

Aug. 11, 1959

A. B. THORUP

2,899,121

FOLDING BOX WITH PARTITION

Filed Jan. 23, 1957

2 Sheets-Sheet 1

FIG. 1.

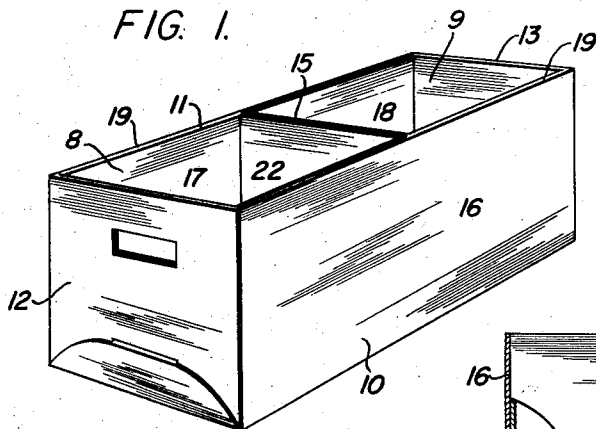


FIG. 2.

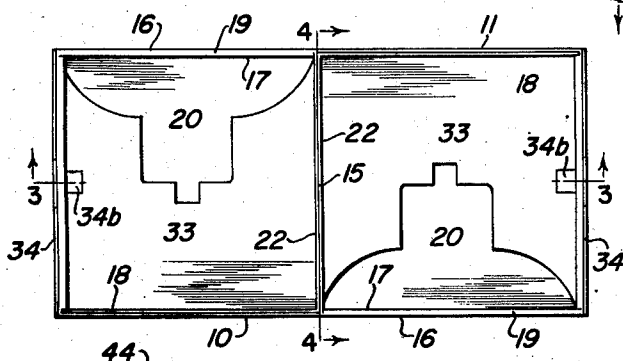


FIG. 4.

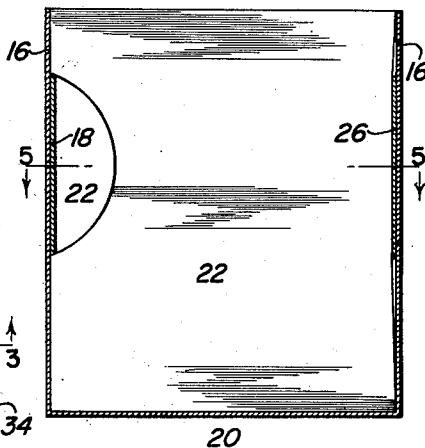
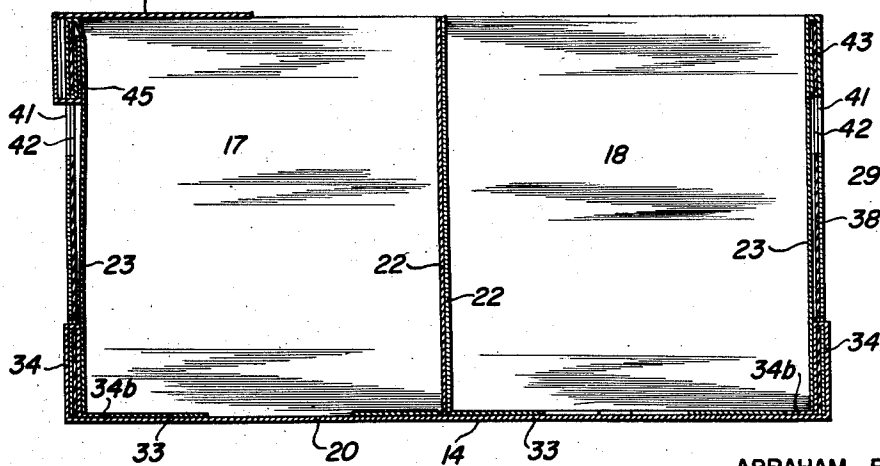


FIG. 3.



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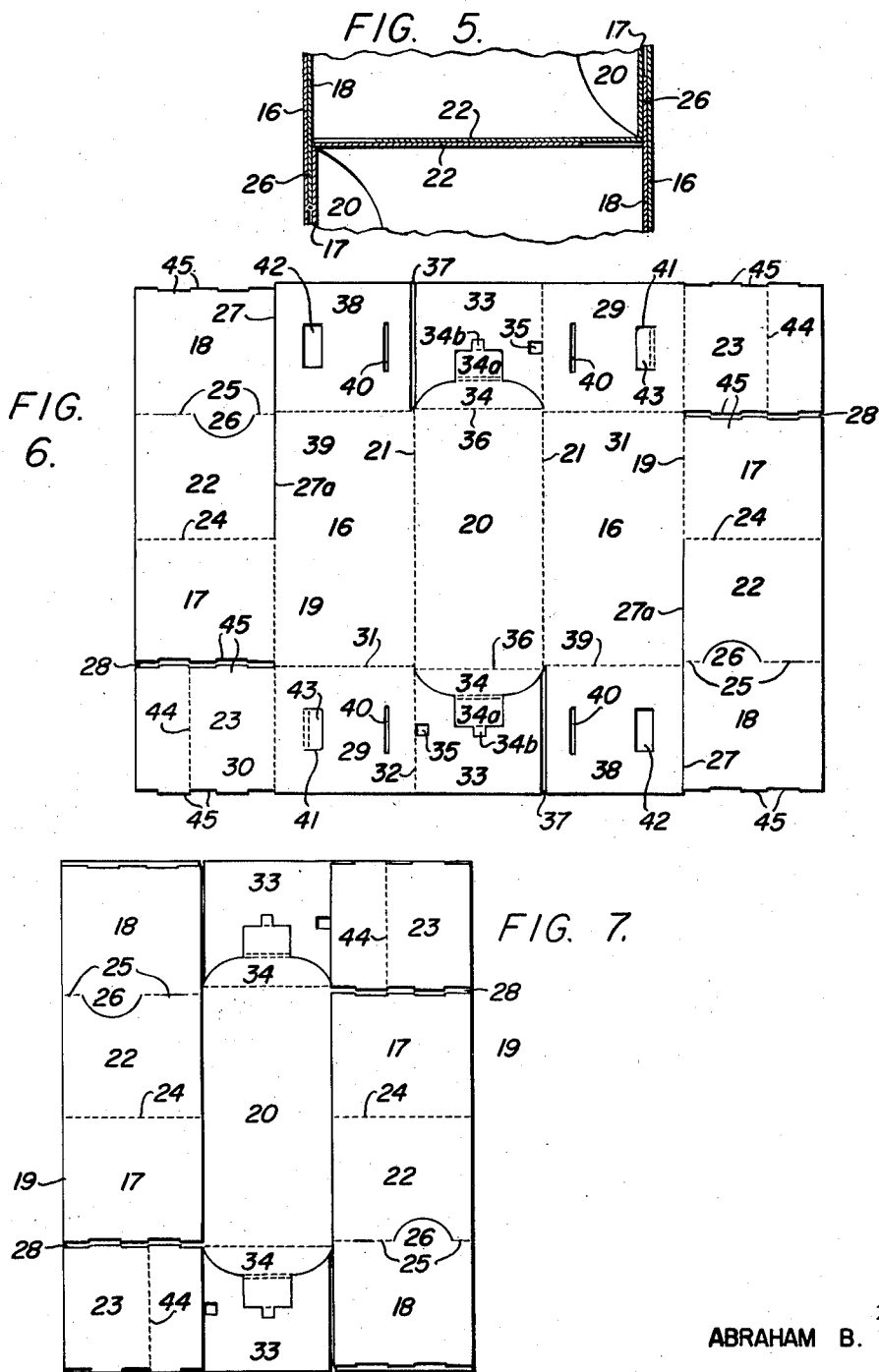
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FOLDING BOX WITH PARTITION

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9 Claims. (Cl. 229—27)

This invention relates to collapsible, folding boxes for the packaging of various items of merchandise, and is concerned particularly with folding boxes having special utility as egg crates.

The shipping of fresh eggs requires special care in packaging. The container must be unusually rigid and sturdy to protect its fragile contents.

Folding boxes of corrugated paperboard have been developed heretofore for the purpose. Yet, those possessing the necessary rigidity and strength for adequate protection of contents have been relatively expensive to construct and assemble, while those constructed for economy have not been satisfactory in use.

Egg crates are customarily of elongate and rectangular parallelepiped formation, partitioned transversely intermediate their lengths.

A principal object of this invention is to provide a new structural design enabling comparatively low cost and quantity production of exceptionally strong and rigid boxes of this desired formation from corrugated sheet paperboard material, using conventional box-making machinery.

Other objects are to provide for unitary construction from a single prepared blank of the material; to avoid the use of staples, tape, and glue, and to require only a relatively simple die-cutting operation on the sheet material; to enable the prepared blanks to be easily reduced in size for shipping to the consumer and to be easily set up for use as desired; to provide smooth inside walls for the set-up box, so that flats and fillers may be easily inserted and withdrawn; to protectively cover the outside bottom edges of the set-up box at its ends, for minimizing snagging and scuffing; to facilitate tight securement of a cover on the set-up box; and to provide superior impact and stacking strength for the set-up box.

Further objects and features will become apparent from the following detailed description of the particular preferred specific embodiment illustrated by way of example in the accompanying drawings.

In the drawings:

Fig. 1 represents a perspective view of the box constructed for use as a shipping crate for eggs, the box being set up for the reception of contents;

Fig. 2, a top plan view;

Fig. 3, a longitudinal section taken on the line 3—3 of Fig. 2 and drawn to an enlarged scale, a fragmentary portion of an appropriate cover being shown in securely locked position on the left-hand end portion of the box;

Fig. 4, a transverse section taken on the line 4—4 of Fig. 2 and drawn to the scale of Fig. 3;

Fig. 5, a fragmentary horizontal section taken on the line 5—5 of Fig. 4;

Fig. 6, a plan view of the prepared blank used to make the box of the foregoing figures, the view being drawn to a considerably reduced scale and the impressed fold lines being shown by broken lines; and

Fig. 7, a corresponding view of the blank folded to reduced size for shipment to the consumer.

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Referring now to the drawings:

The illustrated shipping crate for eggs is set up into the unitary box form of Figs. 1—5 from the single prepared blank of corrugated paperboard material shown in Figs. 6 and 7. It is adapted to contain thirty dozen fresh eggs.

It will be readily appreciated by those skilled in the art that, while the box of the invention is illustrated in this specific form, the structural concepts disclosed are applicable to collapsible folding boxes for various other uses and made from various other stiff but foldable sheet materials.

The egg crate of Figs. 1 through 5 is of elongate and rectangular, parallelepiped formation, partitioned transversely intermediate its ends to form two similar compartments 8 and 9. It comprises mutually opposite, elongate, side walls 10 and 11, mutually opposite end walls 12 and 13, a bottom wall 14, and a partition wall 15, all of which are of multilayer panel formation.

The side walls 10 and 11 are of mutually similar construction, being each made up of an elongate outer panel 16, extending the full length of the box, and a pair of inner panels 17 and 18, aligned end to end and, together being substantially coextensive with the outer panel 16 and disposed in face-to-face relationship therewith. The positions of inner panels 17 and 18 are reversed in the respective side walls, the panels 17 being joined to respective portions of the length of the outer panels 16, respectively, along intervening lines of fold 19.

In the blank of Fig. 6, the several panel sections are designated by the same reference numbers as the wall panels that they form in the set-up box. It can be seen that the elongate and rectangular outer side wall panel sections 16, along with a similar though, here, somewhat narrower outer bottom wall panel section 20, form a series of three relatively elongate panel sections joined side by side centrally of the blank along intervening fold lines 21. It can also be seen that the inner side wall panel sections 17 and 18 of each side wall of the set-up box, along with one of mutually similar partition wall panel sections 22 and one of mutually similar inner end wall panel sections 23, form a series of four panel sections extending along an end of the first-named or central series in perpendicular relationship therewith, there being one of these mutually parallel terminal series at each end of such central series.

The partition wall panel section in each of the terminal series of panel sections is disposed between inner side wall panel sections 17 and 18, being joined to the former along intervening fold line 24 and to the latter along intervening fold line 25 whose length is not continuous but is broken by the base of a partition-locking tongue 26 cut out from partition panel section 22 and extending rigidly from inner side wall panel section 18.

Inner side wall panel sections 18 of the respective terminal series are divided by respective lines of cut 27 from laterally adjoining panel sections of respective series of end wall forming and of inner bottom wall forming panel sections that extend laterally of the aforesaid central series and are joined thereto along respective intervening fold lines. Such cut lines or cuts 27 continue on, at 27a, between the succeeding partition panel sections 22 of the respective terminal series and respective outer side wall panel sections 16 of the central series.

In setting up the box from the shipping condition of the blank shown in Fig. 7, wherein the mutually opposite terminal series of panel sections are folded over laterally upon their respectively adjoining panel sections, these overlapping series of panel sections are folded upwardly on the fold lines 21 after the sets of adjoining panel sections are folded, first, on the fold lines 24, respectively,

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and then, on the discontinuous fold lines 25, respectively, so that the tongues 26 project toward the edge openings between respective sets of face-to-face side wall panels 16 and 17. Such tongues are then pushed into frictional locking position between the wall panels of the respective sets, as shown in Fig. 5, thereby forming both the multi-layer side walls 10 and 11 of the box and the partition wall 15 thereof.

The inner end wall panel sections 23 are separated from the adjoining panel sections 17 of the respective terminal series by slots 28, respectively, cut therebetween, so as to enable the remaining panel sections of the respective terminal series to be folded and set up as above described, independently of such inner end wall panel sections 23. These latter panel sections 23 are joined to respective ends of the series of end wall forming and of inner bottom wall forming panel sections, last named above.

Such last-named series of panel sections each comprises an outer end wall panel section 29, joined to the adjacent inner end wall panel section 23 by an intervening fold line 30 and joined to the adjacent outer side wall panel section 16 by an intervening fold line 31. Succeeding such outer end wall panel section 29 in each series and joined thereto by an intervening fold line 32 is an inner bottom wall panel section 33, from which an end flap 34 provided with locking tongue and tab portions 34a and 34b, respectively, is cut, a receiving notch 35 for the locking tab 34b being also cut therein, as indicated. End flap 34 is joined to outer bottom wall panel section 20 by an intervening fold line 36. Succeeding such inner bottom wall panel section 33 in the series, and separated therefrom by an intervening slot 37, is an intermediate end wall panel section 38.

The panel sections 38 are divided from the adjoining panel sections 18 in the adjacent terminal series of panel sections by the respective cut lines 27, but are joined to the adjoining outer side wall panels by respective intervening fold lines 39.

For the purpose of providing a mating interlock for the locking tongue and tab portions 34a and 34b of each end flap 34, each set of outer and intermediate end wall panel sections 29 and 38, respectively, is provided with mutually coinciding, tongue-receiving slots 40, and, for the purpose of providing hand holes to facilitate handling of the set-up box, each set is also provided with mutually coinciding, hand-hole openings 41 and 42, respectively.

The hand-hole opening 41 is advantageously provided by cutting a flap 43 from the material of the end wall panel section 29, as illustrated, such flap being joined to the panel section 29 on intervening fold lines that permit it to be folded back and through the hand-hole 42 of the adjacent intermediate end wall panel section 38 in the setting up of the box, see Fig. 3, thereby covering and reinforcing the marginal edges defining the hand-hole opening and facilitating interlock of a conventional tongue-lock cover 44, Fig. 3, with the box proper by insertion of the depending locking tongue 45 as illustrated, see left-hand end of Fig. 3.

Following the setting up of the side walls and partition wall as explained above, the remainder of the box is set up by folding the intermediate end wall panel sections 38 against respective inner side wall panels 18, as already set up; by, thereafter, introducing inner bottom wall panel sections 33 between the side walls to overlay the outer bottom wall panel 20 at respectively opposite sides of the partition wall 13, thereby bringing outer end wall panel sections 29 into respective positions closing the previously open ends of the individual compartments 8 and 9 of the box; and by then swinging the intermediate end wall panel sections 38 backwardly into face-to-face relationship with their corresponding outer panel sections 29 as previously set up, the swinging movement over the already positioned inner bottom wall panels 33 being possible because of the accommodating slots 37 cut in the blank.

The respective sets of face-to-face end wall panels 33

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and 38 are then securely locked in their set up positions by inserting the locking tongue and tab portions 34a and 34b of respective end flaps 34 through the registering slots 40 and by frictionally engaging the locking tabs 34b in their respective securement notches 35.

The end walls 12 and 13 of the box, as so far set up, are now structurally reinforced and given a smooth inner lining by folding the respective inner end wall panel sections 23 downwardly into the respective compartments 8 and 9 of the box and into face-to-face relationship with the respective intermediate end wall panels 38. It should be noted that, during this latter operation, the handhole flaps 23 are folded inwardly and upwardly about the marginal edges defining the upper limits of the respective hand-holes, so as to be snugly interfitted between the intermediate and inner end wall panels at the respective ends of the box.

For the purpose of facilitating introduction of the inner end wall panels 23 into the respective compartments of the box, respective fold lines 44 are provided transversely of such panel sections intermediate their lengths.

For securely locking these inner end wall panels 23 in place, the slots 28 and the outer edges of panel sections 18 and 23 are cut in dovetail formation, as indicated at 45. The members of such dovetail formations are arranged on the several panel sections so that they engage when the panel sections 23 are pushed down into place against the respective intermediate end wall panels 38.

Whereas this invention is here illustrated and described with respect to a presently preferred embodiment thereof, it is to be understood that various changes may be made within the scope of the following claims, without departing from the essential teachings hereof.

I claim:

1. A collapsible, partitioned, folding box formed from a single blank of stiff but foldable sheet material, and including mutually opposite end walls, a bottom wall, mutually opposite side walls, and a partition wall, all of multilayer panel formation, individual panels of said partition wall being joined along fold lines at their opposite lateral edges to respective pairs of side wall panels which face each other across the interior of a compartment of the box, one of said side wall panels being joined to a next side wall panel disposed in face-to-face adjoining relationship therewith, the joiner being along a line of fold extending along a top edge of the box, such joiners for opposite partition panels lying at respective opposite lateral sides of the box; and interlocking means between the side walls proper and the corresponding side wall panels and partition wall panels, respectively, said interlocking means comprising tongues cut out from respective partition wall panels and projecting rigidly from and coplanar with said corresponding side wall panels, respectively, into frictional interlocking relationship with adjoining portions of the respective side walls corresponding thereto, and between the panel layers thereof, said box being of elongate and rectangular parallelepiped formation, partitioned transversely intermediate its length to provide two compartments; the side walls being each made up of an elongate outer panel and a pair of inner panels, the latter being aligned end to end and, together, being coextensive with the said outer panel; the partition wall being formed of two panels disposed face to face and joined at their lateral edges, respectively, along respective fold lines, to corresponding inner panels of said side walls that define corresponding compartments of the box; the end walls of the box each comprising two panels disposed face to face and joined, respectively, at mutually opposite lateral edges and along respective fold lines to the outer panels of said side walls; and the bottom wall being made up of an elongate outer panel, joined at its opposite lateral edges and along respective fold lines to the outer panels of the side walls, and, also, of a pair of inner panels disposed at respectively opposite sides of the partition wall and aligned end to end and joined,

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respectively, to the bottom edges of the outer panels of the end walls by respective fold lines.

2. The box of claim 1, wherein a pair of end flaps having locking-tab portions are provided at opposite end edges of the outer bottom panel, being joined thereto along respective fold lines; receiving slots for said locking-tab portions of the end flaps are provided through the respective end walls of the box, including the said two panels of each; a pair of hand openings are formed through the respective end walls, including the said two panels of each; and a pair of inner lining panels for said end walls are joined, as flaps, to the top edges of respective end wall panels at respective opposite ends of the box and depend into the respective compartments of the box in face-to-face relationship with and smoothly covering the apertured panels of said end walls.

3. The box of claim 2, wherein there is additionally provided a cover for the box, said cover having peripheral side and end walls conforming to the side and end walls of the box and adapted to fit frictionally thereover, and having friction-locking tongues depending from its said end walls at the hand hole openings of the box, said tongues being inserted through said hand holes, respectively, and being frictionally tucked between the inner flap panels of the respective end walls and the next adjoining panels thereof.

4. The box of claim 3, wherein flaps are left from the cutting of the hand hole in the panels of the respective end walls, said flaps being folded back between the respective inner flap panels of the said end walls and the next adjacent panel thereof, as spacers facilitating insertion of the respective locking tongues of the cover.

5. A prepared blank of stiff sheet material adapted to be folded and set up as a partition box, said blank being in the form of a flat, rectangular sheet having fold lines impressed thereon and cuts made therein to define a series of three rectangular panel sections joined side by side centrally of the blank along intervening fold lines; terminal series of panel sections joined to the first-named series at mutually opposite ends thereof, respectively, and extending in parallel perpendicularly of the first-named series, each of said terminal series comprising four sequential panel sections, the intermediate two of which, considered together lengthwise of the series, are coextensive with the width of the first-named series and are joined together along an intervening fold line, and, of the other two of which, one is divided from its adjoining intermediate panel by a slot cut therebetween, while the other is joined to its adjoining intermediate panel along an intervening fold line, the said terminal series having the positions of their component panels reversed as respects each other; and mutually opposite series of three panel sections extending along the first-named series laterally thereof and between the said terminal series, each of the last-named series comprising panel sections joined to the panel sections, respectively, of the first-named series along intervening fold lines, two of which former panel sections are joined together along an intervening fold line and the third of which is separated from the adjoining panel section of its series by a slot cut therebetween and from the adjoining panel section of the adjacent terminal series by a cut line which continues on between the succeeding panel section of said adjacent terminal series and its adjoining panel section of the first-named series, whereby said succeeding panel section is foldable to form a partition wall panel in the setting up of the box, the said last-named series having the positions

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of their component panels reversed as respects each other, and having the terminal panel sections of their sets of two joined panel sections joined, respectively, to the adjoining panel sections of said terminal series along intervening fold lines.

6. The blank of claim 5, wherein the intermediate panel section of those making up each of the said last-named series has cut therefrom a flap provided with locking tongue and tab and arranged to fold on the fold line intervening between said intermediate panel section and its adjoining panel section in the said first-named series; and the panel sections of said last-named series adjoining said intermediate panel section are provided with mutually coinciding, receiving slots for the locking tongue portion of said flap.

7. The blank of claim 6, wherein the said intermediate panel section of each of said last-named series has cut therefrom a notch arranged to receive the locking-tab portion of said flap.

8. The blank of claim 7, wherein mutually coinciding hand-hole openings are cut in the said panel sections of each of said last-named series that adjoin said intermediate panel section and have the tongue-receiving slots cut therein.

9. In a collapsible, partitioned, folding box structure formed from a single blank of stiff but foldable sheet material and including mutually opposite side walls and a partition wall of multilayer panel formation, the combination of two oppositely placed and extending series of individual wall panels, the said panels of each series being joined by interconnecting fold lines and providing a partition wall panel disposed intermediate two terminal wall panels at respectively opposite ends thereof, said side wall panels facing each other at respectively opposite sides of a compartment of the box and the partition wall panels of the said series being disposed in face-to-face coextensive relationship between the respective compartments formed by said two series of wall panels; a series of three relatively elongate wall panels joined side by side by intervening fold lines, the intermediate panel of which provides a bottom for the box and the terminal wall panels of which are disposed in face-to-face coextensive relationship with the side wall panels of said two series of wall panels at respectively opposite sides of the box, respectively opposite terminal wall panels of the said two series of wall panels being joined to the said terminal wall panels, respectively, of said series of elongate wall panels along respective opposite portions of their length by intervening fold lines; and tongues cut out from the respective partition wall panels and projecting rigidly from and coplanar with respective adjoining side wall panels at respectively opposite sides of the box into friction lock positions between the respectively adjoining face-to-face terminal wall panels of the partition-wall-providing series and the elongate wall panel series of wall panels.

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