

May 6, 1958

P. A. TOENSMEIER

2,833,458

FOLDING TRAYS

Filed Sept. 30, 1957

2 Sheets-Sheet 1

FIG. 1

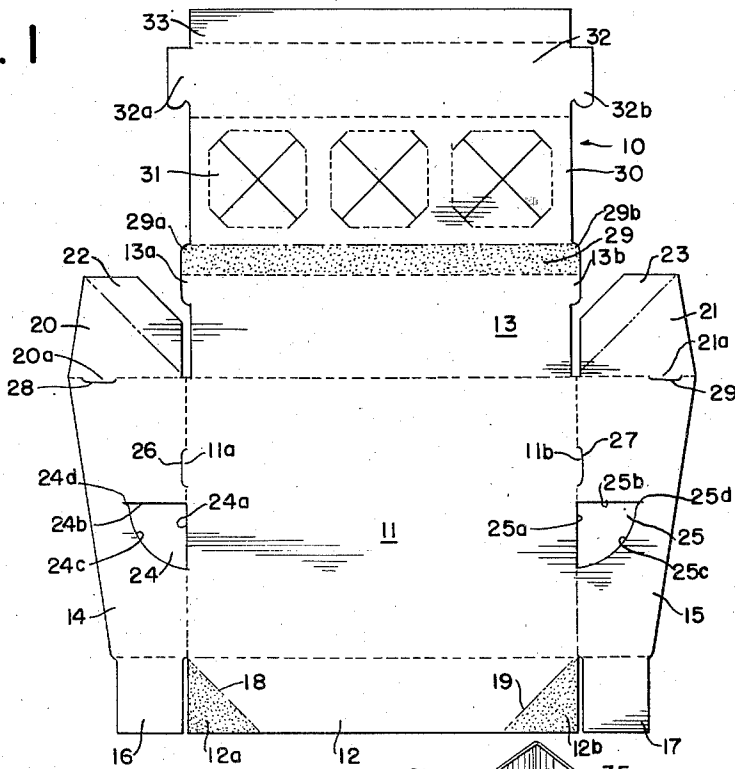
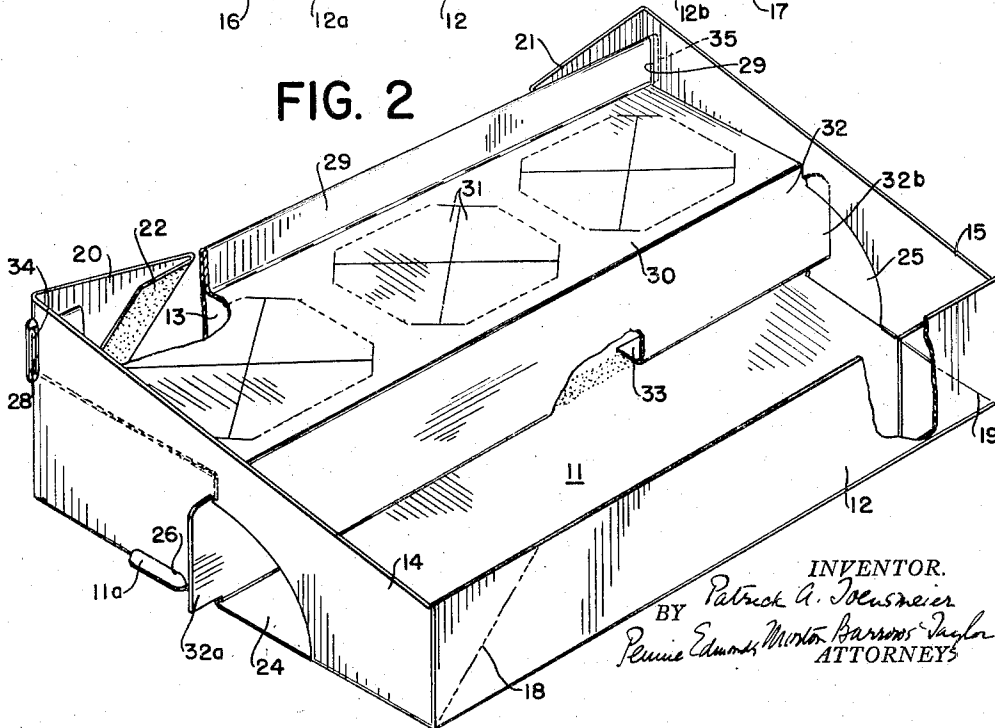


FIG. 2



INVENTOR.
BY Patrick A. Toensmeier
Perrine Edmunds Morton Barrows Taylor
ATTORNEYS

May 6, 1958

P. A. TOENSMEIER

2,833,458

FOLDING TRAYS

Filed Sept. 30, 1957

2 Sheets-Sheet 2

FIG. 3

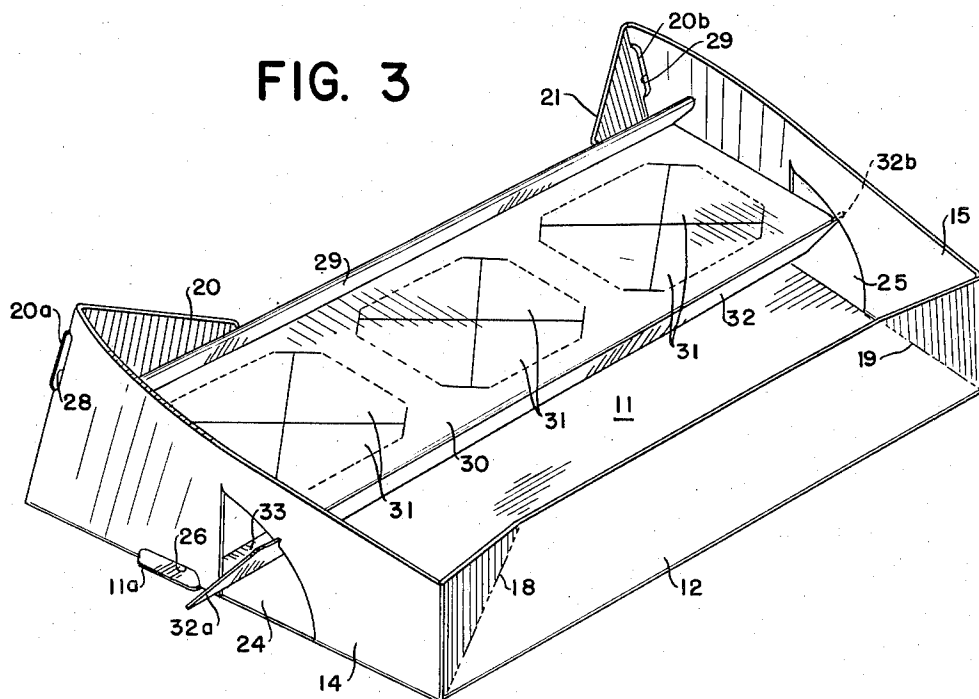
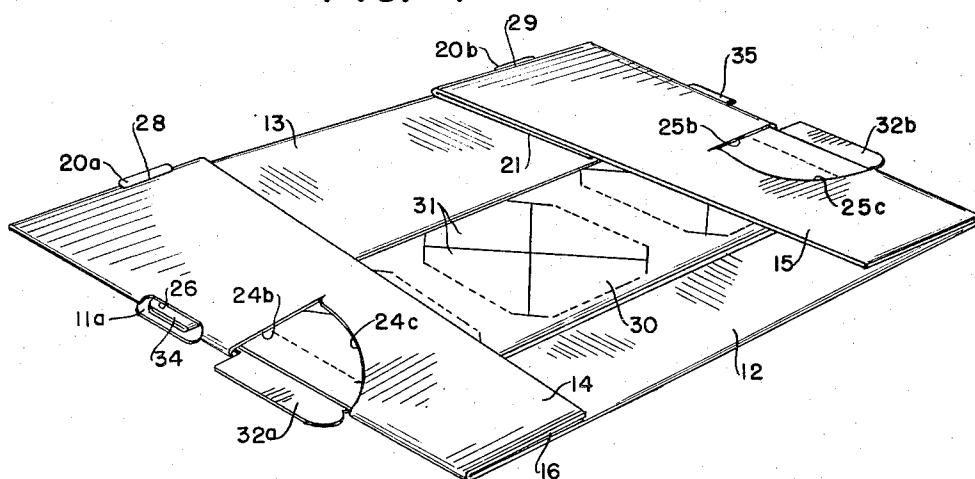


FIG. 4



INVENTOR.
 BY *Patrick A. Toensmeier*
Bennie Edwards *Morton Basson Taylor*
 ATTORNEYS

1

2,833,458

FOLDING TRAYS

Patrick A. Toensmeier, Hamden, Conn., assignor to The New Haven Board & Carton Company, New Haven, Conn., a corporation of Connecticut

Application September 30, 1957, Serial No. 686,986

7 Claims. (Cl. 229—23)

This invention relates to trays for serving food and beverages and is concerned more particularly with a novel tray, which is made of a single blank of paperboard by routine operations and can be shipped flat and quickly erected to usable condition. The new tray collapses so completely that a large number of the collapsed trays can be stored in a small space and the tray is provided with interlocking and reinforcing means, which prevent any substantial distortion, when a loaded tray is picked up or carried in one hand.

The new tray includes a bottom and front, rear, and side walls hinged to the bottom and adapted to be folded inward over the bottom. A middle wall lies parallel to and between the front and rear walls and it is hinged to the bottom and to the forward edge of a platform wall, the rear edge of which is hinged to a reinforcing panel secured to the front face of the rear wall. The middle wall and the reinforcing panel have end extensions received in openings in the side walls and serving to lock the walls in erect position and to prevent the accidental collapse of the container and such locking means make it possible to hold a loaded tray at one end or side without substantial distortion of the tray.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which—

Fig. 1 is a plan view of a blank for making one form of the new tray;

Fig. 2 is a view in perspective with parts broken away of the erected tray made from the blank of Fig. 1;

Fig. 3 is a view in perspective showing a tray made from the blank of Fig. 1 in partially erected condition; and

Fig. 4 is a view of the tray in collapsed condition.

The blank 10 shown in Fig. 1 is made of paperboard of a suitable weight, and it comprises a bottom 11, a front wall 12, a rear wall 13, and side walls 14, 15 hinged to the edges of the bottom. The side walls have end flaps 16, 17 hinged to their front edges, and, in the conversion of the blank into a tray, the flaps 16, 17 are secured to the inner faces of the front wall 12 over triangular areas 12a, 12b lying at the ends of the wall and separated from the remainder of the wall by crease lines 18, 19. At their rear ends, the side walls have triangular panels 20, 21 hinged thereto, and the panels have glue flaps 22, 23 hinged to the inner inclined edges thereof. In the erected carton, the panels 20, 21 lie outside and parallel to the rear wall 13, and the glue flaps 22, 23 are infolded and secured to the outer face of the rear wall.

The side walls 14, 15 are preferably of increasing width from front to rear, and the rear wall 13 is of correspondingly greater width than the front wall 12. The side wall 14 has an opening 24 of generally triangular shape having an inner edge 24a lying in line with the hinge connection between the side wall and the bottom. The opening has a straight rear edge 24b lying at right angles to the edge 24a, and the remaining edge 24c is curved and forms a notch 24d adjacent the point where it meets the edge 24b. The wall 15 has a similar open-

2

ing 25 with edges 25a, 25b, 25c, and the opening is provided with a notch 25d, where the curved wall 25c meets the wall 25b. The side walls are also formed with U-shaped cuts 26, 27, the ends of which lie in the hinge lines between the walls and the bottom, and the side walls have similar U-shaped cuts 28, 29 at their ends with the ends of the cuts lying in the hinge connection between the side walls and the triangular panels 20, 21.

A reinforcing panel 29 of a width equal to the difference in width between the front and rear walls is hinged to the outer edge of the rear wall 13. Adjacent this edge, the wall has lateral extensions 13a, 13b and the panel has similar lateral extensions 29a, 29b. A platform wall 30 is hinged along one edge of the other edge of the reinforcing panel 29 between the extensions 29a, 29b, and the platform wall is formed with tongues 31 hinged thereof and arranged in three groups of four each. The tongues of each group point inward from their hinge connections to the platform wall and can be swung out of the plane of the wall to define an opening for receiving a tumbler or a cup for a beverage.

A middle wall 32 is hinged along one edge to the other edge of the platform wall 30 and has end extensions 32a, 32b. A glue flap 33 is hinged to the other edge of the middle wall between the extensions thereon.

In converting the blank into a tray, the front and rear walls 12, 13 are folded to extend upwardly at right angles to the bottom 11, and the flaps 16, 17 attached to the front edges of the side walls are folded inwardly to lie behind the front wall and are secured thereto over the triangular areas 12a, 12b. The triangular panels 20, 21 secured to the rear edges of the side walls are folded inwardly to lie outside the rear wall 13, and the glue flaps 22, 23 attached to the panels are folded inwardly and secured to the rear face of the rear wall 13 beneath the panels. The reinforcing panel is then given a coating of glue and folded downwardly to lie against and be secured to the front face of the rear wall. When this is done, the extensions 13a, 13b on the rear wall and the extensions 29a, 29b on the reinforcing panel lie in registry and form tongues 34, 35 of double thickness. After the reinforcing panel has been secured to the rear wall, the platform wall 30 is folded to extend forwardly at right angles to the rear wall and the middle wall 32 is folded to lie at right angles to the platform wall and to extend to the bottom. Glue is applied to one face of the glue flap 33 and the latter is folded to lie against and be secured to the bottom beneath the platform wall.

The U-shaped cuts 26, 27 in the side walls 14, 15 define tongues 11a, 11b projecting from the side edges of the bottom and, when the side walls are folded to lie at right angles to the bottom, the tongues remain in the plane of the bottom and the cuts then define slots in the side walls directly above the tongues. Similarly, the cuts 28, 29 in the rear ends of the side walls define tongues 20a, 21a attached to the triangular panels 20, 21 and, when the panels are folded to lie at right angles to the side walls, the tongues 20a, 21a remain in the plane of the panels so that slots are formed in the side walls adjacent their connections to the panels. When the reinforcing panel is folded against and secured to the inner face of the rear wall to produce the double tongues 34, 35, these tongues enter the vertical slots in the side walls adjacent their connections to the flaps. When the platform wall 30 is folded to lie parallel to the bottom and the middle wall 32 is then folded to extend toward the bottom, the extensions 32a, 32b at the ends of the middle wall enter the openings 24, 25 in the side walls.

The folded and glued blank can be collapsed to the condition illustrated in Fig. 4 by folding the front and rear walls inwardly to overlie the bottom. The connections between the front and rear walls and the side walls per-

mit such inward movement of the front and rear walls and, as the walls are moving inwardly, the middle wall folds on its connection to the glue flap 33, so that the platform wall 30 may be lowered to lie against the upper surfaces of the middle wall and of the bottom. During such collapsing movement of the several walls, the extensions 32a, 32b on the middle wall swing down through the openings 24, 25 in the side walls 14, 15 to lie parallel to the bottom. As the rear wall moves forwardly over the bottom wall, the double tongues 34, 35 move out of the vertical slots at the rear ends of the side walls and ultimately enter the horizontal slots above the tongues 11a, 11b projecting from the bottom.

In erecting the folded and glued blank, the operations performed are the reverse of those above described. The inner edges of the front and rear walls are grasped and pulled apart to erect position and, during such movement of the walls, they cause the side walls to become erect. As the rear wall moves upward, the double tongues 34, 35 are pulled out of the horizontal slots above the tongues 11a, 11b and travel upwardly along the inner surfaces of the side walls until the tongues snap into the vertical slots adjacent the tongues 20a, 21a. During the upward swinging movement of the front and rear walls, the middle wall similarly swings upwardly and its extensions 32a, 32b move through the openings 24, 25 in the side walls. The curved edges 24c, 25c of these openings are so formed that, as the extensions approach the vertical, the upper edges of the extensions enter the notches 24d, 25d in the openings. When this occurs, the extensions are locked in place and cannot be accidentally dislodged.

In the erected tray, the rear wall is held erect by the engagement of the double tongues 34, 35 in the vertical slots at the rear ends of the side walls and, similarly, the middle wall is held erect by the engagement of the upper edges of extensions 32a, 32b in the notches at the upper ends of openings 24, 25 in the side walls. As a result, the platform wall is maintained parallel to the bottom and the interlocked parts make the tray so rigid, that a loaded tray may be picked up by being grasped at one end or a corner and will not undergo any substantial warping or distortion. The interlocking of the parts is automatic and occurs as an incident to the movement of the front and rear walls to vertical position in relation to the bottom. The new tray can thus be quickly erected from collapsed condition and the erecting operation produces a rigid, stable structure which can be easily carried with a full load in one hand.

I claim:

1. A tray, which comprises a bottom, a front wall and a rear wall hinged to the front and rear edges of the bottom, respectively, side walls hinged to the side edges of

the bottom and of less width at the front than at the rear, connections between the front ends of the side walls and the ends of the front wall and between the rear ends of the side walls and the ends of the rear wall, the connections facilitating the inward folding of the front and rear walls upon the bottom and the inward folding of the side walls upon the infolded front and rear walls, a middle wall lying parallel to and between the front and rear walls and hinged to the bottom, a platform wall hinged at its front edge to the top edge of the middle wall, and a reinforcing panel hinged to the rear edge of the platform wall and secured to the front face of the rear wall, the side walls having openings between their ends, horizontal slots adjacent their connections to the bottom wall, and vertical slots adjacent their connections to the rear wall, the middle wall having end extensions projecting through the openings in the side walls and the reinforcing panel having end extensions receivable in the vertical slots, when the rear wall is erect, and in the horizontal slots, when the rear wall is folded inwardly upon the bottom wall.

2. The tray of claim 1, in which the openings in the side walls extend upward from the lower edges of the walls and have front and top edges forming a smooth curve and a straight rear edge and the extensions from the middle wall have cuts, in which the top edges of the openings are received, when the middle and side walls are erect and the extensions lie against the rear edges of the openings.

3. The tray of claim 1, in which the rear wall is higher than the middle wall and the reinforcing panel is of a width equal to the difference in height of the rear and middle walls and is attached to the front face of the rear wall starting at the top edge of the wall.

4. The tray of claim 3, in which the reinforcing panel is integral with the rear wall and the platform wall, the platform wall is integral with the middle wall, and the middle wall has an integral glue flap secured to the top face of the bottom.

5. The tray of claim 3, in which the rear wall has end extensions registering and secured in face contact with the end extensions on the reinforcing panel and receivable therewith in the side wall slits.

6. The tray of claim 1, in which the side walls are connected to the rear wall by triangular panels hinged to the rear edges of the side walls and to glue flaps secured beneath the panels to the rear face of the rear wall.

7. The tray of claim 1, in which the platform wall has at least one group of tongues foldable downwardly to define an opening.

References Cited in the file of this patent

UNITED STATES PATENTS

2,679,971 Goldberg ----- June 1, 1954