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Sabounjian(10) **Pub. No.: US 2004/0173611 A1**(43) **Pub. Date: Sep. 9, 2004**(54) **COLLAPSIBLE CONTAINER****Publication Classification**(76) Inventor: **Azad Sabounjian**, Newport Beach, CA
(US)(51) **Int. Cl.⁷** **B65D 25/00**(52) **U.S. Cl.** **220/9.4**

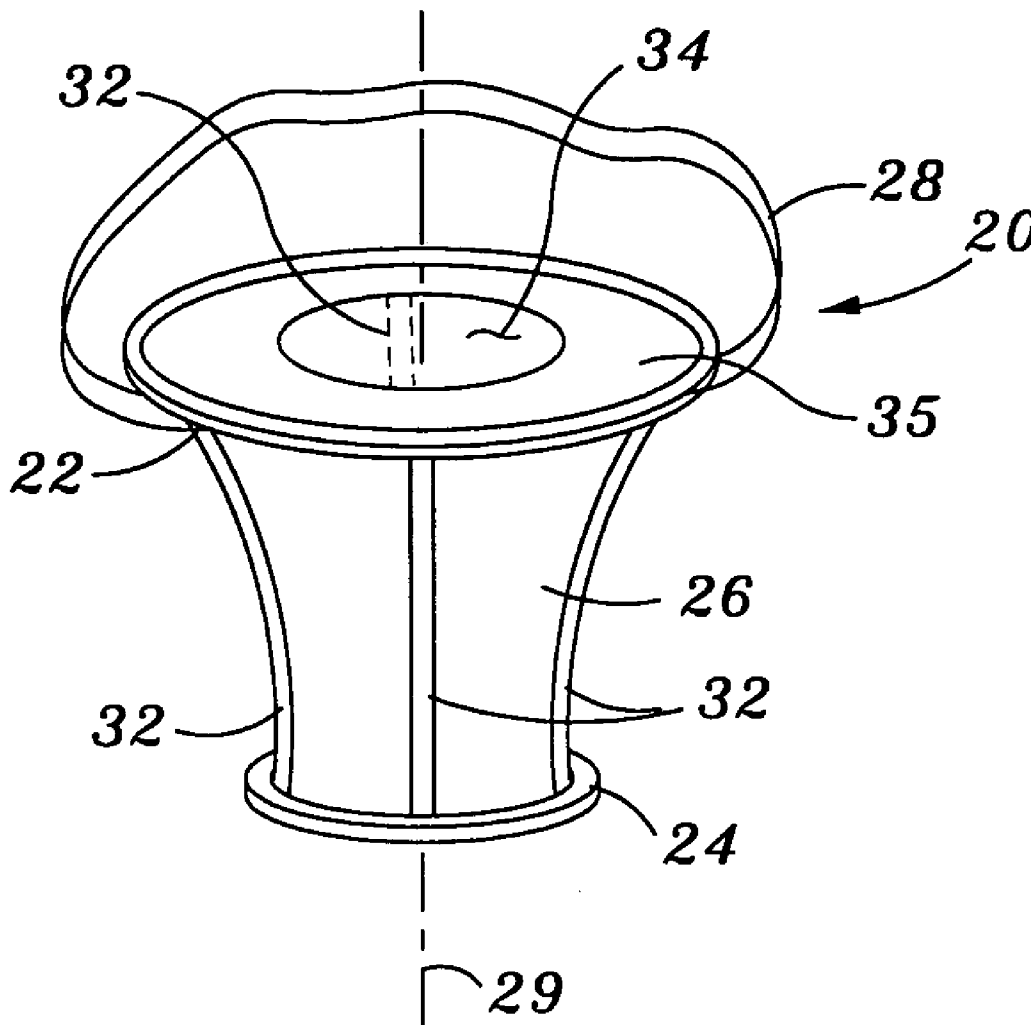
Correspondence Address:

STETINA BRUNDA GARRED & BRUCKER**75 ENTERPRISE, SUITE 250****ALISO VIEJO, CA 92656 (US)**(57) **ABSTRACT**

A collapsible container has first and second opposing rims, each having a tension loop frame contained in a pocket to define the shape of the rim. Sidewalls extend between the rims. Panels are attached to the rims, with an access opening being formed in one of the panels. A plurality of supports extend between the rims and are attached to the side wall to allow the container to move between a first, open position with the supports perpendicular to the rims and a second, collapsed position with the supports parallel to the rims, by rotating the first and second rims relative to each other.

(21) Appl. No.: **10/752,326**(22) Filed: **Jan. 6, 2004****Related U.S. Application Data**

(60) Provisional application No. 60/438,130, filed on Jan. 6, 2003.



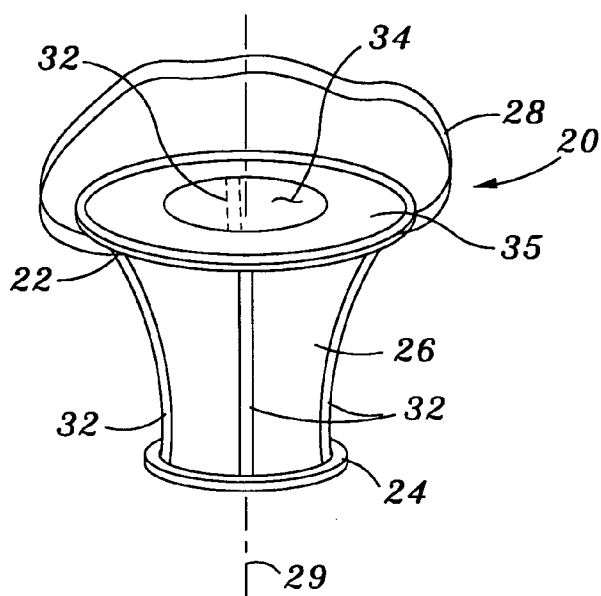


FIG. 1

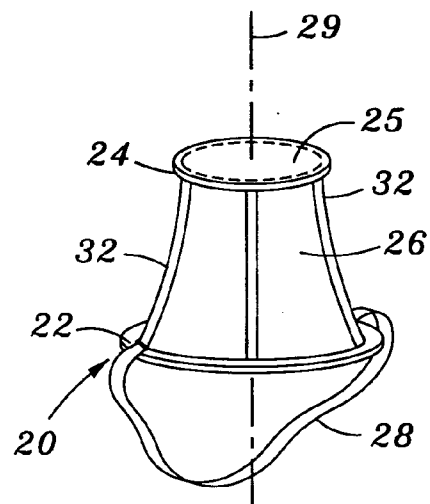


FIG. 2

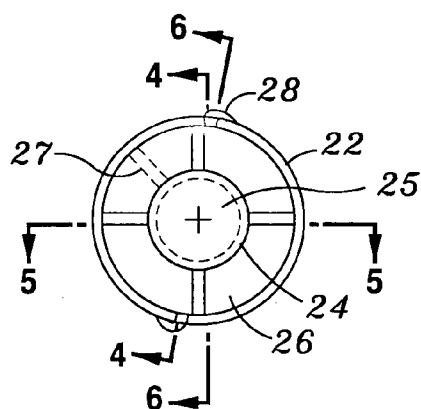


FIG. 3

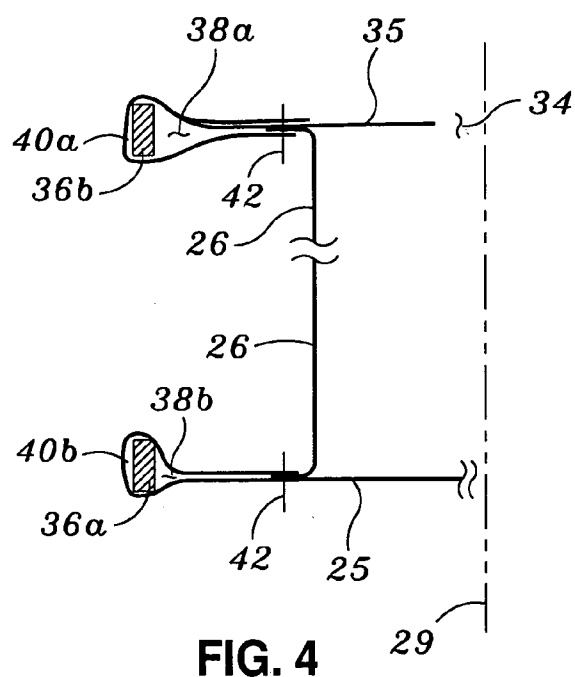


FIG. 4

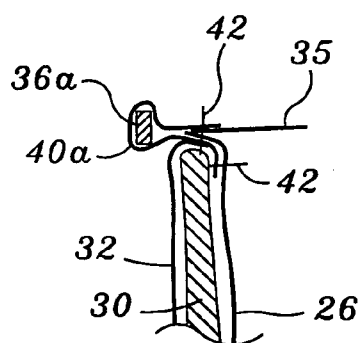


FIG. 5

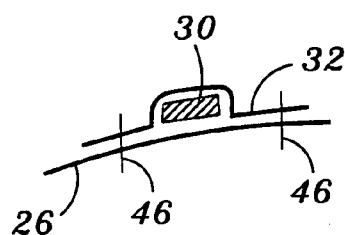


FIG. 7

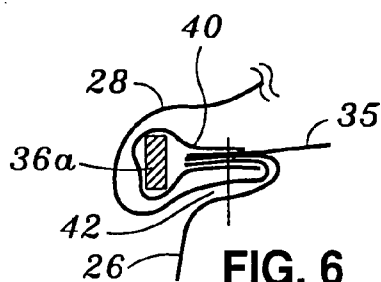


FIG. 6

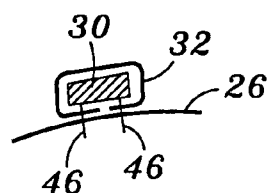


FIG. 8

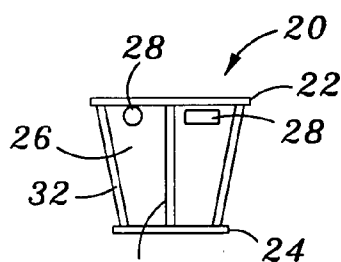


FIG. 13

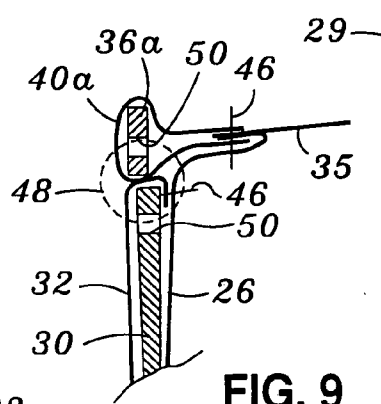


FIG. 9

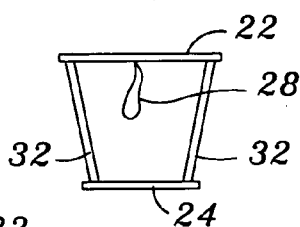


FIG. 12

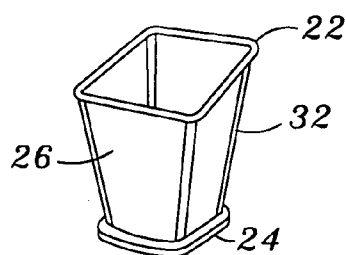


FIG. 11

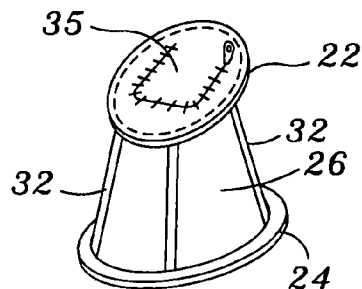


FIG. 10

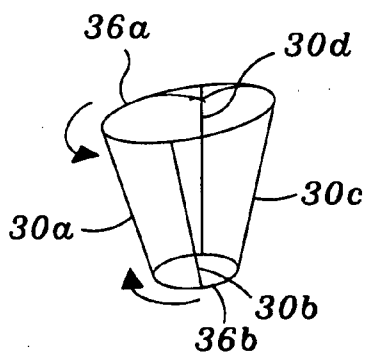


FIG. 14a

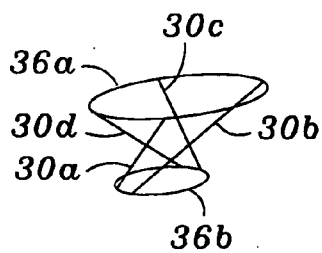


FIG. 14b

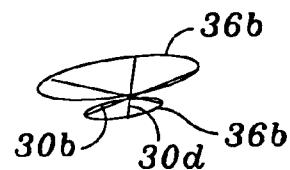


FIG. 14c

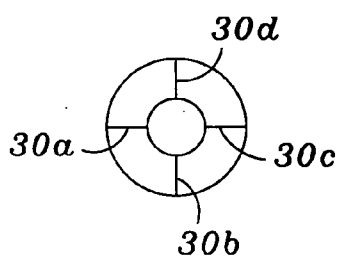


FIG. 15a

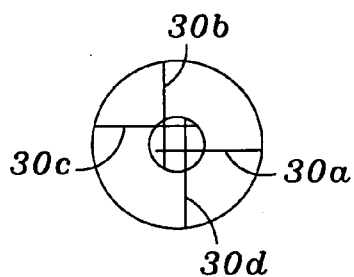


FIG. 15b

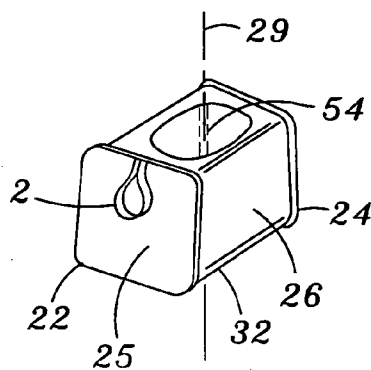


FIG. 16

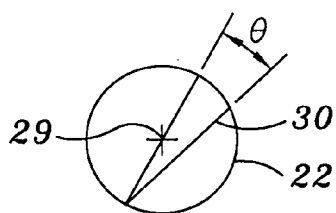


FIG. 18

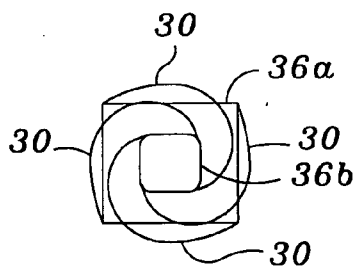


FIG. 17

COLLAPSIBLE CONTAINER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/438,130, filed Jan. 6, 2003, the entire content of which is hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] This invention relates to collapsible containers in general, and in particular to containers that collapse by rotating the top and bottom relative to each other in opposing directions.

BRIEF SUMMARY OF THE INVENTION

[0003] A collapsible container is provided that has first and second opposing rims, with each rim having a flexible, tension loop frame contained in a pocket to define the shape of the rim. A side wall extends between and attached to the rims. Covers are attached to at least one of the rims to define an enclosed space, with an access opening being formed in at least one of the panels or the side wall. The access opening may be removably covered. A plurality of supports extend between the rims and are attached to the side wall by confining pockets that allow the container to move between a first, open position with the supports generally perpendicular to the rims and a second, collapsed position with the supports generally parallel to the rims, by rotating the first and second rims relative to each other.

[0004] Advantageously, but optionally, the loops are circular and there are at least three supports. Alternatively, the loops form a quadrilateral with four corners and there are four of the supports extending between the corners of the rims. A handle can be attached to the collapsible container. To make collapsing easier, the first and second frames have a maximum dimension and each of the supports have a length that is less than that maximum dimension. Alternatively, a support can have a length greater than that maximum dimension, but then the support is sized to allow it to bend as one rim rotates relative to the other to collapse the containers. The frames are preferably flexible tension loop frames.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] These as well as other features of the present invention will become more apparent upon reference to the drawings wherein:

[0006] FIG. 1 is a top perspective view of a first embodiment of a collapsible container;

[0007] FIG. 2 is a bottom perspective view of the container of FIG. 1;

[0008] FIG. 3 is a bottom plan view of the container of FIG. 1;

[0009] FIG. 4 is a partial sectional view taken along section 4-4 of FIG. 3;

[0010] FIG. 5 is a partial sectional view taken along section 5-5 of FIG. 3;

[0011] FIG. 6 is a partial sectional view taken along section 6-6 of FIG. 3;

[0012] FIG. 7 is a sectional view of a first embodiment of a pocket containing a support;

[0013] FIG. 8 is a sectional view of a second embodiment of a pocket containing a support;

[0014] FIG. 9 is a partial sectional view of a further embodiment showing a support immediately adjacent a frame;

[0015] FIG. 10 is a bottom perspective view of a collapsible container having an opening that is releasably closed by a zipper;

[0016] FIG. 11 is a top perspective view of a further embodiment of a container having a quadrilateral shape with square top and bottom rims;

[0017] FIG. 12 is a side view of a further embodiment of a container having a loop handle;

[0018] FIG. 13 is a side view of a further embodiment of a container having an aperture for a handle;

[0019] FIGS. 14a-14c show a collapsible container with four supports collapsing;

[0020] FIGS. 15a-15b show a collapsible container with four supports in the open position and in a substantially collapsed position;

[0021] FIG. 16 shows a further embodiment with the rims forming ends of the container and an opening in a sidewall located on the top of the container;

[0022] FIG. 17 shows a further embodiment of a collapsed container having supports longer than the largest dimension of a frame; and

[0023] FIG. 18 shows the preferred orientation of a support relative to a diameter of a circular frame.

DETAILED DESCRIPTION

[0024] Referring to FIGS. 1-2, a collapsible container 20 is provided that has a first rim 22 opposite a second rim 24 and separated by a flexible side wall or walls 26 which may have one or more seams 27 (FIG. 3) joining adjacent ends of a side wall. A first cover 25 extends across the second rim 24. A handle 28 can be optionally, but advantageously attached to the container 20. A plurality of supports 30 are provided in support-pockets 32 attached to the side walls 26. The container 20 will be described relative to the container shown in Figures, and using relative directions such as top and bottom that are relative to the orientation of the container 20 shown in FIGS. 1-2. The terms radically inward and outward are with respect to longitudinal axis 29 that extends through the center of the container 20, and along the length of the container (when the container is symmetric). In use, the container 20 can have various orientations and the relative directions used to describe the container are not to be taken as limiting the invention if the orientation of the container changes.

[0025] Referring to FIGS. 1-4, the top rim 22 advantageously has an opening 34 allowing access to the interior of the container 20. The opening 34 can be formed in a first or top cover 35 extending across top rim 22. Or the top cover 35 can be entirely omitted. Alternatively, the opening 34 could be releasably closed by a cover held in a closed

position by a zipper, hook and loop fasteners, snaps, buttons or other releasable closing means now known or developed in the future.

[0026] Referring to FIGS. 1-4, the top rim 22 advantageously comprises a first or top frame 36a contained in a first or top pocket 38 formed by an edging 40 that is attached to the side walls 26, or is formed by the side walls, to form the pocket 38. The depicted attachment uses threads to sew the parts together along a seam 42 generally located as shown, but adhesives, melting, and other means for fastening the materials that are now known or developed in the future can be used.

[0027] Advantageously, but optionally, the upper frame 36a is a flexible, tension loop frame made of resilient material that is constrained by the top pocket 38a to a desired configuration. The upper frame 36a is shown as constrained to a circular shape by first pocket, referred to as top pocket 38a, but other shapes can be used, including, but not limited to quadrilateral (e.g., square, rectangular), triangular, hexagonal, octagonal, and other symmetric and non-symmetric shapes.

[0028] The upper frame 36a advantageously has a rectangular cross-sectional shape, but circular cross-sections and other shapes can be used. The top frame 38a can be made of metal, and is preferably of spring steel about $\frac{1}{16}$ by $\frac{1}{8}$ inch in cross-section. Advantageously, if the upper frame 36a has a non-circular cross section then the longer axis of the frame's cross section is vertical, and the shorter axis is radial, relative to the orientation shown in FIG. 4.

[0029] The top pocket 38 is advantageously, but optionally much larger than the top frame 36a. A top pocket 38 having a radial length of about 0.5 inches when used with the rectangular cross-section frame is believed suitable. The radial length is along the axis orthogonal to longitudinal axis 29 of the container 20. A top pocket 38 with a radial length from about $\frac{3}{8}$ to about 1 inch is believed suitable, but less desirable, as discussed later, for containers 20 used for common household use. Proportionately, the upper pocket 38 is advantageously about 5-20 times the radial length of the upper frame 36a, and preferably about 8 times that radial length.

[0030] The bottom rim 24 is also formed by a second, lower frame 36b contained in a second, lower pocket 38b. The upper frame 36a is made the same way as lower frame 36b, and the upper pocket 38a is made the same way as the lower pocket 38b.

[0031] In some situations, it may be desirable to have the bottom rim 24 larger or smaller than the top rim 22. To do so, the lower frame 36b and lower pocket 38b are made larger or smaller in size relative to the upper frame 36a and pocket 38b. It is believed preferable to have the bottom rim 24 slightly smaller than the top rim 22, so the container 20 has a slightly tapered or funnel-like shape.

[0032] Referring to FIGS. 1, 2 and 5, the vertical supports 30 advantageously, but optionally comprises a thin, flexible rod. The support 30 can be made of a section of the frame 36. Advantageously the vertical support has a rectangular cross-section, with the long axis of the cross section perpendicular to a radial axis extending from axis 29, and with the shorter axis of the cross section being generally parallel to that radial axis. Advantageously, the distal ends of the

support 30 are blunted or capped by a protective material in order to avoid penetrating ends. A plastic coating, a protective sheath, melted ends, rounded ends, protective caps, bending the support 30 back on itself to form a U at the distal ends, end and a variety of other means could be used to blunt the ends of the support 30.

[0033] Referring to FIGS. 1, 2 and 5, the pocket 32 encloses the vertical support 30 fairly closely so as to force the side walls 26 that are fastened to the pocket 30 to take the orientation of the support 30. The pockets 30 advantageously take the form of a hat section or a C section, with opposing ends of the pocket attached to the side walls 26 along seam lines 46. Other forms of pockets can be used. It is believed possible, but not preferable, to omit the pockets 32 and have the supports 30 glued, riveted, stapled, melted or otherwise fastened to the abutting side walls 26 in a manner that does not allow relative movement between the support 30 and walls 26. In such situations, the attachment between the support 30 and side walls 26 can be intermittent, or continuous along the length of the support 30. It is also believed possible to directly fasten the supports 30 to the side walls 26 and still cover the supports 30 with pockets 32.

[0034] Referring to FIG. 5, each of the opposing distal ends of the pockets 32 advantageously fold toward the opposing end of the pocket in order to cover and provide padding for the distal ends of support 30. The distal ends are attached to the side walls 26 in the same manner as the remainder of the pocket 32. Advantageously the distal ends of each pocket 32 are located so that the support 30 cannot slide axially within the pocket more than a small amount, say less than 0.5 inches, and preferably the support 30 cannot slide less than about $\frac{1}{16}$ of an inch, and ideally the support cannot move at all, when the container 20 is orientated as shown in FIG. 1.

[0035] Advantageously there are a plurality of supports 26, and preferably at least three supports. Depending on the strength of the supports 26, the orientation of the container 20 (e.g., FIG. 1 v. FIG. 16), and depending on the amount of support that is provided by the supports, the number and configuration of the supports will vary. Preferably, but optionally, the supports 26 extend along an axis generally parallel to longitudinal axis 29. The supports 26 are preferably symmetrically distributed around the periphery of the container 20. In the depicted embodiment, the container 20 is cylindrical, and four supports 30 are located at 90 degree intervals. If the container 20 had a box shape, then a support 30 is preferably located at each corner. Advantageously, but optionally the supports 30 are located at the corners of containers 30 that have corners, but could be located at other places.

[0036] Referring to FIG. 5, the frames 40a, 40b are advantageously located radially outward of the supports 30. Preferably, but optionally, the distal ends of pockets 32 and supports 30 terminate very close to or at the seam line 42. The closer the termination, the sturdier the container 20. If the distal ends of support 30 terminate too far from the seam 42 then the top rim 22 can sag toward the bottom rim 22 along axis 29.

[0037] Advantageously, but optionally, the distal ends of support 30 terminate very close to the frames 36a, 36b. Preferably, the distal ends of support 30 about the frames 36a,

36b directly, or through any intervening layers of the pocket **32** that are interposed between the supports **30** and frames **36**.

[0038] It is believed preferable to have the distal ends of supports **30** fastened to the frames **36** with a rotatable connection. A wire or ring **48** extending through holes **50** in the frames **36** and supports **30** is believed suitable, as shown in FIG. 9. The wire or ring **48** can be covered by one or both of the pockets **40, 32**, or the wire or ring **48** can be inserted through the material forming those pockets. Other forms of joints can be used, such as rotating ball joints, U-joints, a clevis and pin joint, or other joints providing sufficient flexibility to allow the top and bottom rims **22, 24** to be placed adjacent each other when the container **20** is collapsed, as described below.

[0039] Referring to FIG. 14-15, the container **20** has an open position in which the upper and lower rims **20, 22** are separated and the supports extend generally along axis **29**, and also has a folded or collapsed position in which the rims **20, 22** are adjacent each other and the supports are in a plane generally orthogonal to axis **29**. In the collapsed configuration, the supports **30** overlap each other and form tangents to a circle concentric to axis **29**. The container **20** is collapsed by rotating the top rim **20** relative to bottom rim **22** and urging at least one of the top rim **20** and bottom rim **22** toward the other.

[0040] The supports **30** are advantageously not larger than the largest dimension of the frames **36a, 36b**, otherwise the container **20** cannot be collapsed as shown in FIGS. 14-15 without the supports extending beyond the frames **36a, 36b**. If the first and second frames **36a, 36b** are of different sizes, then the length of the supports **30** is advantageously less than half the difference in the largest dimension of the largest of the frames **36a, 36b**, plus half the largest dimension of the smaller of the frames **36a, 36b**. That assumes the frames **36** are coaxially located about centerline **29**. The largest dimension for a circular frame **36** is the diameter of the frame. The largest dimension for a square frame **36** is the diagonal.

[0041] Referring to FIG. 17, longer frames **36** can be used, but then the frames will have to bend about, and preferably curve about the centerline **29**, as shown in FIG. 17. That requires supports **30** made of a sufficiently flexible material and of suitably small dimension to undergo the required bending to collapse the container **20**. Moreover, if frames **30** are longer than the largest dimension of frames **36**, then the frames may extend outside the periphery of the larger of the frames **36a, 36b**.

[0042] It is believed possible that the supports **30a, 30b, 30c, 30d** etc. could have opposing distal ends located diametrically opposite (passing through centerline **29**) each other. Advantageously though, the container **20** collapses such that the supports **30** do not cross the central axis **29**. Preferably, the supports **30**, and each support is at an angle α that is from about 2-30 degrees from a diagonal through the central axis **29** and through one distal end of the support **30**, as shown in FIG. 18.

[0043] Preferably, the pockets **32** restrain the supports **30** so the supports bow slightly when the container begins to collapse from the open position to the closed position, and vice versa. The supports **30** thus cooperate with the pockets **32** to provide a resilient force urging the container to remain in the open position and resisting the collapse of the container **20**.

[0044] The side walls **26** and pockets **32, 38** are preferably made of any of a variety of flexible materials, and preferably are made of the same material. Flexible fabrics are preferred, such as nylon, denim, canvas, or other fabrics. Flexible plastic sheets could also be used. The material can be waterproof, an open mesh, opaque, transparent, or any combination of the above. The above materials are exemplary, and not restrictive. Any material can be used as long as it has sufficient flexibility to allow the container **20** to be collapsed between the open and closed positions.

[0045] The side walls **26** preferably entirely enclose the entire space between the upper and lower rims **22, 24**. Optionally, spaces could be provided so a portion of the space between the rims **22, 24** is not covered by side walls **26**.

[0046] Referring to FIGS. 1, 2, 6 and 12-13, the handle **28** can comprise an aperture in the side wall **26**, but preferably comprises a flexible strap fastened to the container **20**. Advantageously, the handle **28** is fastened to the side wall at one or more locations on the same or different sides of the container **20**. As shown in FIG. 6, the strap **28** can be sewn between the side wall **26** and the edging forming the top pocket **40a**. The handle **28** could fasten directly to the frame **40a** by passing through a hole in the pocket **38a** and encircling the frame **40a**. The handle **28** could be sewn to the side wall **26** with suitable reinforcing. The handle could comprise a rigid handle fastened to the side wall or other portions of the container. Other handles now known or later developed can also be used.

[0047] Referring to FIG. 16, a further embodiment is shown in which the top cover **25** extends across the entire first and second rims **22, 24** to completely block the ends formed by the rims. An access opening **54** can be placed in the side walls **26**, with the longitudinal axis **29** extending through the opening **54**. The opening **54** can extend completely between the first and second rims **22, 24**, or any portion thereof, at any location between the rims. The opening **54** can also extend completely between adjacent supports **30**, or it can extend between a portion of the distance between adjacent supports **30**, at any location between those adjacent supports. It is possible to have a support **30** extend through the opening **54**, but that is not desirable. A support **30** extending through an opening **54** could be used with or without a pocket **32**, and such a support and/or pocket could be used as a handle.

[0048] As seen in FIGS. 1, 3, 15 and 17, the first and second rims **22, 24** are preferably of the same shape, with any corners aligned. But different shaped rims could be used, as for example a square first, top rim **22** with a circular bottom or second rim **24**. Normally, the container **20** has a single rim **22** or **24** resting against the surface that supports the container. When the container **20** is placed so the rims **22, 24** each abut the ground or the surface on which the container is to be placed (FIG. 16), then it is preferable to have the rims **22, 24** be of similar shape and size.

[0049] While detailed embodiments are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to

variously employ the present invention in virtually any appropriately detailed structure.

[0050] The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within the scope and spirit of the invention, including various ways of orientating the container 20 and locating the opening 34, 54 at various locations in the container. Further, the various features of this invention can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described herein. Thus, the invention is not to be limited by the illustrated embodiments but is to be defined by the following claims when read in the broadest reasonable manner to preserve the validity of the claims.

I claim:

1. A collapsible container, comprising:
 - a first rim having a continuous first loop contained in a first pocket enclosing a substantial portion of the first loop;
 - a second rim having a continuous second loop contained in a second pocket enclosing a substantial portion of the second loop, the first rim being spaced apart a predetermined distance from the second rim;
 - a flexible side wall extending the distance between the first and second rims and attached to one of the first and second rims;
 - a plurality of supports extending a substantial portion of the predetermined distance between the first and second pockets, the supports being attached to the side walls; and
 - a bottom attached to the second pocket and cooperating with the side walls to define a contained space.
2. The collapsible container of claim 1, wherein at least a plurality of the pockets are each attached to the side wall by a support pocket that encloses the support sufficiently to make the side wall move with the enclosed support.
3. The collapsible container of claim 2, wherein the first and second loops are flexible tension loop frames.
4. The collapsible container of claim 3, further comprising a handle attached to the container.
5. The collapsible container of claim 3, further comprising a top fastened to the first pocket and having an opening therein.
6. The collapsible container of claim 5, further comprising a cover releasably fastened to the opening.
7. The collapsible container of claim 3, further comprising a flexible cover releasably fastened to the first pocket to provide a closable opening to access the enclosed space.
8. The collapsible container of claim 3, further comprising:
 - a cover attached to the first pocket; and
 - an opening in the side wall providing access to the enclosed space.
9. The collapsible container of claim 8, further comprising a cover over the opening and means for releasably fastening the cover over the opening.
10. The collapsible container of claim 8, further comprising a handle attached to the container.
11. The collapsible container of claim 3, wherein the side walls and bottom are made of fabric.

12. The collapsible container of claim 3, wherein the first and second loops are circular.

13. The collapsible container of claim 12, wherein the first loop has a diameter larger than the second loop.

14. The collapsible container of claim 12, wherein the first loop has a diameter smaller than the second loop.

15. The collapsible container of claim 3, wherein the supports have distal ends each of which is rotatably fastened to whichever of the first and second loops are closest.

16. The collapsible container of claim 3, wherein the first and second loops are constrained by the pockets to have a quadrilateral shape.

17. The collapsible container of claim 16, wherein there are four supports, one at each corner of the quadrilateral.

18. A collapsible container, comprising:

- a first rim having a first flexible, tension loop frame contained in a first pocket;
- a second rim having a second flexible, tension loop frame contained in a second pocket;
- a sidewall extending between the first and second rims and attached to the first and second rims;
- a bottom attached to the second rim and cooperating with the sides to define an enclosed space;
- a plurality of supports extending between the first and second rims and attached to the side wall so as to allow the container to change between a first, open position with the supports generally perpendicular to the rims and a second, collapsed position with the supports generally parallel to the rims, by rotating the first and second rims relative to each other.

19. The collapsible container of claim 18, further comprising a handle attached to the container.

20. The collapsible container of claim 19, further comprising a top attached to the first rim and defining an opening to the enclosed space.

21. The collapsible container of claim 18, further comprising a cover attached to and closing the first rim, and an opening formed in the side wall to allow access to the enclosed space.

22. The collapsible container of claim 18, wherein the supports are attached to the side wall by a pocket enclosing each support sufficiently tight to make the side wall move with the support.

23. The collapsible container of claim 22, wherein the supports have distal ends terminating immediately adjacent the rims.

24. The collapsible container of claim 18, further comprising means for attaching the supports to the side wall.

25. The collapsible container of claim 18, wherein the first and second tension loops are circular.

26. The collapsible container of claim 18, wherein at least one of the first and second tension loops is constrained to a non-circular shape by the pocket containing the non-circular loop.

27. A collapsible container, comprising:

- first and second opposing rims, each having a flexible, tension loop frame contained in a pocket to define the shape of the rim;
- a side wall extending between and attached to the rims;

covers attached to at least one of the rims to define an enclosed space, with an access opening being formed in at least one of the panels or the side wall;

a plurality of supports extending between the rims and attached to the side wall by confining pockets that allow the container to move between a first, open position with the supports generally perpendicular to the rims and a second, collapsed position with the supports generally parallel to the rims, by rotating the first and second rims relative to each other.

28. The collapsible container of claim 27, wherein the loops are circular and there are at least three supports.

29. The collapsible container of claim 27, wherein the loops are quadrilateral and form four corners and wherein there are four of the supports extending between the corners of the rims.

30. The collapsible container of claim 27, wherein the first and second rims each have a cover cooperating with the side

wall to define an enclosed space, and further comprising an opening in the side wall allowing access to that enclosed space.

31. The collapsible container of claim 27, further comprising a handle attached to the collapsible container.

32. The collapsible container of claim 1, wherein the first and second frames have a maximum dimension and each of the supports have a length that is less than that maximum dimension

33. The collapsible container of claim 18, wherein the first and second frames have a maximum dimension and each of the supports have a length that is less than that maximum dimension.

34. The collapsible container of claim 27, wherein the first and second frames have a maximum dimension and each of the supports have a length that is less than that maximum dimension.

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