

[54] LOCKABLE FOLDING TOP ON FOLDING CONTAINER

[75] Inventor: Walter Tyrseck, Quaker Hill, Conn.

[73] Assignee: Robertson Paper Box Company, Inc., Montville, Conn.

[22] Filed: Apr. 24, 1972

[21] Appl. No.: 246,747

[52] U.S. Cl. 229/39 R, 229/41 C

[51] Int. Cl. B65d 5/10

[58] Field of Search 229/39 R, 41 C

[56] References Cited

UNITED STATES PATENTS

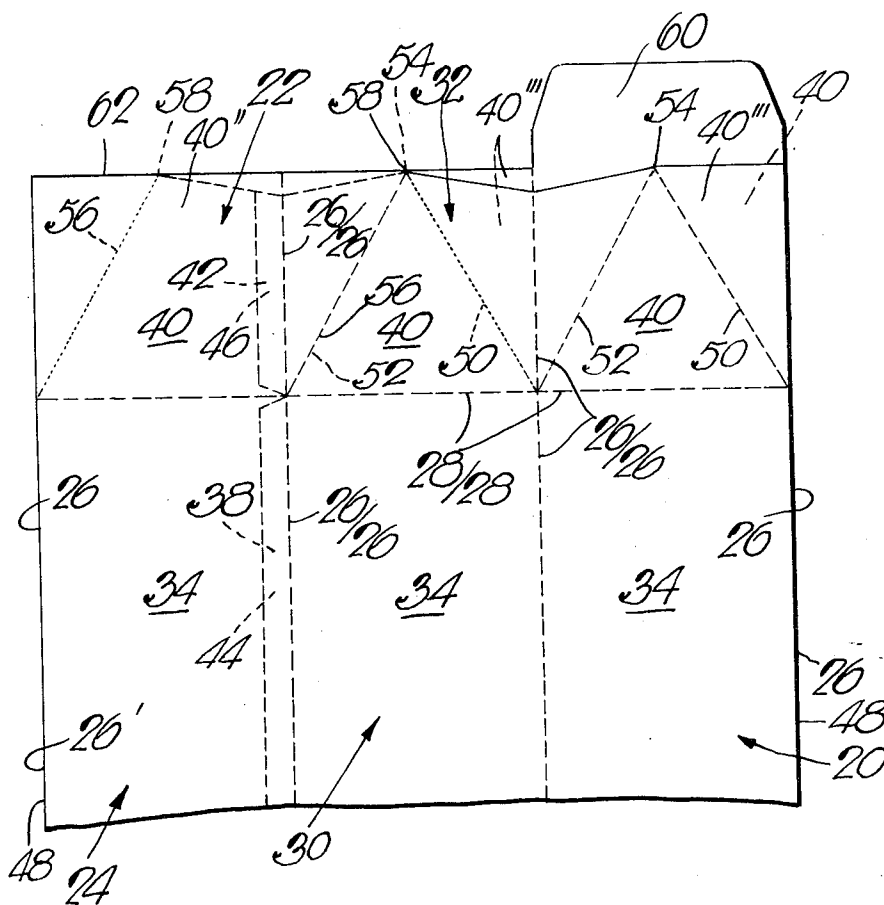
2,044,103	6/1936	Rossi	229/41 C UX
2,307,913	1/1943	Bergstein	229/39 R
2,060,240	11/1936	Pergande	229/39 R
2,065,482	12/1936	Verhoven	229/39 R
2,388,288	11/1945	Ringler et al.	229/39 R X
3,016,181	1/1962	Desmond	229/39 R
3,244,353	4/1966	Miessler, Sr.	229/39 R
3,526,352	9/1970	Swett	229/39 R

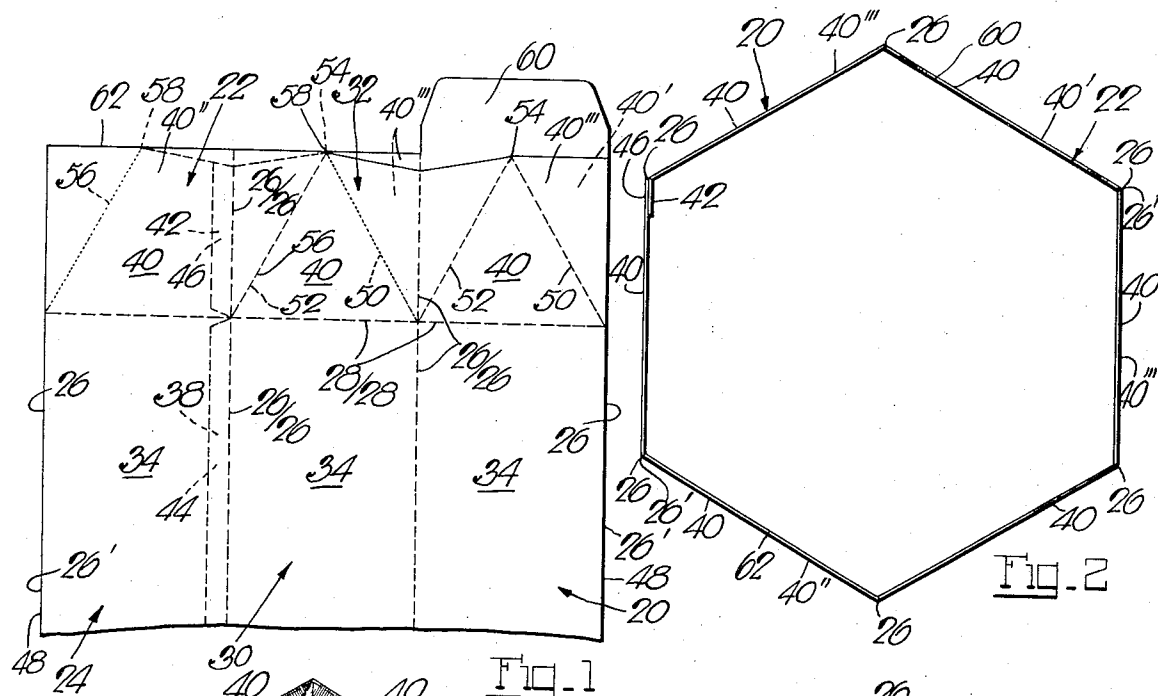
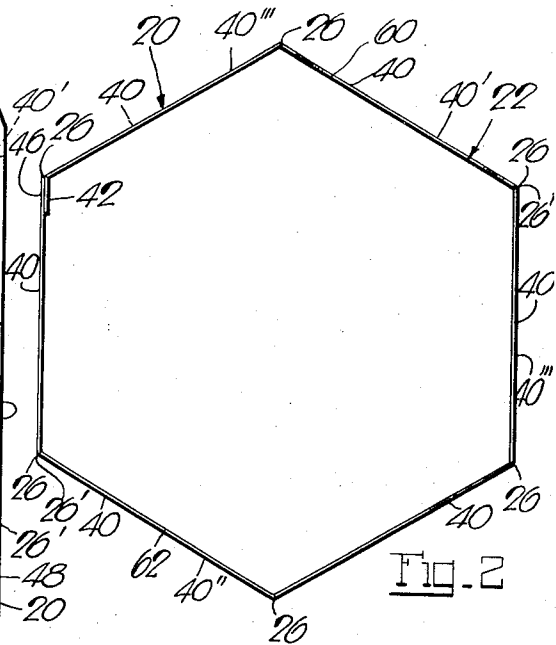
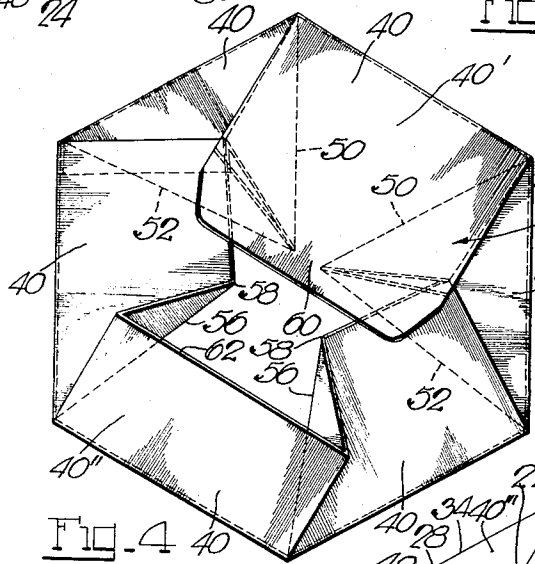
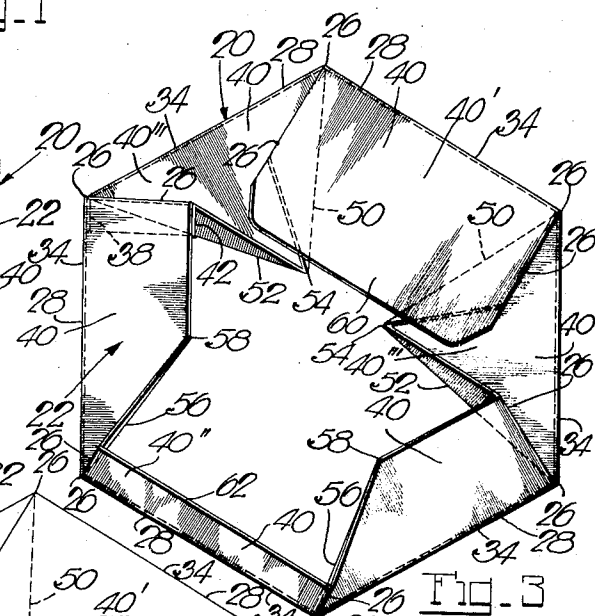
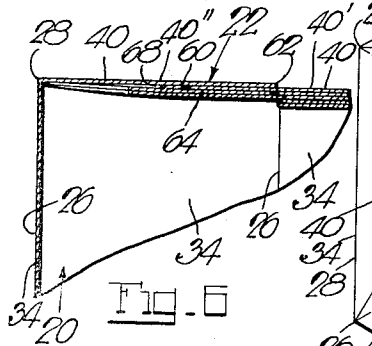
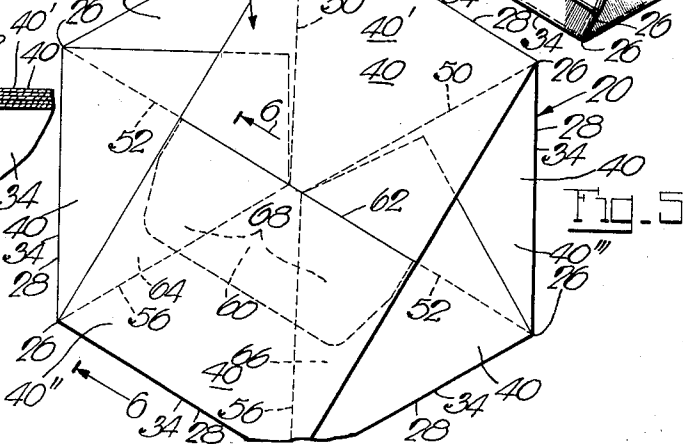
Primary Examiner—Davis T. Moorhead
Attorney—Walter Spruegel

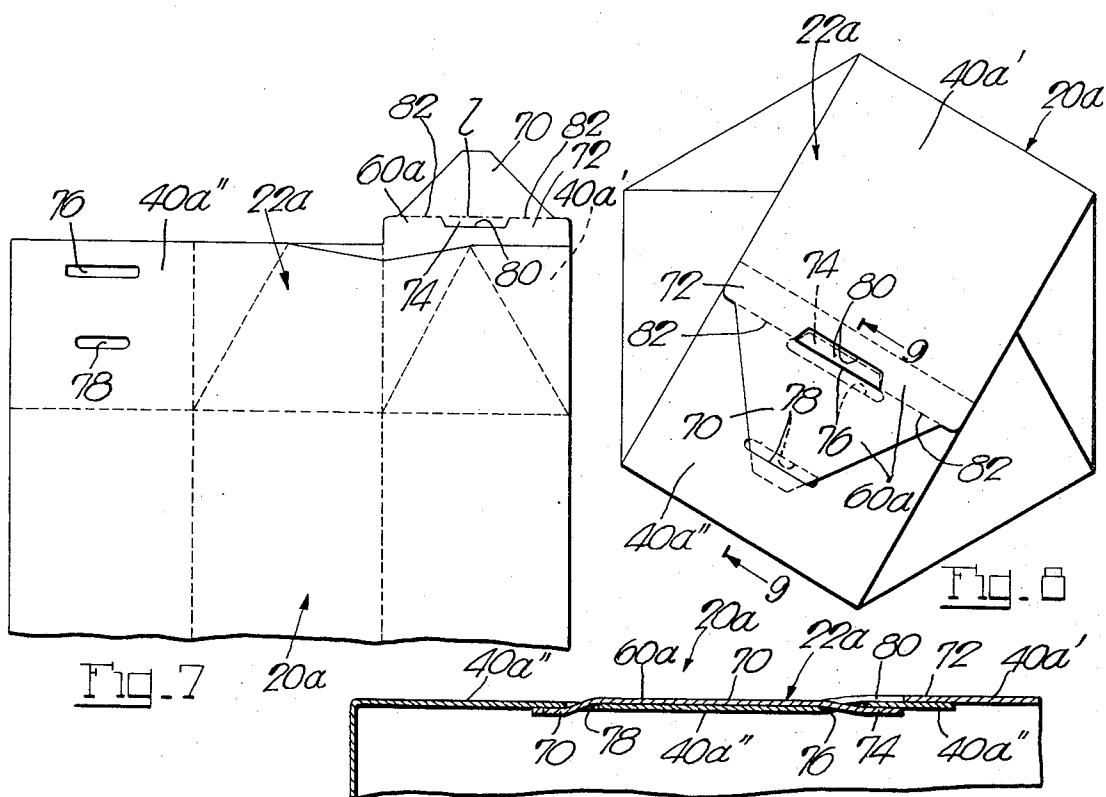
[57] ABSTRACT

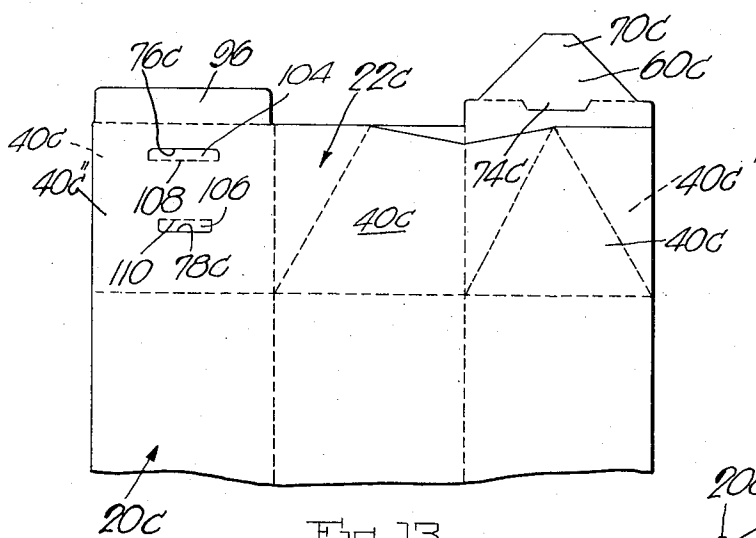
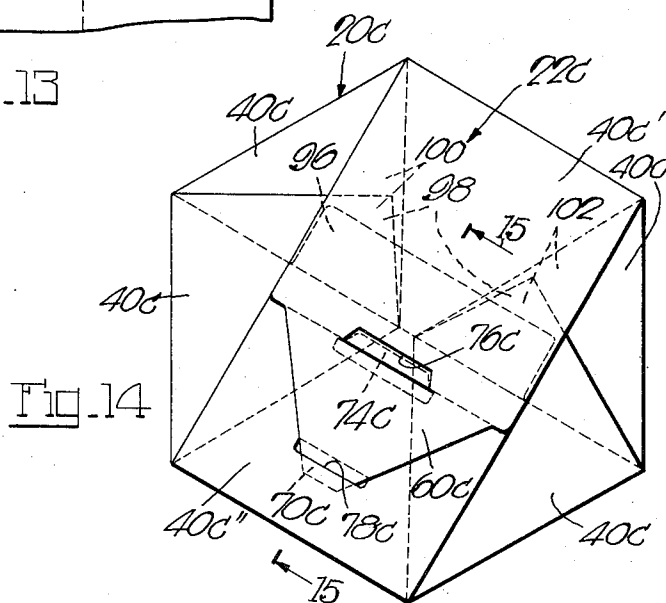
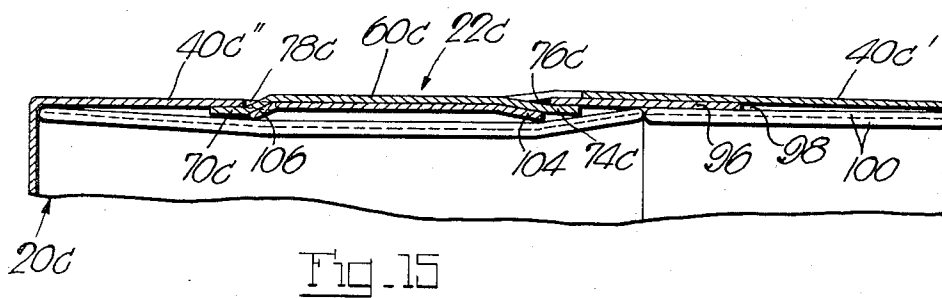
On a folding hexagonal container, a folding top having six top panels continuous with each other and extending coplanar with the container side panels in open top condition, and being foldable about score lines along the top ends of the side panels inwardly into coplanar extension across the container top to close the latter, with two opposite top panels in the set-up container being superposed on the remaining top panels in closed top condition, and being of a length to meet substantially midway of the container top in their top-closing position, and the remaining top panels having appropriate score lines for their folding into partial overlap on their folding into coplanar extension in the closed top, and one of these two superposed top panels in the closed top having an end flap which in closing these superposed top panels is tucked underneath the other superposed top panel to lock both of these panels and, hence, the closed top against opening other than intentional opening.

6 Claims, 15 Drawing Figures









LOCKABLE FOLDING TOP ON FOLDING CONTAINER

This invention relates to folding containers in general, and to folding containers with top closures in particular.

The present invention is concerned with foldable tops on polygonal, and especially hexagonal, folding containers. Among known tops of this kind is one which is applied to a folding hexagonal container, and is formed of a single panel continuous with all but one of the six side panels of the container and provided with score lines which divide the top panel into sections that fold about these score lines into partial overlap with each other in closing the top, with one of these panel sections extending in the closed top from the side panel of the container with which it is continuous all the way across the top to the opposite side panel which is the one not continuous with the top panel, and this particular "cross" panel section is the topmost among, and partially overlaps all others of, the top panel sections in the closed top, and has a hinged end flap which is tucked inside the adjacent side panel of the container in closed top condition. This end flap on the cross panel section, when thus tucked inside the adjacent side panel, will restrain this panel section, and hence also the other panel sections which it partially overlaps, against opening. However, while this folding top panel is satisfactory in most respects, it also has a shortcoming in that its restraint against opening does not prevent at least partial opening of the same in certain handling of the top other than its deliberate opening, and even more important, affords virtually no barrier against inward collapse of the closed top into the container under external force applied to the closed top either accidentally or otherwise, as by unevenly stacking filled containers of substantial weight on top of each other, for example.

It is an object of the present invention to provide on a folding container of polygonal, and especially hexagonal, outline a folding top which is similar to, and has all the advantages of, the aforementioned prior top, but in comparison to the latter is far more secure against unintentional opening in handling and affords a much more effective barrier against its inward collapse into the container under external force. To this end, the top panel is made continuous with all side panels of the container to thereby permit the formation of the aforementioned cross panel section in two complementary parts which are continuous with, and hinge on, two opposite parallel side panels, respectively, of the container, and in the closed top meet at a distance from their hinge connections with the respective side panels, and preferably half-way across the top of the container, and these complementary panel parts are formed with an end flap and a folding end pocket, respectively, of which the end flap is easily led into the still partially unfolded pocket and the latter then closes on the end flap therein all in the course of folding these panel parts into partial overlap with the other top panel sections in closing the container top. Thus, the end flap and the folding pocket on the complementary parts of the cross panel section, by having a sensibly tight interfit in the closed top, not only join these complementary panel parts within the confines of the container top, but also function to lock these parts to each other with adequate firmness not only to prevent their unintentional unfolding and, hence, opening of the top in most any kind of

handling, but also to withstand external forces of even fairly large magnitudes which tend to collapse the closed top inwardly into the container, and occur, for example, in stacking, including unevenly stacking, filled, and accordingly heavy, containers on top of each other.

It is another object of the present invention to provide on a folding container of polygonal, and especially hexagonal, outline a folding top which is quite similar to the featured top just described and includes its cross panel of two complementary parts with an end flap and a folding pocket, respectively, but the end flap is, in the closed top, not only in interfit with the pocket but is also locked therein against ready withdrawal therefrom. To this end, the end flap on one complementary part of the cross panel is transversely scored for folding an end margin of this flap back onto the latter, and the other complementary part of this cross panel is also transversely scored along its end and has therebeyond an extension in the form of a coplanar tab which is folded back onto, and preferably glued to, this other complementary panel part, with the folded-back flap margin and folded-back tab sliding on each other in the course of leading the end flap into the pocket, and their end edges coming into abutment with each other when the end flap is fully entered into the pocket and the latter has closed on the end flap, whereby the thus abutting end edges act as shoulders to lock the end flap against ready withdrawal from the pocket.

It is a further object of the present invention to provide on a folding container of polygonal, and especially hexagonal, outline a folding top of which the complementary parts of the cross panel are, in the closed top, held in even firmer interlock against opening than in the featured top just described, whereby the closed top will exhibit still greater resistance against unintentional opening in any kind of handling, and will also withstand external forces of particularly large magnitudes which tend to collapse the closed top inwardly into the container, as in stacking, and especially in unevenly stacking, particularly heavy containers on top of each other. To this end, an end flap, in the form of a longitudinal extension of one of the complementary parts of the cross panel, is cut intermediate its length to define therein a tongue which projects rearwardly, i.e., away from the front end of this flap, and a front margin of this flap is formed as a tuck tab, while the other complementary part of the cross panel has two transverse slots of which a "front" slot is nearer to the end of this panel part than the other or "rear" slot. With this arrangement, the tongue and tuck tab on the end flap on the one panel part are, in the course of turning the panel parts toward each other with the end flap on top of the other panel part, led into the front and rear slots, respectively, in this other or "slotted" panel part, so that on completed closure of the top the tongue and tuck tab will be tucked underneath the slotted panel part.

Further objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIG. 1 is a fragmentary top view of a folded container with a folding top according to the invention;

FIG. 2 is an enlarged top view of the unfolded container with the top open;

FIGS. 3 and 4 are top views of the container, with the top thereof being shown in progressive stages of its closure;

FIG. 5 is a fragmentary top view of the container with the top fully closed;

FIG. 6 is a fragmentary section taken substantially on the line 6—6 of FIG. 5;

FIG. 7 is a fragmentary top view of a folded container with a folding top which embodies the invention in a modified manner;

FIG. 8 is an enlarged top view of the container of FIG. 7 in unfolded condition, with the top thereof being shown fully closed;

FIG. 9 is an enlarged fragmentary section taken substantially on the line 9—9 of FIG. 8;

FIG. 10 is a fragmentary top view of a folded container with a folding top which embodies the invention in a further modified manner;

FIG. 11 is an enlarged top view of the container of FIG. 10 in unfolded condition, with the top thereof being shown fully closed;

FIG. 12 is a fragmentary section taken substantially on the line 12—12 of FIG. 11;

FIG. 13 is a fragmentary top view of a folded container with a folding top which embodies the invention in a still further modified manner;

FIG. 14 is an enlarged top view of the container of FIG. 13, with the top thereof being shown fully closed; and

FIG. 15 is an enlarged fragmentary section taken substantially on the line 15—15 of FIG. 14.

Referring to the drawings, and more particularly to FIGS. 1 to 6 thereof, the reference numeral 20 designates a folding container with a folding top 22, both of which are shown in folded or knocked-down condition in FIG. 1. The container 20 is in FIG. 2 shown in unfolded or set-up condition with its top 22 open, while the set-up container is in FIG. 5 shown with its top 22 closed.

The container 20 and top 22 are formed of a generally rectangular blank 24 of cardboard or the like, which is provided with longitudinal, and in this instance parallel and equidistant, score lines 26, and a transverse score line 28 which divides the blank 24 into sections 30 and 32. The score lines 26 divide the blank section 30 into a plurality of side panels 34, in this instance six, and a side flap 38, and the same score lines 26 divide the other blank section 32 into six top panels 40 and a side flap 42. To form the blank 24 into the folded container (FIG. 1), the blank is folded about two of the score lines 26, in this instance the score lines 26', for superposition of three successive side panels 34 and three successive top panels 40 on the three remaining side panels 34 and three remaining top panels 40, respectively, and for overlap of the side flaps 38 and 42 with confronting side margins 44 and 46 of the adjacent side panel 34 and adjacent top panel 40, respectively, with these side flaps 38 and 42 being secured, as by gluing, to the respective panel margins 44 and 46 (FIGS. 1 and 2). The score lines 26' thus form the opposite side edges 48 of the folded container.

The folded container 20 (FIG. 1) is set up by simply thrusting the opposite side edges 48 thereof toward each other, whereby the side panels 34, and with it the top panels 40, unfold about the score lines 26 into hexagonal disposition in which the container top is still open (FIG. 2). The container 20 may be closed at the

bottom in any suitable manner (not shown) as by an integral folding bottom which may be like or similar to the folding bottom disclosed in my copending application, Ser. No. 244,175, filed Apr. 4, 1972.

Two of the top panels 40, i.e., the top panels 40' and 40'' which are opposite each other in the set-up container (FIGS. 2 and 3), are of a length to meet substantially midway of the container top in their top-closing position (FIG. 5), and the remaining top panels 40 are substantially of the same length as the panels 40' and 40'' (FIG. 1), with these top panels 40' and 40'' being turned about their respective score lines 28 from their open position (FIG. 2) into their top-closing position (FIG. 5). For simultaneously folding all top panels 40 from their open position (FIG. 2) into their closed position in which they are generally coplanar and the top panels 40' and 40'' uppermost (FIG. 5), the top panels 40 other than the panels 40' and 40'' are provided with suitable score lines. Thus, each of the top panels 40''' next to the top panel 40' is in this instance provided with two score lines 50 and 52 which, as best shown in FIG. 1, extend from the intersections of its opposite longitudinal score lines 26 with its transverse score line 28 and converge to a meeting point 54 substantially midway of the end edge of the panel. Each of the other two top panels 40'''' next to the top panel 40'' is in this instance provided with a score line 56 which extends from the intersection of one of its longitudinal score lines 26 with its transverse score line 28 to a point 58 substantially midway of the end edge of the panel. Thus, with the top 22 open on the set-up container 20 (FIG. 2), the top is closed by simply thrusting the top panels 40''' and 40'''' inwardly about their transverse score lines 28, whereby they will fold about their respective score lines 26, 50, 52 and 56 in the progressive fashion shown in FIGS. 3 and 4, and also compel the two remaining top panels 40' and 40'' to follow inwardly about their respective transverse score lines 28, as will be readily understood. The top panels 40''' and 40''''', in thus turning about their respective score lines 26, 50, 52 and 56, will fold toward partial overlap, and will come into partial overlap and extend generally coplanar when they reach their closed position (FIG. 5). To fully close the top 22 once the panels 40''' and 40'''' are folded to an extent like or similar to that shown in FIG. 4, the uppermost top panels 40' and 40'' are simply pushed down into closed position in which they are coplanar with each other (FIG. 5), whereby they also compel the top panels 40''' and 40'''' therebeneath to continue folding into closed coplanar disposition.

The top 22 thus closed manually would not stay closed, but would open partially owing to a natural tendency of at least the folded top panels 40''' and 40'''' partially to unfold. To avoid such partial self-opening of the closed top 22, provisions are made to lock the top in its closed condition. To this end, the top panel 40' is provided with a lengthwise extension in the form of an end flap or tab 60 which, in closing this top panel 40' and its companion panel 40'', is led beneath the end edge 62 of, and thus tucked beneath, the panel 40''' (FIGS. 5 and 6). Moreover, in the closed top condition, the overlapped portions 64 and 66 of the top panels 40'''' project beneath the top panel 40'' (FIGS. 5 and 6), and these overlapped panel portions 64 and 66 form, together with the top panel 40'', a pocket 68 in which the tucked-in end flap 60 on the top panel 40'

is received, with this pocket 68 holding the end flap 60 sufficiently tight therein to prevent its withdrawal from the pocket in most any manner of handling the closed container other than deliberate opening of the top 22. Further, with each of the uppermost top panels 40' and 40'' being of a length to bridge, in its closed position, the open container top only partially, and in this instance half-way, the thus relatively short bridge span of these top panels, coupled with the fairly tight fit of the panel end flap 60 in the pocket 68, will hold the closed top particularly firm against opening in any kind of handling other than intentional opening, and will also hold the closed top with equal firmness against inward collapse into the container under most external forces, such as on stacking, and particularly unevenly stacking, a number of filled and accordingly heavy containers on top of each other, for example.

Reference is now had to FIGS. 7 and 8 which show a container 20a with a folding top 22a that may in all respects be like the container 20 and top 22 of FIGS. 1 to 5, except that the uppermost companion top panels 40a' and 40a'' are differently locked in their closed position. Thus, the top panel 40a' has an end flap 60a with a leading endlength 70 which in this instance is widthwise reduced in comparison to the remaining flap length 72, and partially blanked from this remaining length 72 of the end flap 60a is a tongue 74 which remains continuous with the leading endlength 70 of this flap 60a along an imaginary dot-and-dash line *l* (FIG. 7), while the other top panel 40a'' is provided with two slots 76 and 78. Thus, in closing the top 22a in the same manner as described in connection with the top 22 of FIGS. 1 to 5, and as the top panel 40a' closes more and more on its companion panel 40a'', the end flap 60a on the panel 40a' is momentarily bent upwardly at its leading end 70 to turn the tongue 74 out of the plane of the remaining flap length 72 and then lead it into the slot 76 in the other top panel 40a'', whereupon on returning the momentarily bent leading flap end 70 toward its normal coplanar disposition with the remaining flap length 72, the tongue 74 will tuck underneath the top panel 40a'' next to the slot 76 therein (see also FIG. 9), with the opening 80, left in the end flap 60a by partially blanking the tongue 74 therefrom, being then visible in this end flap (FIGS. 8 and 9). Further, in thus tucking the tongue 74 underneath the top panel 40a', the leading end 70 of the end flap 60a is also led into the other slot 78 in the top panel 40a'' and will be tucked underneath the latter by the time both top panels 40a' and 40a'' are closed (FIGS. 8 and 9). In this fashion, the closed top 22a will be locked quite firmly against opening in any kind of handling other than intentional opening of the uppermost top panels 40a' and 40a'', and will be locked with particular firmness against inward collapse into the container under an external force, such as on stacking, and particularly unevenly stacking, filled and quite heavy containers on top of each other, for example.

To facilitate the task of leading the tongue 74 into the slot 76 in the top panel 40a'' and underneath the latter, the end flap 60a is at the junction of its leading end 70 and remaining length 72 provided with transverse score lines 82 which extend in line with the line *l* and to, but not within, the tongue 74 (FIG. 7), so that the leading end 70 of the end flap may be folded about these score lines 82 from and into the plane of the remaining flap length 72.

Reference is now had to FIGS. 10 to 12 which show a folding container 20b with a folding top 22b that may in all respects be like the folding top 22 on the container in FIGS. 1 to 6 with the following exceptions. Thus, the end flap 60b on the top panel 40b' is provided with a transverse score line 84 about which an endlength 86 of this flap is turned into super-position on an adjacent portion of the latter, and the associated top panel 40b'' is provided with an extension in the form of an end tab 88 which is turned about a transverse score line 90 in this panel back against an adjacent portion of the latter and is preferably glued thereto. Thus, in closing the top 22b and tucking the end flap 60b into the pocket 68b, the turned-back endlength 86 of this end flap will slide on the turned-back end tab 88 on the top panel 40b'' until closure of the top is completed when this turned-back flap endlength 86 rides off the turned-back end tab 88 and their respective end edges 92 and 94 come into abutment with each other (FIGS. 11 and 12) and act as shoulders which quite firmly lock the closed top against opening in any kind of handling other than deliberate opening of the uppermost top panels 40b' and 40b'', and also against inward collapse into the container under external force or weight.

Reference is finally had to FIGS. 13 to 15 which show a folding container 20c with a folding top 22c that may in all respects be like the folding top 22a on the container in FIGS. 7 to 9, with the following exceptions. Thus, the top panel 40c' is provided with a coplanar end flap 96 which in closing the top, including the associated panels 40c' and 40c'' thereof, is slid underneath the associated top panel 40c' and into a pocket 98 which is formed between this top panel 40c' and the thereby overlapped portions 100 and 102 of the other top panels 40c (FIGS. 14 and 15). Further, the slots 76c and 78c in the top panel 40c'' are formed by partly blanking from the latter tongues 104 and 106 which are continuous with this top panel 40c'' along transverse score lines 108 and 110 (FIG. 13), and which will be turned inwardly (FIG. 15) by the leading end 70c and tongue 74c, respectively, of the end flap 60c when they are led into the respective slots 78c and 76c in the top panel 40c'' in closing the top.

What is claimed is:

1. A folding container with a folding top, providing a flat longitudinal blank with first spaced longitudinal score lines and a transverse score line intersecting said first score lines and dividing said blank into first and second sections, with said first score lines dividing said first and second blank sections into six side panels and six top panels, respectively, said blank being folded about two of said first score lines for overlap of opposite side margins of said blank and for superposition of three successive side panels and three successive top panels on the other side panels and top panels, respectively, in the folded container, with said overlapped side margins of the blank being secured to each other, and said side panels and top panels being turnable about said first score lines and being disposed hexagonally in the set-up container with the top open, two first top panels which are opposite each other in the set-up container with the top open are of a length to meet substantially midway of the top of the set-up container on turning them about said transverse score line into coplanar top-closing position, and the remaining top panels are substantially of the same length as said first top panels, said remaining top panels have second score

lines extending from the intersection of the associated first score lines extending from the intersection of the associated first score lines thereof with said transverse score line at an inclination to the first score lines from which they extend, so that on turning said remaining top panels in the set-up container about said transverse score line into top-closing position they will fold about the respective second score lines into coplanar and partially overlapped disposition and take along and turn said first top panels into their top-closing position in which one of said first top panels is in partial overlap with said remaining top panels and forms therewith a pocket, the other of said first top panels having a lengthwise extension in the form of a first end flap and said one first top panel has an end at which said end flap is manually passed into said pocket, said end flap has intermediate its length a transverse score line about which an end margin of said flap is folded back against the adjacent flap part and the end edge of said folded-back end margin forms a shoulder on said flap, and said one first top panel has a lengthwise extension in the form of another end flap turned into superposition on said one first top panel about a transverse score line of the latter and having an end edge forming a shoulder on said one first top panel, with said folded-back end margin of said first flap sliding on said other end flap in tucking said first flap into said pocket, and said shoulders coming into abutment with each other when in completely tucking said first flap into said pocket said folded-back flap end margin rides off said other end flap.

2. A folding container with a folding top, providing a flat longitudinal blank with first spaced longitudinal score lines and a transverse score line intersecting said first score lines and dividing said blank into first and second sections, with said first score lines dividing said first and second blank sections into six side panels and six top panels, respectively, said blank being folded about two of said score lines for overlap of opposite side margins of said blank and for superposition of three successive side panels and three successive top panels on the other side panels and top panels, respectively, in the folded container, with said overlapped side margins of the blank being secured to each other, and said side panels and top panels being turnable about said first score lines and being disposed hexagonally in the set-up container with the top open, two first top panels which are opposite each other in the set-up container with the top open are of a length to meet substantially midway of the top of the set-up container on turning them about said transverse score line into coplanar top-closing position, and the remaining top panels are substantially of the same length as said first panels, with one of said first top panels having a lengthwise extension in the form of an end flap, the remaining top panels have second score lines extending from the intersection of associated first score lines thereof with said transverse score line at an inclination to the first score lines from which they extend, so that on turning said remaining top panels in the set-up container about said transverse score line into top-closing position they

will fold about the respective second score lines into such partial overlap that they extend coplanar in their top-closing position, and said remaining top panels will, on their manual turning into top-closing position, take along and turn said first top panels into their top-closing position on top of said remaining top panels, with the other of said first top panels having a cut transverse edge past which said end flap is manually passed underneath and tucked in said other first top panel on turning said first top panels into their top-closing position, said other first top panel has two transverse front and rear slots with opposite side edges, of which said front slot is closer to the end edge of said other first top panel than said rear slot, with one of said side edges of said rear slot being said cut transverse edge of said other first top panel, and said end flap has intermediate its length a cut defining in said flap a tongue which projects away from the end edge of said flap and is passed through said front slot in said other first top panel underneath the latter when said first top panels are turned into their top-closing position, whereby the portions of said flap beneath said other first top panel function to lock said first top panels in their top-closing position against separation other than their turning about said transverse score line into open position.

3. A folding container with a folding top as in claim 2, in which said tongue-defining cut in said end flap is U-shaped.

4. A folding container with a folding top as in claim 2, in which said tongue is of a given width transversely of said end flap, and continuous and merges with said end flap along a transverse line of the latter, and said end flap has along said transverse line a third score line which extends to, but not within the width-wise extent of, said tongue, and divides said end panel into front and rear leaves of which said front leaf extends to said end edge of said flap, whereby on folding said front leaf about said third score line out of the plane of said rear leaf, said tongue will move with said front leaf out of the plane of said rear leaf.

5. A folding container with a folding top as in claim 2, in which the top panels next to said one first top panel are partially overlapped by the latter in the top-closing position of said top panels, with said one first top panel and the panel portions it overlaps together forming a second pocket, and said other first top panel has a lengthwise extension in the form of an end flap which is led into said second pocket on turning said top panels into top-closing position.

6. A folding container with a folding top as in claim 2, in which said other first top panel is provided with lips partially blanked from the latter and continuous therewith along third transverse score lines in said other first top panel, with said lips defining said front and rear slots in said other first panel, and being turned about said third score lines out of said slots by said end flap and tongue on passing them through said rear and front slots, respectively, underneath said other first top panel.

* * * * *