March 12, 1963 D. J. O'CONNOR 3,081,005

DISPENSING CLOSURE

Filed Sept. 8, 1959 2 Sheets-Sheet 1

Fig. 1.

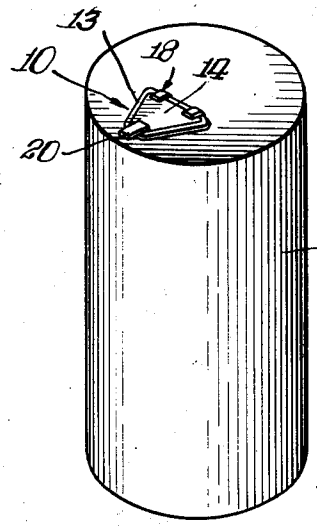


Fig. 2.

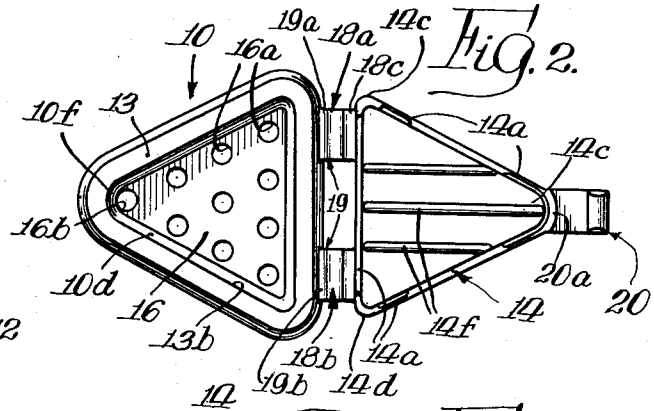


Fig. 3.

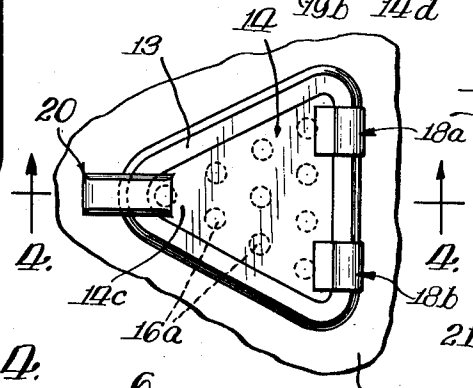


Fig. 4.

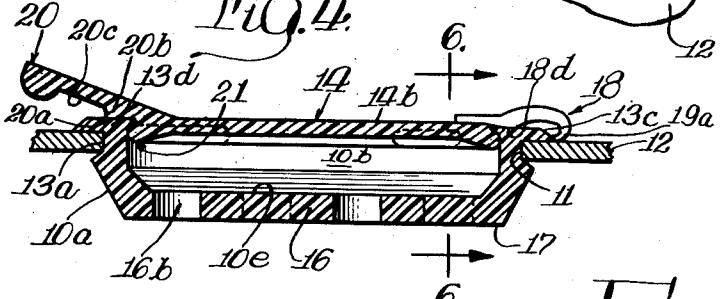
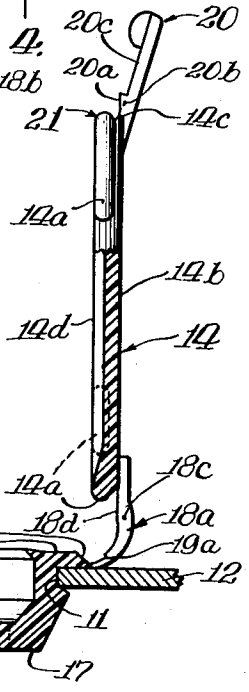


Fig. 5.



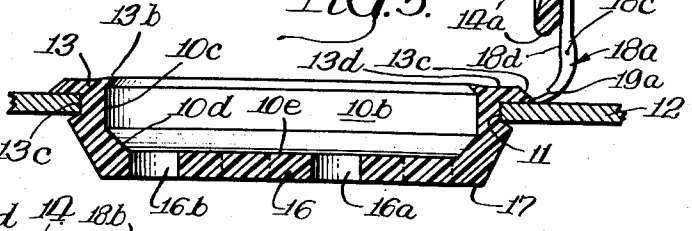
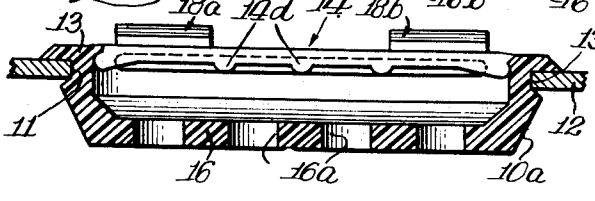


Fig. 6.



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DISPENSING CLOSURE

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Fig. 7.

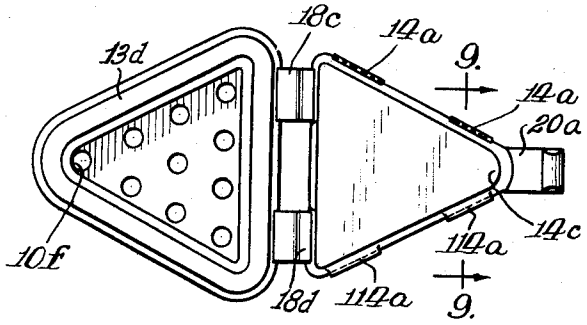


Fig. 8.

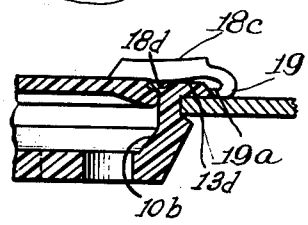


Fig. 11.

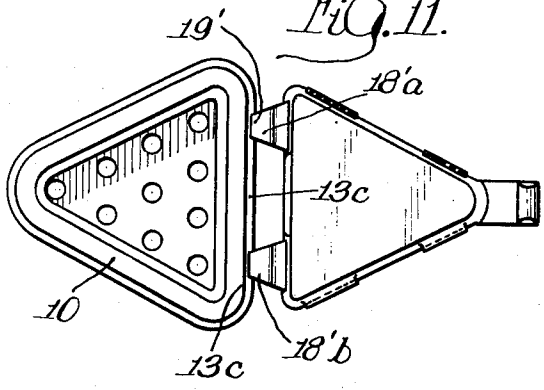


Fig. 10.

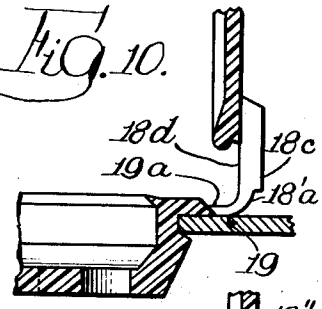


Fig. 14.

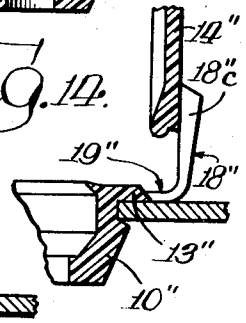


Fig. 13.

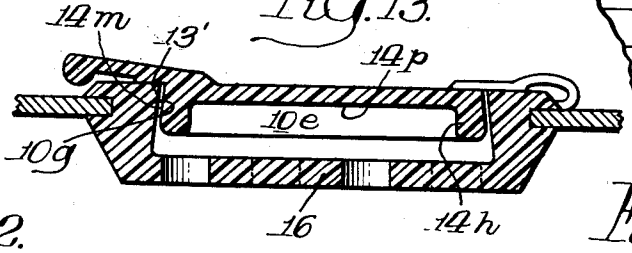


Fig. 12.

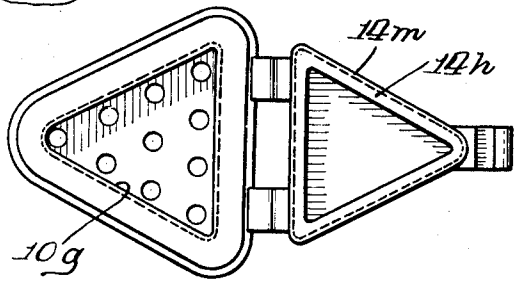
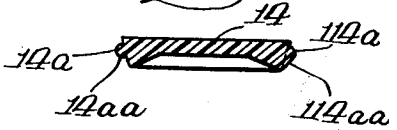


Fig. 9.



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3,081,005

DISPENSING CLOSURE

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Filed Sept. 8, 1959, Ser. No. 838,593
2 Claims. (Cl. 222—189)

This invention relates to dispensing closures, and, in particular, to closures for use in dispensing particulate material from containers.

The invention herein disclosed and claimed constitutes and has for its principal object, an improvement over the dispensing closures described in the U.S. Patent to Albiani, No. 2,826,343 issued March 11, 1958, and the copending application of the same inventor entitled "Dispensing Closure," Serial No. 636,600, filed January 28, 1957, now Patent No. 2,940,645, issued June 14, 1960.

Dispensing closures of the type to which this invention is directed have a body member, insertable through a wall of a container, with an outer end extending just slightly outward of the container wall and with a closure lid member associated with the body to lie flush with the outer end thereof in closed position. The outer end of the body member is provided with a continuous flange having continuous engagement with the container, and the lid is arranged to have a continuous engagement with the outer end when the lid member is in closed position, thereby to permit sealed closing of the container opening. The inner end of the body member is provided with a foraminous wall forming a pouring wall. Such closures further included means spacing the foraminous wall from the lid member to permit a tight closing of the lid notwithstanding any particulate material that might be between the lid and the pouring wall. Such spacing means included a bead means on the lid member which coacted with a shoulder on the body member, when the lid member snapped past the outer end. In such closure, means were provided for hingedly connecting the lid member to the body member and such means also served to align the lid with the body member. To facilitate opening the lid member from a closed position, tab means were provided which overlaid the apex of the closure member (in those closures that were poly-angular in cross-section) to permit the ready insertion of the fingers thereunder. To accommodate the lid member lying flush with the body member, cut-away portions or notches were formed in the periphery of the outer end of the body member to accommodate the seating of the tab and the hinge means.

In my dispensing closure, I have provided a new and improved means for spacing the lid member from the foraminous wall when closed, which spacing means forms part of the connecting means and the tab means. My improved construction functions so that the tab means and the hinge means, while permitting the lid member to be in a closed position flush with the outer end of the body member, provide a means for spacing the lid member from the foraminous wall, thus eliminating all other types of spacing means.

Also I have provided my dispensing closure with an improved means for aligning or registering the lid member in the opening of the body member.

Notwithstanding the aligning function attributed to the hinge means heretofore available in prior art closures, such hinge means sometimes permitted the lid member and the flange of the body member adjacent the hinges to interfere with the net effect that it became impossible to close the opening of the body member. With my improved lid registering means, any such interference is eliminated. In one embodiment of my invention, this lid registering means comprises forming the hinges so that they are thinner adjacent the body member or, conversely thickening other portions of the hinges so that the hinge means will always bend at a predetermined location. In this manner, the remainder of the hinge means acts as a clearance means for the lid member and the outer end of the body member. In another form of my invention, this registering means comprises forming the hinge means triangularly with the apex adjacent the outer end of the body member so that the hinges will bend near the apex.

With this improved registering means I have also found that an operator of the lid may carelessly close the lid into the opening of the body member and the lid will remain closed, even though one corner of the lid has been inserted in the body member. I have also improved one embodiment of my dispensing closure still further by the various locations of the rig members which form part of the retaining means on the lid member, and a particular shape I afford thereto, so that the registering means above discussed is facilitated. In another form of my invention I have improved the retaining means by utilizing tapered side walls, both on the lid member and on the body member.

Accordingly, still another and more particular object of my invention is the provision of a new and improved dispensing closure having a new and improved means for spacing the lid member from the foraminous wall of a body member to allow particulate material to return to the container which spacing means forms a part of the hinge means for connecting the lid member from the body member and the tab means for opening and closing the closure.

Still another object of my invention is the provision of a new and improved closure having a new and improved means for connecting the lid member to the body member, including means for registering the lid member in alignment with the body member so that the lid member may be closed into the body member, even when carelessly handled.

Still another object of my invention is the provision of a new and improved closure having new and improved means for retaining the lid member within the body member.

A still further object of my invention is the provision of a new and improved tab member in a closure for opening and closing the lid from the body member and incorporating means for spacing another end of the lid from the foraminous wall.

Other and more particular objects of my invention will be apparent to those skilled in the art from the following description and drawings forming a part hereof and wherein:

FIGURE 1 is a perspective view of a dispensing closure embodying the teachings of my invention installed in a container;

FIGURE 2 is an enlarged top plan view of the closure of FIGURE 1 with the lid thereof swung 180° from the closed position;

FIGURE 3 is a top plan view similar to that of FIGURE 2 but with the lid in closed position and with the closure installed in a portion of the container;

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 3 and enlarged to show in more detail the construction of my dispensing closure;

FIGURE 5 is a side elevational view partially in section and greatly enlarged, with the lid in a normal open position;

FIGURE 6 is a front sectional view taken along line 6—6 of FIGURE 4 and looking in the direction of the arrows;

FIGURE 7 is an enlarged top plan view of the closure of FIGURE 1 with the lid swung 180° from the closed

position, illustrating to advantage another arrangement of the retaining means on the lid member;

FIGURE 8 is a partial side view, in section, similar to FIGURE 4, illustrating to advantage my improved hinge means with the lid registering means incorporated therein;

FIGURE 9 is an enlarged sectional view taken along lines 9—9 in FIGURE 7 to show the shape of the ribs which constitute the retaining means provided on the lid member;

FIGURE 10 is a partial side sectional view, similar to FIGURE 5, illustrating to advantage the lid in a normal open position and the action of the lid registering means incorporated in the hinge means;

FIGURE 11 is an enlarged top plan view of my invention with the lid swung 180° from closed position, illustrating to advantage another form of registering means incorporated in the hinge means;

FIGURE 12 is an enlarged top plan view of another form of closure, with the lid thereof swung 180° from closed position and illustrating another form of retaining means;

FIGURE 13 is a cross-sectional view of the closure of FIGURE 12 and enlarged to show in more detail the improved construction of the other form of retaining means; and

FIGURE 14 is a partial side sectional view, similar to FIGURE 4, showing still another arrangement of registering means on the lid member.

In the one embodiment of my invention disclosed in FIGURES 1–6 of the drawings, a dispensing closure is shown to comprise a body member **10** arranged to extend through an opening **11** (FIG. 4) provided in a container **12** adapted to hold a quantity of particulate material to be dispensed, such as salt. The body member is generally flat or wafer-like, and is provided with an outer end **13** which extends just slightly outwardly of the surface of that portion of the wall of the container **12** defining the periphery of the opening **11**. Associated with the body member **10** is a lid member **14**, receivable within the body member **13** to effect a closure thereof, and extendable outwardly of the body member to permit a dispensing operation therethrough. The lid member is arranged to lie flush across the outer end **13** when it is in closed position. Improved means **18** (later to be described in detail) are provided for hingedly connecting the lid member to the body member to permit this disposition, to maintain the lid member in an out-of-the-way position during the dispensing operation, and to provide in part a means of spacing the lid member from a foraminous wall **16** at or near the inner end **17**. This connecting means additionally includes means **19** for registering or aligning the lid member **14** within the body member **10** during a closing operation. Tab means **20** assists in moving the lid member **14** from its closed position and extends from the lid member adjacent its apex to overlie the apex of the body member when the lid is closed. Retaining means, indicated in their entirety as **21**, are provided on the lid member and the body member to co-act to retain the lid member removably flush across the outer end **13** of the body member in a closed position.

A general description of the illustrated embodiment of the invention disclosed in FIGURES 1–6 having been described, a more specific description of the elements thereof is made hereinafter. As best can be seen in FIGURES 2 through 6, body member **10** comprises a member having a laterally outwardly enlarged outer end **13** arranged to receive the inner peripheral edges of the container wall portion defining the opening **11**. To assist in the installation of the body member, the laterally outer surface **10***a* toward the inner end **17** of the body member may be beveled inwardly to spring the container wall slightly during insertion and allow it to snap in the groove **13***a*. As best seen in FIGURE 2, the outer end **13** extends continuously to have an unbroken sealing engagement with the container wall, thereby precluding the passage of undesirable materials, such as water vapor, into the container, and precluding any undesirable leaking of particulate material from the container outwardly.

Extending through the body member, from end to end thereof is an opening or bore **10***b* having an outer wall portion, or portion **10***c* and a relatively tapered inner wall or portion **10***d*, which meets with and connects the inner portion **10***e* of the foraminous wall **16** to the outer portion. It is preferred that the passage outer portion **10***c* have a poly-angular cross-section, such as herein disclosed as a triangle, for improved spout action to be described. Bead means **13***b* extend marginally around the outer end **13** of the passage outer portion **10***c* and radially inward thereof to form a part of the retaining means **21**, previously mentioned. One or more foramen **16***a* are provided in wall **16**. Preferably several foramina **16***a* are provided in generally uniform distribution throughout the foraminous wall **16** and with a number thereof closely juxtaposed to the portion **10***d* of the body member. In this preferred arrangement, one foramen **16***b* at the apex **10***f* of the body member is arranged to have its laterally outward portion coincident with the inner edge of wall **10***d* (as best seen in FIGURES 4 and 5). Thus arranged, the body member serves as a means for conducting the particulate material from the container **12** during the dispensing operation. The foraminous wall **16** serves as a means for controlling the flow to provide an improved spout-like action wherein the flow is directed generally over the apex **10***f*, preferably located near the margin of the container **12**, as illustrated in FIGURE 1.

Lid member **14** comprises a flat closure element having a peripheral configuration generally complementary to the polyangular configuration of the passage outer portion **10***c* of the body member. Rib means **14***a*, which may comprise discontinuous, separated elements as seen in FIGURE 2, are spaced longitudinally inwardly from the outer surface **14***b* of the lid member to be received in the outer passage portion **10***c* below the bead means **13***b* and to extend transversely outwardly of the bead means into contact with the wall **10***c*. Thus when the lid member is disposed in the closed position, such as illustrated in FIGURES 4 and 6, the rib means **14***a* co-act with the bead means **13***b* to releasably lock the lid member in closed position and form a part of the retaining means **21** previously mentioned.

Hinge means **18** extend from the outer end **13**, preferably from the peripheral edge **13***c* thereof, to dispose the lid member **14** in a position generally normal to the transverse extent of the body member **10** when the lid is in open position as shown in FIGURE 5. Thus, during the dispensing operation, the lid member is automatically maintained out of the path of flow of the material being dispensed. Preferably, hinge means **18** comprises two hinges, **18***a* and **18***b*, which are spaced substantially apart to provide improved lateral alignment of the lid member with the passage **10***c* and are secured to the outer surface **14***b* precluding any interference with the flush positioning of the lid member relative to the outer end **13** in the closed position thereof. To permit a simple, substantially fool-proof closure operation, as best seen in FIGURES 4 and 5, hinge means **18** are provided with lid registering means, previously identified as **19**.

The lid registering means comprises in this embodiment a relatively thin portion **19***a* on each of the hinges **18***a* and **18***b* adjacent the outer edge **13***c* of the body member **10**, and crosswise of the hinges so as to induce bending of the hinges **18***a* and **18***b* close to the body member. In this manner the clearance of the back portion of the lid member, so as to fit into the passage outer portion **10***c*, is accomplished. This greatly improves the function or operation of the lid member to close the opening **10***b* by reason of the fact that clearance of the outer end **13** of the body member **10** is always accomplished and a thick-

ened portion 18*c* on each hinge insures that the apex 14*c* of the lid is always urged against the apex 10*f* of the body member. In this manner there is little or no danger of the lid not being closed, even though the closing operation is handled rather carelessly.

In connection with this latter accomplishment, I have also found that the construction of the registering means 19, above described, has the additional benefit in that the lid will close sufficiently enough to prevent particulate material from falling out of the closure, even if only the bead means 14*a* near the apex 14*c* alone has been pushed past the bead means 13*b*, or if either of the sides or corners 14*d* or 14*e* of the lid are pushed past the bead means 13*b*.

To assist in moving the lid member 14 from the closed position, tab means 20 previously identified is extended from the outer surface 14*b* of the lid member adjacent its apex 14*c* to overlie apex 10*f* of the body member when the lid is in closed position. As the outer surface of the lid member is flush with the outer end 13, the disposition of the tab means 20 may be as parallel to the surface of the container as desired. Only a minimum of distance between the container and the tab means need be maintained to allow ready insertion of the fingers thereunder for manipulation of the lid member.

As previously mentioned, one of the important features of my present invention is the provision of means on the hinge means and on the tab means to limit the inward movement of the lid member through the passage and space the same from the foraminous wall; said spacing being necessary for proper operation of closures of this type. This is accomplished in the illustrative embodiment shown by the provision on each of the hinges of a surface portion 18*d* on each of the hinges substantially coplanar with the top 14*b* of the lid member and extending outwardly peripherally thereof to cooperate with the top 13*d* of the body member. It can be appreciated, particularly from a study of FIGURES 4 and 5, that with the abutting of the surface 18*d* against the top surface 13*d* inward movement of that end or portion of the lid member 14 is limited. Surface 18*d* is strengthened by a relatively thick portion 18*c* previously mentioned, if necessary. Thus, with rib elements 14*a* co-acting with bead means 13*b*, mutual cooperation is accomplished locating and spacing the lid member from the foraminous wall 16.

At the apex 14*c* of the lid member, the tab means 20 is also provided with a surface 20*a* which extends coplanar with the top 14*b* of the lid 14. Thus, when this surface 20*a* co-acts with the bead means 13*b* and the rib means 14*a* against the top 13*d*, the apex of the lid member is located and spaced from the foraminous wall. Obviously, surface 20*a* may be strengthened by a thickened portion as at 20*b* and need not be discontinuous with the inner surface 20*c* of the tab means 20 to accomplish its function where thought necessary or desirable, the limitation being only that the tab means be spaced advantageously from the container wall to permit the insertion of the fingers thereunder.

Note here, too, that where necessary or desirable, strengthening means such as ribs 14*d* may be provided on the underside of the lid member to prevent unnecessary bending of the lid member toward the foraminous wall.

It is to be noted also that while the dispensing closure device of my present invention may be formed of any suitable material, such as polyethylene, because of its simple integrated structure, it may be formed advantageously by mass production means such as plastic molding, one of the important aspects of my present invention being to take advantage of the resilient characteristics of such material to provide the proper functioning of the various components of my closure, as for example, the hinges 18 allow the snapping of the lid member into the passage 10*c* past the bead means 13*b* and the spacing means 18*d* and 20*a*.

While the operation of my device is substantially self-evident from the above structural description, the following brief description is thought helpful.

The closure 10 is mounted in the container 12 by inserting the inner end of the body member through a suitable opening 11 provided in the container wall, until the surrounding container wall snaps into place into groove 13*a* of the body member. Assuming the lid member 14 to be disposed in the open position of FIGURE 5 extending outwardly from the container wall to close the device, the lid member is hingedly swung about hinge means 18 until it is received in the passage outer portion 10*c*, rib means 14*a* snapping past the bead means 13*b*. The lid member is then releasably locked between the retaining means 21 of the body member and extends completely across the passage to effect a sealing closure thereof. The cooperation of the spacing means 20*a* on the tab means and 18*d* of the hinge means 18 serve to space the inner surface of the lid member from the foraminous wall and as previously mentioned, the lid registering means 19*a* in cooperation with the thickened portion 18*c*, serves to register the lid member in the opening even though only the apex 14*c* or either of the corners 14*d* and 14*e* are in lid-closing relationship with the body member 10.

To dispense particulate material from the container, lid member 14 is swung to the open position of FIGURE 5 by manipulation of the tab means. The container 12 is then disposed to effect the pouring of the material through foraminous wall 16 with apex 10*f* of the body member disposed generally downwardly during a dispensing operation. Upon completion of the dispensing operation, container is returned to the upright position wherein the body member extends generally horizontally and any particulate material remaining in the body member tends to fall backwardly into the container through the foraminous wall. This return of particulate material is aided in the disposition of the foramen 16*b* at the apex 10*f* of the body member as materials normally tend to collect at this point subsequent to the completion of the dispensing operation and thus, substantially all the material that is not actually dispensed will be returned in the container. The tapering of the wall 10*d* radially inwardly towards the foraminous wall also aids in this function. This structure thus maintains a dispensing closure relatively free of such material which would otherwise have a tendency to prevent proper closure thereof. The lid member may be then returned to the closed position of FIGURE 6, thereby placing the container in a sealed closed condition.

Turning now in particular to FIGURE 7, it can be seen that I have illustrated therein the rib means 14*a* and 114*a* of the lid member 14, disposed about the lid in a manner different than that shown in connection with FIGURES 1 through 6. This illustrates a typical example of the variations in the rib elements that can be made in my device, which rib elements will still perform the function required of them. It is to be noted in connection with this figure that the rib elements 14*a* and 114*a* do not coincide with the apex 14*c* of the lid member, yet the lid-registering means and the thickening portion 18*c* still serve to retain the apex in the bore or adjacent the apex 10*f* as in the case of the previously described embodiment.

Preferably, as illustrated in FIGURE 9, the rib elements 14*a* have a more nearly hemispherical shape in cross section to present a surface at 14*aa* which will provide more resistance to closure than the inclined surface 114*aa* of ribs 114*a*. Customarily, at the factory the lids 14 are closed by an arm or lever (not shown) passed transversely over the lid and exerting a downward pressure thereon. By providing ribs 14*a* on the side of the lid which is engaged first by said closing arm, with said angled surface 14*aa*, the increased resistance to closing it provides assures that both the leading and trailing sides

of the lid will simultaneously and uniformly close. The aforementioned surface **20***a* of tab **20** and surface **18***d* of hinges **18** as they engage surface **13***d* of portion **13** limit the extent to which the lid is depressed into opening **10***b* while the aforedescribed registering means **19** also assures proper aligning of the lid **14** in said opening **10***b*.

Turning now to FIGURE 11, it can be seen that I have illustrated therein a second embodiment of the lid-registering means **19'** which in this embodiment comprises the forming of the hinge means **18'***a* and **18'***b* in a triangular manner, with the apex of the triangles adjacent the edge **13***c* of the body member **10**. The relatively narrow portion of the hinge means serves to perform the same function as the lid registering means **19***a* as described in the previous embodiments.

Turning now in particular to FIGURES 12 and 13, I have illustrated therein another lid retaining means which, in this embodiment, comprises the bore of the body **10** as at **10***g* formed tapered, whereby the opening **10***e* is narrower at the outer edge **13'** than adjacent the foraminous wall **16** so as to cooperate with a complementary tapered surface **14***m* on the lid member **14'**.

It can be seen that with bore **10'** narrow near the outer edge **13'** and with the inner edge of the downwardly extending rib **14***h* being slightly larger than the bore near the outer edge **13'**, the lid member **14'** will snap past the outer edge **13'** and be retained in the bore in a manner similar to that described in connection with the previously described embodiments. The function and operation of the other integral parts of my closure, such as the tab means and the hinge means, and the lid registering means perform the same identical function in this embodiment as in the previously described embodiments. It is to be noted, however, in this figure that the lid reinforcing means **14***d* can be omitted because the downwardly extending rim **14***h* performs that function. Too, should the lid be forced down against the foraminous wall, the bottom of the downwardly extending flange **14***h* will still serve to space the lid member from the foraminous wall **16'**, as can be appreciated.

While in FIGURES 12 and 13 I have shown the downward extending rib **14***h* somewhat rectangular in cross-section, obviously, the lid member could be made so that its underside **14***p* is concave with the rib, blended into the underside, if though necessary or desirable.

In FIGURE 14, I have shown a further modification of the hinge means in which the hinges **18''** of the lid **14''** tapers or recedes from a maximum thickness which provide a nonbending section **18''***c* to a thin section at **19''** adjacent edge **13'** of member **10''** to provide another form of lid registering means.

While I have disclosed my closure as polyangular in its plan dimension, I intend to include as part of my invention a closure which is circular in plan, as many of the novel features herein set forth are equally adaptable in such a closure. For example, the lid registering means on the hinges will serve to urge the periphery of the lid opposite the hinges against the periphery of the body member opposite the hinges to aid in the retention of the lid member in the body member, as well as aid in the registering of the lid member in the body member during the closing operation.

Where herein the various parts of my invention have been referred to as located in a right or left or an upper or lower or an inward or outward position, it will be understood that this is done solely for the purpose of facilitating description and that such references relate only to the relative positions of the parts as shown in the drawings.

Also, it is to be understood that many changes and modifications may be made without departing from the scope or sipirit of the invention and the invention is defined and comprehended solely by the appended claims which should be construed as broadly as the prior art will permit.

I claim:

1. A dispensing closure for use with a container having a wall provided with an opening, said closure comprising a generally flat, wafer-like body member having a central bore and an open outer end communicating therewith which abuts the container wall about its said opening, said body member having a transversely extending foramen-containing web disposed across said bore at a distance inwardly from said open end, a lid which releasably seats within said open end, and a pair of spaced hinge straps each having one end connected to one side of said lid and having their other end connected to the outer peripheral edge of said open outer end of the body member, said hinge straps each having a relatively thick section comprising the major portion of their length and a thinner lateral section immediately adjacent their connection to the peripheral edge of the open outer end of the body member which induces bending of the hinge straps close to the said open outer end of the body member so as to register the lid with said open outer end during the closing operation.

2. A dispensing closure for use with a container having a wall provided with an opening, comprising a body member fixable in said opening, said body member having a central bore, an open outer end and an aperture-containing wall extending transversely across the bore of the body member at a distance inwardly from its said open outer end, a lid member hingedly connected at one side to the body member and of a shape to closingly seat within said bore in the open outer end of the body member, said outer end of the body member having an inwardly directed bead about the edge of the bore, and said lid having a continuous edge surface and rib means projecting therefrom on either side of the said hinged connection, said rib means being spaced from the top side of the lid in a releasably closed relation within said bore in the open outer end of the body member, the projecting rib means on one side of said hinged connection being of generally hemispherical cross section and the projecting rib means on the opposed side having a tapered cross-section including a generally rounded top side and a longer gradually inclined underside which merges into the edge surface of the lid.

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