

Sept. 5, 1939.

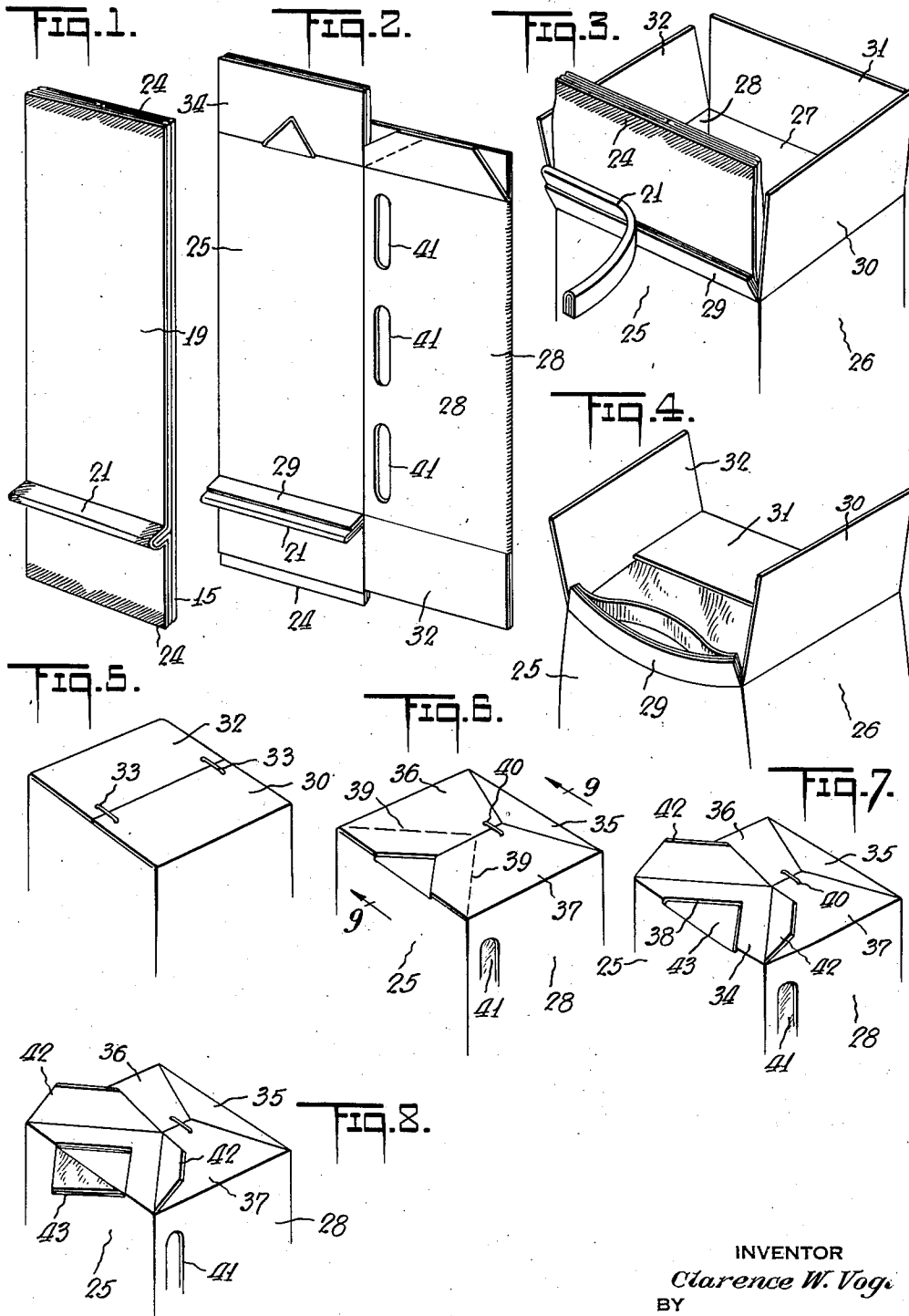
C. W. VOGT

2,171,717

COLLAPSIBLE CONTAINER

Filed Oct. 8, 1935

2 Sheets-Sheet 1



INVENTOR
Clarence W. Vogt
BY
Dennis F. Smith / Harold F. Smith
ATTORNEYS

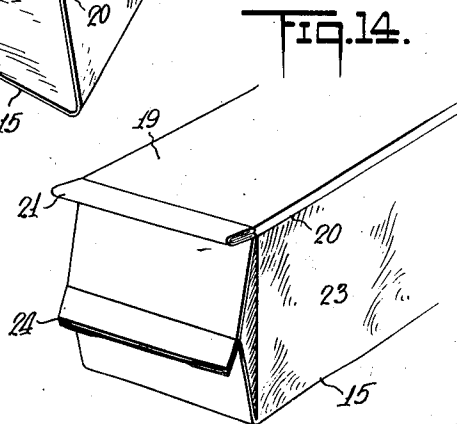
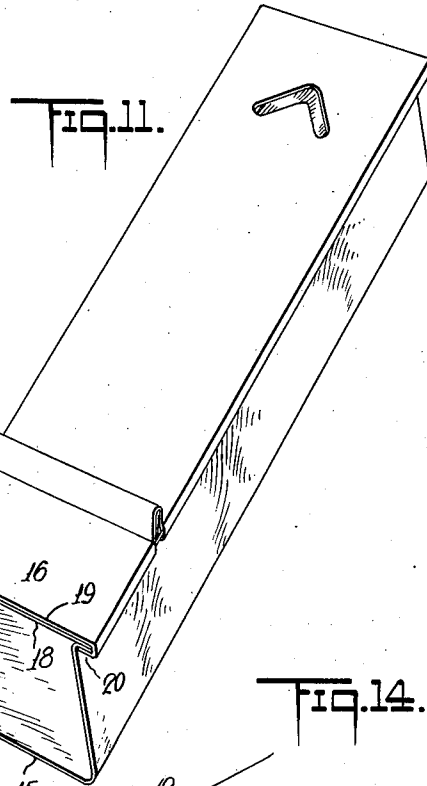
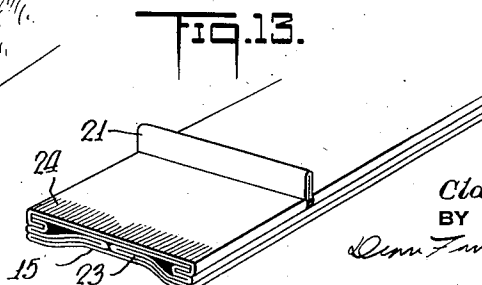
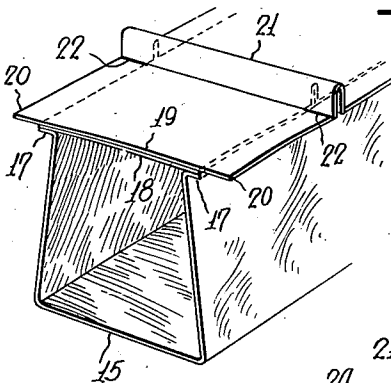
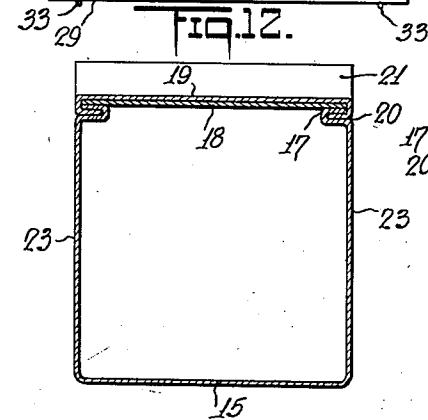
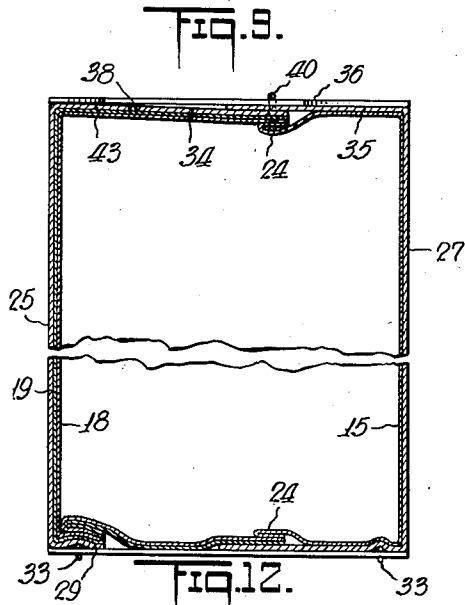
Sept. 5, 1939.

C. W. VOGT
COLLAPSIBLE CONTAINER

2,171,717

Filed Oct. 8, 1935

2 Sheets-Sheet 2



INVENTOR
Clarence W. Vogt
BY
Depp, Furber & Horst, Inc.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,171,717

COLLAPSIBLE CONTAINER

Clarence W. Vogt, New York, N. Y., assignor, by
mesne assignments, to Owens-Illinois Glass
Company, Toledo, Ohio, a corporation of Ohio

Application October 8, 1935, Serial No. 43,995

23 Claims. (Cl. 229-14)

This invention relates to containers which may be made and/or shipped in flat, collapsed or knock-down form, and which may be readily opened up and employed for the storage, shipment and dispensing of pourable materials such as liquids or solids in powdered or granular form.

The invention in its simplest form comprises a bag, tube or liner formed primarily of thin flexible sheet material of such a character that superposed layers or portions thereof may be readily sealed together. In such simple form my invention relates to the construction and arrangement of the parts whereby a filling opening is formed which may be easily, quickly and effectively sealed.

As one important feature of my invention, the container is formed with a pleat having juxtaposed layers in one wall or at the intersection of two walls, whereby upon cutting off or slitting the outer edge of the pleat there remains a pair of parallel lips or flanges which may be separated or bowed apart to form an opening to receive a filling nozzle. After the filling and the removal of said nozzle, these lips or flanges may be sealed together.

As a further feature, the pleat is formed transversely of one side and intermediate of the ends of a tubular casing sealed at its ends so that during shipment and/or storage of the collapsed container, the interior may be maintained sealed and sterile and protected against any possible contamination. The pleat is preferably so located that after slitting or cutting of the outer fold of the pleat and filling of the bag or tube to distend it, the pleat will come along one corner of a rectangular package and thus may be readily sealed with a predetermined volume of material within the package.

The pleat in such construction serves primarily for the filling of the container, but the same construction may be employed where the pleat also serves as a pouring spout upon cutting away of a further portion of the pleat. It may serve solely as a dispensing outlet if the pleat be formed on the side of the tube and the tube be filled and sealed at one end.

As a further feature of my invention, the bag or tube is used as a liner for a carton or casing of thicker supporting material and it likewise may be shipped in flat collapsed form. The thin flexible inner container may be filled before inserting in the carton although preferably it is permanently attached to the carton, which serves to limit the extent to which the liner may be filled if it be of slightly stretchable material,

and which also serves to give to the liner a predetermined shape and proportion.

A further feature of my invention relates to the construction of the outer casing or carton whereby a pouring spout or lip may be formed and the inner liner punctured or cut to facilitate dispensing.

Other important features of my invention will be apparent from a consideration of the accompanying drawings and the following description of certain specific forms, or will be later pointed out. In these drawings:

Fig. 1 is a perspective view of the flexible bag or tube in collapsed form,

Fig. 2 is a perspective view of a collapsed carton having the bag or container attached thereto,

Fig. 3 is a perspective view of one end of the combined carton and bag, and showing a portion of the pleat cut away preparatory to filling,

Fig. 4 is a perspective view similar to Fig. 3, but showing the bag open and distended,

Fig. 5 is a perspective view of the same end of the bag after filling and sealing the bag and closing the carton,

Fig. 6 is a perspective view of the opposite end of the carton,

Fig. 7 is a view similar to Fig. 6, but showing the first step preparatory to dispensing,

Fig. 8 is a view similar to Fig. 7 but showing the bag opened and the pouring lip formed,

Fig. 9 is a vertical section through the package and taken on the line 9-9 of Fig. 6,

Fig. 10 is a perspective view of a portion of the tube or bag during the process of manufacture,

Fig. 11 is a perspective view similar to Fig. 10, but showing the same after further steps in the operation,

Fig. 12 is an end view of the construction shown in Fig. 11, but with the tube before collapsing and end sealing,

Fig. 13 is a perspective view of an end portion of the collapsed bag, and

Fig. 14 is a perspective view of the distended bag.

The bag which may form the complete container or form the liner for a carton, is preferably made from thin flexible sheet material of strip form progressively assembled to form an endwise advancing tube, and progressively collapsed and sealed transversely at spaced points along the length thereof and then cut transversely intermediate of the edges of the sealed portion to form the complete, hermetically sealed, empty and collapsed container.

The tube is formed primarily of a material

such that when the layers are superposed and slit and pressed together, they will weld, vulcanize or permanently unite. As an example of such material, I may and preferably do employ a type of thin, flexible, transparent, slightly elastic material sold under the name of "Pliofilm" and made from a chlorinated rubber compound. This material has the property of fusing or vulcanizing together upon the application of heat and pressure.

In forming the tube there is employed two strips 15 and 16, one of these strips 15 being formed of the Pliofilm bent to substantially channel shape, with outwardly extending flanges 17. The other strip 16 is formed of a layer 18 of Pliofilm cemented or otherwise secured to a layer 19 which may be of paper or other flexible sheet material which will not be injuriously affected by the application of sufficient heat and pressure to effect welding, fusing or vulcanizing of the Pliofilm. The outer paper layer 19 is somewhat wider than the inner layer 18 so as to form marginal extensions 20, and the inner layer 18 is of such width as to span the open side of the channel strip 15 and terminate approximately flush with the outer edges of the flanges 17.

After assembling the two strips as shown in Fig. 10, the lateral extensions 20 are folded beneath the flanges 17 as shown in Fig. 11, and heat and pressure is applied to the undersides of the extensions 20 and the upper side of the strip 19 so as to soften the superposed layers formed of the edge portions of the layer 18 and the flange 17. Such heat and pressure is employed as will cause these two superposed layers to fuse or vulcanize together and at the same time firmly adhere to the outer layers of the paper along the seams.

In some cases it may be desirable to apply adhesive to the under side of the extension 20 so as to cause it to adhere to the under side of the flange 17, and to apply adhesive to the upper surface of the extension 20 to cause it to adhere to the wall 23 when in the position shown in Fig. 12. Such sealing by adhesive gives a reinforcing effect which will compensate for any weakening resulting from an excessive heating and softening of the Pliofilm.

As an important feature of the invention, the laminated strip 16 is bent to form transverse pleats 21 at spaced points along the length thereof, the spacing being determined by the desired length of the bag or container to be formed.

Prior to the folding under of the side extensions 20, said extensions may be transversely slit at opposite sides of the pleats 21 as indicated at 22, and the projecting end portions of the outer paper layers of these pleats may be cut off if desired or folded back. Heat and pressure is also applied to the end portions of the pleats so as to seal together the two layers thereof but only along the ends of the pleats.

After these operations have been completed, the tube may be extended to angular form as shown in Fig. 12, and may be collapsed by suitable tucking and folding mechanisms. The two opposite side walls 23 of the strip 15 may be folded inwardly so as to bring the bottom wall of the channel-shaped strip and the laminated strip 16 into superposed relationship as shown in Fig. 13, and heat and pressure may be applied at spaced narrow sections across the collapsed tube to seal together all of the superposed layers

as shown in Fig. 13. The area of the sealing may be substantially double the width indicated by the shaded section 24, and the collapsed tube cut transversely intermediate of the edges of the sealed section.

It will, of course, be evident that in Fig. 13 as well as in other figures of the drawings, the thickness of the various layers is shown very greatly exaggerated, and that in practice all of these layers are very thin.

As a result of these operations there will be formed a series of collapsed bags shown in Fig. 1, and each bag will be hermetically sealed.

The surfaces of the material of the bag which are later to come in contact with a product which the bag is intended to hold, may be treated with a germicidal solution by spraying, flooding or wetting such surfaces with a solution containing such germicidal or bacteriacidal agent which has been previously dissolved by a suitable solvent. The solvent may be evaporated prior to the sealing of the bag, thus leaving these surfaces not only sterile but to a desirable degree bacteriacidal upon their later contact with the milk or other bacteria-containing product which the bag is to contain.

During shipment and prior to filling, the bag will remain in this condition due to the fact that it is still in its collapsed and sealed condition.

This bag may be employed as a separate container which may or may not be placed in a carton before or after filling, but it is preferably secured within and attached to a collapsed carton. This carton may be of tubular form with side walls 25, 26, 27 and 28 which terminate in closure flaps at each end.

Several sides of the carton are preferably of an inside width substantially equal to the width of the collapsed bag and of a length determined by the length of the bag when the latter is filled. The side wall 25 is provided with a flange 29 at one end, which will hereinafter be referred to as the bottom or filling end. This flange is of a width slightly less than that of the pleat 21, and the bag is secured within the carton with the pleat juxtaposed to this flange. The securing of the bag within the carton is preferably effected by the use of an adhesive which may be initially applied to the surface of either the bag wall 19 or the carton wall 25 over the entire area or any desired portion of the area of said walls. The other sides 26, 27 and 28 have closure flanges 30, 31 and 32 which may be of simple rectangular form, and the opposite flanges 30 and 32 of such width that they substantially abut when in folded or closed position.

When it is desired to fill the bag, the outer edge portion of the pleat 21 which extends beyond the flange 29 is cut away as indicated in Fig. 3, or is slit along its outer edge. The slitting or cutting leaves the two opposite walls of the pleat in the form of two parallel closely juxtaposed flanges or flaps which may be bowed apart to form an opening along the desired length of the pleat, depending upon the size and shape of the filling nozzle or other filling apparatus. Previous to this slitting, the end portion of the bag beyond the pleat may be folded over and the flange 31 folded down so that at this stage the filling or bottom end of the complete article will appear as shown in Fig. 4.

After the filling of the bag, which filling operation may act as a means for distending the bag to completely fill the carton, the two lips or flanges forming the opposite sides of the pleat are

brought together and heat and pressure is applied to form a seal. The flange 29 with the sealed edge may then be folded over into approximately the plane of the flange 31 and the two flanges 30 and 32 folded over and secured in place. As a suitable securing means, I may employ staples 33 as shown in Fig. 5. A thin strip of metal serving as a mandrel may be slid or placed beneath the flanges 30 and 32 before the staples are applied so that it will deflect the inner ends of the staples and prevent them from puncturing the bag. It will be noted that the bag is protected from contact with these staples by the flanges 29 and 31 of the carton. After the stapling, the mandrel may of course be removed.

The opposite end of the carton is provided with flanges 34, 35, 36 and 37. The opposite flanges 34 and 35 may be of simple rectangular form and the flange 34 may be provided with a V-shaped slot 38, the ends of which may extend slightly down on the side wall 25. The other two flanges 36 and 37 may have their corner portions cut away along lines substantially parallel to the slot 38, but not to such an extent as to prevent these flanges from substantially completely covering said slot as indicated in Fig. 6. The flanges 36 and 37 may also be provided with scored lines 39 lying substantially parallel to the sides of the slot 38 when in folded position.

The end of the carton shown in Figs. 6, 7 and 8 is what may be designated as the top or dispensing end and it will be understood that the container is supported with this end downward during the filling. It will also be understood that the flaps 34, 35, 36 and 37 are folded together and secured prior to the filling.

The two outer flaps 36 and 37 may be connected by a staple 40 which may be applied with a thin mandrel extending beneath the flaps 36 and 37 although preferably it is applied after the carton has been opened up and while the bag is in collapsed position so that the staple 40 may extend through one of the sealed end portions of the bag as shown in Fig. 9. In this case, the mandrel for deflecting the inner ends of the staple during the application of the latter, may be projected inwardly through the opposite or bottom end of the carton while the latter is opened as shown in Fig. 3.

The bag within which the contents is sealed is supported by the carton and substantially completely fills the latter. If desired one or more walls of the carton may be provided with slots or apertures such as shown at 41 in Fig. 2, so as to provide sight openings and to permit the contents to be viewed through the transparent wall of the bag. This is particularly desirable where the bag is employed for milk so that the purchaser of the package may see the cream line, or where the packages contains other material which the customer may desire to view without opening the package or to inspect from time to time if the contents are dispensed a portion at a time.

In dispensing the contents, the portions of the flanges 36 and 37 are bent upwardly on the scored lines 39 so as to form flanges 42, and the knife or other sharp instrument is extended through the V-shaped slot 38 along the entire length thereof, and the triangular portion 43 thus severed from the remainder of the flange 34 is bent outwardly as shown in Fig. 8 and forms a pouring lip, spout or guide. During the dispensing of the contents, the bag will collapse as the liquid

or other pourable material flows out so that a smooth, steady stream without gurgling or intake of air will be formed.

If it is desired to dispense only a portion of the contents, the pouring lip or flange 43 is bent back to the position shown in Fig. 7, and by applying slight pressure inwardly and laterally its edges may be projected beneath the juxtaposed edges of the remaining part of the flange 34 so as to be retained in closed position. This inward movement is permitted by the extending of the ends of the V-shaped slot 38 slightly below the fold line between the flange 34 and the wall 25.

In the construction illustrated, the outer strip 16 of one wall of the tube is opaque, whereas the other three walls of the tube or bag are transparent. The window openings 41 should therefore be formed in the walls of the carton opposite to one or more of these transparent sides of the bag.

To avoid the necessity for slitting through the outer paper layer 19 in cutting along the V-shaped slot 38, the paper layer 19 may be provided with a V-shaped slot 44 as shown in Fig. 11, and which will register with the slot 38 when the collapsed bag and the carton blank are assembled. The slot 44 may be slightly wider than the slot 38 so that upon slitting the inner layer 18 along the registering slot 38 and 44, the material will not come in contact with the outer paper layer 19 during dispensing.

Although in the construction illustrated, the pleat 21 is employed for filling and sealing, and the dispensing is effected by cutting a slit in the bag at the opposite end at the slots 38 and 44, it will be evident that for some apparatus or with some materials, the material may be dispensed by cutting away a further portion of the pleat. The pleat is not sealed along its length during the making of the tube and is opened up merely by cutting off or slitting the fold.

After filling the walls of the pleat may be sealed together along the entire length and across any desired portion of the width of the pleat, and for dispensing this sealed portion of the pleat may be cut away to reopen the pleat and permit dispensing from between opposite layers or lips of the pleat.

It will be understood that the bag or container need not be permanently connected to the carton and may be filled through one end at the time the bag is made, and the pleat employed only to facilitate opening and dispensing.

It will also be understood that the inner bag or container need not be attached to any form of container and may be filled before or after being placed in any suitable form of carton or protecting casing, and may be removed from such carton or casing before being opened up to permit dispensing of the contents.

Although the tube shown has only the flat strip laminated and the channel-shaped strip of merely the fusible or vulcanizable material, it will be obvious that the bottom wall of the tubular strip may also be laminated in order that in forming the end seals the heating and pressure applying members will be protected by the paper on both sides of the seal. Instead of paper, any other suitable sheet material may be employed, which will be non-fusible at the temperature of fusing or vulcanizing of the Pliofilm or other inert heat-sealing material.

If the carton be square in cross-section, it is preferable that the pleat be spaced from the end seam to a distance substantially equal to

one-half the width of the side of the carton so as to bring the pleat along the intersection of one side and one end of the complete package.

In some constructions, the carton may be formed with a slot out through which the pleat may extend so that the bag may be filled or emptied without opening the carton and by merely slitting or cutting the projecting pleat. Although I prefer to use Pliofilm or other heat sealing material, I might use, particularly for some liquids, other material such as Cellophane, and use adhesive for effecting the sealing.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A container comprising a tube of flexible impervious material normally in flat collapsed condition, the opposite ends of said tube being sealed and one side having a pleat adapted to be cut along its outer edge to form parallel flanges which may be bowed apart to form an opening into said container.

2. A container comprising a tube of flexible, impervious material normally in flat collapsed position, the opposite ends of said tube being sealed and one side having a pleat adapted to be cut along its outer edge to form parallel flanges which may be bowed apart to form an opening into said container, said flanges being of such material that they may be directly sealed together by the application of heat and pressure to close said opening.

3. A container comprising a tube of flexible, impervious material normally in flat collapsed condition, the opposite ends of said tube being sealed and one side of said tube having a pleat extending transversely thereof and adapted to be cut along its outer edge to form parallel flanges which may be bowed apart to form an opening into said container.

4. A container comprising a tube of flexible, impervious material normally in flat collapsed condition, the opposite ends of said tube being sealed and one side of said tube having a pleat extending transversely thereof and adapted to be cut along its outer edge to form parallel flanges which may be bowed apart to form an opening into said container, said pleat being spaced from one end of said tube to a distance substantially equal to one-half the length of the pleat.

5. A normally flat distensible liquid-tight bag, comprising a tube of thin, pliable, fusible material folded to form two rectangular faces and infolded side walls, the superposed faces and infolded side walls being sealed together at each end of the bag, and one of said rectangular faces having a transverse pleat intermediate of its ends.

6. A normally flat distensible liquid-tight bag, comprising a tube of thin, pliable, fusible material folded to form two rectangular faces and infolded side walls, the superposed faces and infolded side walls being sealed together at each end of the bag, and one of said rectangular faces having a transverse pleat intermediate of its ends, said pleat being spaced from one of said ends to a distance substantially equal to one-half the width of said rectangular face.

7. A normally flat, distensible, liquid-tight bag, comprising a tube of thin, flexible, fusible material folded to form two rectangular faces and infolded sides, the superposed faces and infolded sides being sealed together at each end of the bag and one of said rectangular faces having a pleat extending transversely thereof and of a length substantially equal to the width of said face, the

layers forming said pleat being sealed together at the ends of the pleat.

8. A tube substantially rectangular in cross-section and formed of a substantially channel-shaped strip and a substantially flat strip, the strips having their edges secured together, and said flat strip having a transverse pleat intermediate of its ends.

9. A tube substantially rectangular in cross-section, and formed of a substantially channel-shaped strip and a substantially flat strip, said strips having their edges secured together, and said flat strip having a transverse pleat intermediate of its ends, the layers forming said pleat being sealed together only at their ends.

10. A tube substantially rectangular in cross-section and formed of a substantially channel-shaped strip of thin, flexible, fusible material, and a substantially flat laminated strip, the outer lamination of said second strip being non-fusible and the inner lamination being fusible, the edges of said strips being sealed together.

11. A tube substantially rectangular in cross-section and formed of a substantially channel-shaped strip of thin, flexible, fusible material, the edges of said strip being folded outwardly to form flanges, a laminated strip having an inner layer of thin, flexible, fusible material superposed on and secured to said flanges, and an outer non-fusible lamination covering the entire outer surface of the first mentioned lamination and having its edges folded under said flanges.

12. A tube of substantially rectangular cross-section and formed of a substantially channel-shaped strip and a substantially flat laminated strip, said laminated strip having a transverse pleat intermediate of its ends, and the layers of said laminated strip being secured together at the ends of said pleat, the edges of said laminated strip being sealed to the edges of said channel-shaped strip, said pleat providing means whereby said tube may be opened upon cutting the outer folded edge of the pleat.

13. A collapsible container including a rectangular collapsible carton having end flaps, a liquid-tight bag of flexible material within said carton and secured to one wall thereof, one of said end flaps having a slot through which said bag may be slit, the portion of said end flap and the bag wall defined by said slot and slit being adapted to be bent outwardly to form a pouring lip.

14. A liquid container including a rectangular casing and an inner liquid-tight flexible liner, said casing having in one wall thereof a substantially L-shaped slot through which said liner may be slit, the portion defined by said slot being bendable outwardly to form a pouring lip.

15. A container including a carton having end flaps foldable to form an end closure, one of said flaps being comparatively narrow, and an inner liner having a pleat adjacent to and extending beyond said narrow flap and adapted to define an opening upon the cutting of the outer edge of the fold.

16. A substantially rectangular collapsible carton having end flaps, a substantially rectangular collapsed tube secured within and to one wall of said carton, the length of said tube being greater than the length of said carton, and said tube having a section adjacent to one end of one wall of said carton provided with a slit forming an opening into said tube.

17. A container including a substantially rectangular collapsible carton, a tube formed of Pliofilm and with a paper lamination on one side

thereof, said paper lamination being secured to the inner surface of one wall of said carton, and said tube having a transverse pleat in the side thereof having said paper lamination and beyond the end of said carton wall.

18. A container including a substantially rectangular collapsible carton, a tube formed of Pliofilm and with a paper lamination on one side thereof, said paper lamination being secured to the inner surface of one wall of said carton, and said tube having a transverse pleat in the side thereof having said paper lamination and beyond the end of said carton wall, said pleat being formed of inner layers of Pliofilm and outer layers of paper, and said pleat being adapted to be cut along the outer folded edge to form an opening into said tube.

19. A carton having closure flaps at each end and a thin, flexible, impervious liner secured therein, said liner having a portion formed of two juxtaposed parallel wall portions connected together along one edge and adapted to be cut along said edge to form a filling opening adjacent to one end of said carton, said walls being adapted to be sealed together to close said opening after the filling, and said liner having a section adjacent to the opposite end of the carton adapted to be cut and folded outwardly along with a portion of one of said flaps to form a pouring lip for dispensing the contents, said liner being normally collapsed within the carton and distensible to substantially fill said carton upon the filling of the liner through said filling opening and collapsible within the carton upon the dispensing of the contents thereof from said pouring lips.

20. A normally flat distendable bag comprising a tube of flexible impervious material having its opposite ends sealed, and one side having a pair of substantially parallel juxtaposed layers adapted to be bowed apart to form an opening into the bag.

21. A collapsible container including a collapsible rectangular carton having end flaps, and a liquid-tight bag of flexible material within said carton and secured to one wall thereof, one end portion of the bag having an opening into the bag and disposed beyond the end of the juxtaposed flap of the carton.

22. A flat container construction in knocked-down form designed to be squared up into box form, comprising an outer receptacle element and an inner element, the outer element being a tubular blank having closing flaps attached to the walls by hinge lines, the inner element constituting a flat bag made of flexible material and relatively impervious, a wall of the flexible bag being adhesively secured to only one wall of the outer structure, whereby upon squaring up the outer element into box form, the inner element may remain in flat collapsed form against said wall the end of the bag projecting beyond the hinge line of the flaps at one end of the outer receptacle element.

23. A flat container construction in knocked-down form designed to be squared up into box form, comprising an outer receptacle element and an inner receptacle element, the outer element being tubular and having closing flaps attached to the walls thereof by hinge lines, said inner element being also tubular in flat collapsed form, and made of flexible material which on the inside at least is heat-fusible, the seam forming said tubular structure having no intervening material except fused portions of the said heat-fusible material, said inner element unsecured to the closing flaps of said outer receptacle element, but adhesively secured to one wall of the said outer receptacle element whereby opening up the outer element does not open up the inner element.

CLARENCE W. VOGT.