

PATENT SPECIFICATION

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(71) We, DART INDUSTRIES INC., a Corporation organised and existing under the Laws of the State of Delaware, United States of America, of 8480 Beverly Boulevard, Los Angeles, State of California, 90054, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to press type closures for containers. More particularly, the invention concerns reusable, resilient, distortable integrally constructed closures for open-mouthed containers and combinations of such closures and containers.

Food storage containers, including those formed of plastic materials, have been available for many years and have generally employed a bowl, cylinder, or similarly shaped tubular vessel and a separate closure or lid made of a relatively flexible material. The closures for such vessels may be of several types.

One of these types might include an inverted peripheral groove that is placed upon the top edge or rim of a container wall and is pressed on to or expanded over that edge to form a hermetic seal between the two parts. The application of such a closure would usually require that the user apply pressure all around the periphery of the closure to affectively seat same upon the container.

Another possible closure could be of a two-position type which may be flexed to either of two stable positions. In one of these positions, the closure may be easily placed over the rim or within the open mouth of a container, and then may be flexed to the second position. This flexing action either expands or contracts the peripheral portions of the closure and forces it

into tight locking contact with the rim or inside container wall. Other types of closures could include cork-like and toggle action closures which fit loosely into the open mouth of a container and which are thereafter expanded into contact with the container inside wall surfaces.

All of the mentioned closures may be quite satisfactory in operation and construction. It should be noted, however, that each is not wholly satisfactory for many reasons. For example, the closure having the inverted peripheral groove has to be stretched over or pressed on to the container rim normally by finger pressure applied at successively adjacent points along the top groove defining wall. This may be a time-consuming and laborious procedure, especially if the closure is as tight fitting as is required to obtain a lasting hermetic seal. Further when the closure must be stretched in this manner, stress concentrations are increased to such a degree that stress cracking may result. Similarly, lids of this type are susceptible to warpage due to a lack of structural rigidity, and in a warped condition, placement of the lid on a container is made more difficult and sometimes even impossible.

The two-position closure may also require some dexterity if it is to be accurately locked in position. For example, the peripheral edge of such a closure must be maintained in close association with the top edge of the container as the top wall of the closure is flexed to its locking position. As might be expected, this, in some instances, necessitates that the closure be held simultaneously at the edges and flexed at the centre.

Similarly, the toggle action and roll type toggle action closures may also require dexterity in their assemblage with suitable closures. In addition, the toggle action lids include hinged areas that are necessarily

weakened and are therefore more susceptible to failure. This type of construction also presents numerous moulding difficulties which tend to limit the materials of construction from which such closures may be manufactured. And, like the tightly stretched closure mentioned above, extreme stresses are created in the sealed position which tends to accelerate stress cracking of the closure. Further, when a roll-type toggle is employed, it is not uncommon for the seal between the closure and container to be lost when items are placed on top of the closure. The weight of such items will depress the dome-like central area and because of its inherent tendency to continue to completion any such change in position, the dome-like area will simply roll into its second or released position. It should also be apparent that such closures also have a tendency to turn inside-out, thus requiring that the user reinvert the closure before any further attempt is made to seal the container. Such additional working, besides being bothersome, also shortens the life of the closure.

Closures of the above-mentioned types may restrict the manufacturer somewhat in his material selection and in the overall dimensional characteristics of the closure, i.e. wall thicknesses, etc. In most instances, the utmost flexibility is needed, and therefore thinner constructions are required. This in turn results in an end product or closure that is highly susceptible to heat distortion.

Expandable cork-like closures are also deficient in several respects, especially where large open-mouthed containers are concerned. For example, the construction of such closures besides employing complicated mechanical manipulative devices also decreases the usable volume in any container where they are used, because of their bulk.

According to the present invention there is provided a resilient distortable integrally constructed closure for hermetically sealing an open-mouthed member when said closure is in use, which closure comprises a centre main wall being substantially formed of a plurality of corrugations (as hereinafter defined) emanating from a centre portion thereof and tapering downwardly and inwardly to said centre portion from a terminal peripheral edge such that upon application of downward pressure to said centre portion said corrugations tend to collapse upon one another and substantially uniformly displace said peripheral edge until the closure is easily positionable on an open-mouthed member when the closure is in use, there being a sealing member positioned around and integral with said peripheral edge of the

centre main wall at a position proximate the uppermost portion of said corrugations, which sealing member is displaceable in like manner with said peripheral edge such that at least a portion of the sealing member is closely engageable with and sealable against the walls of an open-mouthed member when the closure is in use due to the resilience of the closure upon the discontinuance of applied downward pressure to said centre main wall.

As used herein the term "corrugations" is intended to cover true corrugations, flutes, pleats or folds.

The closure of the invention includes several distinctive constructional features which enhance its applicability for use in the food storage container area and in other related fields. Among these is a biased or conical centre wall arrangement which includes a corrugated, folded, fluted or similarly pleated construction that enables the contraction of the centre wall peripheral edge and the recovery thereof toward or to its extended position with minimum development of internal stresses. This edge includes as an integral part a sealing member which in its sealed relationship with a container retains the contained materials out of contact with those parts of the closure that lie above the seal or overlie the container edge or rim. Thus, because of this internal sealing arrangement, the hygienic features of this closure are improved over those where sealing was obtained on the outside wall of the container.

The closure is preferably integrally moulded from thermoplastics material. In addition, preferably, the centre portion and at least portions of the peripheral edge lie in different but substantially parallel planes.

In one embodiment the sealing member includes a plurality of integral walls interconnected such that in cross-section there is defined a substantially U-shaped lip that is capable, when the closure is in use, of overlying the wall or walls which define the open mouth of the open-mouthed container.

Preferably at least one of the two substantially parallel walls which form the arms of said U-shaped lip further includes a substantially continuous peripheral protruding portion which is capable of pressing abutting against the wall or walls which define the open mouth in the open-mouthed container to thereby hermetically seal the container with the closure when the latter is in use.

In other embodiments: the sloping sealing member comprises an integral substantially uniform smooth surfaced upwardly and outwardly sloping side wall; or,

the sealing member includes a substantially U-shaped groove having connected inner, outer and top walls, said top and outer walls having inside surfaces upon which there are disposed a plurality of integral ribs spaced therearound.

The invention also includes a combination of a closure in accordance with the invention together with an open-mouthed container.

Preferably the container includes a projecting wall construction forming the open mouth thereof, in which construction at least parts of the projecting walls are undercut adjacent the upper edge thereof, at least a portion of the sealing member of the closure being closely engageable with and sealable against the walls of said container below said undercut.

In another embodiment the container includes a projecting wall construction forming the open mouth thereof, in which construction the projecting walls are flared outwardly away from the centre of the container.

The constructions described in detail below should reduce both internal stresses within the container closure, and the force required to assemble properly a closure and container. At the same time, it is desirable to maximise the sealing pressure between the closure and container and the lateral contraction of the closure sealing member per unit of applied force.

Some specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a top view of a closure construction;

Figure 2 is a cross-section of the closure taken along line 2-2 in Figure 1 and a partial cross-section of a container showing the closure in sealing relationship with the container;

Figure 3 is a partial bottom view of the closure depicted in Figure 1;

Figure 4 is an enlarged partial cross-section of the peripheral edge of a typical closure and another container shown in disassembled relationship;

Figure 5 is a partial cross-section of another embodiment of a closure member and container;

Figure 6 is a partial cross-section of another embodiment of a closure member and container;

Figure 7 is a partial cross-section of the closure construction taken along line 7-7 of Figure 1;

Figure 8 is a cross-sectional side elevation of an assembled and modified closure and container;

Figure 9 is a bottom view of this modified closure construction depicted in Figure

8; and

Figure 10 is an enlarged partial cross-section of the peripheral edge of the closure and container shown in Figure 8 except that they are shown in disassembled relationship.

Referring now to Figures 1 to 4, it can be seen that in this embodiment, the closure member 10 includes essentially three functional parts, a peripheral inverted U-shaped groove in lip 12, a conical or biased centre main wall 14 and a centrally positioned substantially planar area 16 in the centre surface wall. Specifically, the conical or biased area is formed of a plurality of upstanding tapered ridges 18, that produce a corrugated, fluted or pleated construction which is more fully described hereinafter. These corrugations (Figure 7) emanate from the substantially planar area 16 and terminate at or closely adjacent the peripheral edge 24 of the centre main wall 14. The lip 12 is integrally attached to edge 24 and portions of this lip effect the seal between the closure 10 and container 20.

It can be seen that at the peripheral edge 24 of the centre main wall, there is an integral upwardly extended side wall 26. Further, as indicated, the side wall 26 normally extends above the biased, corrugated centre main wall 14 and forms the inside wall of the inverted peripherally disposed groove or lip 12 in closure member 10. This lip and groove are completed by an outer downwardly directed wall 37 and an interconnecting substantially horizontally disposed top wall 33. The outer portion 28 of wall 26 is arranged for mating engagement with the inner wall area of the projecting wall 30 which forms the open mouth in container 20. This engagement creates the hermetic seal referred to and thus produces a highly desirable storage container especially suited for the storage of foodstuffs. Likewise, the outer and top walls 37 and 33, respectively, function to position the closure properly on the container 20 and to form a suitable means for grasping the closure 10 to effect its removal from the container.

In addition, it should be pointed out that in obtaining the mating engagement between the inner area of projecting wall 30 and the outer portion 28 of wall 26, it is particularly important to maintain the innermost peripheral corner area of wall 30 in close proximity to the upper-innermost corner area of wall 26. Such close proximity or abutment can be helpful in producing a moment arm reaction against any tendency of wall 14 to assume an upwardly convex configuration.

The biased or conical centre main wall 14 includes, therefore, a corrugated or

fluted structure such as is exemplified by the plurality of downwardly and inwardly tapered ridges 18. As can be readily seen in Figures 1 and 2, upper portions 38 of these ridges are angularly directed with respect to planar area 16 and therefore the respective peripheral edges 24A thereof lie in a plane removed from that of planar area 16. Similarly, bottom portions 40 of these corrugations lie in a substantially parallel plane approximate to that of area 16 when the closure is in a relaxed or "as moulded" condition. However, when the closure is in place upon a container, even the bottom portion 40 will be angled toward the container centre.

The corrugation height at its peripheral terminus 24, i.e. the point of connection to the integral upwardly extended side wall 26, is dependent, upon the size of the closure as well as the other parameters mentioned above. Similarly, it is preferable that the uppermost flute portion 38 is approximately opposite a principal sealing point or protruding bead 32 which is more fully discussed below. Thus, even though the lateral dimensions of the outer portion 28 at bead 32 are slightly greater than that of the inside diameter of the container, the application of pressure to the centrally positioned substantially planar area 16 will cause sufficient inward lateral displacement of the side wall 26 such that the closure slips easily on to the container.

With continued reference to Figures 1 and 4, in particular, it may be seen that in operation the locally distortable closure member is contractably and distensibly constructed so that the wall 26 will be displaceable with the peripheral edge 24 of biased centre main wall 14.

In accomplishing this, the resiliency and elastic memory of the particular materials of construction must be considered and, in particular, the centre main wall shape should be carefully constructed to take advantage of these inherent physical characteristics of the materials employed. Therefore, the radially extending biased centre main wall 14, which extends between the centre portion or substantially planar area 16 to the peripheral edge 24, is of considerable importance to the closure.

In essence, the centre main wall 14, because of its biased construction, tends to collapse upon itself upon the application of light finger pressure to area 16. This collapse substantially uniformly displaces the peripheral edge 24 inwardly and thus draws the side wall 26 inwardly with it. Seemingly, the entire centre main wall 14 would continue to collapse with an umbrella-like result if it were not for the reinforcing and stiffening effect of the side wall 26. Despite this restraining effect, the

corrugated wall 14 continues to function as described and the resilient return of the closure to its approximate "as moulded" size and shape after each distortion is presumably aided by the noted side wall 70 26.

As indicated above, the closure embodiments depicted in Figures 2, 4 and 6 further include an outwardly protruding bead 32 which extends around the periphery of outer portion 28 of side wall 26. Figure 4 further shows an undercut or inverted ledge 34 below which the bead 32 is constructed to seal against the inner surface of projecting wall 30 of the container. As is readily apparent, the undercut is produced by a downwardly directed inwardly sloping portion 36 of this inner surface which terminates with undercut 34. At this point which is adjacent the upper edge of projecting wall 30, the normal inner wall contour is resumed.

The comparative distances between the inside upper surface 27 of the U-shaped groove and the bead 32, and between the top edge projecting wall 30 and undercut 34, are preferred to be such that the entirety of the bead will lie below and out of contact with the undercut when the container and closure are in sealed relationship. This then ensures that actual sealing occurs between the bead 32 or the wall 26 and the container side wall and not against the undercut 34. In addition, it may be desirable to form a small flattened area 21 on the outermost area of bead 32 to effect an even better seal between the closure 10 and container 20.

The noted disparity in the respective dimensions between surface 27 and bead 32, and the top edge of wall 30 and undercut 34, tends to negate the necessity to retain exacting tolerances on them. For example, if a lasting seal were to be maintained between the bead and undercut, one would have to be assured that a virtual line contact was kept between these elements because of their respective contoured features. In this disclosed arrangement, however, it is only necessary to maintain the bead 32 below the undercut 34 in a manner so that sealing occurs against a virtually flat wall surface.

The undercut 34 therefore functions to produce an audible indication of when the closure slips into proper sealing engagement with the container, and further tends to restrain the closure upon the open mouth of the container. In this respect, it should be noted that the undercut 34 may be either continuous or discontinuous to produce the desired effect, and that the undercut and bead may be reversed in their placement on the container and closure respectively if desired.

In addition and as is evident from Figures 2, 5 and 6, the undercut 34 need not be employed as shown in the preferred embodiment. For example, the uppermost part of projecting walls 30 of a typical tubular member or container 20, when utilizing this invention, may be flared as is depicted in Figures 2 and 5. Further, the lip 12 need not extend downwardly over the container rim but instead may terminate with top wall 33 (Figure 5) extending substantially horizontally out beyond projecting edge 30. Likewise, bead 32 may be eliminated in certain instances without impairing the operability of the closure.

In the embodiment shown in Figure 6, an inwardly protruding peripherally extending integral ridge 35 resides on the inside surface of the outer wall 37. In this instance, a dual seal is effected, thus further improving the overall seal that is produced. Also, as is evident from Figure 2 ribs 25 may be employed at spaced intervals on the underside of wall 33 so that air can be easily expelled from the container 20 as the closure 10 is applied. In this respect, it should be apparent that as the closure member 10 is applied to the open end of an otherwise closed container, air will be expelled or displaced therefrom. This, therefore, will create a slight pressure differential across the closure further tending to assist its being retained on the container.

For applying such closures, application forces, sealing pressures, and the stresses in the closures are variable. Ideally, a high sealing pressure, a small pushdown force and a low stress level in the described structure are desirable. Therefore, it becomes significant to analyze the relationship between the applied axial force (push-down pressure), the lateral contraction or displacement of the side wall 26, the stresses within the closure, and the sealing pressure.

Another aspect of construction which may be employed with closures of this type is clearly exhibited in Figures 8 and 10. There the ribs 42 are exposed and may be seen to extend from wall 26 along the underside of wall 33 and then downwardly along the inside of outer wall 37. These ribs are spaced at selected intervals around the lip 12 so that air can be easily expelled from container 20 as the closure 10 is applied. Note in particular that by extending the ribs 42 down the outer wall 26 sealing between that wall and the container 20 is prevented during the application of the closure. This enables air to be displaced from the container and thus creates a more desirable inside condition in the container subsequent to its being sealed by closure

wall 24.

Our explanation of the advantages obtained from the above described specific embodiments will now be set out to assist a reader in understanding the characteristics displayed by those embodiments.

The material properties of the majority of materials from which closure members 10 might be produced, particularly plastics materials have no directional preference and are thus isotropic in nature. However, the biased construction illustrated and the introduction of corrugations make the stretching and bending stiffness in the peripheral or circumferential direction weaker than those in the radial direction. This difference in stiffness in two perpendicular directions, which is referred to as orthotropy, is thought to be a contributory factor in the operation of the closure as is described above.

Computer analysis of closure member 10 may be accomplished treating the member as a shallow orthotropic thin elastic conical shell of revolution with the side wall 26 acting as an edge stiffener. Thus, it was found that the peak stresses in this closure member 10 occur during the push-down phase as the closure is applied to the container. Further, the dominant stresses occur at the edge of the planar area 16 and are radially and circumferentially directed. Shear stresses are found to be of secondary importance.

Similarly, by varying the structural parameters, one learns that the radial contraction per unit push-down force for a corrugated closure is much larger than that for a flat closure even if the latter is determined by a nonlinear plate analysis. The radial contraction for a smooth conical closure, an isotropic shell, whose meridional slope is about one-half of the uppermost flute portion 38, approximates that of a corrugated closure but only if the side wall construction is very stiff. If, however, the side wall is relatively flexible, the radial contraction of a smooth conical closure will be theoretically only about one-third that of a corrugated closure. Further, the smooth conical arrangement has at least one other disadvantage in that the peak stresses produced therein are about twice as high as those created in a corrugated closure member.

These behaviours are all due to an important property of the corrugated construction, i.e., its relatively low bending and stretching stiffness in the circumferential direction. This property is also exemplified by the fact that the radial or lateral displacement per unit push-down force increases with flute height and with the number of flutes. It follows that for a given lateral displacement, a seal with a

larger number of flutes will require a smaller push-down force and therefore the peak stresses will be reduced.

A reduction in peak stresses may also be effected by increasing the radius or area of planar area 16. The reason for this seems to be that the reduced effects of stress concentration gained by making the area larger, overcome corresponding losses due to a higher stretching stiffness. Additional reductions in stresses may be accomplished by making the seal lip 12 more flexible, or by increasing the ratio of the flute height at the side wall to the flute thickness at the side wall. It should be noted, however, that such reduction of peak stresses are not without limit and that at some point, the peak stresses will no longer occur at the edge of the planar area 16.

Peak stresses may also be reduced significantly by reducing the lateral displacement in effecting placement of the closure on a container. However, this also reduces the sealing pressure between the two and therefore somewhat modifies the extent that this approach may be employed.

Additional analysis reveals that a measure of the sealing pressure of the closure is the radial stress at the outer edge of the corrugated seal after the closure is fitted with the container and the push-down force is removed and it becomes apparent that the sealing pressure will increase as the ratio between the flute height at the side wall and the flute base width at the side wall increases. The same effect may also be obtained by increasing the ratio between the radius of planar area 16 and the radius at the side wall 26.

Having learned how the push-down force, the lateral displacement, peak stresses and sealing pressure vary with the structural design, the various design parameters may then be chosen to achieve the appropriate desired results.

Also, the closure member 10 is preferably formed from a distortable thermoplastic, for example, low density polyethylene; however, high density polyethylene, polypropylene, polyolefin blends or similar materials may be suitably employed in forming the closure. Likewise, the open-mouthed containers 20 (Figures 2, 4, 5 and 6) with which these closures are primarily intended for use, are also generally formed from the same or similar materials. It should be pointed out, however, that such closures may well be adapted for use with containers made from diversified types of materials.

In this new method of operation, the closures described above tend to experience a lateral displacement within the conical, corrugated or fluted area 18 as pressure is

applied to the planar area 16 in the approximate centre of the centre main wall 14. The biased construction accentuates this displacement as the centre main wall 14 folds upon itself in an accordion-like fashion. This then similarly tends to enable the side wall 26 to draw inwardly, thereby facilitating entry of the centre main wall area 14 into the open-mouth end of the container or tubular member 20. After insertion and upon release of the applied pressure, the resilient closure material due to its elastic memory, attempts to assume its relaxed or "as moulded" orientation and thus expands the side wall 26 against the inner portion of the container wall to hermetically seal the container. To remove the closure, it is only necessary to apply an upward pressure against the U-shaped seal lip 12 thus prying the closure off from projecting edge 30 of the container.

WHAT WE CLAIM IS:—

1. A resilient distortable integrally constructed closure for hermetically sealing an open-mouthed member when said closure is in use, which closure comprises a centre main wall being substantially formed of a plurality of corrugations (as hereinbefore defined) emanating from a centre portion thereof and tapering downwardly and inwardly to said centre portion from a terminal peripheral edge such that upon application of downward pressure to said centre portion said corrugations tend to collapse upon one another and substantially uniformly displace said peripheral edge until the closure is easily positionable on an open-mouthed member when the closure is in use, there being a sealing member positioned around and integral with said peripheral edge of the centre main wall at a position proximate the uppermost portion of said corrugations, which sealing member is displaceable in like manner with said peripheral edge such that at least a portion of the sealing member is closely engageable with and sealable against the walls of an open-mouthed member when the closure is in use due to the resilience of the closure upon the discontinuance of applied downward pressure to said centre main wall.

2. A closure as claimed in claim 1, which closure is integrally moulded from thermoplastics material.

3. A closure as claimed in claim 1 or claim 2, wherein said centre portion and at least portions of the peripheral edge lie in different but substantially parallel planes.

4. A closure as claimed in any one of claims 1 to 3, wherein the sealing member comprises an integral substantially uniform smooth surfaced upwardly and outwardly sloping side wall.

5. A closure as claimed in any one of



larger number of flutes will require a smaller push-down force and therefore the peak stresses will be reduced.

A reduction in peak stresses may also be effected by increasing the radius or area of planar area 16. The reason for this seems to be that the reduced effects of stress concentration gained by making the area larger, overcome corresponding losses due to a higher stretching stiffness. Additional reductions in stresses may be accomplished by making the seal lip 12 more flexible, or by increasing the ratio of the flute height at the side wall to the flute thickness at the side wall. It should be noted, however, that such reduction of peak stresses are not without limit and that at some point, the peak stresses will no longer occur at the edge of the planar area 16. Peak stresses may also be reduced significantly by reducing the lateral displacement in effecting placement of the closure on a container. However, this also reduces the sealing pressure between the two and therefore somewhat modifies the extent that this approach may be employed.

Additional analysis reveals that a measure of the sealing pressure of the closure is the radial stress at the outer edge of the corrugated seal after the closure is fitted with the container and the push-down force is removed and it becomes apparent that the sealing pressure will increase as the ratio between the flute height at the side wall and the flute base width at the side wall increases. The same effect may also be obtained by increasing the ratio between the radius of planar area 16 and the radius at the side wall 26.

Having learned how the push-down force, the lateral displacement, peak stresses and sealing pressure vary with the structural design, the various design parameters may then be chosen to achieve the appropriate desired results.

Also, the closure member 10 is preferably formed from a distortable thermoplastic, for example, low density polyethylene; however, high density polyethylene, polypropylene, polyolefin blends or similar materials may be suitably employed in forming the closure. Likewise, the open-mouthed containers 20 (Figures 2, 4, 5 and 6) with which these closures are primarily intended for use, are also generally formed from the same or similar materials. It should be pointed out, however, that such closures may well be adapted for use with containers made from diversified types of materials.

In this new method of operation, the closures described above tend to experience a lateral displacement within the conical, corrugated or fluted area 18 as pressure is

applied to the planar area 16 in the approximate centre of the centre main wall 14. The biased construction accentuates this displacement as the centre main wall 14 folds upon itself in an accordion-like fashion. This then similarly tends to enable the side wall 26 to draw inwardly, thereby facilitating entry of the centre main wall area 14 into the open-mouth end of the container or tubular member 20. After insertion and upon release of the applied pressure, the resilient closure material due to its elastic memory, attempts to assume its relaxed or "as moulded" orientation and thus expands the side wall 26 against the inner portion of the container wall to hermetically seal the container. To remove the closure, it is only necessary to apply an upward pressure against the U-shaped seal lip 12 thus prying the closure off from projecting edge 30 of the container.

WHAT WE CLAIM IS:—

1. A resilient distortable integrally constructed closure for hermetically sealing an open-mouthed member when said closure is in use, which closure comprises a centre main wall being substantially formed of a plurality of corrugations (as hereinbefore defined) emanating from a centre portion thereof and tapering downwardly and inwardly to said centre portion from a terminal peripheral edge such that upon application of downward pressure to said centre portion said corrugations tend to collapse upon one another and substantially uniformly displace said peripheral edge until the closure is easily positionable on an open-mouthed member when the closure is in use, there being a sealing member positioned around and integral with said peripheral edge of the centre main wall at a position proximate the uppermost portion of said corrugations, which sealing member is displaceable in like manner with said peripheral edge such that at least a portion of the sealing member is closely engageable with and sealable against the walls of an open-mouthed member when the closure is in use due to the resilience of the closure upon the discontinuance of applied downward pressure to said centre main wall.

2. A closure as claimed in claim 1, which closure is integrally moulded from thermoplastics material.

3. A closure as claimed in claim 1 or claim 2, wherein said centre portion and at least portions of the peripheral edge lie in different but substantially parallel planes.

4. A closure as claimed in any one of claims 1 to 3, wherein the sealing member comprises an integral substantially uniform smooth surfaced upwardly and outwardly sloping side wall.

5. A closure as claimed in any one of



claims 1 to 3, wherein the sealing member includes a plurality of integral walls interconnected such that in cross-section there is defined a substantially U-shaped lip that is capable, when the closure is in use, of overlying the wall or walls which define the open mouth of the open-mouthed container.

6. A closure as claimed in claim 5, wherein at least one of the two substantially parallel walls which form the arms of said U-shaped lip further includes a substantially continuous peripheral protruding portion which is capable of pressing abutting against the wall or walls which define the open mouth in the open-mouthed container to thereby hermetically seal the container with the closure when the latter is in use.

7. A closure as claimed in any one of claims 1 to 3, wherein the sealing member includes a substantially U-shaped groove having connected inner, outer and top walls, said top and outer walls having inside surfaces upon which there are disposed a plurality of integral ribs spaced therearound.

8. A closure construction substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 4 and 7, Figure 5, Figure 6 or Figures 8 to 10 of

the accompanying drawings.

9. A combination of a closure as claimed in any one of the preceding claims together with an open-mouthed container.

10. A combination as claimed in claim 9, wherein the container includes a projecting wall construction forming the open mouth thereof, in which construction at least parts of the projecting walls are undercut adjacent the upper edge thereof, at least a portion of the sealing member of the closure being closely engageable with and sealable against the walls of said container below said undercut.

11. A combination as claimed in claim 9, wherein the container includes a projecting wall construction forming the open mouth thereof, in which construction the projecting walls are flared outwardly away from the centre of the container.

12. A combination of a closure construction and an open-mouthed container substantially as hereinbefore described with reference to and as illustrated in Figures 2 and 4, Figure 5, Figure 6 and Figures 8 and 10 of the accompanying drawings.

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