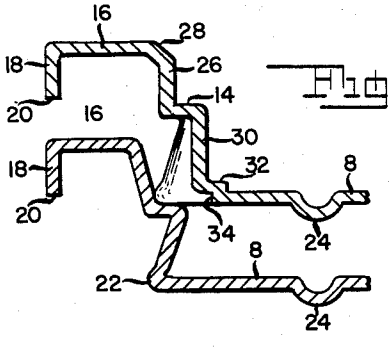


Fig. 6

INVENTOR.
LOUIS E. MARTINELLI

BY Kenwood Ross

ATTORNEY.

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CLOSURE OR LID

Louis E. Martinelli, Springfield, Mass., assignor to Massachusetts Plastic Corporation, Ludlow, Mass., a corporation of Massachusetts

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The present invention relates to new and useful improvements in structural refinements in closure lids for packaging receptacles or containers of plastic, paper or the like and is directed more particularly to the provision of a lid which is so designed as to facilitate the more ready dispensing thereof from a stack of such lids, internested as to each other.

The invention envisions a stacking arrangement whereby the lids of a stack are maintained during shipment and/or storage in an evenly spaced relationship as to each other whereby they can be more easily dispensed in seriatim, as desired.

A principal object hereof is to provide an improved closure construction of the type in which the possibility of the interlocking or uneven stacking of adjacent closure lids of a stack thereof is obviated, wherefore an even flow or continuity in a capping line is insured.

The closure lid hereof is locally distortable and not only is formed to fit on and to serve as a closure for a container, but also is additionally formed for facilitating the assumption of a unique nested relationship when a plurality thereof are disposed in a stack for removal therefrom in seriatim at the filling or packaging machine as required for covering filled containers.

In accordance with this invention, the lid is formed with a central diaphragm which is dimensioned to seat against the inner surface of a container as well as to seat upon the complemental component of the next adjacent and lower lid when a pair thereof are disposed in stacked relationship.

An upstanding rim surrounds the diaphragm. It is of inverted J shape in cross section and has an inner side wall to seat within the container, a top wall extending across the top of the container bead, and an outer skirt extending downwardly over the outer periphery of the bead. The outer skirt is shorter than the inner wall which is formed with an annular offset portion providing a shoulder at an intermediate part of the wall approximately opposite the lower edge of the skirt and adapted to engage and grip the inner surface of the container at that point. The diameter of the inner wall below the shoulder is less than the diameter above the shoulder by an amount conforming to the flare of the container and also which permits lids to be partially nested for stacking. The space required for each lid in the stack is thus determined by the height of the skirts.

The lid is formed in manner to have integral centering and stacking means in the form of inwardly projecting flutes at spaced intervals along the upper and lower zones of the side wall thereof which are so designed that one lid can be uniquely nested in another and can be supported by each other by novel line contact between wall portions of one lid and the said flutes of the next adjacent lid, wherefore the lids are spaced uniformly and evenly in a stack, to insure the releasable interlocking of a plurality of such lids. Such arrangement facilitates the shipping thereof in that lids so stacked will not jam or lock onto each other and facilitates the dispensing thereof from the stack as same are required at the capping machine.

As a further refinement, the lid is provided with novel venting means to facilitate the assumption of the nesting relationship.

It will be understood that the closure lids are adapted for automatic feeding in stacked relation, to an apparatus for feeding and applying same to receptacles or containers, such as food containers, preparatory to sealing them thereonto.

While the closure lid of the invention is particularly adaptable for use with a container formed of a resilient and locally distortable material, such as polyethylene which is chemically inert and sterile and resistant to micro-organisms and the like, its use is not limited thereto. For example, the lid may be utilized with a vessel body formed of any relatively rigid material such as polystyrene.

A further object is to provide a closure lid which may be held to close tolerances in production and which will hold its shape and dimensions to a high degree through a wide range of temperature and moisture conditions.

Still another object is to provide a closure lid for the purposes above indicated which may be molded in one piece, such as by infusion molding or reasonable equivalent.

The characteristic features which I consider to be novel with my invention, will be better understood when viewed in the light of following detailed description and the accompanying drawing in which:

FIG. 1 is an elevational view of a pair of the closure lids of the invention in stacked relationship as to each other;

FIG. 2 is a plan view taken from the top as viewed in FIG. 1;

FIG. 3 is an enlarged view in section taken on the line 3—3 of FIG. 2;

FIG. 4 is a similar view on the line 4—4 of FIG. 2;

FIG. 5 is a similar view on the line 5—5 of FIG. 2; and

FIG. 6 is a similar view on the line 6—6 of FIG. 2.

In the following description and in the appended claims, various components and details thereof will be identified by specific names for purposes of convenience. Such specific terms and expressions are used in a generic and descriptive sense only, not being employed for the purpose of limitation, and being intended to be as generic in their application as the prior art will permit. They are not intended to exclude any reasonable equivalents of the features shown and described.

With continued reference now to the drawing, which illustrates a typical and preferred embodiment of the invention for the purpose of disclosure, I have shown a closure lid as preferably constituting a one-piece structure formed from a relatively thin, oriented styrene or other plastic sheet stock having similar physical characteristics which is locally distortable so as to have the desired degree of flexibility and resiliency. As aforesaid, it will be understood that the closure lid may be molded by compression or injection, as desired.

While the closure lid has been illustrated as being of annular configuration, same may assume a square or rectangular or equivalent shape for use on a receptacle of complemental shape and having a parapet type of retaining flange or rim extending around the uppermost outer periphery of its defining walls.

Said closure lid includes a lowermost, horizontally-extending circular diaphragm or base wall 8 which may, if desired, be bowed or dished to provide greater resilience for aiding the sealing and/or gripping functions when stacked or when used on containers.

An upstanding, integral substantially vertically-extending rim surrounds diaphragm 8, and is of inverted J-shape in cross section so as to define an inner, annular side wall which, in use, functions to seat within a container, a top wall which, in use, extends across the top of the container bead, and an outer skirt which extends downwardly over

the outer periphery of the bead, all as will be now referred to more specifically.

The said annular side wall extends upwardly from the peripheral edge of said diaphragm or base wall 8 and includes a lower cylindrical wall zone 10 and an upper cylindrical wall zone 12. The upper cylindrical wall zone 12 extends substantially through one half of the height of the said side wall and preferably a little better than one half of said height.

The lower cylindrical wall zone 10 is preferentially flared inwardly slightly and the upper cylindrical wall zone 12 is preferentially flared outwardly slightly relative to a vertical axis perpendicular to the horizontal plane of the base wall 8.

The lower and upper cylindrical wall zones 10 and 12 are each preferentially inclined away from said vertical axis at an angle of about 5°.

The upper and lower cylindrical wall zones provide a pair of more or less vertically-aligned gripping areas for the side wall of the lid whereby it is enabled to grip the container tightly to form a secure closure.

An annular generally horizontally-extending stacking ring or seating ledge 14 is provided intermediate the lower and upper cylindrical wall zones 10 and 12, the uppermost edge of the lower cylindrical wall zone merging into the inner edge of said stacking ring and the lowermost edge of the upper cylindrical wall zone merging into the outer edge of said stacking ring.

The upper edge of the upper cylindrical wall zone 12 merges with the inner edge of an annular outwardly and horizontally projecting, peripheral rim or top wall 16 which is marginally offset from the zone-defining portions of the annular inner side wall and extends outwardly from said upper cylindrical wall zone 12.

An outermost, vertically-disposed, annular skirt 18 depends from the outer periphery of rim 16.

The top wall provides a smooth top surface for the closure and the skirt provides a smooth outer surface therefor, it extending downwardly from the top wall to a point to cover and conceal the break in the side wall representative of the stacking ring 14.

It will be observed that the skirt 18 has a lowermost edge 20 which is spaced from the horizontal plane of the top wall 16 of the next lower and adjacent lid when a pair of the lids are held in stacked relationship as to each other. The said lowermost edge 20 is adaptable for the mechanical embracement thereof by the fingers or pawls of a dispensing mechanism.

The diaphragm or base wall 8 will be observed to be displaced axially downwardly from and inwardly of the top wall 16 and below the plane of the lower edge 20 of the skirt 18.

The configuration of the rim 16 and the skirt 18 and the upper cylindrical wall zone 12 will be observed to define an annular groove adaptable to receive the rim of a container, said delineated members functioning as an engaging means for engaging a mating rim portion or edge of a vessel or receptacle or container, said rim portion or edge following the shape of the lid groove whereby a sealing engagement is effectuated.

Preferentially, the distance between the upper cylindrical wall zone 12 and the flange or skirt 18 is substantially equal to or preferably only slightly smaller than the horizontal distance between the outermost edge of the inner portion of the lip or bead with which said lid is to be cooperatively associated and the configuration of the lid rim is such as to necessitate a slight squeezing action between the bead or lip of the container and the inner and outer walls of the lid.

To remove the lid from said container, the thumb may be introduced between the flange or skirt 18 and the rim of the container and, using the container as a fulcrum, the lid may be raised in a progressive manner.

The upper cylindrical wall zone 12 of the side wall, being characterized by a gently outwardly converging slope from said stacking ring 14 is adapted to facilitate the

inter-nesting of the lids in a stack thereof and contributes resistance against distortion along the annular axis of the side wall, wherefor said side wall may be formed of a lighter gauge.

Further, the slope of the upper cylindrical wall zone 12 of the side wall provides a camming face whereby, when the lids are placed in stacked relationship, the next upper and adjacent lid is urged against the stacking ring 14 of the lower lid.

Additionally the lower cylindrical wall zone 10 of the side wall inclines or flares slightly outwardly and downwardly away from said stacking ring 14, and has a small rounded jointure or bead 22 merging with the base wall 8 which has a perimetric recess, and which serves to form the seating surface for one lid upon the stacking ring of an adjacent and next lower lid and which offers further resistance against bending along the annular axis of the side wall.

The base wall 8 may, if desired, be provided with a concentric recess or depression 24 adjacent and at any desired distance from the perimetric edge thereof.

The continuous inner surface of the upper cylindrical wall zone 12 of the side wall is identified as a gripping zone and is provided with a plurality of similarly-shaped circumferentially-spaced, substantially vertically-extending, centering lugs 26 extending inwardly from the plane of said cylindrical wall zone, which centering lugs are formed by indenting inwardly the said cylindrical wall zone 12 from a point adjacent the bottom thereof to a point adjacent the top thereof and may be formed during the molding operation.

The inner faces of the centering lugs 26 extend substantially upwardly from the stacking ring 14 to adjoin the inner edge of the peripheral rim 16.

Referring to FIGS. 4 and 6, it will be observable that a slight bevel 28 is provided at the point of jointure between rim 16 and the centering lug 26, same presenting a camming face functioning to permit the easy stacking of lids in superposed relationship.

While the centering lugs are shown as disposed in an equally spaced diametric relationship, it will be understood that they may be provided in any spaced relationship along the upper cylindrical wall zone of the side wall and their number may vary within reasonable limits.

The centering lugs 26 preferentially are of relatively small width and thickness and serve to frictionally engage the annular bead 22 of the next adjacent and higher lid to center said next adjacent and higher lid and to provide an effective gripping engagement between the two lids.

The continuous inner surface of the lower cylindrical wall zone 10 of the side wall is identified as a supporting or stacking zone and is provided with a plurality of circumferentially-spaced substantially vertically-extending, stacking lugs 29 extending inwardly from the plane of said lower cylindrical wall zone and slightly inwardly of and beyond the plane of the inner peripheral edge of stacking ring 14.

The stacking lugs 29 incline slightly inwardly and extend upwardly from the base wall 8 to adjoin the stacking ring 14 and function to prevent the adjacent and next higher closure lid from slipping downwardly below said stacking ring.

As with the centering lugs 26, the stacking lugs 29 are shown as disposed in diametric relationship, but they may also be provided in any spaced relationship along the lower cylindrical wall zone 10 of the side wall whereby they may serve their supporting function.

The stacking lugs 29 increase the stacking ring land area so as to prevent the adjacent lids from snapping into each other.

Even should the lock between a pair of lids release itself at a point diametrically opposite to one of the stacking lugs 29, and the upper lid ride off the stacking ring 14, the annular flange or skirt 18 of the rim of the upper lid will contact the rim of the next lower lid approximately

centrally thereof to prevent any interlocking of the respective skirts.

As aforesaid, the centering lugs **26** on the upper cylindrical wall zone of the side wall function to center or align and to lock together adjacent lids by means of a frictional interengagement therebetween to the end that the lids are held in spaced, parallel, and concentric relationship.

When the lids are placed in stacked and inter-nested position, and a downward force is applied against the annular rim **16** of the uppermost lid, the centering lugs **26**, being frictionally locked with the side wall of the next adjacent lid, tend to hold the diametrically opposite side of the lid down and in place so that the flange or skirt **18** cannot be forced downwardly to hook or overlap the adjacent lid therebelow. Rather the lid is deflected at the inside edge of the annular rim **16**, and the lowermost edge of the flange or skirt **18** will be observed to abut the top of the annular rim **16** of the lower adjacent lid so as to prevent overlocking.

The stacking lugs **29** coact with the centering lugs **26** and function to hold the adjacent and next upper lid upwardly, as aforesaid.

The tightness of the centering lugs **26** on the lower cylindrical wall zone **10** of the side wall of a superposed lid function to deflect the bead **22** of said superposed lid around the sides of the centering lugs **26** of the lower adjacent lid and onto stacking ring **14** of said lowermost adjacent lid so as to expose more land surface and thereby to preclude the lid from snapping into the lower adjacent lid.

The accomplishment of the non-locking feature between adjacent covers is due to the nature of the joint structure therebetween, the elements being so arranged that the joint becomes tighter as the pressure from above increases.

A plurality of circumferentially-arranged generally vertically-disposed inwardly facing air vents in the form of notches **30** are provided in the lower clindrical wall zone **10** of the side wall and extend between the base wall **8** and the stacking rim **14**.

When a lid is placed upon a container, the air vents **30**, being disposed between the rim of the container and the lower portion **12** of the side wall of the lid, allow for the passage of entrapped air or gases from the container to the atmosphere.

As shown in FIG. 6, air vent **30** is provided with an inwardly extending toe portion **32** adjacent the peripheral edge of the base wall **8**, which toe portion **32** is recessed relative to the base wall **8** to form a passageway **34** communicating with the air vent.

The passageway **34** serves as the means of communication between the interior of a container to which a lid has been applied and the air vent **30** of said lid.

While only three of the air vents **30** have been shown, it will be understood that a greater or lesser number may be used to suit the particular demands of the user.

Further, air vents **30** may be located at any point about the periphery of the lower cylindrical wall zone **10** of the side wall.

It has been found that lids made in accordance with this invention and formed of polystyrene provide the necessary stiffness and strength when made of relatively thin dimensions. For example, the walls hereof have a substantially uniform thickness of about .027."

It will be seen from the foregoing that lids made in accordance with this invention are adapted for use throughout the full range of variations of size and shape which are encountered in paper containers. This presents a very substantial advantage over lids of the prior art where it was found that with a lid intended to fit the container of given size, it would be too tight for one container and too loose for another container.

Having thus described my invention with particularity with reference to its preferred forms, it will be obvious to those skilled in the art, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit and scope of my invention, and I aim in the appended claim to cover such changes and modifications as are within the scope of the invention.

What I claim is:

In an annular container lid for separable nested relation in a stack thereof, the combination of, a horizontal bottom wall and an annular side wall extending upwardly therefrom, said side wall having an inwardly extending annular ledge defining a stacking ring intermediate upper and lower edges thereof and in a plane parallel to the plane of said bottom wall and with upper and lower edge portions extending upwardly and downwardly respectively therefrom, said upper edge portion of said side wall flaring or tapering outwardly from said ledge at its bottom extremity to its top extremity and terminating in an uppermost horizontally-disposed continuous or peripheral rim marginally offset therefrom and extending outwardly therefrom, said lower edge portion of said side wall inclining outwardly from said ledge and joining at said bottom wall with a concentric bead provided in the under surface of said bottom wall adjacent the perimetric edge thereof, the outer periphery of said rim being provided with an outermost vertically-depending continuous peripheral flange, the continuous inner surface of said upper edge portion of said side wall being provided with a plurality of circumferentially-spaced substantially vertically-extending centering lugs extending inwardly from the plane thereof, the continuous inner surface of said lower edge portion of said side wall being provided with a plurality of circumferentially-spaced substantially vertically-extending stacking lugs extending inwardly from the plane thereof and slightly inwardly of and beyond the plane of the inner peripheral edge of said stacking ring, and a plurality of circumferentially-arranged generally vertically-disposed air vents in the form of notches provided in said lower edge portion and extending vertically between said bottom wall and stacking ring.

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