

United States Patent

[11] 3,595,446

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[45] Patented **July 27, 1971**
Continuation-in-part of application Ser. No. 782,669, Dec. 10, 1968, now abandoned.

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Primary Examiner—Samuel F. Coleman
Assistant Examiner—Norman L. Stack, Jr.
Attorney—Don J. Smith

[54] QUICK-OPEN CONTAINER STRUCTURE
23 Claims, 33 Drawing Figs.

[52] U.S. Cl..... 222/213,
222/541

[51] Int. Cl. B67d 37/00

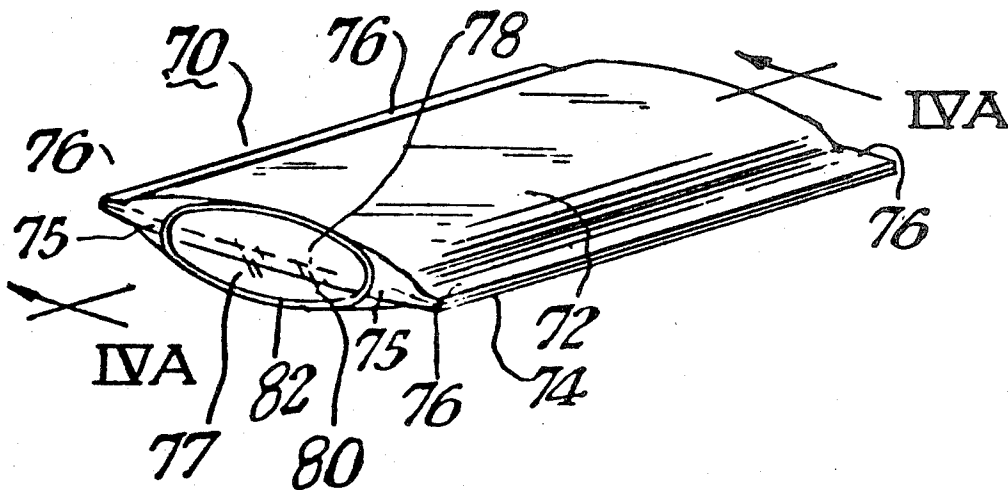
[50] **Field of Search**..... 222/541,
213, 490, 188, 481.5, 498, 212; 206/56 AA;
229/DIG. 14; 215/39; 150/0.5

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ABSTRACT: I disclose a quick-opening container structure comprising a generally cup-shaped body section having an opening therein, frangible cover means substantially coextending with said opening and joined to said body section about the periphery of said opening, means for forming a frangible line of weakening at said cover means, and a stiffening ring joined to one of said cover means and said body section and disposed about said periphery whereby the application of deformational forces longitudinally of said line of weakening causes said ring to induce an opening at said weakening means.



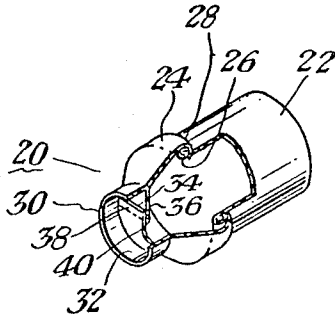


FIG. 1

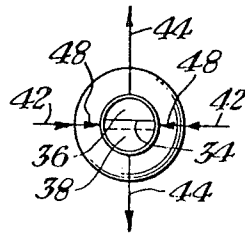


FIG. 1A

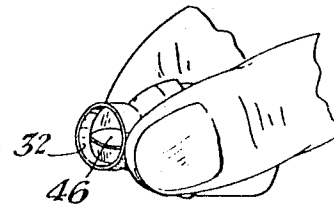


FIG. 1B

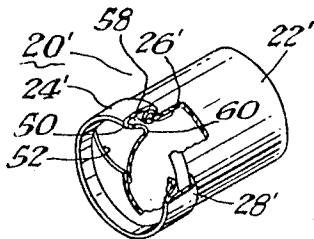


FIG. 2

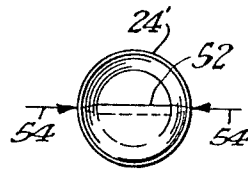


FIG. 2A

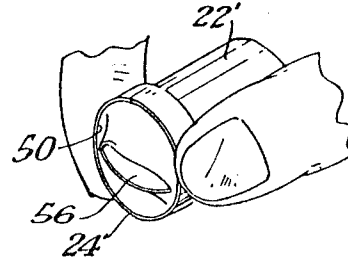


FIG. 3

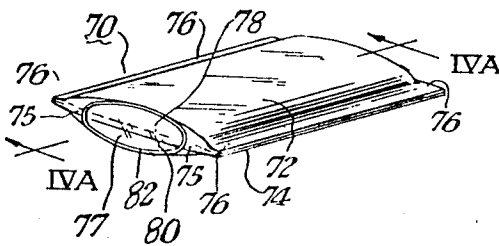


FIG. 4

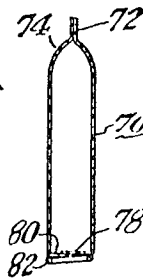


FIG. 4A

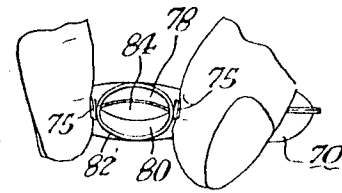


FIG. 4B

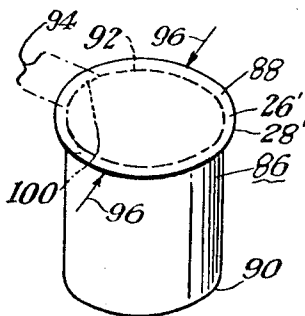


FIG. 5

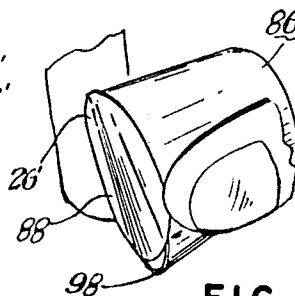


FIG. 5A

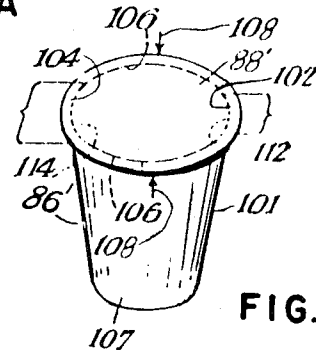


FIG. 6

FIG. 6A

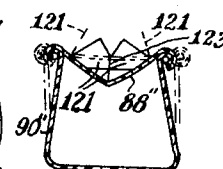
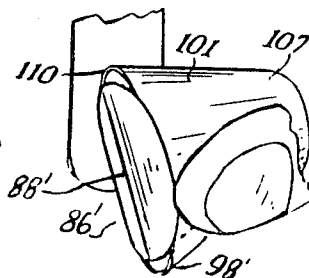


FIG. 7

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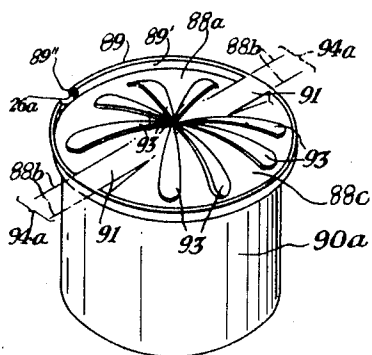


FIG. 5B

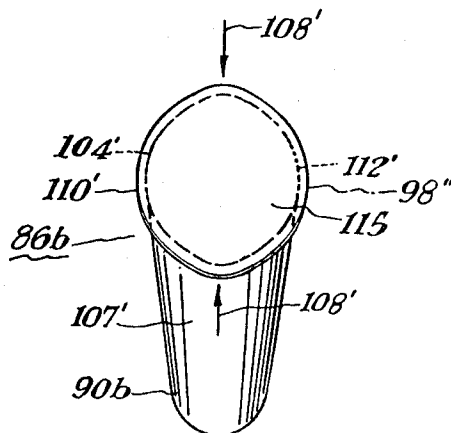


FIG. 6B

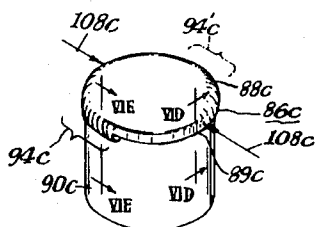


FIG. 6C

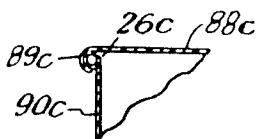


FIG. 6D

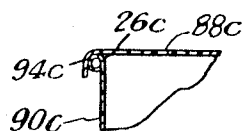


FIG. 6E

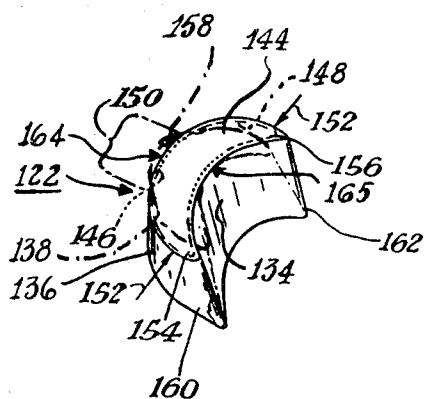


FIG. 8

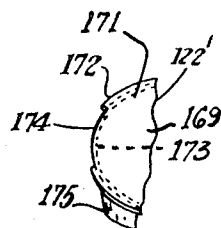


FIG. 9

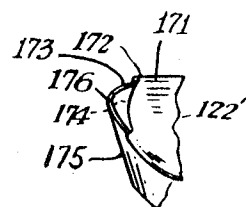


FIG. 9A

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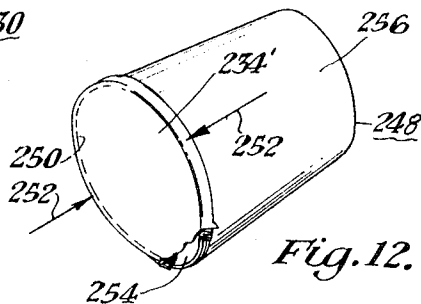
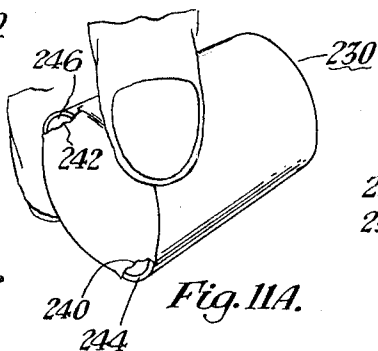
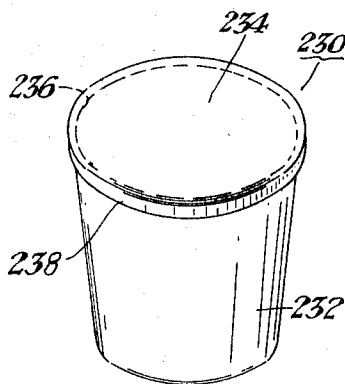
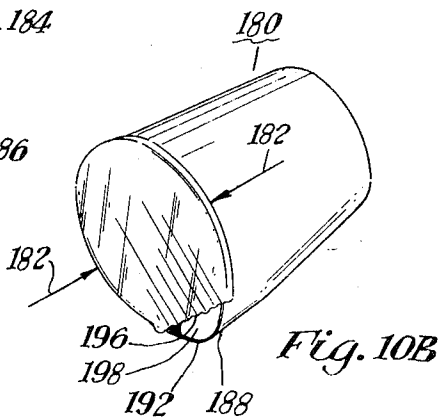
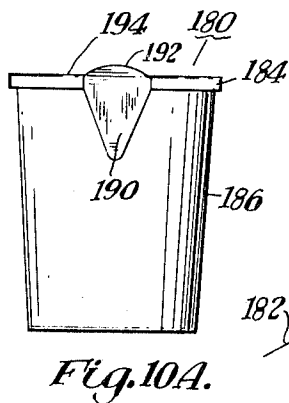
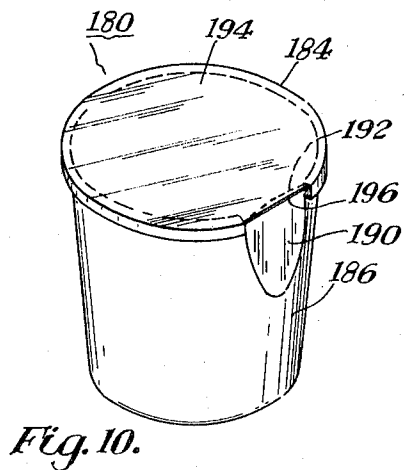


Fig. 11.

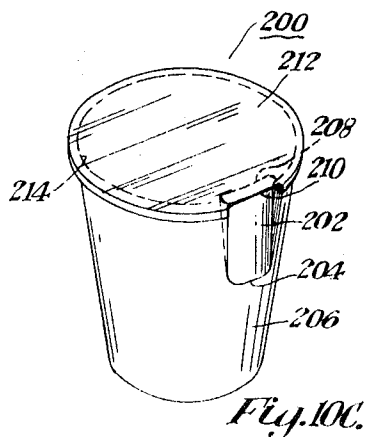
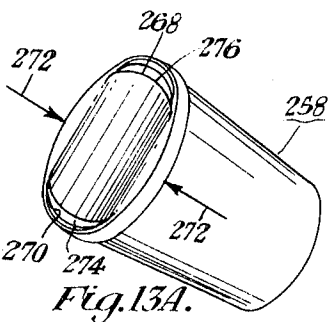
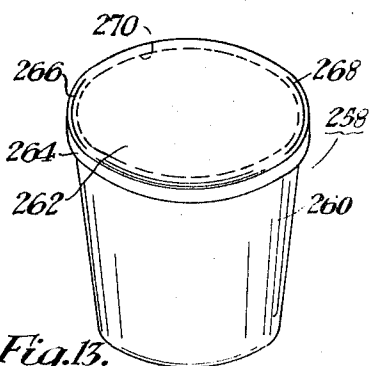
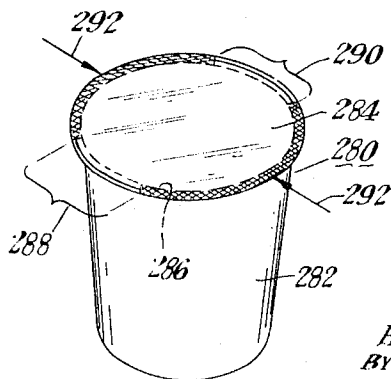
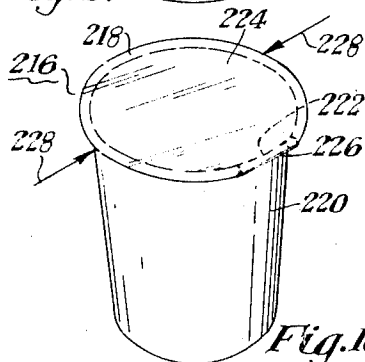


Fig. 13.



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QUICK-OPEN CONTAINER STRUCTURE

This application is a continuation-in-part of my copending application entitled "Quick-Open Container Structure" filed Dec. 10, 1968, Ser. No. 782,669, now abandoned.

The present invention relates to quick-opening container structures, and more particularly to a container of the character described arranged for transporting and dispensing pharmaceuticals, foodstuffs, and the like.

The desirability of a quick-opening, sealable container structure has been elaborated upon in my copending application, Ser. No. 716,438. As there stated, there are many applications where it is desirable to afford containers of the character described for pharmaceuticals, foodstuffs, and other fluids or relatively free-flowing solids. In many cases these materials because of their nature or end use are dispensed in relatively small, usually individualized, quantities. For convenience in handling, and in appropriate situations to prevent contamination of the contents, it is desirable to provide a package or container which can be readily and effectively sealed but which can be opened quickly, preferably with the use of one hand, leaving the other hand free for other administrations.

Previously proposed container structures of this general nature either have been overly large and inappropriate for individualized portions, have been incapable of proper and effective sealing throughout the useful life of the container, have been complicated in construction, have required the use of two hands for breaking the seal or otherwise opening the package, or have not been furnished with suitable pouring means upon opening. In amplification of certain of the shortcomings, the pouring means of known packages are sometimes large or bulky or otherwise difficult to use. For example, such pouring means may get in the way of the patient's or user's nose. In other conventional packages the pouring means, where provided, are either difficult to extract from the package or will not remain in the intended configuration. In the case of fluid dispensation, known packages, particularly those for individualized portions, almost uniformly fail to provide quick-opening airflow means in addition to pouring means. As a final comment on the prior art, before citing specific examples, known containers of this character frequently are too complex for mass production techniques or do not provide the user with sufficient indication of an operational approach to their opening procedures.

I am aware of the United States patents to Antonious U.S. Pat. No. 3,110,335; Carter U.S. Pat. No. 2,470,573; Kersh et al. U.S. Pat. No. 3,315,866; Stephens U.S. Pat. No. 2,696,943; Collie U.S. Pat. No. 3,321,123; Miller U.S. Pat. No. 3,302,858; O'Neal et al. U.S. Pat. No. 2,330,840; Gardner U.S. Pat. No. 3,301,549; and O'Neal U.S. Pat. No. 2,839,234. Although, perhaps, useful for their intended purposes, these patents, in general utilize complex structures for opening purposes which are difficult to manufacture in quantity and difficult to seal where required. None of these known structures, therefore, is readily adaptable for use as quick-opening, individualized containers for foodstuffs or pharmaceuticals or the like. Carter U.S. Pat. No. 2,740,573, as an example, requires two hands for opening and is otherwise unduly complex in construction for individualized dispensing. dispensing. Although Antonious U.S. Pat. No. 3,110,335 is of greater interest than others of the cited patents in that a package which apparently can be opened with one hand is disclosed, the Antonious container is not suitable for fluids or free-flowing solids, cannot be adequately sealed, and is overly complicated for individualized dispensing. Relative to certain modifications of my invention, none of these references affords both quick-opening dispensing and air intake means for liquid containers.

Also relevant to this discussion are the United States patents to Forney U.S. Pat. No. 988,453; Miner U.S. Pat. No. 1,190,935; Russell U.S. Pat. No. 2,008,314; Alter U.S. Pat. No. 2,084,757; Lieber U.S. Pat. No. 2,150,627; and Wolfe

U.S. Pat. No. 2,215,989. Although these containers may be useful for their intended purposes, the last-mentioned group of patents suffer from the same disadvantages as pointed out in connection with the Antonious structure, insofar as transporting and dispensing small or individualized fluid portions are concerned.

I overcome these disadvantages of the prior art by furnishing a quick-opening container structure for dispensing small or individualized portions of a relatively free-flowing fluid or particulate material. The several modifications of my novel container structure are variously adaptable for use with pharmaceuticals and a variety of foodstuffs (coffee cream for example) and the like. The container structures forming the subject matter of this invention can be manipulated quickly and with the use of one hand to open the container and to form pouring means for the contained material. In another modification an air inlet port also is formed by the container-opening procedure. The pouring or dispensing means, and the air inlet means if provided, occupy a minimum of space and require a minimum of structural components so that my container structure does not impede manufacture or subsequent use. My novel container structures are amenable to a variety of applications, and can be used with equal facility in hospitals for individualized dispensing of pharmaceuticals or in restaurants or on the homefront for dispensing small or individualized portions of foodstuffs and the like.

I accomplish these desirable results by providing a quick-opening container structure comprising a generally cup-shaped body section having an opening therein, frangible cover means substantially coextending with said opening and joined to said body section about the periphery of said opening, means for forming a frangible line of weakening at said cover means, and a stiffening ring joined to one of said cover means and said body section and disposed about said periphery whereby the application of deformational forces longitudinally of said line of weakening causes said ring to induce an opening at said weakening means.

I also desirably provide a similar container structure wherein said container body section is a generally cup-shaped member, said ring is joined to the open edges of said cup-shaped member to form a rim therefor, and said cover means is a cap having slightly reentrant peripheral edges snapped over said rim.

I also desirably provide a similar container structure wherein said cover means include a pouring lip at least partially surrounding said line of weakening.

I also desirably provide a similar container structure wherein said cover means are dished inwardly of said opening so that upon distortion of said stiffening ring and the adjacent components of said container said cover means are dished further inwardly to form a pouring spout.

I also desirably provide a similar container structure wherein a portion of the junction between said body section and said cover means are more or less rigidly joined, and the remainder of said junction is frangibly joined so that deformation of said stiffening ring and the adjacent components of said construction severs said frangible junction remainder and shapes the portion of said body section adjacent said frangible junction into a pouring spout for dispensing material contained in said container construction.

I also desirably provide a similar container structure wherein the frangible remainder of said junction is divided into two generally opposite portions with permanently sealed junction portions disposed therebetween so that distortion of said stiffening ring forms said pouring spout and an air inlet port at said frangible junction portions respectively.

I also desirably provide a similar container structure wherein opposing wall structures of said cup-shaped body section are of intersecting arcuate configurations defining a crescentoid body section, and a portion of said cover means is frangibly joined to a portion of the outer arcuate wall structure and the remainder of the junction between said cover means and said crescentoid section is more or less rigidly

joined so that application of opening forces to the adjacent horns of said crescentoid section part said cover means and said outer arcuate wall structure at said frangible junction to form a pouring spout in said outer wall structure.

During the foregoing discussion, various objects, features and advantages of the invention have been set forth. These and other objects, features and advantages of the invention together with structural details thereof will be elaborated upon during the forthcoming description of certain presently preferred embodiments of the invention and presently preferred methods of practicing the same.

In the accompanying drawings I have shown certain presently preferred embodiments of the invention and have illustrated certain presently preferred methods of practicing the same, wherein:

FIG. 1 is an isometric view of one form of quick-opening container structure arranged in accordance with my invention;

FIG. 1A is a top plan view of the container shown in FIG. 1;

FIG. 1B is an isometric view showing the opened and dispensing configuration of the container of FIG. 1;

FIG. 2 is an isometric view of another form of my novel container structure;

FIG. 2A is a top plan view of the container shown in FIG. 2;

FIG. 3 is an isometric view showing the opened and dispensing configuration of the container of FIG. 2;

FIG. 4 is an isometric view of still another form of my quick-opening container;

FIG. 4A is a longitudinally sectioned view of the container structure of FIG. 4 taken along reference line IVA-IVA thereof;

FIG. 4B is a partially isometric view of the FIG. 4 container structure and showing its opened and dispensing configuration;

FIG. 5 is an isometric view of still another form of my novel container structure;

FIG. 5A is an isometric view of the opened and dispensing condition of the FIG. 5 container;

FIG. 5B is an isometric view of the modification of the container structure shown in FIGS. 5 and 5A;

FIG. 6 is an isometric view of a modified form of the container structure shown in FIG. 5;

FIG. 6A is an isometric view showing the opened and dispensing configuration of the FIG. 6 structure;

FIG. 6B is an isometric view of a modification of the container structure shown in FIGS. 6 and 6A;

FIG. 6C is an isometric view of another modification of my novel container structure;

FIG. 6D is a partial cross-sectional view of the container structure of FIG. 6C and taken along reference line VID-VID thereof;

FIG. 6E is a similar cross-sectional view of the container structure of FIG. 6C but taken along reference line VIE-VIE thereof;

FIG. 7 is a similar view showing a modified, cap-controlling structure;

FIG. 8 is an isometric view of another form of my novel container structure;

FIG. 9 is a partial, isometric view of a modification of my novel container structure;

FIG. 9A is a similar isometric view showing the opened configuration of the container of FIG. 9;

FIG. 10 is an isometric view of still another form of my quick-open container;

FIG. 10A is a front elevational view of the container of FIG. 10;

FIG. 10B is an isometric view of the container of FIG. 10 in its opened condition;

FIG. 10C is an isometric view of a modification of the container structure of FIG. 10;

FIG. 10D is a similar view of another modification of the structure of FIG. 10;

FIG. 11 is an isometric view of still another arrangement of my quick-open container structure;

FIG. 11A is a similar view showing the container structure of FIG. 11 in its opened condition;

FIG. 12 is a similar view showing a modification of the container of FIG. 11 in its opened condition;

FIG. 13 is an isometric view of a further arrangement of my quick-open container;

FIG. 13A is a similar view showing the container of FIG. 13 in its opened condition; and

FIG. 14 is an isometric view of yet another arrangement of my quick-open container.

Referring now more particularly to FIGS. 1 and 1A of the drawings, my exemplary container structure 20 shown therein comprises in this example a generally cup-shaped base portion 22 and a cap structure 24. The base or cup-shaped part 22 can be provided with a rolled or otherwise reinforced rim 26, which serves as a stiffening ring for the purposes stated below. For engaging the rim 26 the cap 24 can be provided with a slightly reentrant edge 28 to permit the cap 24 to snap over the rim 26. If desired and depending upon the materials employed, the cap edge 28 can be sealed to the base rim 26 by heat or solvent welding or by the application of a suitable known cement.

The cap is provided with a line of weakening denoted generally at 34 and can take the form of any of the preferentially weakened, frangible structures set forth in the aforementioned application or in others of my copending applications Ser. No. 716,554, filed Mar. 27, 1968, entitled "Individualized Dispensing Packages"; Ser. No. 725,610, filed May 1, 1968, entitled "Quick Opening Package"; and Ser. No. 765,097, filed Oct. 4, 1968, entitled "Quick Opening Packet." In this example, the line of weakening 34 includes overlapping edge portions 36, 38 of the cap structure 24. For many applications, for example dispensing coffee cream, salt, or similar foodstuffs, or condiments, the overlying portions 36, 38 provide an adequate seal against entry of foreign matter or against spillage. In more critical applications, as for pharmaceuticals, a line of frangible heat sealing, solvent welding, or frangible cement 40 can be interposed between the overlapping portions 36, 38 for a more complete and effective seal. The cap structure 24 is also provided with an integral pouring lip 30 in this example, disposed inwardly of the cap edge 28. The pouring lip is a ridge member extending at least part way around the line of weakening 34.

To open the container 20 pressure can be applied to the container junction 26-28 as denoted by arrows 42, for example, as with the thumb and forefinger as shown in FIG. 1B. The resulting deformational forces ovalize the container structure 20, the cap 24 of which is dished upwardly (as viewed in FIG. 1) for this purpose and the stiffening ring in the form of the cup rim 26 applies spreading forces (arrows 44) to the overlapping cap portions 36, 38 to provide a dispensing opening 46 (FIG. 1B). A pouring lip or spout is afforded by lip structure 30 mentioned previously. If desired opening force can be applied directly to the lip structure 30 as denoted by arrows 48 so that greater opening forces can be applied to the overlapping portions 36, 38 (arrows 44). Such application of force is desirable where a completely sealed or otherwise stronger line of weakening is employed.

If desired, suitable indicia (not shown) can be disposed at the arrows 42 or 48 to indicate the proper positional application of opening forces. Instead of ovalization, the container 20 (and similar containers shown therein) can be made oval and circularized for opening purposes.

A somewhat similar container structure 20' is illustrated in FIGS. 2 and 2A of the drawings. Here, the cap 24' includes a peripheral pouring lip (or ridge) structure 50 and, in this example, a longer line of weakening 52 so that application of opening forces (arrows 54) to the joint structure 26', 28' affords a correspondingly larger dispensing opening 56 (FIG. 3). The line of weakening 52 can be constructed as set forth in the preceding figures or as appropriately disclosed in any of my aforementioned copending applications. The lip structure 50 likewise serves as a pouring lip or sprout.

Where the cap 24' is shaped from sheet material, it is desirable to provide means for preventing the contained material from entering the hollow lip (or ridge) structure 50 and from being entrapped in any part of the interior 58 of the lip structure when the container 20' is upturned for pouring or dispensing. One arrangement for preventing the entry of fluid into the lip interior 58 includes shaping the cap 24' such that an inwardly extending cap projection 60 at the inner base periphery of the lip structure 50 firmly and contingently engages the adjacent surface of the rim or stiffening means 26' of the container base 22' (FIG 3). The cap projection 60, in consequence of its juxtaposition to the rim 26', abets the stiffening function thereof.

The principles of my invention are applied to a somewhat differently shaped container 70 as shown in FIGS. 4, 4A and 4B. The package 70 includes a body structure formed in this example from juxtaposed plastic sheets 72, 74 which are heat-sealed or otherwise more or less rigidly joined along their overlying lateral and one-end edges as denoted by reference characters 76. The overlapped edges at the other end of the container 70 are similarly sealed or joined only adjacent the corners as denoted by reference characters 75. The unsealed portion 77 defines a dispensing area of the container 70 as described below. Any fluid or relatively free-flowing material can be contained within the container 70, although the container is particularly adapted for rather viscous materials as certain foodstuffs or condiments, as will be apparent hereinafter.

At the aforementioned other end of the container 70, overlapping edge portions 78, 80 of the layers 72, 74 respectively provide a line of weakening for opening purposes, similar to the line of weakening 34 (FIGS. 1 and 1A). An opening or stiffening ring 82 is secured to the adjacent surfaces of the container 70 such that the line of weakening or edge portions 78, 80 are entirely within the dispensing area 77 which is enclosed by the stiffening ring 82. In this arrangement, the stiffening ring 82 is normally oval in shape so that the line of weakening 78, 80 is opened by squeezing the ring 82 to a generally circular contour (FIG. 4B) to provide a dispensing opening 84 between the overlapping edges 78, 80.

Here again, the container 70 can be quickly and readily opened by the thumb and forefinger of one hand. The ring 82 further can serve as a pouring lip for the container 70. Depending on the application of the invention, the overlying edges 78, 80 can be frangibly joined or sealed as discussed previously, or an equivalent line of weakening can be substituted.

Container 86 of FIGS. 5 and 5A includes cap 88 and base or cup-shaped portion 90. In this example, the base portion 90 is provided with a stiffening ring or rim 26' engaged by edge portion 28' of the cap 88. In the container 86, as in other containers disclosed herein, the stiffening or similar means or ring can be applied to the cap 88 instead. The function of the stiffening ring moreover can be absorbed by the cap structure by fabricating the cap from a stiffer material.

The quick-opening feature of the container 86 is realized by providing a more or less rigid seal or junction between the cap periphery 28' and the upper edge or rim 26' of the cup 90. The more or less rigid junction 92, however, is discontinuous in the area denoted by bracket 94. In the particular structure shown, the application of diametric and opposite forces (arrows 96) to the container 86 distorts the upper portions of the cup 90 and causes that portion 98 thereof (FIG. 5A) adjacent the unsealed cap periphery 94 to snap or spring outwardly from under the cap 88 and form a pouring spout as shown in FIG. 5A. Here again, the container 86 can be opened with the thumb and forefinger of one hand.

In more critical applications, the rigid junction 92 can be more or less permanently sealed as by heat sealing or with a highly adhesive cement, while a frangible cement or light heat sealing denoted by the arcuate chain line 100 can be applied between the cap and the cup rim in the area of the pouring spout 98. This affords a more complete and effective seal

against contaminating influences. For the formation of the pouring spout 98 the cup portion 90 is not provided with any structural projections or other additions. Rather, the normal flexibility of at least the upper portions of the cup 90 (as viewed in FIG. 5) coupled with the greater rigidity of the cap 88 (which can be made from a suitable plastic for this purpose) and the directional application of forces 96 cooperate to shape the loosened cup portion 98 into a pouring spout as shown.

The cap 88, as in the other cover means show herein, can be dished or bowed inwardly or outwardly as desired. When the cap is further bowed outwardly, on opening, a larger dispensing opening is formed. An outwardly dished, i.e. a convex, cap structure is desirable in most applications.

Alternatively the frangible seal or joint 94 can be formed by means of a snap-on cover as taught in FIGS. 5B, 6B, or 9 and 9A. In FIG 5B cover 88a is provided with a peripheral reentrant portion including inner wall 89' and an outer wall 89'' both of which frictionally engage the container rim 26a to form a junction or seal between the cap 88a and the container bottom or cup-shaped section 90a.

One or more preferentially weakened or frangible joints are formed in the rim area, for example where denoted by brackets 94a. In furtherance of this purpose one or both of the frictionally engaged wall sections 89' and 89'' of the reentrant edge portion 89 can be weakened in the frangible joint area or areas. As taught in FIGS. 9 and 9A described below the outer wall 89'' can be cut away in the bracketed area 94a. In this example, however, the adjacent inner wall 89' is weakened or eliminated for example by the provision of embossed ramp structures 91 at diametrically apposed areas 94a. Embossed fillet structures (not shown) obviously can be substituted for the ramps 91. In some cases, as where the frictional engagement between the cap 88a and the cup section 90a is particularly strong, it is desirable to weaken both of the walls 89', 89''. In other applications, as where the frictional engagement between the cap 88a and the cup section 90a is rather weak, the ramps 91 can be omitted and a transverse section (denoted by chain lines 88b through the cap 88a and including the frangible junction areas 94a can be weakened by omitting, as shown, some of the reinforcing ribs or other reinforcing embossments such as the embossments 93, which conventionally are distributed uniformly about the cap structure 88a.

The weakened area 88b or the ramps 91 permit the cap 88a to bow desirably outwardly when the upper portion (as viewed in the drawings) is deformed to separate the cap and cup junction at the areas 94a. To facilitate outward bowing of the cap 88a, the floor or central area 88c can be domed as shown or otherwise sloped upwardly in the area of the ramps 91. Alternatively, the transverse area 88b can be formed by thinning the material of the cap 88a at this location.

A somewhat similar container 101 is shown in FIG. 6 and 6A of the drawings wherein the cap and cup junction are furnished with two, desirably diametrically spaced, frangible cap-and-rim junctional portions 102, 104. The remaining areas 106 along the junction between the cap 88' and the cup portion 107 and between the frangible areas 102, 104 are more or less rigidly joined or sealed. Accordingly, the application of diametric forces (arrows 108) to the cap or cup junction results in the formation of the pouring spout 98' (FIG. 6A) and of an air inlet port 110. It is understood, of course, that the spout 98' and the air port 110 can be of differing sizes as determined by the respective lengths of the frangible joined areas 102, 104. FIGS. 6 and 6A illustrate also the use of a truncated cone cup member 107 to afford a larger junction area with the cap 88' for a given volume. A larger pouring spout 98', therefore, can be formed. As pointed out above with respect to the container of FIGS. 5 and 5A the frangibly joined portions 102, 104 can be frangibly sealed as denoted by respective arcuate dotted lines 112, 114.

A similar but avoid container structure 86b is shown in FIG. 6B. In this arrangement the upper portion of the container 86b

is deformed to a more or less circular contour by the application of opening forces (arrows 108') to the ends of the oval cap structure 115. The use of the oval cap 115 denotes, moreover, the areas of proper application of the opening forces 108' and requires either a minimum of instruction or no instruction for the opening procedure. In this arrangement the oval cap 115 is joined to the ovoid or ovalized cup section 107' through the use of frangibly joined or sealed areas denoted by dotted lines 104' and 112'. These frangible areas can be formed by any of the means or methods described above. If desired the cup section 107' can be formed of non-rigid material with a more or less circular cross-sectional shape so that the upper portion thereof is displaced into ovoid form when snap engaged with a relatively rigid cap structure 115. An outward bowing of the cap structure 115, upon application of deformational forces advantageously produces a larger opening at the pouring spout 98'' or the air inlet port 110'. This applies, of course, to the other cap structures mentioned herein which bow outwardly upon the application of opening forces.

Depending on the materials used, it is contemplated, in appropriate cases, that various cover means disclosed herein can be heat-sealed to the associated cup members. For example, "heavy" heat sealing is appropriate for the denoted more or less rigidly joined areas and "light" heat sealing for the frangibly joined areas.

In FIG. 6C another arrangement 86c of my quick-opening container is illustrated. Body section 90c is provided with a rolled rim structure 26c as better shown in FIGS. 6D and 6E. A cap 88c is fabricated from aluminum foil or the like and is crimped or crown sealed about its peripheral edges 89c to the rim 26c of the body section 90c, as better shown in FIG. 6D of the drawings. In the frangible area (denoted by bracket 94c) of the joint thus formed, the crimping imparted to the frangible portion 94c of the crown seal is considerably less as demonstrated by FIG. 6E. Accordingly, when opening forces are applied to the container 86c (arrows 108c) the frangible joint 94c is readily severed, and at least the upper portions of the body section 90c are deformed into a pouring spout similar to the spout 98 of FIG. 5A. If desired, a similar frangible joint 94c can be formed diametrically opposite from the first-mentioned frangible joint 94c in the FIG. 6C construction so that an air inlet port similar to the port 110 of FIG. 6A can be formed at the same time. The frangible and infrangible seal areas can be provided by "light" and "heavy" heat sealing, or other variable junction formation, as noted previously.

The cap 88 of FIG. 5 or 88' in FIG. 6 in certain applications can be slightly dished inwardly or outwardly (not shown) to ensure buckling or bowing of the cap in a predetermined direction when opening forces are applied to the container 86 or 86'. The possibility of external projections being formed during the opening procedure is thereby eliminated. In those cases where the cap is dished and bowed outwardly during the opening procedure, the cap itself does not create much of a projection.

As shown in FIG. 7, a pair of lugs or protuberances 121 are formed on the cap 88'', which abut at 123 to prevent undue bending of the cap 88'' and the upper portions of the container section 90''. The protuberances 121 can be provided if desired with suitable locking projections (not shown) to maintain the cap in its opened, bent condition. Alternatively, the cap 88'' of FIG. 7 can be slightly dished outwardly (not shown) for bowing in the same direction when the respective containers are opened. The lugs 121 would still be mounted on the concave side (in this case the underside) of the outwardly bowed cap.

Although the packages described previously have been illustrated as generally circular, cylindrical or conic configuration, it will be understood the other shapes can be used. For example a cubic or parallelepipedonic shape can be used to advantage to conserve space during shipping and storage. The pouring spout and the air port, if used, can be formed at diametric corners beneath a lid structure covering one end or one side of the parallelepipedon or cube, respectively.

Referring now to FIG. 8 of the drawings, my quick-open crescentoid container structure 122 is shaped for use with a coffee or tea cup and saucer (not shown) but is useful of course in other applications. When served with a cup and saucer, the crescentoid configuration is shaped for nestling into the space generally between a saucer and the arcuate wall surfaces of a cup. In furtherance of this purpose the crescentoid container 122 is provided with an inwardly bowed arcuate surface 134 which is desirably provided with a radius of curvature about equal to or less than that of the cup wall. On the other hand the outer arcuate wall surface 136 desirably is of still lesser radius and may be more or less semicircular, depending upon the capacity desired. It will be understood, of course, that other arcuate or bowed shapes can be employed for the wall surfaces 134, 136 instead of the illustrated circular surfaces.

The crescentoid container 122 is provided with cover means such as cap structure 144 which can be secured to the container after the manner of FIGS. 5 and 6 and related figures described above. Thus, a frangible junction portion as denoted by dotted line portion 146, is formed between the outer wall rim 143 and the cap 144 as denoted by bracket 150. A similar frangible junction 151 is formed between the cap 144 and the concave cup wall 134 to facilitate bowing of the cap 144. The container 122 is opened with the application of opposed forces (arrows 152) to upper horns 154, 156 of the crescentic cross section of the container 122. The application of opening forces 152 desirably is adjacent the upper portions of the container 122, i.e., near the sealed cap structure 144. Squeezing of the upper horns 154, 156 of the crescentoid package 122 further bows the wall structures 134, 136 and the forward movement of the wall structures 136, 138 breaks the frangible seals 146, 151 to form a pouring spout 158 (chain outline 138). This results from the application of the opening forces 152 which arches the cap structure 144 in a direction transversely of force application as horns 160, 162 of the crescentic cap 144 tend to follow the horns 154, 156 of the container structure 122 (chain outline 138). However, the cap 144 bows upwardly, but its crescentic edges 164, 165 are not able to follow the outward movement of the convex or outer wall 136 of the container 122 with the result that the frangible seal or junctions 146, 151 between the cap 144 and the walls 134, 136 are parted. The frangible rim-cap areas 150, 151 can be made by various sealing or joining means of differing strengths as described herein, including the joining means of FIGS. 9 and 9A.

In opening the crescentoid container 122 the presence of the crescentic horns 154, 156 in most cases direct the proper application of opening forces (arrows 152) without further instruction. However, printed instructions can be readily applied to the container 122, if desired. Most importantly the container 122, in addition to its compact shape can be quickly and facily opened with the fingers of one hand.

Any of my aforescribed packages, can be positively sealed adjacent their pouring spouts or air inlets with a frangible glue or cement or with very light heat sealing. Alternatively my container can be less positively but more quickly sealed as shown in FIGS. 9 and 9A. In the later modification of my container 169, snap-over or reentrant edges 172 of cap 171 are cut away slightly at 174, but not sufficiently to uncover the underlying rim 173 of the wall 175. When opening forces are applied to the container 169 (FIG. 9A) the adjacent outer wall structure 175 is deformed outwardly from under the overlying portion of the lid or cap 171 by the opening forces to form a pouring spout 176 adjacent the cutaway cap portion 174.

With reference now to FIGS. 10, 10A and 10B another arrangement 180 of my quick-open container structure is illustrated. As in the preceding figures the container 180 can be opened with the fingers of one hand with the application of opening forces (arrows 182) to the container rim 184 or upper portions of the cup section 186 of the container 180. In this arrangement a pouring spout 188 (FIG. 10B) is formed from a flattened surface 190 (FIGS. 10 and 10A) disposed on the upper portion of the cup section 186. Desirably, the rim 184 is

discontinuous in the area of the flattened section 190. An upper or free edge 192 of the flattened surface is thereby disposed inwardly of the adjacent end portions of the rim 184, which can be formed by rolling or folding the sheet material from which the cup section 186 is fabricated.

The container 180 is sealed by lightly stretching suitable cover means, such as a flexible sheet or membrane 194, over the rim 184. The membrane 194 desirably is more or less permanently joined to the rim 184 by heat sealing or by using a suitable cement or glue. When the membrane 194 is thus joined to the rim, a contact seal is formed between the upper edge 192 of the flattened section 190 and the adjacent surface of the membrane 194, which is stretched over the edge 192. In furtherance of this purpose, the upper edge 192 can be elevated to form a compression seal (FIG. 10A). By slightly curving the edge 192 stretching of the membrane 194 over the edge 192 is facilitated.

When the container 180 is opened (FIG. 10B) the opening force 182 ovoidizes the cup section 186. This forces the flattened section 190 into a rounded contour to form the aforementioned pouring spout 188. In doing so, the upper edge 192 of the flattened section snaps outwardly from under the overlying edge 196 (FIG. 10) of the membrane 194 to form a dispensing opening 198 (FIG. 10B).

A similar arrangement is shown in FIG. 10C, where a container 200 is provided with a cylindrical spout section 202. Like the flattened section 190 of FIG. 10, the cylindrical section 202 is disposed vertically such that the section 202 intersects and merges at 204 with the frustoconical section of the cup 206. It will be understood, of course, if the cup section 186 (FIG. 10) or 206 (FIG. 10C) were of cylindrical contour, that the flattened area 190 or the cylindrical surface 202 could be continued to the bottoms of the cup sections. The use of the cylindrical section 202 provides an upper edge 208 which is also disposed inwardly of the adjacent lightly stretched portion 210 of the sealing membrane or sheet 212, which is otherwise joined in a similar manner to the container rim 214. If desired, the upper edge 208 of the cylindrical section 202 can be elevated after the manner of FIGS. 10 and 10A. The use of the cylindrical section 202 facilitates shaping the cylindrical section into a pouring spout when the container 200 is opened after the manner of FIG. 10B.

In FIG. 10D, container 216 affords a somewhat more protruding rim structure 218, which is discontinuous relative to the inner periphery of the opening of the cup section 220 as denoted by reference character 222. The sealing membrane or sheet 224 is more or less permanently sealed along the length of the discontinuous rim 218 by one of the methods noted previously. However, the membrane 224 is not sealed to the edge 222 of the cup section 220 which lies between the ends of the discontinuous rim 218. Instead the adjacent portion 226 of the membrane 224 is lightly stretched thereover. The edge 222 extends at least as high as the top surfaces of the rim 218 to form a contact seal or closure with the membrane 224. When diametrically opposite forces (arrows 228) are applied to the discontinuous rim structure 218 the unrimmed edge 222 is forced outwardly from under the adjacent portion 226 of the membrane 224 to form a pouring spout after the manner of FIG. 10B.

It is contemplated that the container structures of my invention can be used for the storage of liquids requiring refrigeration. The problems inherent in conventional containers owing to the expansion of air above the liquid but within the container are largely eliminated by my invention. In the first instance, the container structure of my invention can be more nearly filled as the container is not apt to be tilted or jerked by the opening process. Conventional containers are prone to tilting and jerking during removal of tightly engaged caps, tearing of perforated portions, pulling of adhered tabs, and the like. In opening my container structure the opening forces can be applied gradually without jerking or tilting to form the pouring and air openings.

My container structure is amenable in certain applications to permitting controlled leakage or escape of expanding air or other gas within the package while still maintaining an effective seal. For example, a considerable pressure within the container structure 180 of FIGS. 10—10B will cause air or other gas that may be contained therein to escape through the compression seal between the stretched membrane portion 196 and the protruding edge 192. However, the flexibility and stretched condition of the membrane 194 will again form a suitable compression seal after such leakage. Controlled leakage from the container structure can be facilitated by use of the container structure 200 or 216 (FIGS. 10C, 10D) wherein contact seals are formed between the lightly stretched membrane portions 210, 226 and the unsealed upper edges 208, 222 of the cup sections of the containers. Of course, the container edges 192, 208, or 222 can be projected to various heights above that of the adjacent rim portions to increase the escape pressure.

Referring now to FIGS. 11 and 11A, another arrangement 230 of my quick-opening container is illustrated and includes cup section 232 and a crimped lid structure 234. The cup section 232 is provided with a relatively heavy reinforcing rim 236 about which the material of the lid 234 is lightly but uniformly crimped as denoted by reference character 238. The rim 236 which is continuous about the opening of the cup section 232 is provided with such structural strength that it can be ovalized (FIG. 11A) without buckling by the crimping forces exerted by the crimped cap 234. Accordingly, when opening forces are applied to any two diametrically opposite points about the rim 236 the ovalization causes the lid crimping to give way at the areas 240, 242 thereof to form a dispensing opening 244 and air port 246 in the container 230. Owing to the uniformly light crimping frangible junction of the lid 234, the container 230 can be grasped at any suitable location about its rim structure to form one or two openings at areas removed from the points of pressure application. It is not necessary, therefore, to indicate on the container 230 particular locations for the application of opening forces.

In place of the crimped lid 234 a section of sheet or membrane material can be utilized and lightly, uniformly and frangibly cemented or heat-sealed to the rim structure 236 as illustrated in FIG. 14 and described below. If desired, a skipping or intermittent heat sealing can be used to further reduce the required opening force.

A similar container 248 is shown in FIG. 12 having a crimped lid structure 234' and discontinuous rim 250. In the container 248, which is shown in its open condition with forces having been applied (arrows 252), the lid 234' is crimped in a conventional manner along the length of the discontinuous rim 250. The cap 234' is not, of course, crimped to the free edge 254 of the cup section 256 which lies intermediately of the ends of the discontinuous rim structure 250, but rather is stretched thereover. Thus, when opening forces 252 are applied, as shown, the ends of the rim 250, which are provided with suitable structural rigidity for this purpose, shape the adjacent portion of the cup section 256 including the free edge 254 into a pouring spout as shown.

In FIGS. 13, 13A a container structure 258 is illustrated having a cup section 260 and lid structure 262 provided with a snap-over frictionally engageable skirt 264 for sealing purposes. The lid 262 further is afforded a pouring slit 266 or similar line of weakening. A similar slit or line of weakening 268 can also be provided for the purpose of forming an air inlet port when the container 258 is opened. Desirably, the slit 266, and the slit 268 if used, are disposed outwardly of or directly over the container rim 270 so that a contact seal is afforded between the adjacent portions of the lid 262 and the rim 270 in the unopened configuration of the container 260. The cap 262 otherwise is frictionally engaged by means of its skirt 264 about the outer periphery of the rim 270.

When opening forces (arrows 272) are applied to the container 258 (FIG. 13A), the resulting ovalization of the rim structure 270 and adjacent portions of the container 258

spreads the slits 266, 268, or otherwise separates edges of cap at the lines of weakening, to form a dispensing opening 274 and an air port 276. This permits the lid skirt 264 to ovalize while the central area of the lid 262 maintains its original shape (except that it bows upwardly or downwardly) to aid in defining the openings 274, 276.

As noted previously, the slits or lines of weakening 266, if used, can be provided alternatively in the form of score lines extending very nearly through the material of the cap 262. The cap material is then ruptured by ovalization of the rim 270. On the other hand, the lines of weakening in the form of through-slits 266, 268 can be covered with a frangible coating of a suitable cement or other sealing material.

In FIG. 14 my quick-open container structure 280 includes a cup section 282 and a section of sheet or membrane material 284. The membrane 284, which can be transparent if desired, is heat-sealed to a rim structure 286 of the cup section 282, and for this purpose at least the rim 286 can be provided with a coating of a known thermoplastic material. With the exception of the rim areas denoted by brackets 288, 290 the membrane 284 is relatively heavily heat-sealed to the rim 286 to form a more or less permanent junction therewith. At the areas of the rim 286 denoted by the brackets 288, 290 the membrane 284 is very lightly heat-sealed to provide a frangible junction 286 at one or both of the bracket areas 288, 290.

Upon the application of opening forces (arrows 292), the rim structure 286, which is provided with suitable structural strength, ovalizes to rupture its junction with the membrane 284 at the bracketed areas 288, 290. A dispensing opening and if desired an air port, are formed respectively at the frangible junctions 288, 290 after the manner of FIG. 11A.

From the foregoing it will be apparent that novel and efficient forms of quick-opening dispensing containers have been disclosed. Most importantly, these containers are of noncomplex construction and are readily adaptable for both transporting and dispensing small or individualized portions of various types of fluids or of relatively free-flowing particulate material. A distinct advantage of each of the embodiments of my invention is their susceptibility to opening with the use of one hand. The containers, moreover, are readily adaptable for partial or complete sealing of their frangible opening means depending upon the nature of the pharmaceuticals, foodstuffs, condiments or the like contained therein. While I have shown and described certain presently preferred embodiments of the invention and have illustrated certain presently preferred methods of practicing the same, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the spirit and scope of the invention.

I claim:

1. A quick-opening stiffening means and comprising a container body section having an opening therein, cover means substantially coextending with said opening and sealingly joined thereto to form a sealed junction between said container section and said cover means, said junction extending about the entire periphery of said opening, means for forming frangible opening means in said container structure adjacent at least a portion of said junction, and stiffening means joined to one of said cover means and said container section and disposed about said periphery so that application of deformational forces to said container structure generally longitudinally but remotely of said opening means causes said stiffening means to induce a dispensing opening at said opening means.

2. The combination according to claim 1 wherein said container section is formed from a pair of sheet members joined about their peripheral edges save at an area defining said opening, said cover means being formed by overlapping extensions of said sheet members, and said stiffening means are joined to said extensions.

3. The combination according to claim 1 wherein said opening means are divided and are disposed at two frangible junction portions spaced about the periphery of said container sec-

tion opening so that distortion of said stiffening means forms said dispensing opening and an air inlet port at said frangible junction portions respectively.

4. The combination according to claim 1 wherein said container section is provided with said stiffening means about said container section opening, and said cover means are joined to said stiffening means by a crown seal, said crown seal being lightly crimped to form said opening means and being heavily crimped at other areas of the junction between said cover means and said body section.

5. The combination according to claim 1 wherein said stiffening means are a continuous rim secured about the opening edges of said container section, said cover means are uniformly but frangibly secured about the periphery of said rim to form said opening means, and the structural strength of said rim exceeds that of said frangible junction so that upon application of said deformational forces at least one section of said junction is separated to form said dispensing opening at an area removed from the application of said deformational forces.

6. The combination according to claim 5 wherein said cover means are formed from a metallic foil which is lightly and frangibly crimped about the periphery of said rim.

7. The combination according to claim 1 wherein opposing wall structures of said container body section are of intersecting arcuate configurations defining a crescentoid body section so that application of said deformational forces to the horns of said crescentoid section induce said dispensing opening.

8. The combination according to claim 1 wherein said container section is a generally cup-shaped member, said stiffening means are joined to the open edges of said cup-shaped member to form a rim therefor, and said cover means is a cap having reentrant peripheral edges snapped onto said rim.

9. The combination according to claim 8 wherein said cup-shaped member is of ovoid configuration and said cover means are of oval configuration to denote the proper application of said deformational forces at more arcuate portions of said ovoid, said opening means being disposed adjacent at least one less arcuate portion of said ovoid.

10. The combination according to claim 8 wherein said opening means are formed by weakening said peripheral edges at the intended location of said dispensing opening.

11. The combination according to claim 10 wherein said cover means are frictionally engaged with said cup-shaped member, and means are provided for weakening a transverse area of said cover means to facilitate bowing of said cover means in order to induce said dispensing opening.

12. The combination according to claim 1 wherein said cover means include a pouring lip adjacent said opening means and said stiffening means.

13. The combination according to claim 12 wherein said cover means are bowed outwardly of said container section opening, and said pouring lip is a ridge member located on said cover means at a position inwardly of the peripheral edges of said opening.

14. The combination according to claim 12 wherein said pouring lip is a ridge member juxtaposed to said stiffening means in order to abet the stiffening function thereof.

15. The combination according to claim 14 wherein said pouring lip ridge is hollow, and said cover means include an inwardly extending member disposed for contingent engagement with edges of said body section opening to prevent the entry of contained material into said hollow ridge.

16. The combination according to claim 1 wherein said opening means are disposed at said junction portion, and deformation of said stiffening means and the adjacent components of said container structure severs said junction portion to form said dispensing opening and shapes a portion of said body section adjacent said junction portion into a pouring spout for dispensing material contained in said container structure.

17. The combination according to claim 16 wherein said stiffening means include a rim secured about the open edges

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of said container section, and said cover means include a cap having a reentrant peripheral edge snapped onto at least a major portion of said rim.

18. The combination according to claim 16 wherein said cover means and said stiffening means include thermo-plastic materials, said junction portion includes a relatively light heat-sealed area between said plastic materials, and the remainder of said junction includes a relatively heavy heat sealed area between said plastic materials.

19. The combination according to claim 16 wherein said opening means are disposed in said cover means intermediate the peripheral edges thereof.

20. The combination according to claim 1 wherein said stiffening means are discontinuous adjacent an edge portion of said container section opening, and said opening means are formed by lightly stretching said cover means over said edge

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portion for sealing contact therewith.

21. The combination according to claim 20 wherein said edge portion is projected outwardly of said stiffening means to facilitate forming a compression seal between said cover means and said edge portion.

22. The combination according to claim 20 wherein a portion of said container section adjacent said edge portion is flattened to dispose said edge inwardly of said stiffening means.

23. The combination according to claim 20 wherein a portion of said container section adjacent said edge portion is cylindric to dispose said edge portion inwardly of said stiffening member and is outwardly convex to aid in shaping said container section portion into a pouring spout upon deformation of said stiffening member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,595,446 Dated July 27, 1971

Inventor(s) Harold Richard Hellstrom

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 74, "avoid" should read -- ovoid --. Column 11, line 53, "stiffening means and" should read -- container structure --; line 63, "container structure" should read -- stiffening means --.

Signed and sealed this 30th day of May 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents