Nov. 12, 1957 H. GINSBERG 2,812,892

REINFORCED AND PARTITIONED FOLDING BOX

Filed May 7, 1952 3 Sheets-Sheet 1

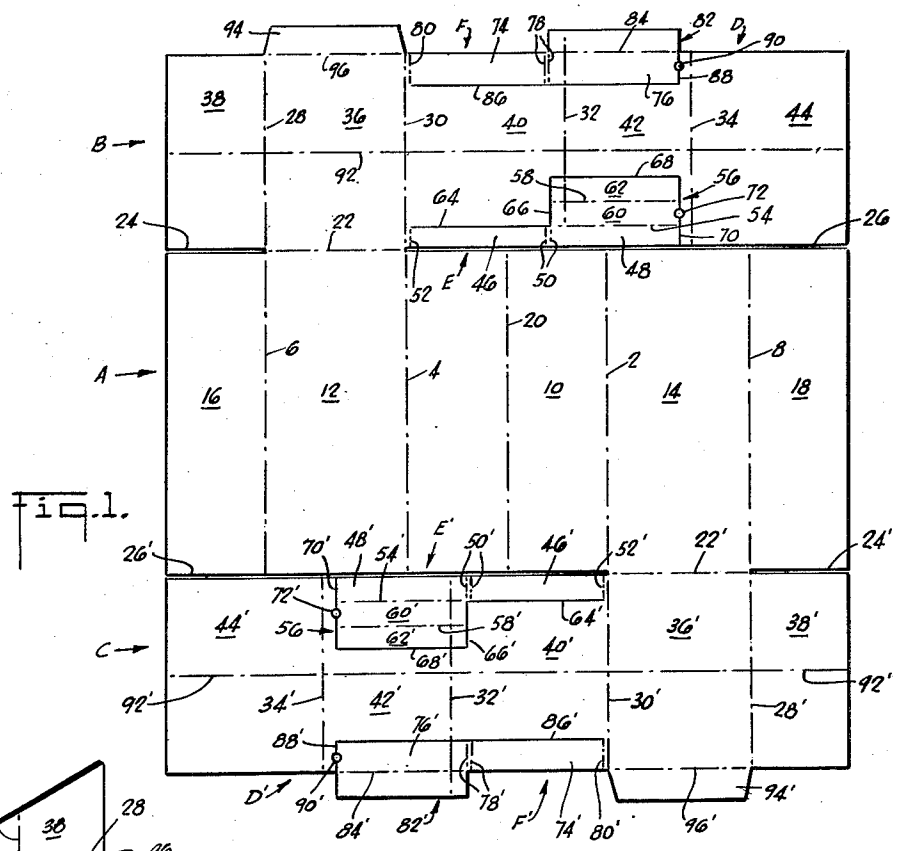


Fig. 1.

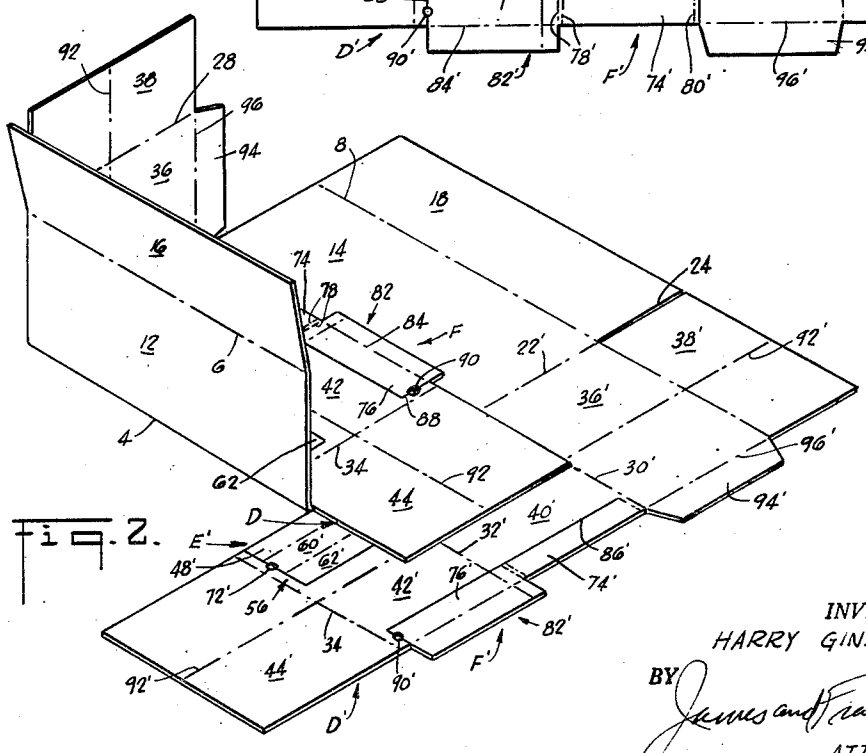


Fig. 2.

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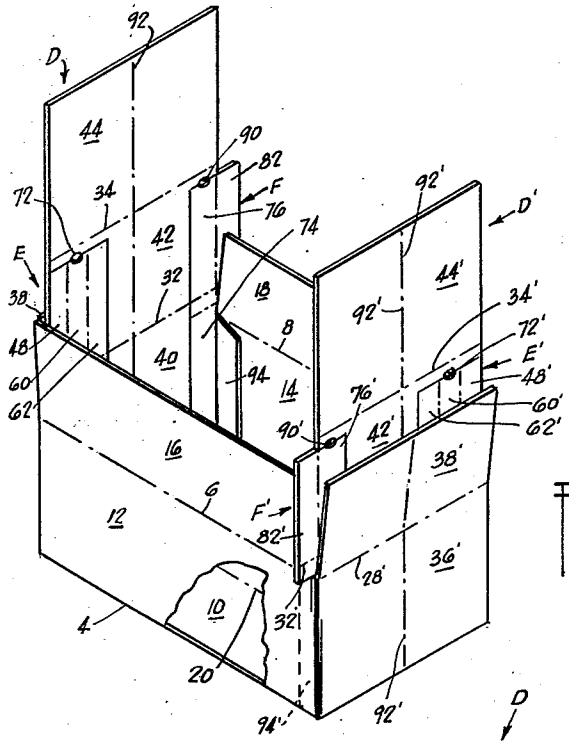


Fig. 3.

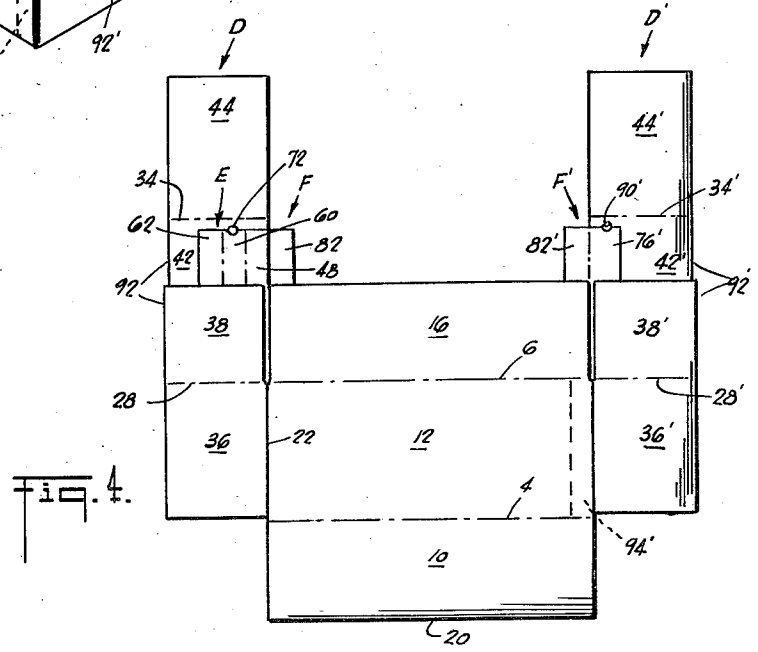


Fig. 4.

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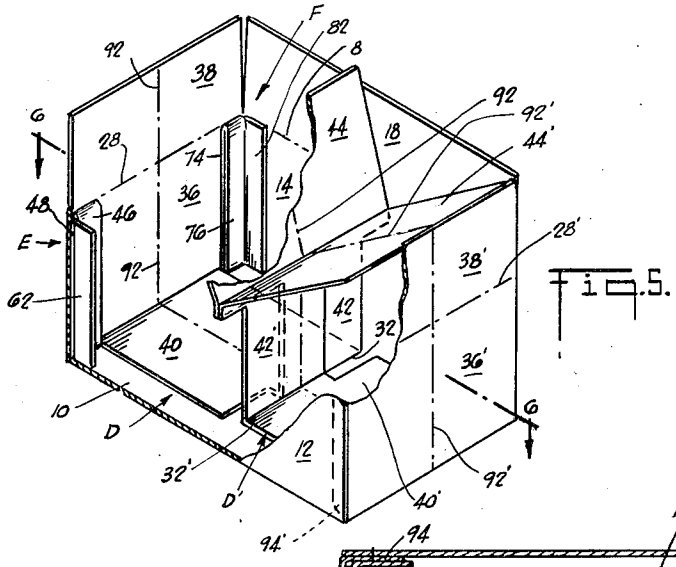


Fig. 5.

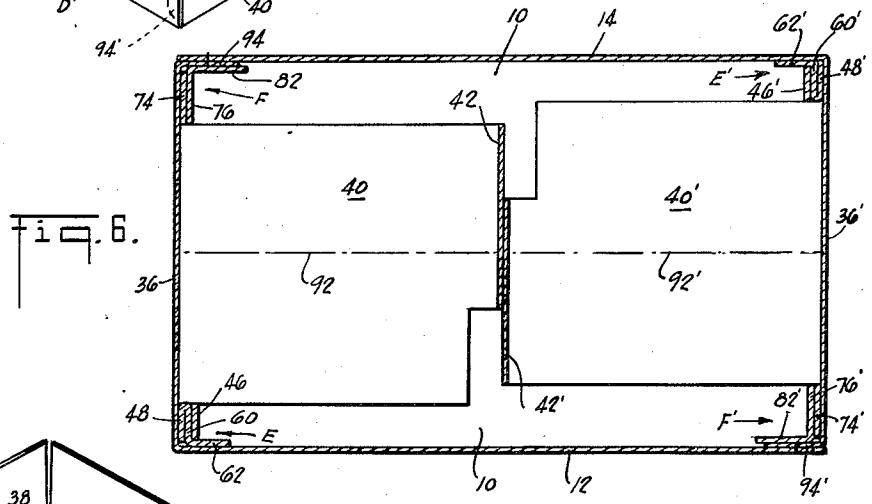


Fig. 6.

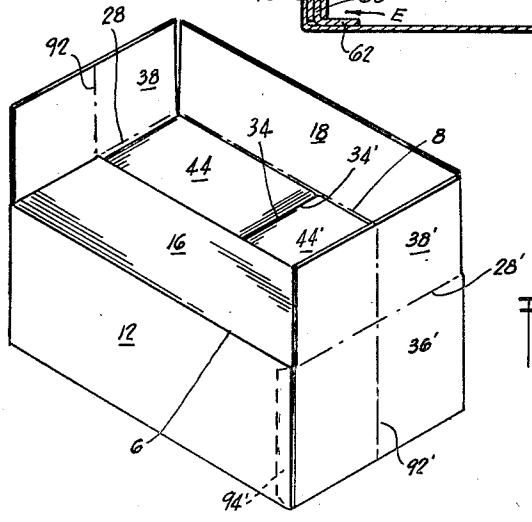


Fig. 7.

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REINFORCED AND PARTITIONED FOLDING BOX

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Application May 7, 1952, Serial No. 286,543

19 Claims. (Cl. 229—27)

The present invention relates to a folding box of improved construction adapted to be formed from a blank of corrugated paper or the like. The box of the present invention is particularly adapted for use in the shipping of citrus fruits such as oranges but may, of course, be used for the shipping of any appropriate merchandise.

One problem presented in the packaging and transportation of small objects is the necessity of stacking containers in which those objects are packed, thus necessitating the use of containers of sufficient strength and rigidity so that the lower containers can satisfactorily withstand the weight of the containers piled thereon. If the lower containers should be flattened by that weight pressure will be applied to the contents of the containers, thus damaging them and causing them to spoil.

It is also desirable that such containers be of an appreciable size in order to minimize handling problems. But when a large number of small objects are packed within a large container, and particularly when they must be rather loosely packed in order to avoid damage to the objects, the contents of the container tend to shift. Accordingly compartmentation of the container is desirable and usually necessary.

Because of the above requirements, citrus fruits have in the past been packaged almost exclusively in wooden crates. Such crates must be manually assembled, as by nailing, so that the erecting operation involves considerable labor, and because of the rigid form of such crates, storage and handling of the empty crates presents a real problem.

The present invention relates to the production of a container from a single flat blank of corrugated paperboard or the like, said container not only exhibiting the desired degree of compartmentation and rigidity, but also being shippable and storable in flat condition so as to take up little space, the container being readily erectable to open condition so as to facilitate handling and minimize packing problems. A particular feature of the present invention is the production of such a container from a substantially rectangular blank, so that the formation of said blanks from an extensive sheet of blank-forming material may be accomplished with minimal waste.

The container of the present invention is characterized by (1) bottom walls of double thickness, the better to withstand the weight of its contents, (2) a central partition largely of double thickness, so as to provide the desired compartmentation and prevent shifting of the contents and so as to strengthen the central portion of the container, (3) a cover of double and partially of triple thickness, which cover is readily set up by the infolding of flaps which may conveniently be secured to one another, and (4) very importantly, the provision at the four corners of the container of reinforcing struts or pillars which so strengthen and rigidify the container that a large number of such filled containers can be stacked one upon the other without any significant distortion of the lowermost container.

These reinforcing struts or pillars are formed from those elements of the blank which define the partition members, and are temporarily attached to said partition members but are manually separable therefrom. The containers are shipped and stored flat, with the pillar-forming portions in attached condition, being separated from the partition members and folded so as to define the reinforcing struts or pillars only when the box is to be erected. In this way handling of the containers is greatly facilitated.

In order to enhance the rigidifying effect of the pillars, they are set up in angled form so as to lie closely along the inner surfaces of the side and end walls of the container at the corners. Hence they are preferably formed of foldable strips and connected flaps, at least a portion of the flaps being bendable at right angles to said strips so as to define, in conjunction with the strips, an angled pillar or strut.

To the accomplishment of the above and to such other objects as may hereinafter appear, the present invention relates to the structure of a folding box and to the blank from which it is formed, as defined in the following claims and as described in this specification, taken together with the accompanying drawings, in which:

Fig. 1 is a top plan view of a blank from which the box of the present invention is formed;

Fig. 2 is a perspective view showing the first stage in the erection of the box;

Fig. 3 is a perspective view, partially broken away, showing the box in partially assembled form preparatory to being flattened to knocked-down condition;

Fig. 4 is a top plan view of the box of Fig. 3 flattened to knocked-down condition;

Fig. 5 is a perspective view, partially broken away, showing the box in fully erected condition, and with the corner reinforcements in place;

Fig. 6 is a top cross sectional view taken along the line 6—6 of Fig. 5; and

Fig. 7 is a perspective view of the fully erected box with some of the cover flaps folded to closed position.

The box blank, shown in Fig. 1, comprises a central body portion generally designated A and a pair of wing portions generally designated B and C. The central body portion A is divided by fold lines 2, 4, 6 and 8 into a central bottom wall panel 10, side wall panels 12 and 14, and side cover flap panels 16 and 18. The bottom wall 10 is provided with a central fold line 20 along the length thereof. Each of the wings B and C are identical but are oriented in opposite directions. The wing B is connected to the central body portion A by means of fold line 22 extending along one edge of the side wall panel 12, the remainder of the wing B being separated from the central body portion A by means of cuts 24 and 26. Fold lines 28, 30, 32 and 34 divide the wing B into end wall panel 36 connected directly and foldably to the side wall 12, end cover flap panel 38 extending along and separated from the side cover flap panel 16, and the partition member generally designated D, said partition member being foldably secured via fold line 30 to a side edge of the end wall panel 36 and itself being subdivided by fold lines 32 and 34 into a first panel 40, a second panel 42 and a third panel 44, the length of said first panel 40 being substantially equal to half the length of the bottom wall panel 10, the length of the second panel 42 being substantially equal to the height of the end wall panel 36 and of the side wall panel 12, those heights being the same, and the length of the third panel 44 being substantially equal to that of the first panel 40.

The partition member D includes separable inner and outer side portions E and F respectively. The inner side portion E includes a strip defined by the two sections

46 and 48, those sections being of equal length and separated by the double fold line 50, the length of each of the strip sections 46 and 48 being substantially equal to the height of the end wall panel 36. The first strip section 46 starts close to the end wall panel 36, its beginning being defined by the fold line 52 which may be slightly separated from the fold line 30. Secured to the second strip section 48 by means of fold line 54 is a flap generally designated 56, that flap having a width greater than the width of the strip section 48 and being divided by longitudinal fold line 58 so as to define flap segments 60 and 62, the width of the flap segment 60 being substantially equal to the width of the strip section 48. Perforated or tearable lines 64, 66, 68 and 70 temporarily secure the inner side portion E to the partition member D, a finger hole 72 being provided at the outer end of the side portion E so as to facilitate its separation from the partition member D when the box is to be finally erected.

The outer side portion F is defined by a pair of strip sections 74 and 76 separated by double fold line 78, the length of the strip sections 74 and 76 being substantially equal to one another and equal to the height of the end wall panel 36. As was the case with the inner side portion E, the strip section 74 starts at fold line 80 which may be slightly separated from the fold line 30. A flap generally designated 82 is secured to the strip section 76 by means of fold line 84, that flap 82 extending outwardly from the partition member C. The outer side portion F is detachable from the partition member D by means of perforated or tearable lines 86 and 88, and a finger hole 90 is provided at the end thereof to facilitate its separation from the partition member D.

The entire wing B is provided with a central longitudinal fold line 92, and the end edge of the end wall panel 36 is provided with a projecting securing tab 94 connected thereto by means of fold line 96.

The wing C is identical with the wing B, primed numerals being employed to designate the parts of the wing C corresponding to similar parts of the wing B, except for the fact that the wing C is oppositely oriented from the wing B by being foldably secured, via fold line 22', to that edge of the side wall panel 14 on the opposite side of the central body portion A from the edge of the side wall panel 12 to which the wing B is foldably secured.

The first step in erecting the container of the present invention is illustrated in Fig. 2. The side wall 12 is bent up at right angles to the bottom wall 10 and the end wall 36 is bent at right angles thereto, the partition member D being first bent at right angles to the end wall 36 along the fold line 30 so as to lie substantially parallel to and over the bottom wall 10, as illustrated. The partition member D is then bent about the fold line 30 so as to extend vertically parallel to and inside of the end wall 36. The same sequence of operations is followed with respect to the side wall 14, the end wall 36', and the partition member D', except that the partition member D' is folded parallel to and inside of the end wall 36' before the latter is folded perpendicular to the side wall 18. The securing tabs 94 and 94' extending from the side edges of the end walls 36 and 36' respectively are bent along the inside of the adjacent side walls 14 and 12 respectively, as shown in Fig. 3, and said securing tabs 94 and 94' are then fastened in place by means of adhesive, staples or any suitable fastening means.

In order to collapse the box to the flat condition shown in Fig. 4, the bottom wall 10 is bent downwardly so as to fold around the central fold line 20 while the end portions of the box are folded outwardly along the fold lines 92 and 92' respectively. The box may be stored and shipped in this flattened condition so as to be readily handled and take up a minimum amount of space.

It will be noted from Fig. 3 that the flaps 82 and 82' of the outer side portions F and F' clear the side walls 12 and 14, extending out between the side cover flaps 16 and 18 and the end cover flaps 38 and 38'. When the box is knocked down to flattened condition, those flaps are positioned inside the flattened box as shown in Fig. 4.

When the box is to be erected for use it is first straightened to the condition shown in Fig. 3, the side portions E, E' and F' being separated from the partition members D and D' by grasping them through the finger holes 72 and 90 and tearing along the appropriate perforated or tearable lines. The inner side portion E is folded so that the first strip section 46 lies parallel to but spaced from the end wall 36 closely adjacent to the corner which it makes with the side wall 12, the flap segment 60 is folded under the second strip section 48, the flap segment 62 is folded at right angles to the flap segment 60, and the strip section 48 is then folded downwardly parallel to the strip section 46 and between it and the end wall 36, the flap segment 60 being interposed between the strip sections 46 and 48 and the flap segment 62 being disposed at right angles thereto so as to lie along the inner surface of the side wall 12 adjacent the corner in question. The outer side portion F is folded by causing the first strip section 74 to lie alongside the inner surface of the end wall 36 adjacent the corner which it forms with the side wall 14, the second strip section 76 is folded downwardly so as to lie parallel to and against the first strip section 74 and the flap 82 is folded at right angles to the second strip section 76 so as to lie alongside the inner surface of the side wall 14 adjacent the corner in question. The side portions E' and F' are similarly manipulated. In this way the side portions define reinforcing pillars or struts at opposite corners of the container, each of those struts being of substantially the same height as the container itself and each having an angled configuration conforming to that corner so as to provide great rigidity and so as to resist any dislocation or displacement from its desired position.

Removal of the side portions E, E', F and F' from the partition members D and D' respectively necessarily involves some diminution of the partitioning effect provided by the panels 42 and 42'. This is particularly the case when the inner side portion E is considered, because of the width of that side portion E over at least part of the partitioning panel 42. However, because the two partitioning members D and D' are oppositely oriented and positioned, the inner side portion E on partitioning member D comes opposite the outer and narrower side portion F' on partitioning member D', so that on each side of the partition defined by the panels 42 and 42', only narrow gaps are left, defined by the width of the strip portions 76 or 76', and since the width of those strip portions is generally considerably less than the size of the products packed in the containers, effective partitioning action remains.

After the two compartments defined by the partitioning panels 42 and 42' have been filled, the panels 44 and 44' are bent downwardly parallel to the bottom wall 10, each of those panels thus defining a cover for one of the compartments (see Fig. 7). Thereafter the side cover flaps 16 and 18 are bent downwardly thereover, those flaps preferably having a height such that together they will completely cover the top of the box, after which the end cover flaps 38 and 38' are bent downwardly into superposed position. The flaps may be secured in closed position in any conventional manner, as by the use of adhesive or staples.

The thus produced box is extremely strong. Its bottom is defined by the bottom wall 10 reinforced over most of its area by the panels 40 or 40'. Its top is at least two-ply, defined by the panels 44, 44' and the side cover flaps 16 and 18, and is three-ply over a considerable portion of its area by reason of the end cover flaps 38 and 38'. The end walls are double ply, defined by the end wall panels 36 and 36' and the panels 40 and 40'. The

central partition is double ply over a substantial portion of its area as defined by the panels 42 and 42', and at least single ply over a sufficient area to prevent shifting of the contents of the container from one compartment to another. Most importantly, the body of the box is rigidified and strengthened by means of the multiply and angular pillars or struts defined by the side portions E, F, E' and F' formed respectively from the partitioning members D and D'. The nature of these corner reinforcements is such as to permit a large number of fully loaded boxes to be stacked one above the other without danger of damage to their contents. The entire box may be produced from a single substantially rectangular blank, and only a minimal waste of material is involved in producing a number of said blanks from a continuous sheet of corrugated paperboard or the like. The entire blank may be formed in a single operation, and it is even feasible to produce a plurality of said blanks in a single stamping operation through the use of multiple dies. The box is preliminarily erected in the factory and then shipped in knocked-down or flattened condition so as to take up a small amount of space and to permit ready handling. All that need be done when the box is to be packed is to fold it to open condition, tear the side portions E, F, E' and F' away from the partitioning members D and D' respectively, and fold the side portions E, F, E' and F' into their strut shape.

While but a single embodiment of the present invention has been here disclosed, it will be apparent that many variations may be made therein as to the size, relative proportions and arrangement of the parts thereof, without departing from the spirit of the invention as defined in the following claims.

I claim:

1. A folding box comprising a bottom wall, side walls foldably connected thereto, end walls foldably connected to each of said side walls, and a partition member foldably connected to one of said end walls, said partition member comprising a first panel foldably secured to said one of said end walls and overlying said bottom wall and a second panel foldably secured to said first panel and bent upwardly from said first panel so as to define a partition within said box, side portions of at least one of said panels being partially separated therefrom remaining foldably secured to said partition member along at least one edge, and being folded into pillar-like reinforcements at corners of said box.

2. The folding box of claim 1, in which a first one of said side portions comprises a strip to a portion of the length of which a flap is foldably secured, said flap extending from a side edge of said partition member, and in which the second one of said side portions comprises a strip to a portion of the length of which a flap of greater width is foldably secured, said flap being formed from the body of said partition member and having a fold line along the length thereof so as to divide it into two segments.

3. The folding box of claim 2, in which two partition members are employed, one secured to each end wall, and in which said first side portion on one of said partition members is opposite the second side portion on the other of said partition members.

4. The folding box of claim 1, in which one of said side portions comprises a strip to a portion of the length of which a flap of greater width is foldably secured, said flap being formed from the body of said partition member and having a fold line along the length thereof so as to divide it into two segments.

5. The folding box of claim 1, in which one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal foldline extends from a side edge of said partition member.

6. The folding box of claim 5, in which said flap is secured to the strip section remote from said end wall.

7. The folding box of claim 1, in which one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal fold line is formed from the body of said partition member, the width of said flap being greater than the width of said strip section and said flap being provided with a longitudinal fold line dividing said flap into first and second segments, said first segment having a width substantially equal to that of said strip section.

8. The folding box of claim 7, in which said flap is attached to the strip section remote from said end wall.

9. The folding box of claim 1, in which a first one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal fold line extends from a side edge of said partition member, and in which a second one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal fold line is formed from the body of said partition member, the width of said flap being greater than the width of said strip section and said flap being provided with a longitudinal fold line dividing said flap into first and second segments, said first segment having a width substantially equal to that of said strip section.

10. The folding box of claim 9, in which two partition members are employed, one secured to each end wall, and in which said first side portion on one of said partition members is opposite the second side portion on the other of said partition members.

11. The folding box of claim 9, in which the flaps which form parts of said first and second side portions are each attached to their respective strip sections which are remote from the end walls.

12. The folding box of claim 9, in which two partition members are employed, one secured to each end wall, in which said first side portion on one of said partition members is opposite the second side portion on the other of said partition members, and in which the flaps which form parts of said first and second side portions are each attached to their respective strip sections which are remote from the end walls.

13. A folding box comprising interconnected bottom, side and end walls, and a partition member connected to one of said walls and comprising a first panel foldably secured to said one of said walls and overlying said bottom wall and a second panel foldably secured to said first panel and bent upwardly from said first panel so as to define a partition within said box, side portions of at least one of said panels being partially separated therefrom remaining foldably secured to said partition member along at least one edge, and being folded into pillar-like reinforcements at corners of said box.

14. The folding box of claim 13, in which a first one of said side portions comprises a strip to a portion of the length of which a flap is foldably secured, said flap extending from a side edge of said partition member, and in which the second one of said side portions comprises a strip to a portion of the length of which a flap of greater width is foldably secured, said flap being formed from the body of said partition member and having a fold line along the length thereof so as to divide it into two segments.

15. The folding box of claim 13, in which two partition members are employed, one extending inwardly from each end of said box, and in which said first side portion

on one of said partition members is opposite the second side portion on the other of said partition members.

16. The folding box of claim 13, in which a first one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal fold line extends from a side edge of said partition member, and in which a second one of said side portions comprises a strip of substantially uniform width having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections, and in which a flap attached to one of said strip sections by a longitudinal fold line is formed from the body of said partition member, the width of said flap being greater than the width of said strip section and said flap being provided with a longitudinal fold line dividing said flap into first and second segments, said first segment having a width substantially equal to that of said strip section.

17. The folding box of claim 13, in which two partition members are employed, one extending inwardly from each end of said box, and in which said partition members each includes a third panel foldably connected to said second panel at the upper edge thereof and having a length such that when folded parallel to said first panel it defines a cover flap for half of said box.

18. A blank from which a box may be erected, said blank comprising a central body portion defining a bottom wall, side walls, and side cover flaps separated by fold lines, end walls having a height equal to that of said side walls connected by fold lines respectively to opposite exposed edges of said side walls so as to extend to opposite sides of said body portion, end cover flaps each foldably secured to one side edge of each of said end walls so as to extend along and separated from adjacent side cover flaps, and partition members each foldably secured to the other side edge of each of said end walls so as to extend along and separated from the remainder of said body portion, said partition members having fold lines dividing them into three panels extending serially in the same direction from said end walls, the first panel having a length substantially equal to half the length of said bottom wall, the second panel having a length substantially equal to the height of said side walls, and the third panel having a length equal to that of said first panel, and securing tabs projecting out from the exposed end edges of said end walls, said partition members comprising inner and outer side portions separable from the remainder of said partition members, the outer side portion comprising a strip extending substantially from said end wall and having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections each having a length substantially equal to the height of said side walls, and a flap extending outwardly from said blank along and foldably attached to said strip section remote from said end wall, the inner side portion comprising a strip extending substantially from said end wall and having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections each having a length substantially equal to the height of said side walls, and a flap extending inwardly from said blank along and foldably attached to said strip section remote from said end wall, the width of said flap being greater than the width of said strip section and said flap being provided with a longitudinal fold line to divide said flap into first and second segments, said first segment having a width substantially equal to said strip section.

19. A blank from which a box may be erected, said blank comprising a central body portion defining a bottom wall, side walls, and side cover flaps separated by fold lines, end walls having a height equal to that of said side walls connected respectively by fold lines to opposite exposed edges of said side walls so as to extend to opposite sides of said body portion, end cover flaps each foldably secured to one side edge of each of said end walls so as to extend along and separated from adjacent side cover flaps, and partition members foldably secured to the other side edge of each of said end walls so as to extend along and separated from the remainder of said body portion, said partition members having fold lines dividing them into two panels, the first panel having a length substantially equal to half the length of said bottom wall and the second panel having a length substantially equal to the height of said side walls, inner and outer side portions of said partition members being separable therefrom, the outer side portion comprising a strip extending substantially from said end wall and having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections each having a length substantially equal to the height of said side walls, and a flap extending outwardly from said blank along and foldably attached to said strip section remote from said end wall, the inner side portion comprising a strip extending substantially from said end wall and having a transverse fold line substantially midway of its length so as to divide said strip into two strip sections each having a length substantially equal to the height of said side walls, and a flap extending inwardly into said blank along and foldably attached to said strip section remote from said end wall, the width of said flap being greater than the width of said strip section and said flap being provided with a longitudinal fold line to divide said flap into first and second segments, said first segment having a width substantially equal to said strip section.

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