

Oct. 7, 1969

P. A. LATHAM ETAL

3,471,058

COLLAPSIBLE DISPENSING CONTAINER

Filed Oct. 6, 1966

3 Sheets-Sheet 1

FIG. 1

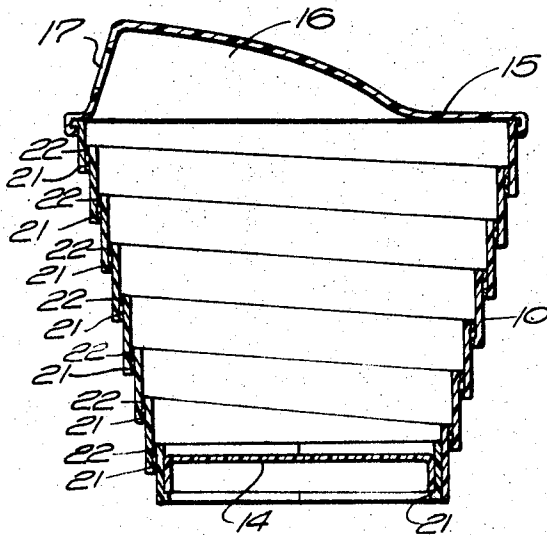
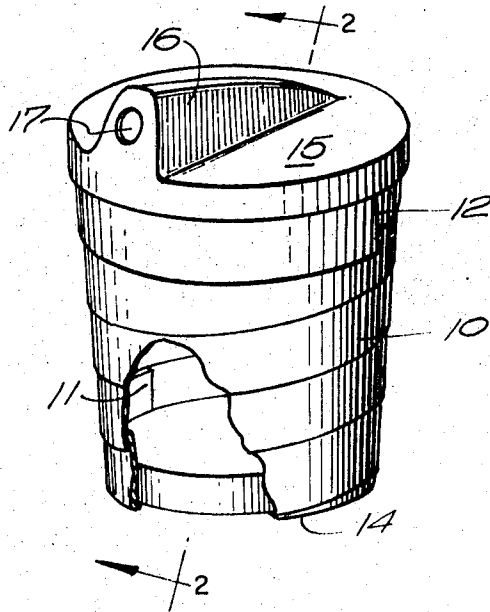


FIG. 2

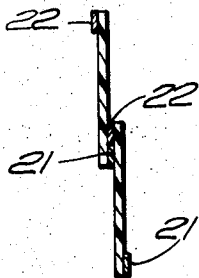


FIG. 5

FIG. 3

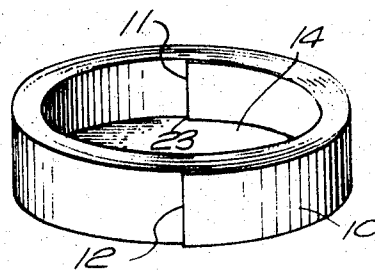
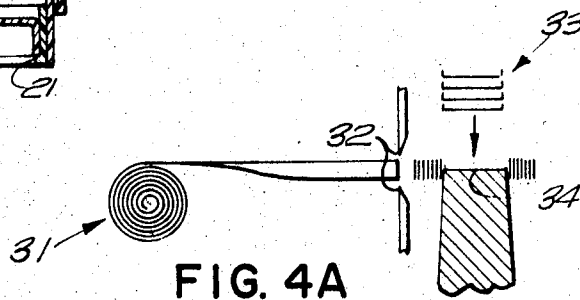


FIG. 4A



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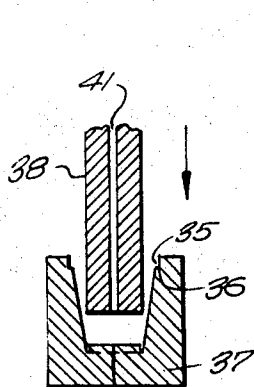


FIG. 4B

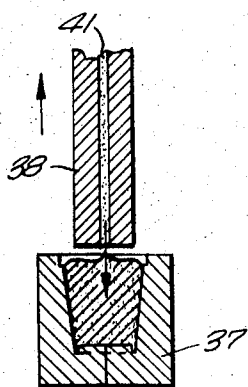


FIG. 4C

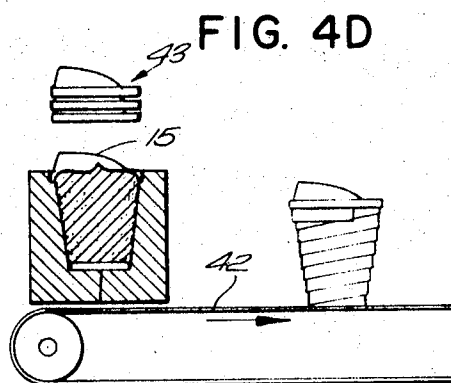


FIG. 4D

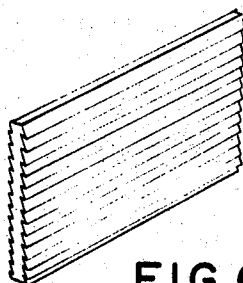


FIG. 6

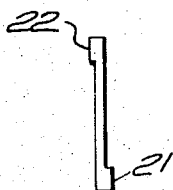


FIG. 7

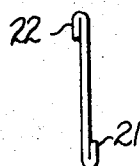


FIG. 7A

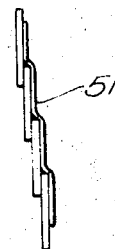


FIG. 8

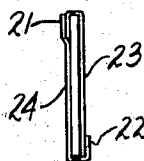


FIG. 7B

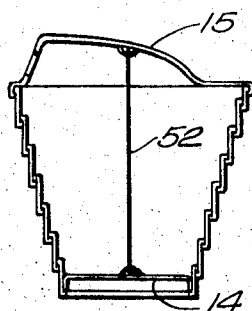


FIG. 9

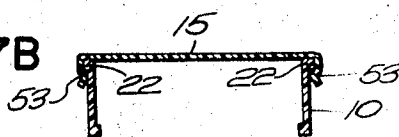


FIG. 10

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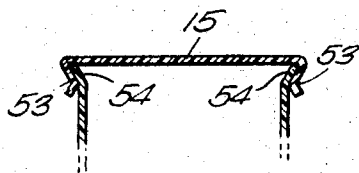


FIG. 11

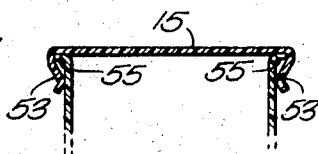


FIG. 12

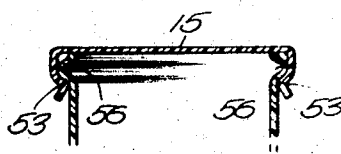


FIG. 13

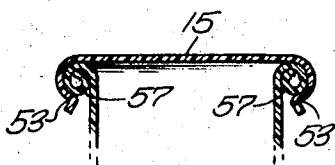


FIG. 14

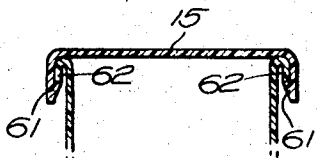


FIG. 15

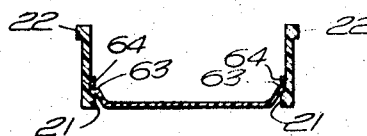


FIG. 16

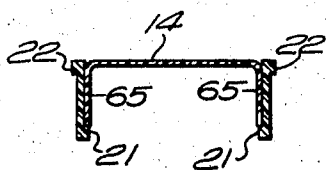


FIG. 17

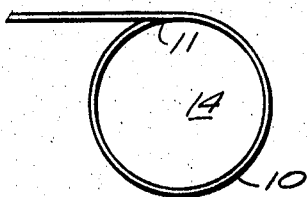


FIG. 18

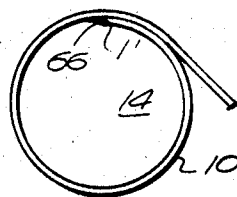


FIG. 19

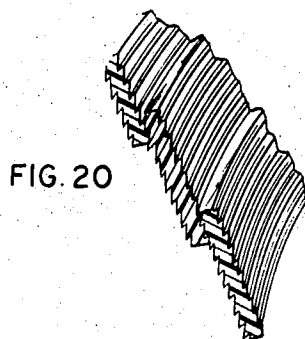


FIG. 20

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COLLAPSIBLE DISPENSING CONTAINER

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U.S. Cl. 222—92

19 Claims

ABSTRACT OF THE DISCLOSURE

A container comprises a continuous strip which begins at its leading edge and ends at its trailing edge helically wound around the container axis to define the cylindrical wall of the container with adjacent convolutions in frictional engagement for allowing relative displacement of the convolutions in a direction along the axis while opposing appreciable relative angular displacement about the axis. The leading edge of the strip is fastened upon itself to define the base convolution in which a base is situated. The trailing edge of the strip is fastened upon itself to define the lid convolution. A lid fits over the upper or lid edge of the lid convolution to coact with the base and the strip to fully enclose the internal volume of the container.

The present invention relates in general to containing and more particularly concerns novel methods and means for containing embodying a telescoping structure that is relatively easy and inexpensive to fabricate, occupies relatively little space when shipped empty, occupies just enough space to contain the remaining material after partial withdrawal and facilitates material removal by enabling the user to continuously keep material near the opening of the container.

According to the invention, the container includes a cylindrical wall of a unitary strip of flexible material forming a number of closed loops or convolutions coaxial about and surrounding the cylinder axis. Means defining a base is secured to a base edge of the base loop whereby the remaining or lid edge of the lid loop may be moved away from the base to expand the volume of the container with the strip forming a helix whereby each convolution overlaps a portion of the adjacent one. The lid edge of the container may be pressed toward the base to expel material through the opening end of the cylinder near the lid edge. Preferably, means are provided for limiting the axial displacement of each convolution, this means typically comprising a small base protrusion located along the base edge of the continuous strip and a small lid protrusion located on the lid edge of the continuous strip and separated by the strip thickness. A cap may cover the opening of the container. This cap may be formed with a small opening for ejecting paste-like material, such as shaving cream, tooth paste, mustard, catsup and the like.

In accordance with the principles of the invention, a strip of flexible material, such as cardboard or plastic, is wrapped a number of times about itself to form a plurality of substantially concentric loops or convolutions. Means defining a bottom or base plate is fastened to one extreme one of the loops thus formed, the base loop or convolution. The trailing edge of the strip is secured to the strip to define the other extreme loop, the lid loop or convolution, and form a container according to the invention collapsed ready for shipment in a form that occupies relatively small volume. The container may then be expanded, filled and capped.

It is an important object of this invention to provide an economical material container that occupies relatively little volume when empty prior to filling and may be relatively rapidly and easily expanded just before being filled.

It is a further object of the invention to achieve the

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preceding object with a container that coacts with the material contained to achieve increased structural strength and fluid tightness when desired.

It is another object of the invention to achieve the preceding objects with a container that may be easily collapsed as material is withdrawn so that the material is always relatively near the container opening.

It is still a further object of the invention to achieve the preceding objects with a container that may be filled with a liquid that later solidifies.

It is still a further object of the invention to achieve the preceding objects with a dispensing type container whereby contraction of the container results in expelling the contained material.

It is still a further object of the invention to provide techniques and apparatus for making containers in accordance with the preceding objects.

It is a further object of the invention to provide containers in accordance with the preceding objects having means for limiting the maximum length of the container.

Numerous other features, objects and advantages of the invention will become apparent from the following specification when read in connection with the accompanying drawing in which:

FIG. 1 is a perspective view of an exemplary embodiment according to the invention;

FIG. 2 is a longitudinal sectional view through section 2—2 of FIG. 1;

FIG. 3 shows a fully collapsed container according to the invention without a lid;

FIGS. 4A through 4D are a pictorial representation of a preferred method of making and using the invention, facilitating converting rolls of package forming material into filled containers on the same premises;

FIG. 5 is a sectional view through a pair of overlapping convolutions to illustrate a detail of how the locking arrangement limits the maximum expansion;

FIG. 6 is a perspective view of sawtooth-textured strip material having locking properties;

FIGS. 7, 7A and 7B are sectional views through strips each formed with steps in base and lid edges to achieve the locking feature;

FIG. 8 is a sectional view through a number of overlapping convolutions illustrating how a strip of tape applied after expansion may limit expansion;

FIG. 9 is a sectional view through a container with a permanently attached lid showing how a tension cable may be used to limit expansion;

FIGS. 10—15 are diametrical sectional views through top portions of containers according to the invention illustrating various arrangements for keeping the lid secured to the lid convolution of the container;

FIG. 16 is a diametrical sectional view through the bottom portion of a typical container illustrating a preferred bottom section for locking with the bottom convolution;

FIG. 17 is a diametrical sectional view through another bottom portion having a raised base to insure that substantially all the container contents are expelled when the container is collapsed;

FIG. 18 is a top view showing one preferred form of feathering the leading edge to insure a good fit of the base convolution about the base;

FIG. 19 is a top view of another form of base that is stepped to assure a good fit between the base and the first convolution; and

FIG. 20 is a longitudinal sectional view of a few convolutions of a container according to the invention made of sawtooth-textured strip of the type illustrated in FIG. 6 helpful in understanding the ratcheting action achieved with such a strip.

With reference now to the drawing and more particularly FIG. 1 thereof, there is shown a perspective view

of a container according to the invention especially suitable for dispensing material, such as shaving cream. The container comprises a continuous strip 10 which begins at its leading edge 11 and ends at its trailing edge 12 helically wound around the axis 13 of the container to define the cylindrical wall thereof. The leading edge 11 of the strip 10 is fastened upon itself to define the base convolution in which base 14 is situated. The trailing edge 12 of the strip is fastened upon itself to define the lid convolution. The lid 15 fits over the upper or lid edge of the lid convolution to coact with the base 14 and the strip to fully enclose the internal volume of the container. The container lid 15 is formed with an inverted U-shaped channel 16 terminating in an opening 17 for guiding the material inside through channel 16 and out through opening 17 as lid 15 and base 14 are urged together.

Referring to FIG. 2, there is shown a sectional view through section 2—2 of FIG. 1. In the preferred embodiment of the invention shown the base 14 is of inverted cup shape to establish a good seal with the lower or base edge of the base convolution. Preferably the inside surface of the strip is formed with a ridge 21 near the base edge and the outside of the strip is formed with a ridge 22 near the lid edge. The ridges 21 and 22 engage one another with the container fully expanded as shown to prevent the strip from becoming uncoiled. At the same time the mating ridges 21 and 22 help effect a good fluid seal when these ridges are made of suitable material, preferably slightly compressible and essentially fluid tight.

Ridges 21 and 22 may be separate strips of tape, or strip 10 may be formed with ridges 21 and 22 as a unitary part thereof. The portions corresponding to ridges 21 and 22 could be made hollow of generally O-shaped cross section to facilitate deformation and achieving an especially good fluid-tight seal. Alternately these portions could be of inverted U-shaped cross section to facilitate especially snug locking interengagement.

For numerous uses achievement of a perfect fluid-tight seal is unnecessary. For example, when the container is used for ice cream, liquid ice cream mix may fill the container and then frozen shortly after filling. A flat cap may be placed over the lid convolution to close the opening shortly after filling or after freezing. A user then lifts the lid, scoops ice cream from the top, puts the lid back on and presses down on the lid until the remaining ice cream substantially fills the volume between lid and base. The next time ice cream is to be dispensed, the user removes the lid and finds ice cream still immediately adjacent the opening near the top of the container. The container takes less space in the freezer each time it is telescoped in this manner. The invention thus helps minimize wasted space. In conventional containers a quart container of ice cream always occupies a quart of space in the refrigerator, even though only a spoonful of ice cream may be left.

Referring to FIG. 3, there is shown a perspective view of the container fully telescoped within itself with the lid removed. Base 14 is shown formed with a small step 23 corresponding substantially to the strip thickness for accommodating leading edge 11 and allowing the first convolution to snugly engage base 14. In general the angular spacing between leading edge 11 and trailing edge 12 is not the same from container to container because the container is preferably wound until a predetermined maximum diameter is reached corresponding substantially to the nominal inside diameter of the lid. Winding according to this diameter criterion is advantageous because the thickness of the strip need not be maintained to impractically rigorous tolerances.

Referring now to FIG. 4, there is shown a pictorial representation of a preferred method and means for making the invention. More specifically, FIG. 4A shows a roll 31 of strip material for forming the containers. The strip material is brought through opposed cutting edges 32 and cut to selected lengths. A base from the base stack 33 is seated upon a mandrel 34. The strip of appropriate

length is wrapped around base 14 for one turn and attached to the bottom by sealing, bonding, mechanical rolling or other suitable techniques and then sealed upon itself for a short circumferential distance, such as that subtending about ninety degrees. The wrapping is continued without axial displacement of the strip until the correct diameter is reached. The strip 10 is then attached to itself for a distance typically and preferably that subtending at least ninety degrees. Preferably the wrapping is carried out with the strip held at constant predetermined tension that gives an effective seal and reliable telescoping action. That is, the tension should be high enough to result in a good seal along the lapped spiral seam while not being so great that the frictional force between overlapping surfaces is so high that axial displacement of the different convolutions is too difficult.

Referring to FIG. 4B, the container may then be seated with the outermost convolution 35 on the step 36 of tapered holder 37. Tapered holder 37 has the step 36 for supporting the lid convolution and tapers to a bottom diameter preferably slightly larger than that of the base convolution so that a mating filling head 38 with a central opening 41 may be urged downward against base 14 to fully expand the container. The head 38 may then be raised while filling the container as shown in FIG. 4C.

Referring to FIG. 4D, the holder 37 with filled container may then be placed on conveyor belt 42, capped with a lid 15 from the stack 43 and moved to a storing room, which in the case of ice cream mix, might be a freezing compartment. An advantage of the invention is that the lid may be of relatively small height because the container itself may expand as the ice cream freezes. With conventional nonexpanding containers, as the ice cream freezes, it bulges in the center, requiring a lid that will accommodate this bulge. Still another advantage of the invention is that the material filling the container helps urge the overlapping edges together and keep a substantially fluid tight seal. And the telescoping action cleans the inside walls of the container as it is shortened during use to reduce waste.

Referring to FIG. 5, there is shown a sectional view of two overlapping strip portions illustrating how the base ridge 21 and lid ridge 22 engage one another when the container is fully expanded. As there illustrated, ridges 21 and 22 may each be a separate strip of tape laminated or otherwise bonded to strip 10.

Referring to FIG. 6, there is shown a sectional view of an alternate form that strip 10 may assume having sawtoothed texture on both sides as illustrated with the points on one side pointing down and the points on the other side pointing up to facilitate stepwise locking with ratcheting action. That is, as the contents of the container are expelled, the container may be shortened to the next sawtooth step but may not be expanded.

The ratcheting action will be better understood from the view of FIG. 20 illustrating a longitudinal sectional view through a container according to the invention made of the sawtooth-textured strip of FIG. 6. Note how the downwardly pointing teeth at the top of the inside surface of the strip mesh with the upwardly pointing teeth at the bottom of the outside surface of the strip to provide the ratcheting action. Note that the container with such a strip may be collapsed but not expanded.

Referring to FIG. 7, there is shown a sectional view of a strip with ridges 21 and 22 formed. FIG. 7A shows the steps 21 and 22 formed by bending the top and bottom edges back upon and sealing them to opposite sides of the strip. FIG. 7B shows the steps 21 and 22 formed by surrounding a strip of rectangular cross section with two overlapping strips 23 and 24 of J-shaped cross section. When strips 23 and 24 are a liquidproof film of plastic or other suitable material, they coact not only to form steps 21 and 22, but also prevent wicking when the strip of rectangular cross section is of material, such as cardboard, subject to wicking.

Referring to FIG. 8, there is shown a sectional view through a number of overlapping convolutions illustrating how a strip of tape 51 may be laid over the convolutions after expansion to limit the maximum expansion of the container.

Referring to FIG. 9, there is shown a diametrical sectional view through a container according to the invention having a permanently attached lid in which a tension cable 52 is connected between base 14 and lid 15 to limit the maximum extension of the container.

Referring to FIGS. 10-15, there are shown diametrical sectional views through top portions of containers according to the invention showing a number of alternate arrangements for locking lid 15 to the uppermost convolution. In FIG. 10 strip 10 has the cross section shown in FIG. 7, and lid 15 is formed with a roll 53 curving inwardly to grip the underside of ridge 22. In FIG. 11 roll 53 is shown gripping the underside of a top edge 54 of the uppermost convolution that has been rolled outward at an angle of the order of 45 degrees. In FIG. 12 roll 53 is shown gripping the underside of the upper edge 55 rolled outward at an angle of substantially 90 degrees. In FIG. 13 roll 53 is shown gripping the underside of a roll 56 formed in the upper edge of the uppermost convolution. In FIG. 14 roll 53 is shown gripping the underside of the upper edge 57 of the uppermost convolution formed in a roll so as to provide a high degree of resiliency and press firmly against lid 15.

Referring to FIG. 15, lid 15 is shown formed with a ridge 61 projecting radially inward whose upper side is adapted to grip the underside of the upper edge 62 of the uppermost convolution rolled back parallel to the uppermost convolution to form an upper portion of generally U-shaped cross section.

Referring to FIG. 16, there is shown a sectional view through the bottom portion of the container illustrating a preferred cross section of base 14 for insuring maximum filling of the container and snug engagement with the lowermost convolution. Note that base 14 is formed with a horizontal ridge 63 adapted to engage ridge 21 when strip 10 is of the cross section shown in FIG. 7 and a vertical ridge 64 adapted to snugly engage the inside of the lowermost convolution.

Referring to FIG. 17, there is shown a diametrical sectional view through the lowermost portion of a container according to the invention illustrating a preferred section of base 14 for a container in which the contents are fully expelled when the container is fully collapsed. Base 14 is then formed with an annular rim 65 of height corresponding substantially to that of strip 10 less the height of ridge 21 so that it rests on the top of ridge 21 with its horizontal platform substantially level with the top of ridge 22 while annular rim 65 may snugly engage the inside surface of strip 10 in the lowermost convolution.

Referring to FIG. 18, there is shown a top view of base 14 with the lowermost convolution in place illustrating how the leading edge 11 may be feathered as shown to taper to a knife edge so that base 14 may be substantially circular while the lowermost convolution snugly engages base 14 to effect a substantially fluid-tight seal around the complete perimeter of base 14. Trailing edge 12 may be similarly tapered.

Referring to FIG. 19, there is shown a top view of base 14 with the lowermost convolution in place in which base 14 is formed with a step 66 corresponding substantially to the thickness of strip 10 so that leading edge 11 butts against this step to insure a substantially uniform thickness about the first convolution. Lid 15 may be similarly stepped.

The specific cross sections of strip 10, base 14, upper portions with various means for engaging the lid 15, and other illustrative arrangements are by way of example only for showing various forms which the invention may

take and are not to be construed as a limitation of the invention. The advantages of containers according to the invention are numerous. The containers may be made shortly before being filled so that the user need only pay for shipping rolls of strip material instead of containers, thereby reducing transportation costs. The machinery for making the containers may be relatively simple and be a part of the means for filling the container. Less material is required for a given volume, and the thickness may be decreased because the structural arrangement with overlaps and small diameter produces a container of improved strength. The container diminishes in size as the product is dispensed to provide the user of the contents with desired space savings in storage. The container is convenient and easy to use because the contents are more readily accessible to the consumer. Merely replacing the cap each time following use and pressing down on the container until the contents are level with the lid keeps the contents at the top for the next dispensation. The height of the container automatically is a clear visual indication of the amount of contents remaining in the container.

By integrating a spout on the lid and attaching it permanently, the container becomes an especially convenient dispenser for light messy viscous fluids, such as toothpaste, mayonnaise and the like.

The invention is especially suited for producing any size containers from the same roll and machinery merely by making more or less convolutions and using lids of larger diameter for the larger sizes.

The freshness of food contents may be preserved for longer periods by eliminating the air or head space each time the container is compressed. For use in aerosol or fiber drum applications, considerable savings should be effected in shipping costs. The invention may use various types of material, such as paper, cardboard, plastic coated paper, foil coated papers, plastic sheet materials and any future new sheet materials that may be developed. Plastic or wax coated paper may be used to prevent wicking.

If desired, a spiral sealing tape may be added around the spiralling edges of strip 10 or the entire container may be enclosed in a shrink-type sleeving if an especially fluid-tight seal is required. Alternately, the overlapping edges may be lightly heat-sealed, this heat sealing preferably being strong enough to establish the seal but mechanically weak enough so that the seal will break when the container is shortened.

The strip 10 may have a plastic coating inside and a wax coating outside. After expansion the container may be heated sufficiently to melt the wax and establish a fluid-tight seal after cooling. The container may then be filled with liquid which later solidifies. The seal is sufficiently weak so that it may be broken as the container is compressed as the contents are used.

The invention has numerous uses and may contain a wide variety of material. If the specific embodiment shown in FIG. 1 also includes an inner flexible bag, the invention may be used to dispense virtually all kinds of pastes and liquids. If one rapidly relatively displaces the base and lid convolutions, the invention may function as a source of air comprising expandable bellows. The invention may be made in numerous different sizes for containing all kinds of materials. The invention may also be used as a container for concrete or other building material. For example, the invention may be shipped in compressed form to a construction site, expanded to a desired column height and filled with concrete to form a circular column. Such a container might preferably be made open at both ends so that the outermost convolution could rest on a floor and the innermost convolution be toward the ceiling whereby the column thus formed would be tapered from a wider diameter at the bottom to a narrower diameter at the top.

Still another advantageous use of the invention is for concentrates, such as frozen juices. Preferably the con-

centrate is in the container fully collapsed with the container being expandable to maximum volume sufficient to accommodate the required amount of water or other liquid. Thus, the user could fully expand the container, fill it with water or other liquid (e.g., milk for a pancake mix), put the cap on, shake and dispense. The invention would thus additionally function as a shaker and dispenser.

In a preferred embodiment of the invention of the type shown in FIG. 1, the material used for strip 10 is a strip of 42 inches flexible plastic 1.25 inches wide and .022 inch thick with 6 convolutions forming a container 5 inches high.

It is evident that those skilled in the art may now make numerous other uses and modifications of and departures from the specific embodiments described herein without departing from the inventive concepts. Consequently, the invention is to be construed as embracing each and every novel feature and novel combination of features present in or possessed by the apparatus and techniques herein disclosed and construed as limited solely by the spirit and scope of the appended claims.

What is claimed is:

1. Containing apparatus comprising,
 - a continuous strip of flexible material having generally parallel base and lid edges along its length, a leading edge and a trailing edge and forming a cascade of contiguous convolutions nested one inside the other about an axis with a consecutive pair of convolutions in at least partially overlapping contacting relationship,
 - means for fastening said leading edge to a first inner portion of said strip to define the first of said convolutions,
 - means for fastening said trailing edge to a second inner portion of said strip to define the last of said convolutions,
 - and means including the remaining ones of said convolutions intercoupling said first and last convolutions for allowing relative displacement of said convolutions in a direction along said axis while opposing appreciable relative angular displacement thereof about said axis.
2. Containing apparatus in accordance with claim 1 and further comprising means defining a base, and means for fastening said base to said first convolution.
3. Containing apparatus in accordance with claim 2 and further comprising means defining a lid, and means for fastening said lid to said last convolution.
4. Containing apparatus in accordance with claim 1 and further comprising limiting means for limiting the relative displacement of said convolutions along the direction of said axis to less than a predetermined maximum displacement.
5. Containing apparatus in accordance with claim 4 wherein said limiting means comprises a lid ridge adjacent to the lid edge of said strip and a base ridge adjacent to the base edge of said strip,
 - said lid ridge and said base ridge being on opposite sides of said strip,
 - whereby interengagement of the lid ridge of one convolution with the base ridge of the immediately adjacent convolution establishes said predetermined maximum displacement.
6. Containing apparatus in accordance with claim 5 wherein said strip is formed with said lid ridge and said base ridge.
7. Containing apparatus in accordance with claim 6 wherein one of said lid and base ridges is of sawtooth form pointing toward said lid edge and the other of said lid and base ridges is of sawtooth form pointing toward said base edge and said strip is formed with a plurality of contiguous ridges of sawtooth form pointing toward said lid edge

on the same side of said strip as said one ridge and formed with a plurality of contiguous ridges of sawtooth form pointing toward said base edge on the same side of said as said other ridge,

- 5 whereby consecutive convolutions provide ratcheting action allowing relative displacement in one direction along said axis while opposing relative displacement in the opposite direction along said axis.
8. Containing apparatus in accordance with claim 4 wherein said limiting means comprises a strip of flexible material fastened at least to the first and last of said convolutions.
9. Containing apparatus in accordance with claim 3 and further comprising,
 - 15 limiting means for limiting the relative displacement of said convolutions along the direction of said axis to less than a predetermined maximum displacement comprising a flexible member inside said convolutions interconnecting said lid and said base.
10. Containing apparatus in accordance with claim 2 wherein said base is formed with a step of radial dimension corresponding substantially to the thickness of said strip,
 - said leading edge abutting said step,
 - said first convolution being fastened to the periphery of said base to form a substantially fluid-tight containing portion defined by said base and said first convolution.
11. Containing apparatus in accordance with claim 2 wherein said strip tapers in thickness near said leading edge to a knife edge at said leading edge,
 - 30 said first convolution being fastened to the periphery of said base to form a substantially fluid-tight containing portion defined by said base and said first convolution.
12. Containing apparatus in accordance with claim 5 and further comprising means defining a base seated upon the base ridge of said first convolution.
13. Containing apparatus in accordance with claim 12 wherein said base is formed with an annular lip that rests upon the base ridge of said first convolution.
14. Containing apparatus in accordance with claim 3 wherein said means for fastening said lid to said last convolution includes a rim on said lid extending toward said base,
 - 45 said rim including a lid protrusion extending radially inward,
 - the upper portion of said last convolution being formed with a strip protrusion extending radially outward for engagement with said lid protrusion,
 - said lid protrusion and said strip protrusion comprising means for normally opposing relative displacement along the direction of said axis between said lid and said last convolution.
15. A method of making containing apparatus of the type comprising a continuous strip of flexible material having generally parallel base and lid edges along its length, a leading edge and a trailing edge and forming a cascade of contiguous convolutions nested one inside the other about an axis with a consecutive pair of convolutions in at least partially overlapping contacting relationship, means for fastening said leading edge to a first inner portion of said strip to define the first of said convolutions, means for fastening said trailing edge to a second inner portion of said strip to define the last of said convolutions, and means including the remaining ones of said convolutions intercoupling said first and last convolutions for allowing relative displacement of said convolutions in a direction along said axis while opposing appreciable relative angular displacement thereof about said axis, the said method including the steps of,
 - 70 fastening said leading edge to said first inner portion to define the first of said convolutions,
 - wrapping said strip about said first convolution and each succeeding convolution while maintaining a predetermined tension in said strip sufficiently high to effect a satisfactory seal between overlapping contiguous
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ones of said convolutions and sufficiently low to establish a frictional force therebetween allowing relative displacement of said convolutions in a direction along said axis,

and fastening said trailing edge to said second inner portion of said strip to form the last of said convolutions.

16. A method of making containing apparatus in accordance with claim 15 and further including the step of, terminating the second step when the maximum diameter of the convolutions then formed corresponds to a predetermined value.

17. A method of making containing apparatus in accordance with claim 15 and further including, wrapping said strip around and fastening said strip to means defining a base to form a substantially fluid-tight containing portion comprising said base and said first convolution.

18. A method of making containing apparatus in accordance with claim 17 and further including, terminating the second step when the maximum diameter of the convolutions then formed corresponds to a predetermined nominal diameter, relatively displacing said convolution along the direction of said axis to establish a predetermined axial separation between said first and last convolutions,

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filling said containing apparatus with filling material, and placing means defining a lid over and in snug engagement with said last convolution to fully surround said filling material.

19. Containing apparatus in accordance with claim 3 and further comprising, dispensing means associated with said means defining a lid, said dispensing means defining a passage for expelling material from said containing apparatus when said base and lid are urged together.

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