United States Patent [19]

Carlisle

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[54] **PLASTIC-FILM CONTAINERS WITH SELF-SEALING ORIFICES**

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[52] **U.S. Cl.** **222/491,** 222/530, 222/107

[51] **Int. Cl.** **B65d 37/00**

[58] **Field of Search** 222/491, 494, 173, 105, 222/107, 527–530; 248/97, 108, 109, 152, 346, 350; 150/50, 9, 51; 229/57, 62, 62.5

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Primary Examiner—Stanley H. Tollberg

[57] **ABSTRACT**

The disclosed containers are formed of supple plastic films fused together face-to-face along continuous seams that converge in the fluid-discharge direction to form a spout. When part of the spout is distended by fluid contents, a seal forms between the films. Squeezing the container develops internal fluid pressure that causes release of the seal. Depending on the proportions of the spout, the seal is either self-restoring when pressure is relaxed, or the seal remains open until it is manually restored. The form of the spout also determines the character of the discharge, whether a continuing stream, or a limited-quantity discharge, or a fine jet that breaks up into a spray.

Adding a spout-pressing plate to a container having a self-restoring seal forms a novel dispenser.

A guard applied to the spout can prevent unintended opening of the seal when the container is squeezed. The films that form the container can be shaped to provide a stable gusseted base.

In a variant, a container has a spout proportioned to form an especially secure seal across the discharge passage, which does not open in response to practical levels of internal pressure. Such a seal is rendered pressure-releasable, and it can even be released entirely, by lessening the distension of the spout walls. Both in this variant and where the seal is pressure-releasable, internal fluid pressure builds up when the container is squeezed in use or in handling. With both types of seal, the danger of developing wall-bursting stresses due to internal pressure is minimized by shaping all seams so as to be free of corners directed toward the interior of the container.

29 Claims, 21 Drawing Figures

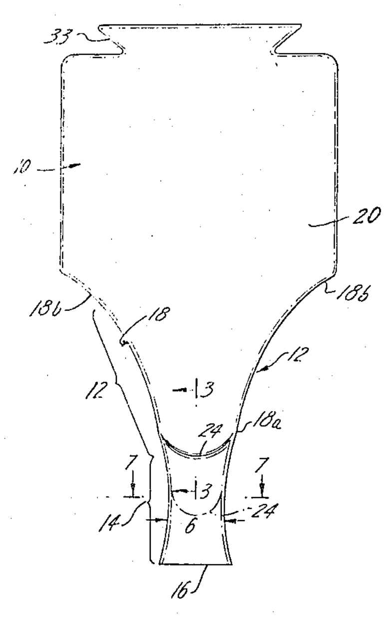


FIG. 1

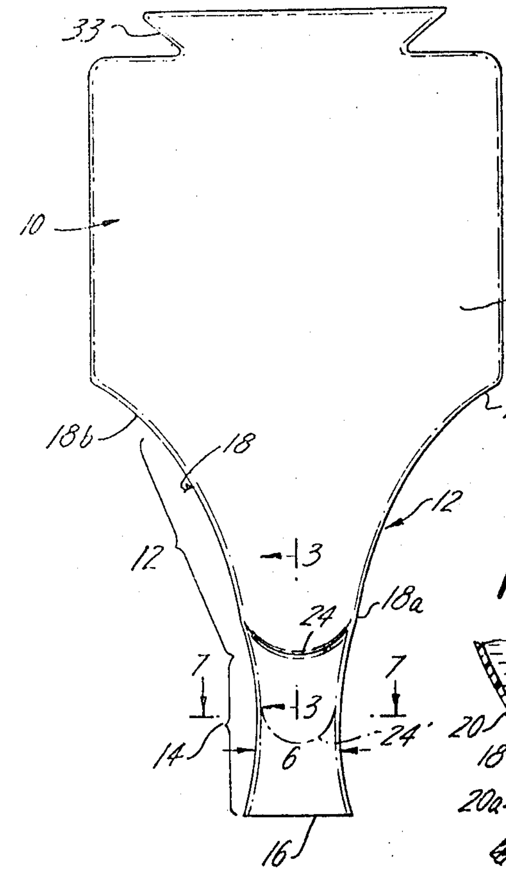


FIG. 2

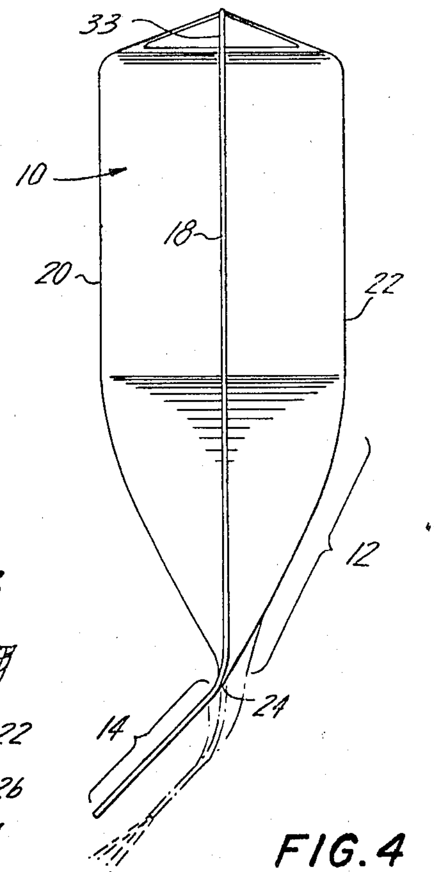


FIG. 3

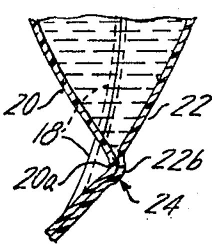
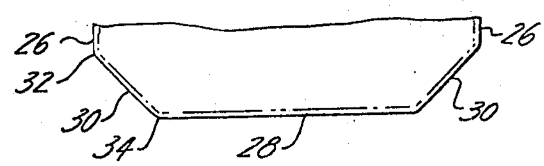
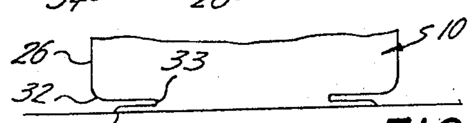


FIG. 4





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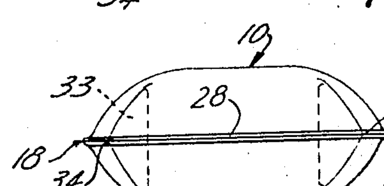

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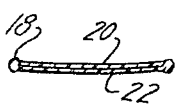


FIG. 7

FIG. 8

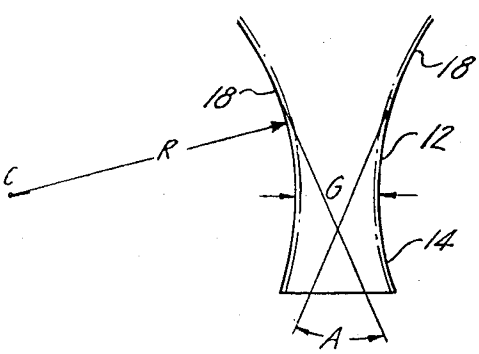


FIG. 9

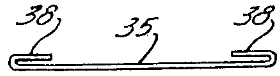
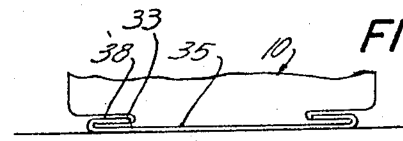


FIG. 10



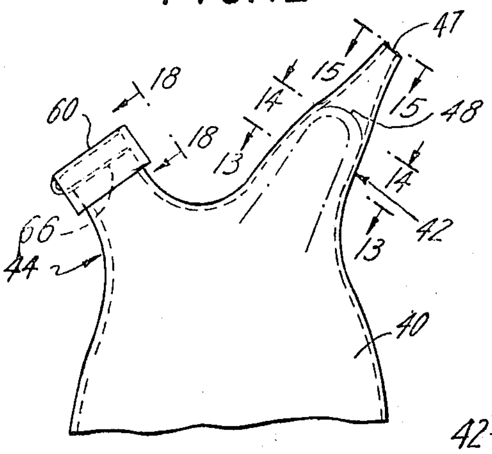


FIG. 12

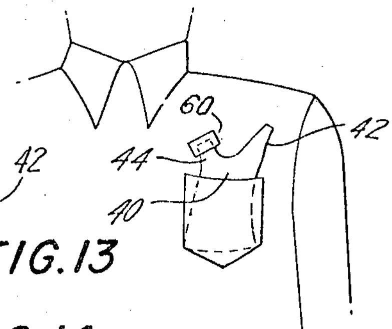


FIG. 11

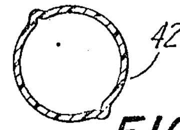


FIG. 13

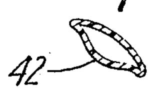


FIG. 14

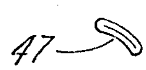


FIG. 15

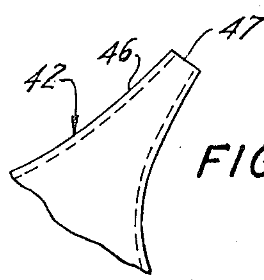


FIG. 16

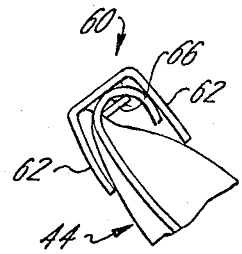


FIG. 18

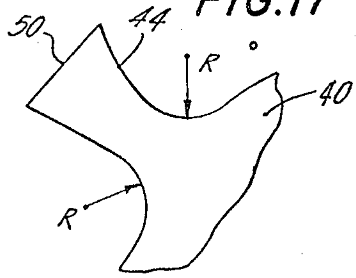
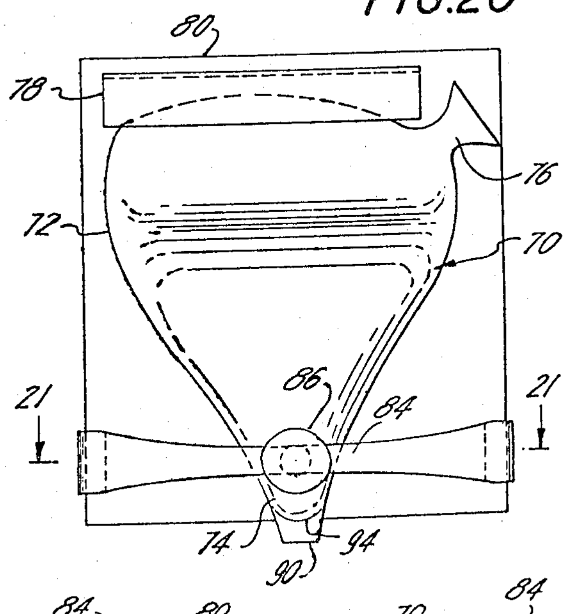


FIG. 17

FIG. 20



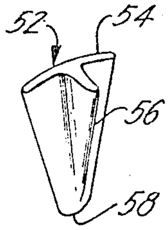


FIG. 19

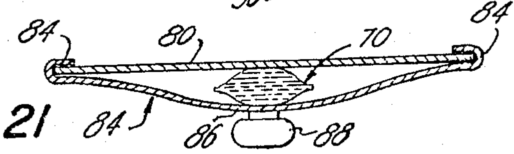


FIG. 21

PLASTIC-FILM CONTAINERS WITH SELF-SEALING ORIFICES

The present invention relates to containers having plastic-film walls and a discharge passage for fluids, especially for dispensing liquids.

Containers having plastic-film walls and a discharge orifice are usually equipped with some form of plug or discrete valve structure such as a pinch clamp for closing the orifice when the contents are to be used a little at a time. On the other hand, some forms of plastic-film containers intended for one-time use have a seam that forms a sealed spout. In that case, when the tip of the spout is torn away, the spout is open permanently.

SUMMARY OF THE INVENTION

Pursuant to the present invention, a container is provided with a spout formed of two supple films of thermoplastic material, the films being joined together face-to-face along straight or curved seams that converge toward a discharge passage. The spout is proportioned with regard to the width of the discharge passage and the shape of the spout to form a film-to-film seal across the discharge passage, the seal being releasable in response to internal fluid pressure pursuant to a notable aspect of the invention. The walls of the portion of the spout leading to the seal are distended, and they abut at the seal. The fluid pressure required to release a pressure-releasable seal can be reduced by pressing the distended walls of the spout closer together, ultimately releasing the seal when the walls of the spout are sufficiently flattened. The character of a pressure-releasable seal varies widely with the shape of the spout-forming seams and with the width of the discharge passage across which the seal forms. Particular forms of the spout produce a continuous discharge of liquid after the seal is released and until it is restored deliberately, or brief discharges or "gobs" are dispensed in response to pressure suddenly applied to the spout, or flow continues so long as the container is squeezed, or a fine jet is produced that breaks up into a spray. The spout can also be proportioned to form a secure wall-to-wall seal that does not open in response to practical levels of internal fluid pressure. Such a seal can be rendered pressure-releasable by pressing the distended walls of the spout closer together. In containers having spouts proportioned to form either type of seal, the seams that join the walls together should be free of corners directed toward the container interior.

An object of the invention resides in providing novel containers for many applications, having supple plastic-film walls joined together face-to-face along fused seams that define a spout having a discharge passage across which a pressure-releasable seal can form directly between the walls of the spout.

A further object of the invention resides in providing a novel container for liquids, the container having supple plastic-film walls incorporating a spout that squirts liquid only so long as internal fluid pressure is maintained and which seals itself when the fluid pressure is relaxed.

A further object of the invention resides in providing a container having supple plastic-film walls joined together by seams that converge to form a spout in which a seal forms which is pressure-releasable and which is self-restoring when the internal seal-releasing fluid pressure is relaxed.

A further object of the invention resides in providing a novel container for liquids, the container having a spout of supple plastic-film walls shaped to form a seal that opens in response to fluid pressure that develops when the container is squeezed, after which the spout remains open so that liquid can continue to pour until the seal is deliberately restored.

A further object of the invention related to the foregoing resides in providing a novel container having flaccid plastic-film walls and a passage that can be opened for filling and refilling the container, where the passage is closed by a seal involving the films alone, the container also having a separate discharge spout closed by a wall-to-wall seal that opens to discharge fluid when the container is squeezed, but without opening the seal of the filling passage.

A further object resides in providing a novel dispenser including a container having a self-sealing pressure-releasable spout and a spout-pressing device that may be operated abruptly for effecting limited-quantity discharges. Abrupt operation of the spout-pressing device momentarily builds up the internal fluid pressure in the spout so that a gob of liquid is discharged whereupon the seal is self-restoring. Locating the pressing device near the seal reduces the pressure needed to release the seal.

A further object of the invention resides in providing a container having a flaccid-walled spout in which a releasable seal forms between the walls of the spout, where the spout carries a removable guard that inhibits unintentional opening of the seal.

A further object resides in providing a flaccid-film container having a spout whose margins and discharge passage are proportioned to form an especially secure seal across the discharge passage but which does not open in response to all practical levels of pressure safely below the bursting strength of the container. Such a spout can be released by pressing its distended walls closer together near the seal, thereby rendering the seal pressure-responsive; and the seal can also be released by inserting a seal-parting device or a funnel when the spout is to be used as a filling port for the container.

A still further object of the invention resides in the provision of a flaccid-walled container having a spout extending from the body of the container, where at least the spout has marginal seams and where all the seams of the container are free of corners directed toward the interior of the container, thereby imparting high strength for resisting internal liquid pressures.

A still further object of the invention resides in forming a container of edge-seamed plastic films shaped to develop controlled puckers that form a stable base.

The nature of the invention, including the foregoing and other objects, novel features and advantages, are realized in several illustrative embodiments of the invention in its various aspects, which are described in detail below and shown in the accompanying drawings. In these embodiments, two thermoplastic supple or flaccid films are joined together face-to-face along edge seams to form a container body and a spout that provides a discharge passage extending outwardly from the body. A first portion of the spout which adjoins the body of the container is readily distended by contained fluid. Segments or elements of the seams along the first spout portion converge in the fluid discharge direction. From another point of view, those segments or elements of the seams that extend along the first spout portion can also be regarded as diverging generally toward the body of the container converge toward and define a discharge. When the walls of the first spout portion are distended by fluid, an arcuate bend forms in one of the films extending across the discharge passage. The bend is prominent at the center and vanishes toward the seams. This bend in one film bears against the other film, to constitute a seal. In each example, there is a second portion of the spout projecting outwardly of the seal. Squeezing the container develops internal fluid pressure that opens the seal where the spout is proportioned to render the seal pressure-releasable.

In each of the described embodiments the seams of the first spout portion converge in the fluid-discharge direction or, stated another way, they diverge from an intermediate portion of the spout generally toward the body of the container and the wall sections of the first spout portion form what may be described roughly as parti-conic shapes having narrow ends that abut one another when distended by contained fluid so as to form a seal.

The seams are ideally formed at the very edges of the films. Such seams are formed when the films are substantially face-to-face and flat. When liquid distends the films, such edge seams contribute flexibility that helps in achieving best sealing action in the spout. Flexibility of the seams elsewhere around the container contributes toward avoidance of unsightly puckers that tend to develop in the container walls.

A special form of edge seam promotes success and consistency in producing dependable releasable seals. This form of seam is formed by holding a pair of thermoplastic films together face-to-face or nearly face-to-face, concurrently but separately cutting the films with a hot blade advancing along a cutting line to produce overlying melted edges, and holding the films face-to-face as the melted edges fuse together.

In one described embodiment where seams of the spout converge to a small gap, having an inside width (excluding the seams) of one-fourth inch or less, the seal opens when the container is squeezed firmly. The seal tends to restore itself when squeezing pressure is relaxed. Liquid in the container squirts out as a fine jet stream, having many applications. An orifice is formed by spread-apart film surfaces, resembling a slit in cross-section. That form of small orifice resists clogging by particles of dirt or solids in the liquid composition, whereas such particles might well cause clogging in the case of a small round-bore discharge passage. At some distance from the "slit" orifice, the jet stream breaks up into a fine spray.

In each example, the seal must form at a location spaced from the actual discharge orifice at the edge of the films. In described embodiments where a container spout has seams that converge to a discharge passage wider than one-fourth inch, the edge-seamed films that form the spout project outwardly beyond the region of the seal to form a distinct extension. Where seams converge prominently in a spout that forms a pressure-releasable seal, the seal tends to be self-restoring after internal fluid pressure is relaxed. In case of a spout whose seams converge moderately, only enough to enable a seal to be formed, and especially where the discharge passage is relatively wide where it is closed by the seal, the seal tends to remain open after it has been released. The location of the seal in such ciruumstances tends to vary and by squeezing the container, it is possible to shift the seal into the extension, and finally to open the seal. Discharge of the liquid from such a container, once started, continues under gravity pressure. To stop the flow, the seal can be re-established by simple manipulation, or by inverting the container.

In several embodiments detailed below, the liquid in a container is dispensed when the container is squeezed firmly enough to develop seal-releasing fluid pressure. The seal can be rendered easily opened in response to only slight internal pressure by laterally pressing and more-or-less flattening the spout. Thus, a supple-film container of liquid with a self-sealing spout can be used as a drinking vessel; and in that use, the container need be squeezed only slightly to build up internal fluid pressure while the spout is held and nearly flattened between the user's lips. A container having a spout proportioned so that the seal is not pressure-releasable can be used as a drinking vessel in the same manner. In such applications, the container may be held horizontally or even with the spout aimed upward. In a still further distinctive embodiment, a supple-film container may have a downward-directed spout between a support panel and a pressure-applying plate. If the plate is pressed abruptly, the inertia of the liquid in the container above the plate tends to develop a large value of fluid pressure at the seal momentarily, to dispense a gob of liquid. Pressing the plate also reduces the distension of the walls of the spout and in that way lessens the internal pressure needed to open the seal. With such a dispenser, it is not necessary to squeeze the body of the container for developing seal-opening pressure. The spout in this case should be shaped to develop the self-restoring type of seal in this dispenser.

In the described containers, the seal that forms is effective to confine gases as well as liquids. Indeed the term "liquid" is used in a non-technical sense to include not only true liquids but also other fluent material comprising liquid that contains fine solid particles, soft gels, etc. As will be seen, the materials to be contained are limited essentially by their compatibility with the material of the films. The seals develop partly as a result of flexibility of the films which should be supple or flaccid, in this respect contrasting with tinfoil and unplasticized cellulose acetate, for example. A wide range of thermoplastic films are suitable, such as polyethylene, polypropylene, and polyvinyl chloride. Suitably supple films are stretched much more easily than metal foil, but extremely elastic films as of very thin latex are not recommended. In any case, the kind of seam that is needed seems to dictate the use of thermoplastic films, as a practical matter, whereas making tough seams between latex sheets is difficult.

A guard can also be provided to protect a spout with a releasable seal, for maintaining a seal closed even though internal seal-releasing fluid pressure is developed. Such a guard is useful where a container has both a discharge spout and a filling spout, and where the filling spout should remain closed while pressure is developed to open the seal of the discharge spout. Such a guard is useful even where there is only one spout, to avoid unintended discharge when the container is squeezed incidental to handling.

Where the whole container including the spout is formed of plastic films joined face-to-face, the seam can be shaped to develop a stable base for the container. Slant seam portions are included between the seam at the bottom of the container and the seams along its sides. Deep puckers tend to develop at these slant seams, forming a gusseted container bottom to serve as a stable base.

It is possible and at times desirable to proportion the spout of a container so that it forms a seal across the discharge passage, which seal does not release or open when the container is squeezed to develop internal fluid pressure within safe limits. Such a seal can be an advantage where the container may be squeezed inadvertently in handling, when fluid should not discharge. A seal of this type can be rendered pressure-releasable in order to discharge liquid deliberately, by forcing the walls of the spout closer together. Seals of the spouts here involved are rendered non-releasable in response to internal pressure by increased convergence of the seams that shape the spout or by reducing the width of the discharge passage where the seal forms, or both.

The nature of the invention, and its further objects, novel features and advantages will be more fully understood and better appreciated from the following detailed description of various presently preferred illustrative embodiments of the invention in its several aspects, those embodiments being shown in the accompanying drawings.

In the drawings:

FIG. **1** is the front view of a container filled with liquid, as an embodiment of various aspects of the invention, the container being inverted and sealed, including phantom lines representing the liquid-discharging, unsealed state of the container;

FIG. **2** is a side view of the container of FIG. **1**, including phantom lines representing portions of the container in liquid-discharging state;

FIG. **3** is a greatly enlarged, fragmentary cross-section of part of the container of FIGS. **1** and **2**, as viewed from the section line **3—3** in FIG. **1**;

FIG. **4** is a fragmentary front view of the bottom of the container of FIGS. **1** and **2**, when empty and flat;

FIG. **5** is a fragmentary front view of the bottom of the filled container of FIGS. **1** and **2**, resting on the bottom;

FIG. **6** is a bottom view of the container as shown in FIG. **5**;

FIG. **7** is a greatly enlarged cross-section of the container of FIG. **1** as seen at the line **7—7**;

FIG. **8** is a fragmentary view of the discharge end of the container of FIGS. **1** and **2**, when empty and flat;

FIG. **9** is the front view of a bottom plate that may be used with the container of FIG. **1**;

FIG. **10** is a fragmentary view of the bottom of the container as shown in FIG. **5**, equipped with the plate of FIG. **9**;

FIG. **11** illustrates another embodiment of the invention, drawn to reduced scale;

FIG. **12** is a fragmentary view of the embodiment of FIG. **11**, drawn nearly to full scale;

FIGS. **13**, **14** and **15** show two cross-sections and an end view, respectively, of a spout of the container in FIG. **12**, as viewed from the planes **13—13**, **14—14** and **15—15** in FIG. **12**;

FIG. **16** is a fragmentary view of one of the spouts in FIG. **12**, as seen when empty and flat;

FIG. **17** is a fragmentary view of a second spout of the container of FIGS. **11** and **12**, as seen when flat;

FIG. **18** is a fragmentary view of said second spout, as seen from the plane **18—18** in FIG. **12**;

FIG. **19** is a perspective view of a nozzle spreader, useful in refilling the container of FIGS. **11** and **12**;

FIG. **20** is the front elevation of a novel dispenser, as an embodiment of further aspects of the invention drawn to reduced scale; and

FIG. **21** is a cross-section of the dispenser of FIG. **20** as viewed from the plane **21—21** therein.

Referring now to the drawings, container **10** includes a spout including a spout portion **12**, and an extension **14** projecting outwardly and ending at discharge opening **16**. Container **10** is formed of two films of thermoplastic material, polyethylene for example, united along their edges in a continuous seam **18**. The films **20** and **22** are face-to-face when the container is flat. This face-to-face relationship is especially important at the seams forming the margins of spout portion **12** and extension **14**, as will be seen. When flat, the films of the spout are congruent.

Seam **18** can be made by means of a blade having the outline of the flattened container, heated to the fusing temperature of the thermoplastic films and pressed against the films until the seam is formed and the container is cut out along the seam. Such a seam can serve the purposes of the present invention unless it is made with techniques causing the films to diverge from the seam. Some slight divergence adjacent the seam is tolerable, but ideally the films should be in face-to-face contact.

In a preferred novel method, the seam may be made by means of a heated blade that cuts along two face-to-face films, melting the edges of the films as it cuts; and the films are held face-to-face adjacent the cut edges long enough for the fused edges of the films to merge into an edge seam. The desired face-to-face contact of the films immediately adjacent the seams is easily realized by this method.

The spout portion **12** and the extension **14** are divided at an arcuate or fingernail-shaped seal **24**, as viewed in FIG. **1**. This seal is formed by a bend **20***a* (FIG. 3) in film **20** which bears against film **22** with enough force to produce a noticeable bulge **22***b* in film **22**. The bulge is most noticeable, and the bend is most pronounced, midway between the seams. The forces that develop seal **24** cause the films to be displaced (FIG. 3) from a line extending from seam to seam. Both films **20** and **22** are warped surfaces in the region of seal **24**. In addition to the arcuate form of seal **24** as shown in FIG. **1**, the seal has another curvature relative to an imaginary unwarped surface extending seam-to-seam in the region of the seal **24**. It is this latter curvature that is responsible for the offset between seam **18** and seal **24** in FIG. **3**. The bend **20***a* is prominent midway between the seams, and decreases toward the seams. Immediately adjacent the seams there is no noticeable bend **20***a*, and it is at those points that the face-to-face relationships between the films is important. The forces producing the seal can overcome only a slight amount of natural divergence that could exist between the films at each seam.

The physical proportions of spout portion **12** have dominant influence on the formation of seal **24** and on the nature of the seal. As seen in FIG. 3, when liquid distends walls **20** and **22**, each of the walls slopes toward the other. Provided that the angle between films **20** and **22** is not too great, a particular kind of seal is produced which opens when the container is squeezed, i.e., an internal pressure-releasable seal. Where seams **18** are symmetrical at opposite sides of medial plane 3—3 of FIG. **1**, the angle between the distended films when measured at the medial plane, is largely determined by the shape and spaced relationship of the seams. (While only one continuous seam forms the entire container of FIGS. **1** and **2**, it is convenient to use the plural term "seams" in referring to spout portion **12** and extension **14**.) The medial plane passes through walls **20** and **22** along the centerlines of the spout portion **12** and the extension **14**. More generally, the "centerlines" of a spout extend along the walls midway between the seams and, as represented in FIG. 3, the centerlines of the readily distendable wall sections adjacent the abutment (disregarding bends **20***a* and **20***b*) form an angle of less than about 90°. The sections of the walls below bend **20***a* coextend, and their centerlines are in general alignment with the centerline of one of the wall sections above bends **20***a* and **20***b* and at an angle to the centerline of the other wall section above bands **20***a* and **20***b*. Seams **18** forming spout portion **12** converge toward extension **14**, and the seams reach a point of minimum separation. As seen in FIG. **8** (which represents spout portion **12** and nozzle **14** when the films are flat), each seam **18** is continuous, and it is curved along a radius R having a center C. The minimum separation of the converging seams that form spout portion **12** and extension **14** occurs at a gap G. In an example, radius R of both seams **18** is three inches and gap G is ⅜ inch, measured across the outside dimension of the nozzle. Each seam in this example is about 0.030 inch wide where films **20** and **22** are polyethylene films of about 0.004 inch thick, joined by the preferred method described above.

When the container with this spout is filled, seal **24** forms above gap G, and this seal is formed at a wider part of the spout than the ⅜-inch width of gap G. For convenience, the width of a seal may be taken to be the width measured across the apex of the seal, from seam to seam. Further, while the width of a seal is not critical except in the one-fourth-inch range, the widths given here and elsewhere in this specification represent outside dimensions unless stated otherwise. Likewise, the seams in all of the described embodiments are made by the preferred method described above and are about 0.030-inch wide.

Such a seal is pressure-releasable, provided that the wall-to-wall or film-to-film angle above the seal is not too great. This wall-to-wall angle is measured at the median plane 3—3 (FIG. **1**) between the seams. The wall-to-wall angle is in turn determined mainly by the convergence of the portions of the seams above the seal **24** and by the separation between the seams at the seal.

Films **20** and **22** exhibit a limited degree of elasticity, a quality associated with the supple quality of the film. The elasticity of the films is demonstrated by the warping of the films that occurs as shown in FIG. **3**, and it is further demonstrated by the fact that spout portion **12** is not puckered when distended by liquid even though seams **18** in the embodiment of FIGS. **1** and **8** are not straight but curved. Strips of 0.004 inch thick and 1.0 inch wide polyethylene film used in making spouts with excellent seals (as in FIG. **3**) showed 10 percent elongation when tested with a six-pound weight. The same film when subjected to a softening heat treatment exhibited 10 percent elongation for a one-inch wide strip when subjected to a test weight of 0.6 pound. The latter film when formed into a container having a self-sealing spout showed a tendency to allow opening of the seal in response to lower pressures than in the case of the less stretchy film.

When the walls of the spout are distended as in FIGS. **1–3**, each wall forms an approximation of part of a cone. Seal **24** is formed where the tips of these particonic wall shapes meet. The seal in a spout of the above proportions is releasable in response to internal fluid pressure resulting from squeezing the container. Of course, the seal-releasing pressure must be safely below the bursting strength of the container.

When the seal is in the position represented by the solid line **24** in FIG. **1**, extension **14** characteristically slants to one side, as shown in FIGS. **2** and **3**. Squeezing the container causes seal **24** to shift toward exit opening **16**. The seal reaches a limiting position **24'**, after which the liquid in the container starts to pour out of extension **14**. This continues in the case of a spout having the dimensions given above even if the container is no longer squeezed after pouring starts. The spout is in the condition represented by phantom lines in FIG. **2**. Flow stops and seal **24** forms again, when the extension is pushed back to the solid-line position of FIG. **2**. This usually requires only a light stroke of a finger.

Container **10** can be supported by a hanging tab or by a fixture of some form or by the grasp of a person's fingers, using care in any case to avoid imposing enough squeezing pressure to open seal **24** unintentionally. Effective support can be disposed under the shoulders **18***b* formed where the seals **18** of spout portion **12** approach the bulk of the container The support should not be located so as to flatten the spout, since reducing the film-to-film angle of any given spout reduces the pressure needed to open the seal and then gravity pressure of the liquid could be enough to start the discharge of liquid.

The portions of seams **18** along the spout portion **12** far from seal **24** have little effect on formation of the seal. The greatest effect results from the convergence of the seams **18** in the region above the minimum separation G. Tangents to the seams **18** of the flattened spout above gap G (FIG. **8**) have an angle A between them. This angle could be made so large that the seal would not open when pressure (within practical limits) is applied to the container. The angle could be so small that pressure amounting to no more than the hydraulic head of the liquid in the container would be enough to open the seal. A practical range of angle A is from about 5° for a seal width of ⅛ inch to about 140° for a seal width of about 1¼ inch, to produce pressure-releasable seals.

The shape of spout portion **12** is thus of controlling importance to formation of a seal and to the character of the seal that is formed. Where the marginal seams **18** of te spout related to each other by an angle much larger than 140° (this angle being measured with the container empty and flat) then a seal would form but it would not be pressure-releasable except possibly by such a large value of pressure that the container would be in danger of being ruptured.

The angle A may not always be easy to measure since the seams 18 that form spout 12 need not be straight or nearly straight. The seams may be curved prominently as part of a circle or some other curve. In that case it may be hard to determine angle A. The relationship between seams 18 of the spout which is necessary to develop a pressure-releasable seal can be expressed in another way, as indicated above. The seams that define spout 12 are so related to each other that when the container is full, the angle between the centerlines of the mutually abutting films adjacent to the seal (disregarding bends 20a and 22a) is a maximum of about 90° measured between the centerlines of wall sections 20 and 22 as represented in FIG. 3. This wall-to-wall angle of 90° is applicable to a spout having a seal whose width (measured from seam to seam along a line tangent to the apex of the seal) is large, 1¼ inch, for example. For spouts having narrower seals, the wall-to-wall angle should be less than 90°. A pressure-releasable seal forms across a spout having a wall-to-wall angle of about 85° where the seal is 1⅛ inch wide. Such a spout can be made with curved seams 18 (FIG. 8) having radii of about one inch. A pressure-releasable seal having a wall-to-wall angle of about 75° is formed across a spout whose seal width is ¾ inch and whose marginal seams 18 (FIG. 8) have radii of about 1½ inch. Pressure-releasable seals are formed across spouts whose seal widths are in the range of ¼ inch to ⅝ inch where the wall-to-wall angle adjacent the seal is in the range of about 45° to 75°. A pressure-releasable seal is formed across a spout whose width (measured across the wall surfaces to — but not into — the seams) is 1/16 inch to ¼ inch where the wall-to-wall angle is in the range of about 5° to 45°. In these examples, the smaller wall-to-wall angles are related to the narrower seals. For these spouts to form pressure-releasable seals, the seams 18 converge at a small angle A, whether straight or long-radius seams are used.

Along with this discussion of spout and seal parameters, it is pertinent to note that spouts having different seal widths behave differently. Seals in the 1/16 to ¼ inch range produce a squirted jet stream. The jet is flat where it emerges from the external opening of the nozzle spout extension, pulls closer together a short distance from the opening and forms a spiral, and then the jet breaks into tiny droplets that are not so fine as to become suspended in air but which form a fine spray that is useful for many purposes. Optimal wall-to-wall angles can be developed using seams 18 that have long radii or are straight, and have seam-to-seam angles A in the range 10° to 45°. When a "squirter" container is used, the seal 24 is opened by squeeze-induced pressure, and the seal forms again as soon as the squeeze is interrupted. Similarly, in the case of seals ½ to 7/16 inch wide, a limited discharge of liquid is produced, continuing only while the container is squeezed, and then resealing occurs. In case of pressure-releasable seals appreciably wider than 7/16 inch, once they are open they tend to remain open until the seal is restored, for example in the manner described above in connection with FIG. 2. As previously noted, the term "seal width" is the width of the seal that forms in any given spout when its walls are freely distended, and where the width is measured along a line from seam to seam and tangent to the apex of the seal. These widths are inexact, inasmuch as many factors have secondary modifying effects. For example, two such factors are the stiffness and the thickness of the film material. The figures above were obtained with polyethylene about 0.004 inch thick.

Seam 18 as described above is formed at the edge of the plastic walls that constitute the container. This factor contributes to the formation of the seal 24 and it contributes to the avoidance of a great many puckers along seam 18. In contrast, the seam could be formed along a line spaced inward from the edge of the plastic. Any extension of the films outside the seams develops physical resistance to bending of the seam. Where the films are joined by seams spaced from the edges of the films, puckering tends to occur where portions of the seams that form extension 14 merge into the portions of the seams that form spout portion 12. The walls of extension 14 are essentially flat and the walls of spout portion 12 are distended, so that what was a smooth-line seam (FIG. 8) develops an undulation 18a (FIG. 1). The fact that the seam is at the edge avoids stiffness, or gives the seam a suppleness that promotes the formation of smooth bends in seams 18.

When container 10 is not in use, it can be laid on its side. In so doing, care should be taken not to distort the walls that form the spout. A better way to store container 10 is upright. This is facilitated by enabling the walls of the container to form a flat bottom as shown in FIGS. 5 and 6. Where the body of the container is formed of the same two plastic sheets that form the spout, it can be shaped as shown in FIG. 4, to have more-or-less parallel side portions 26, a transverse end 28 and 45° slant portions 30 between portions 26 and 28, forming corners 32 and 34. Transverse end 28 occupies about 40–80 percent of the bottom. When the container is filled, a deep pucker or gusset 33 tends to form (FIGS. 1 and 2) in the container due to the described shape. A flat bottom is formed in this way, on which the container can rest.

The stability of the gusseted bottom depends somewhat on the proportions of the container as a whole. A wide plate 35 as of sheet-metal or plastic (FIG. 9) can be used to improve the stability of the container when resting on its bottom. Plate 35 has turned-in margins 38 extending from a flat base 36. Margins 38 are received in the tucks of gussets 33 (FIG. 10) when the plate is assembled to the container bottom. Plate 35 imposes a flat shape on the container bottom that resists any tendency of the upright container to roll over. Moreover, plate 35 can be made amply wide. Preferably, it is appreciably wider than the small dimension of the container bottom, the vertical dimension as seen in FIG. 6. Container 10 equipped with base plate 35 can be deposited upright without concern about toppling.

Container 40 in FIGS. 11 and 12 includes a squirting spout 42 and a filling spout 44. This container is useful for window-cleaning fluid, lubricating oil, etc.

Spout 42 when flat has the proportions shown in FIG. 16, for example. At the tip or discharge orifice 47, the spout (there being no distinct nozzle here the container being flat) is 3/16 inch wide for example, this being the outside measurement including the orifice 47 and two seams. The width of the flattened spout at a distance of one inch from the discharge orifice is about 13/16 inch in this example, and seams 46 (formed the same way as seams 18) having such long-radius curvature that they are approximately straight, and they converge at an angle of about 25°, measured when flat.

When the container including spout **42** is full, the walls of this spout are fully distended and this causes a seal **48** to form about 3/16 inch from orifice **47.** The portion of the spout extension between the seal and the orifice is tilted, as in FIG. **3.** Squeezing the container produces a fine and long jet stream from spout **42.** The stream is essentially flat immediately adjacent to orifice **47.** It becomes narrower and thicker a short distance from orifice **47,** and a spiral twist develops in the jet stream. The jet has a long, relatively straight trajectory, and ultimately it breaks up into a tight-angled spray amounting to a ray of tiny droplets. The width of seal **48,** measured along a line tangent to the apex of the seal, is about ¼ inch including the passage and both seams. When pressure in the container is built up progressively, the seal shifts toward orifice **47** and finally the seal opens and a jet of liquid is delivered at orifice **47.** As soon as the pressure is relaxed, the jet is interrupted and the spout becomes sealed, of itself.

Spout **44** of container **40** is shown flat in FIG. **17,** and it is shown filled and distended in FIG. **18.** Spout **44** extends to a flaring orifice **50.** A spreader **52** for the orifice is shown in FIG. **19,** having a curved wall **54** and a rib **56,** tapered to a thin and narrow blade-like tip **58.** Spreader **50** can be inserted in spout **44** which then can serve as a funnel to help in filling the container. Orifice **50** can be made as wide as may be considered necessary for this purpose. The length of spreader **52** should be such that, when inserted into spout **44,** it has a part projecting from orifice **50** and, at the same time, the tip **58** should extend deep enough into the spout so that rib **56** opens the passage so that liquid can enter. A straw or a separate funnel can also be used to refill containers such as those of FIGS. **1** and **11,** even where the spout is not flared as described above. The "self-contained funnel" represented by the flared spout **44** of FIG. **17** is a distinct advantage.

The radii R of the seams that form the portion of spout **44** that is filled when pressure develops in the container should be small (e.g. ¼ inch), and the minimum separation between the marginal seams should also be small (e.g., 5/16 inch) where a seal is to develop in spout **44** that does not open in response to pressure sufficient to produce a jet spray from spout **42.** Notwithstanding this proportion, spout **44** can still be used as a filling passage. Too-sharp radii for the spout should be avoided, in order to guard against tearing stresses when the container is squeezed.

As a safeguard against unintentional near-flattening of spout **44** such as might occur in handling, with the result that the seal would open and liquid could leak out, a security clip or guard **60** is applied to spout **44.** Two side walls **62** extend at an angle from the middle portion **64** of guard **60,** and a tongue **66** is bent and extends integrally from middle part **64,** between — and spaced from — side walls **62.** Tongue **66** does not disturb the seal formed in spout **44,** but the tongue holds the whole guard in place on spout **44** as shown in FIGS. **12** and **18.** Walls **62** protect the spout against pressure such as would reduce the angle of its walls. Were the walls of the spout pressed close to each other, the kind of seal represented in FIG. **3** would not exist and liquid could escape. The purpose of guard **60** is to protect the seal that forms inherently when the spout is distended. Guard **60** can be proportioned relative to the spout to develop an angle between the walls (see FIG. **3**) that form the seal, thereby enhancing the effectiveness of the seal, but no effort is made here to rely on guard **60** to squeeze the walls of the spout together, to create a totally different kind of seal. It is to be understood that other means may be used to keep spout **44** sealed when container **40** is squeezed for producing a jet-spray. The described self-sealing spout and guard form a distinctive novel sealing means having evident practical merit. Guard **60** (properly proportioned) is valuable for protecting the spout of the container in FIGS. **1** and **2** against unintentional opening of the seal and escape of liquid.

A distinctive form of dispenser embodying features of the foregoing embodiments and certain additional features is illustrated in FIGS. **20** and **21.** That dispenser includes container **70** formed of supple films as of 0.004 inch polyethylene edge-seamed together as described above to form a body portion **72,** a dispensing spout **74** and a filling "spout" **76.** A spring-biased clip **78** clamps the upper part of container **70** against a panel, so that spout **74** aims downward when panel **80** is upright.

A resilient strip **82** as of metal or plastic has end portions **84** that grip the edges of panel **80,** enabling the strip to slide along the parallel lateral edges of panel **80** and to retain any adjusted position on the panel. Strip **82** has a portion **86** that is arched over a portion of container **70** above seal **94.** Portion **86** carries a knob **88** which, when pushed, causes strip portion **86** to act as a device that applies pressure to the container above the seal **94.** In an example, spout **74** has a discharge orifice **90** that is 3/16 inch wide and edge seams **92** that diverge such that the container is 1 ⅝ inch wide measured 1½ inch from orifice **90.** In this instance, the width of the orifice is measured internally so as not to include the edge seams **92.** Pressure device **84** is disposed with its lower edge ¾ inch from orifice **90** and is ⅝ inch wide where it spans container **72.** A seal **94** that is 5/16 inch wide (measured from seam to seam) tends to form above orifice **90.**

It may be assumed that container **72** contains liquid up to one-half of its top-to-bottom dimension, thereby causing the spout and the portion of the container underlying pressure device **84** to be distended (see FIG. **21**). Abrupt pressure applied by hand to knob **88** and pressure device **86** deflates the underlying part of the container. This forces the liquid in the container to rise suddenly. The inertia of the liquid above pressure device **86** resists this upward displacement, causing an abrupt rise of pressure in spout **74.** This pressure momentarily opens the seal in spout **74** and causes a gob of liquid to be discharged. The pressure is momentary, and the seal is self-restoring after the momentary discharge occurs.

With pressure device **86** located as stated above, there is a tendency for spout **74** to become resealed after the momentary discharge occurs even if pressure against knob **88** is maintained. The pressure member can be shifted upward, to increase the volume of the discharged gob of liquid. Pressure member **86** could be shifted downward a bit, but if that were done then seal **94** would probably remain open and discharge of liquid would continue, until the pressure applying device is released and the walls of the spout are allowed to become distended, so that the wall-to-wall seal in spout **74** restores itself.

The dispenser of FIGS. **20** and **21** is useful as a dispenser for many liquids, such as liquid soap or lotion or antiseptic liquid. Little or no instruction is needed to new users. The elemental simplicity of this dispenser, its low cost, and its immunity to becoming inoperative, as compared with usual soap dispensers (for example), are at once apparent.

Container **70** may be refilled at spout **76**, as with an inserted funnel. Alternatively, the container may be discarded when empty because of its very low cost; and in that case, a factory-filled container may be substituted. For absolute assurance against leakage from the spout before a factory-filled container is to be used, the discharge spout and the filling orifice may be sealed by a fused seam like seams **92.** The seam closing the tip of spout **74** may be removed with a sharp blade when the new container is mounted for use.

It has been found that a shear cut across the spout, made by scissors for example, tends to form a seal in the nature of a cold weld. Such a seal may be used in place of a fused seam to prevent unintended discharge of liquid from both spouts in the course of handling container **72,** before it is put to use. When a container having a spout that is sealed by a shear cut is to be readied for use, that seal can usually be opened by squeezing the walls of the spout together, then using the fingers to force a small volume of liquid outward, in a "milking" motion.

The applications of the described embodiments of the invention are endless. For example, the container of FIG. **1** can be used by a person confined to bed, as a drinking vessel. The user's lips can flatten the walls of the spout just enough to allow the seal to release liquid from the container when the spout is aimed upward and the container is gently squeezed. The container can be refilled via the discharge spout.

All kinds of liquids may be contained, it being required only that the film used with any particular liquid should be non-porous and neither permeable nor attacked by the liquid. In cases where a particular liquid dissolves a given plastic film, then a different film should be selected. In some instances, liquids merely soften the films to a limited degree. To preserve the form of the container and its spout despite softening effects of a particular liquid, it may be useful to resort to laminated films, for example, an extruded laminate of polyethylene containing a layer of 0.00025 polyvinyl chloride (Saran) bonded between layers of the polyethylene contributes the property of resistance to the solvent effect of certain liquids to be dispensed. While a material such as polyethylene terephthalate (Mylar) in a thickness of 0.004 inch might not be sufficiently supple to form a seal across a spout, such a material is useful as an extremely thin layer in an otherwise suitable laminate.

The pressure-releasable type of seal has been discussed above at length in connection with the illustrative embodiments shown in the drawings. However, it is not necessary in all cases to provide a pressure-releasable seal. For example, where a spout is provided for use as a filling orifice (e.g., spout **44** in FIG. **12** and spout **76** in FIG. **17**), it may well be desirable for the seal to remain closed even when high pressure is developed in the contained liquid, below the bursting strength of the container. There are definite advantages to a spout that forms a seal across its discharge passage, where the seal is non-responsive to internal fluid pressure within practical limits. For example, the spouts **12** and **42** in FIGS. **1** and **11** can be proportioned so as to render their seals non-responsive to internal liquid pressure. Such spouts are thus made secure against unintentional release of liquid when the container is squeezed in handling. A dispensing container in the form shown in FIG. **11** and carried in a shirt-pocket is subject to being squeezed unintentionally when the wearer's jacket is accidentally bumped and when the seal should remain closed. Such a container is useful for squirting lubricating oil, antiseptic liquid such as alcohol, etc., and in such uses, it may be important to provide security against the liquid discharging unintentionally.

In each of the examples above, the container has a spout having converging seams proportioned to form a seal across the discharge passage. In those embodiments, the seal can be rendered non-releasable in response to internal liquid pressure by making the discharge passage narrower where the seal forms, or by making the angle of convergence wider or by using a shorter radius of curvature in forming the seams along the margins of the spout. (The wider angle of convergence and the shorter radius of curvature of the seam are two ways of producing more prominent convergence.) Further, the proportions of any given spout can be modified to render the seal non-releasable in response to practical limits of internal pressures, by both reducing the seal width and increasing the prominence of the seam convergence.

A dispensing nozzle such as that of FIG. **1** or that of FIG. **11** when proportioned so as to be inherently non-releasable in response to internal fluid pressure alone can be used for dispensing liquid by applying collapsing force against the distended walls of the spout near the seal. Thus, the user can grasp the container with one hand and can use his thumb and forefinger or his lips to reduce the distension of the walls. This has the effect of making the seal pressure-releasable. Then the user can squeeze the container to dispense liquid.

In making such a spout, and indeed as a general rule, care should be used to avoid sharp corners whose apexes are exposed to or directed toward the interior of the container. This applies not only to the seams of the spout but also where the spout meets the body of the container, and generally throughout the container. Any such corner causes a concentration of stresses to develop in the wall of the container when exposed to internal pressure, risking rupture when the container is first squeezed or when the container has become stretched or weakened near such a corner after the container has been squeezed repeatedly. Even sharply curved seams that arch toward the container interior should be avoided in the case of containers that may be subjected to hard squeezing. As a practical limit in such containers, inward curves should not have a radius of less than about one-half inch.

From the foregoing it is evident that the described illustrative embodiments of the invention in its various aspects, and their variants, can be altered and can be given a wide range of application by those skilled in the art. Consequently, the appended claims should be construed broadly, in accordance with the full spirit and scope of the invention.

What is claimed is:

1. A container for fluids having a body and a spout extending outwardly from the body, said spout having congruent opposing walls of supple, imperforate material and being defined by laterally spaced seams uniting said walls and disposing them in substantially face-to-face contact when said spout is empty, said seams including first seam elements extending divergently at least from an intermediate portion of the spout generally toward said body, said container being dimensioned and configured to provide means for forming a releasable seal across said spout at said intermediate portion thereof, opposing first sections of said walls between said first seam elements being free of interconnection and being adapted to become readily distended by contained fluid, such distension causing said first wall sections to converge into sealing abutment with one another with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls conextending from said abutment with the centerlines thereof in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without auxiliary sealing means.

2. The container in accordance with claim **1**, wherein said walls of the spout have a limited degree of elasticity so that portions of said coextending second wall sections at and near said abutment are warped relative to an imaginary curved but unwarped surface extending between said laterally spaced seams, thereby tending to reinforce said sealing abutment.

3. The container of claim **1**, wherein said seams and walls of said spout are dimensioned and configured so that the relationship of said second wall sections to said first wall sections is altered when a substantial level of internal fluid pressure is developed so as to overcome said sealing abutment, thereby permitting fluid contents to discharge from said container.

4. The container of claim **3** wherein said container is dimensioned and configured so that said walls tend to restore said sealing abutment upon diminution of the internal pressure from said substantial level thereof, thereby tending to automatically reclose said container upon such pressure diminution.

5. The container of claim **3** wherein said container is are dimensioned and configured so that the altered relationship between said first and second wall sections is stable so that said sealing abutment is restorable to reclose said container only upon the application of external force to said spout.

6. The container of claim **1** wherein said seams include second elements defining said second wall sections, said second seam elements extending generally divergently toward said body, the divergence thereof being less pronounced than that of said first elements to define a generally outwardly tapering flow passage through said spout.

7. The container of claim **6** wherein said seams defining said spout are of smoothly curvilinear configuration.

8. The container of claim **7** wherein said curvilinear seams are relatively narrow and are located substantially at the lateral edges of said spout.

9. The container of claim **1** wherein when the container is flat, segments of said seams converge toward an imaginary point located within a region of said container outward of said intermediate portion of the spout.

10. The container of claim **7** wherein said container is dimensioned and configured so that said abutment is progressively shifted along said outwardly tapering flow passage and away from said body at progressively increasing levels of internal pressure, ultimately overcoming the sealing abutment and permitting fluid contents to discharge from said container.

11. A container having congruent opposing walls of supple, imperforate material having at least one bond uniting said walls and disposing them in face-to-face contact when said container is empty, said opposing congruent walls providing integral walls of a body for containing fluids and of a spout projecting outwardly from said body, said spout being defined by laterally spaced seams provided by said bond and including seam portions extending divergently at least from an intermediate portion of the spout generally toward said body, said container being dimensioned and configured to provide means for forming a releasable seal across the spout at said intermediate portion thereof, opposing first wall sections between said divergently extending seam portions being free of interconnection and being adapted to become readily distended by contained fluid, such distension causing said first opposing wall sections to converge into sealing abutment with one another with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls coextending from said abutment with their centerlines in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without auxiliary sealing means.

12. The container of claim **11** wherein said layers are comprised of synthetic resinous thermoplastic material.

13. The container of claim **12** wherein said bond is a relatively narrow heat seal located substantially at the edge of said container.

14. The container of claim **13** wherein said body is of generally circular configuration and said discharge region is an elongated, outwardly tapering extension thereof, said container thereby being of generally teardrop configuration.

15. The container of claim **11** wherein said body has, in a flat disposition, a generally rectilinear edge extending thereacross at a location remote from said spout, said edge being of a length that is substantially less than the width of said walls of said body at a location spaced a short distance therefrom, intermediate portions of said body walls lying between said edge and said spaced location being narrower than said body walls at said location so that, when said container is placed in an upright position with said edge disposed thereunder on a support surface, the outer margins of said intermediate wall portions tend to fold inwardly of said body, in turn permitting distension of said wall portions therebetween under the weight of fluid contents, thereby providing an extended base area for supporting said container in a relatively stable, upright position.

16. The container of claim **15** wherein said intermediate wall portions are defined by generally rectilinear slanting seam portions extending outwardly from the ends of said rectilinear edge.

17. The container of claim **1** wherein said container additionally includes fluid contents therewithin, and is completely closed to provide an integral package.

18. A container for fluids having a body and a spout extending outwardly from the body, said spout having congruent opposing walls of supple, imperforate material and being defined by laterally spaced seams uniting said walls and disposing them in substantially face-to-face contact when said spout is empty, said seams including first seam elements extending divergently at least from an intermediate portion of the spout generally toward said body, said container being dimensioned and configured to provide means for forming a releasable seal across said spout at said intermediate portion thereof, opposing first sections of said walls between said first seam elements being free of interconnection and being adapted to become readily distended by contained fluid, such distension causing said first wall sections to converge into sealing abutment with one another with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls coextending from said abutment with the centerlines thereof in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without auxiliary sealing means, that portion of the container which comprises said spout and the portion of said body which adjoins the spout being free of inwardly directed corners having a tendency to move inwardly a substantial distance, which would result in increasing the angle of convergence of said first wall sections and in reinforcing said sealing abutment in response to development of substantial internal pressures.

19. A container for liquids having a body and a spout extending outwardly from the body, said spout having congruent opposing walls of supple imperforate material defined by laterally spaced seams uniting said walls and disposing them in substantially face-to-face contact when said spout is empty, said walls including first opposing wall sections adjoining said body and bounded by first elements of said seams, said first wall sections being adapted to become readily distended by liquid in the container in the absence of applied pressure and specifically being free of interconnection between said seam elements, and said walls including second opposing wall sections projecting from said first opposing wall sections, segments of said first elements of said seams converging toward a point in said spout outward of said first wall sections when the container is flat, said container being dimensioned and configured to provide means for forming a generally arcuate internal-pressure-releasable and self-restorable seal across said spout at a portion thereof where said second wall sections extend from first wall sections, said first wall sections when distended converging into sealing abutment with one another in the absence of seal-releasing pressure, with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls coextending from said abutment with the centerlines thereof in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without resort to auxiliary sealing means.

20. A squeeze-releasable dispensing container including a main body and a spout projecting outwardly therefrom, the spout and the adjoining portion of the body providing a discharge region, said container having congruent supple, imperforate walls, said walls being united along seams that tend to dispose the walls substantially face-to-face when the container is empty, said seams including seam portions bounding first wall sections of the spout adjoining the body which seam portions converge toward each other along the spout in the fluid-discharge direction, the walls of the discharge region being adapted to become readily distended by contained fluid and specifically being free of interconnection between said seams, and said container being dimensioned and configured to provide means for forming an internal-pressure-releasable seal across the spout wherein one of the walls when distended by contained fluid bears against the other in a sealing abutment extending generally arcuately between said seams with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls coextending from said abutment with the centerlines thereof in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without auxiliary sealing means.

21. A container for fluids, including a body and a spout projecting outwardly therefrom, the spout and the adjoining portion of the body providing a discharge region, said discharge region being formed of congruent opposing walls of supple imperforate material interconnected by seams disposing the walls substantially face-to-face when the discharge region is empty, a first portion of the spout adjoining the body being defined by elements of said seams, such interconnection between said walls being shaped for causing said first spout portion to become readily distended by contained fluid, said discharge region being dimensioned and configured to provide means for causing said first spout portion to decrease in cross-section progressively in the fluid discharge direction when distended by contained fluid and, when so distended, for forming a sealing abutment extending generally arcuately across said spout wherein one of said walls bears against the other with the centerlines of said first wall sections adjacent said abutment forming an angle of less than about 90° and with opposing second sections of said walls coextending from said abutment with the centerlines thereof in general alignment with the centerline of one of said first wall sections and at an angle to the centerline of the other of said first wall sections, whereby said spout can be sealed without auxiliary sealing means.

22. A container in accordance with claim 1 wherein the divergence of at least segments of said first elements of said seams adjacent said abutment is limited to result in a reduction of the angle of divergence of said segments when said first wall sections become distended by fluid.

23. A container in accordance with claim 1 wherein the portions of said seams between said body and said intermediate portion of the spout have a curvature having a minimum radius of at least one-half inch when the container is flat.

24. A container in accordance with claim 11 wherein said container is dimensioned and configured to render said releasable seal responsive to internal fluid pressure, said container additionally including a second self-sealing spout non-releasable in response to internal

fluid pressure sufficient to release said releasable seal.

25. In combination, the container in accordance with claim **19** and means for suspending said container with said spout directed downward, further including a pair of pressure-applying devices disposed at opposite sides of said container above said seal, whereby abrupt actuation of said pressure-applying devices causes said container to dispense a discrete quantity of liquid.

26. A container in accordance with claim **19** wherein the width of the outer extremity of said spout is limited to cause discharged liquid to form a spiral jet which breaks up into droplets.

27. The container of claim **12** wherein each of said walls comprises a laminate containing at least two distinct materials.

28. The container of claim **17** wherein said spout has a fused closure adjacent its outer end which is removable to provide a discharge opening.

29. The container of claim **17** wherein said second wall sections have a discharge opening adjacent the outer ends thereof, and wherein said container additionally includes a closure member disengagedly secured on said second wall sections to temporarily close said discharge opening.

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