June 15, 1954 R. GUYER 2,681,173

TRAY STRUCTURE

Filed Feb. 14, 1949

2 Sheets-Sheet 1

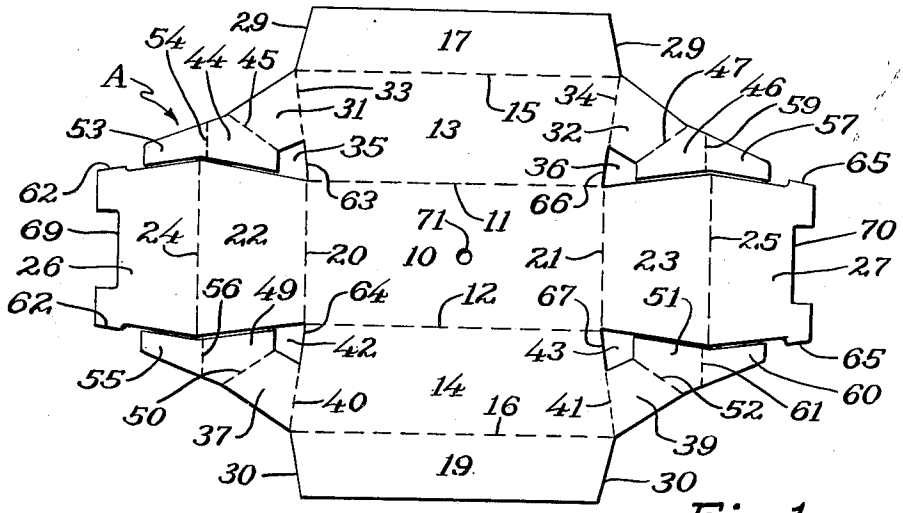


Fig. 1

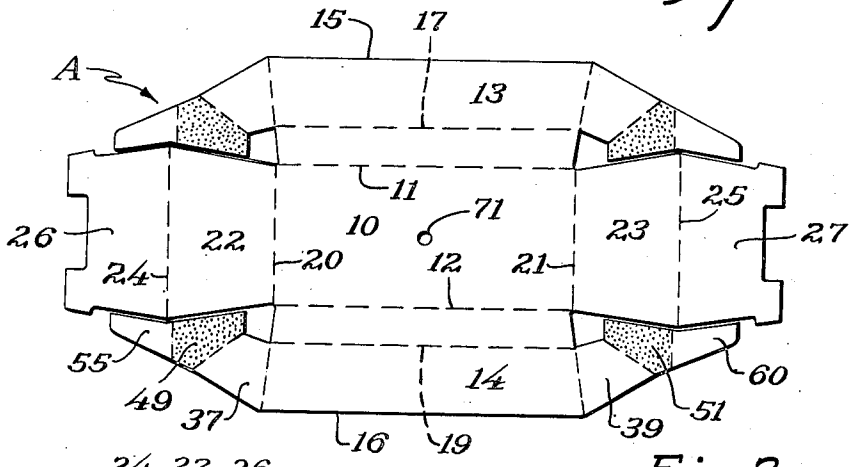


Fig. 2

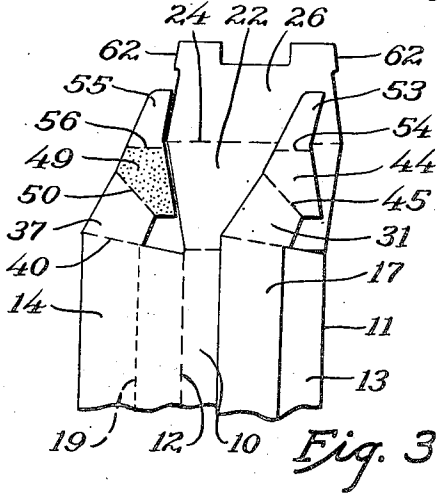


Fig. 3

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TRAY STRUCTURE

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2 Sheets-Sheet 2

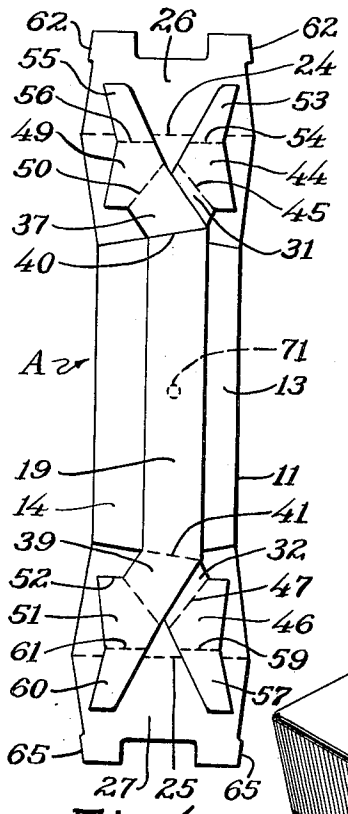


Fig. 4

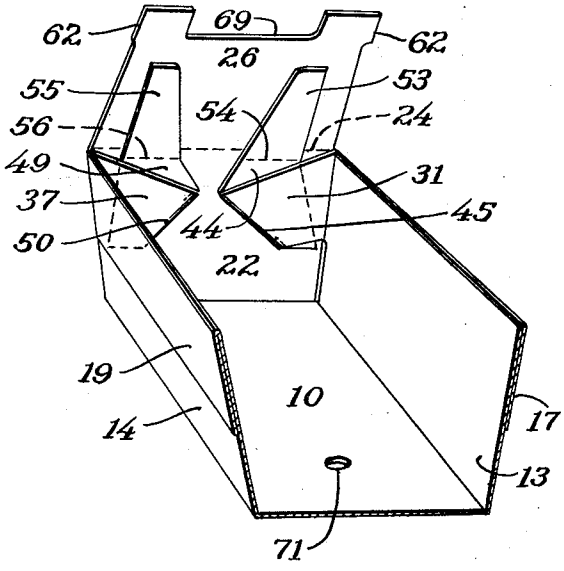


Fig. 6

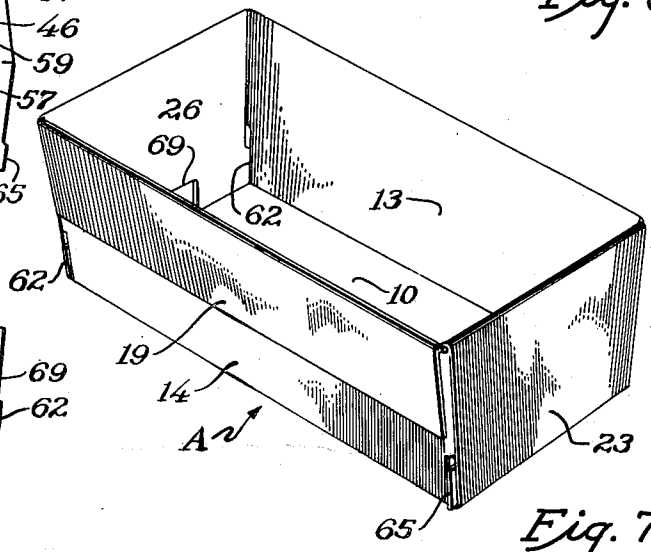


Fig. 7

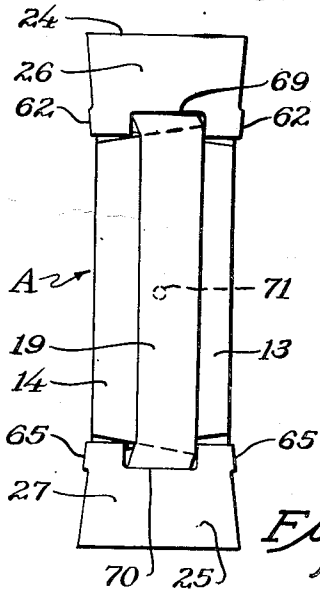


Fig. 5

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UNITED STATES PATENT OFFICE

2,681,173

TRAY STRUCTURE

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4 Claims. (Cl. 229—34)

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My invention relates to an improvement in a tray and deals with a type of tray which may act as a tall basket for containing fruit, vegetables, or other commodities.

The object of the present invention lies in the provision of a tray which may be glued and folded into a flat condition for transportation and storage and yet which may be erected into tray formation quickly and easily. The tray is provided with reinforced side and end walls which fold into a flat condition for gluing and storage, but which may be quickly folded to erect the side walls into tray formation. As a result the tray requires little space for storage, but still forms a strong receptacle for various commodities.

A feature of the present invention lies in the fact that my tray can be folded and glued on conventional folding and gluing equipment. While the tray includes doubled side walls to provide strength and rigidity and provides side wall flaps which are glued to the end walls of the tray, the various folding and gluing operations may be accomplished on equipment commonly used for cartons of various types.

A feature of the present invention lies in the provision of flaps foldably connected to the side walls of the tray and designed to overlie the portions of the end walls during the folding and gluing operation. Means are provided for compensating for the varying thicknesses of the different parts of the tray so that sufficient pressure may be exerted on the body of the tray to properly adhere the side wall flaps to the end walls.

Difficulty is often experienced in gluing trays which are relatively long and narrow and which are provided with doubled side wall edges. As the side walls are folded onto the bottom wall of the tray for gluing the side wall flaps to the end wall the thickness of the center portion of the carton usually greatly exceeds the thickness of the end portions of the carton. As a result it is difficult to maintain proper sealing pressure against the flaps connecting the side walls to the end walls. I provide a means of building up the thickness of the end portions of the carton so that proper sealing pressure may be applied and an effective adherence of the various parts of the carton is obtained.

An added feature of the present invention lies in the means for locking the carton into set up condition. End wall flaps are provided which extend over the flaps connecting the side walls to the end walls. These end wall flaps lock in notches between the side walls and the end walls to hold the carton in erect form. These locking

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flaps on the end walls also serve to conceal the connecting flaps and to provide a relatively smooth inner wall for the tray ends.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a diagrammatic view of the blank from which my tray or basket is formed.

Figure 2 is a plan view of the tray or basket blank after the marginal side wall flaps have been folded onto the side walls of the carton and adhered thereto.

Figure 3 is a plan view of an end of the blank with one side wall folded onto the bottom panel.

Figure 4 is a plan view of one end of the blank showing both side walls folded to overlie the bottom wall.

Figure 5 is a plan view of the carton in completely folded condition.

Figure 6 is a perspective view of an end of the carton in partially set up form.

Figure 7 is a perspective view of the tray or basket in completely set up form.

The basket A includes a bottom panel 10 which is foldably connected along parallel fold lines 11 and 12 to side wall panels 13 and 14. The side wall panels 13 and 14 are hingedly connected along parallel fold lines 15 and 16 to side wall flaps 17 and 19 respectively. The bottom panel 10 is preferably rectangular in form while the side walls 13 and 14 may be wider along the fold lines 15 and 16 than along the fold lines 11 and 12 so that the basket walls will taper outwardly.

The bottom panel 10 is likewise connected along right angularly extending parallel fold lines 20 and 21 to end walls 22 and 23. The end walls 22 and 23 are hingedly connected along parallel fold lines 24 and 25 to locking panels 26 and 27. The specific shape of these locking flaps will be later described in detail. The end walls 22 and 23 in preferred form of construction gradually increase in width from the fold lines 20 and 21 to the fold lines 24 and 25 so that the side walls of the carton will incline outwardly. The flaps 17 and 19 are designed to reinforce the side walls of the carton and accordingly are folded upon the side walls 13 and 14 and adhered thereto as indicated in Figure 2 of the drawings. In this figure the flaps 17 and 19 are folded underneath the panels 13 and 14 and the marginal edges of the flaps are shown in dotted outlines. As indicated in Figures 1 and 2 the flaps 17 and 19 have converging opposed ends 29 and 30 so that when these flaps are ad-

hered to the side walls the ends of the flaps will be flush with the ends of the side walls.

Connecting flaps 31 and 32 are hingedly connected along fold lines 33 and 34 to the opposite ends of the side wall panel 13. The flaps 31 and 32 do not extend the full length of the side wall ends, the inner edges of the flaps terminating in spaced relation to the fold line 11 so as to provide an opening 35 between the connecting flap 31 and the end panel 22 and to provide a similar opening 36 between the flap 32 and the end wall 23. Similar connecting flaps 37 and 39 are foldably connected along fold lines 40 and 41 to opposite ends of the side wall panel 14. The flaps 37 and 39 do not extend the full length of the ends of the side wall 14, terminating in spaced relation to the fold line 12 to provide openings 42 and 43 between the connecting flaps 37 and 39 and the end walls 22 and 23.

An anchoring flap 44 is hingedly connected to the connecting flap 31 along a diagonal fold line 45 which is directed toward the juncture between the fold lines 11 and 20. A similar anchoring flap 46 is foldably connected to the connecting flap 32 along a diagonal fold line 47 which is directed toward the juncture between the fold lines 11 and 21. The anchoring flaps 44 and 46 are anchored to the end wall panels 22 and 23 by a suitable adhesive or similar means as will be later described in detail.

An anchoring flap 49 is foldably connected to the end of the connecting flap 37 along a diagonal fold line 50. The fold line 50 is directed toward the juncture between the fold lines 12 and 20. A similar anchoring flap 51 is foldably connected to the connecting flap 39 along a diagonal fold line 52 which is directed toward the juncture between fold lines 12 and 21. The anchoring flaps 49 and 51 are secured to the end wall panels 22 and 23 in the formation of the carton as will be later stated.

A bearing flap 53 is foldably connected to the anchoring flap 44 along a fold line 54 which is parallel to, but spaced slightly from, the fold line 24. The bearing flap 55 is foldably connected to the anchoring flap 49 along a fold line 56 which is aligned with the fold line 54. A bearing flap 57 is foldably connected to the anchoring flap 46 along a fold line 59 which is parallel to, and spaced slightly from, the fold line 25. The bearing flap 60 is foldably connected to the anchoring flap 51 along a fold line 61 which is aligned with the fold line 59.

It will be noted that the side edges of the locking panels 26 and 27 converge together so that when the locking panels are folded upon the end wall panels 22 and 23, the side edges of the locking panels tend to follow the side edges of the end wall panels. However, near the extremity of the locking panels 26, laterally extending projections 62 are provided which engage against the free edges 63 and 64 of the side wall panels 13 and 14 below the attachment of the side wall panels to the connecting panels 31 and 37. Similar laterally extending projections 65 on the locking panel 27 are designed to engage against the free edges 66 and 67 of the side walls 13 and 14, below the connection of these side walls with the connecting flaps 32 and 39. Notches 69 and 70 are formed in the ends of the locking panels 26 and 27 for a reason which will later be obvious.

In forming the tray from the blank illustrated in Figure 1 of the drawings the first step of construction is the folding of the flaps 17 and 19 beneath the side wall panels 13 and 14 and adhering these elements together as shown in Figure 2 of the drawings. The carton is next folded along one of the fold lines 11 or 12, Figure 3 showing the carton being folded along the fold line 11. This action causes the side wall panel 13 to overlie a portion of the bottom panel 10 and causes the connecting flaps 31 and 32, the anchoring flaps 44 and 46, and the bearing flaps 53 and 57 to overlie the end wall panels 22 and 23, the bearing flaps projecting over the fold lines 24 and 25 to overlie portions of the locking panels 26 and 27. Before the folding operation thus described adhesive is applied to the anchoring panels 44 and 46 as shown in Figure 2 of the drawings.

As also shown in Figure 2 of the drawings, adhesive is applied to the anchoring panels 49 and 51 and as a next operation the carton is folded along the fold line 12 so that the side wall panel 14 overlies a portion of the bottom panel 10. Due to the relatively narrow width of the bottom panel 10, the side wall panels 13 and 14 are shown in overlapping relationship after this second folding operation.

The folding of the side wall 14 along the fold line 12 causes the connecting flaps 37 and 39, the anchoring flaps 49 and 51, and the bearing flaps 55 and 60 to overlie portions of the end wall panels 22 and 23, the bearing flaps 55 and 60 extending partially over the fold lines 24 and 25 to overlie parts of the locking panels 26 and 27. This places each end of the tray in the position shown in Figure 4 of the drawings.

As a final step of the folding operation the locking panels 26 and 27 are folded to overlie the end wall panels 22 and 23. It will be noted from Figure 4 of the drawings that the fold lines between the various anchoring flaps which are adhered to the end panels 22 and 23 fall slightly short of the fold lines 24 and 25. As a result the inward folding of the locking panels 26 and 27 causes these bearing flaps to fold therewith and to overlie the anchoring flaps to which they are foldably attached. The bearing flap 53 overlies the anchoring flap 44, the bearing flap 55 overlies the anchoring flap 49, the bearing flap 57 overlies the anchoring flap 46 and the bearing flap 60 overlies the anchored flap 51. Thus when the carton is completely folded into the flat condition illustrated in Figure 5 of the drawings, there are four thicknesses of carton stock extending substantially over the adhesive coated areas of the anchoring flaps. The end panels 22 and 23 form the lowermost layer of carton stock, the anchoring flaps 44, 46, 49 and 51 form the next above layer; the bearing flaps 53, 55, 57 and 60 form the third layer of carton stock; and the locking panels 26 and 27 form the uppermost layer. As a result when the carton passes between pressure belts or the like, sufficient pressure may be exerted upon these adhesive coated areas to cause adherence.

It will be noted that the center portion of the tray is composed of five thicknesses of carton stock due to the overlapping of the double thickness side wall portions. Therefore if the bearing flaps described were omitted from the structure pressure belts or rollers extending over the carton as it moves longitudinally thereunder would not create the necessary pressure against the thinner end portions of the carton. However, by proportioning the flaps properly with relation to the width of the tray bottom and height of the side walls, rollers or belts may be provided outwardly of the thickest center por-

tion of the carton which tend to apply pressure; and as the ends are only of one thickness of stock, thinner than the thickest center portion, sufficient pressure to adhere the flaps is provided under almost any circumstances.

As shown in Figures 1 and 2 of the drawings and as shown in dotted outline in Figure 5 of the drawings, an aperture 71 is provided near the center of the bottom panel 10. This aperture is of value in setting up the tray into the position shown in Figure 7. In order to set up the tray from the flat condition shown in Figure 5, the carton is placed into a guiding frame in such a manner that a pin or dowel extends through the aperture 71 and presses against the side walls 13 and 14 overlying the bottom. This action unfolds the side walls to the position shown in Figure 6 of the drawings so that the upper edges of the side walls are spaced apart and the fingers may be inserted therebetween. The side walls are next folded outwardly until the connecting flaps prevent further outward folding, this action tending to erect the end wall panels 22 and 23. The unfolding of the side wall panels from the base, partially unfolds the locking panels 26 and 27. To complete the setting up operation it is only necessary to swing the locking panels down into the locking position shown in Figure 7, the laterally extending projections 62 and 65 engaging against the free edges of the side wall panels 13 and 14.

The notches 69 and 70 in the ends of the locking panels 26 and 27 prevent the locking panels from overlapping the double thickness portions of the side walls 13 and 14 so as to build up a still greater thickness of carton stock at these points. Due to the tapering form of the side walls, the locking flap would otherwise slightly overlap the upper ends of the side walls in folded condition to add another thickness of carton stock to the already thickest portion of the carton.

In accordance with the patent statutes, I have described the principles of construction and operation of my tray, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A tray in flat form formed of sheet material of substantially uniform thickness, including a bottom panel, side wall panels foldably connected to opposite edges of said bottom panel and folded onto said bottom panel reinforcing flaps secured in surface contact with said side wall panels, connecting flaps foldably connected to opposite ends of each side wall panel, and arranged in overlapping relation, anchoring flaps foldably connected along diagonal fold lines to said connecting flaps, said anchoring flaps lying in the same plane as one side wall panel and the lowermost connecting flap, end wall panels foldably connected to opposite ends of said bottom panel and lying in the same plane, said connecting flaps and said anchoring flaps overlying said end panels, adhesive means securing said anchoring flaps to said end panels, bearing flaps hingedly secured to said anchoring flaps and folded to overlie the same, said bearing flaps lying in the same planes as the reinforcing flap on said one side wall panel and in the same plane as the uppermost connecting flap, the other side wall panel and its reinforcing flap overlapping said one side wall panel and its reinforcing flap forming a portion of five thicknesses.

2. The structure defined in claim 1 and including liner panels foldably connected to the end edges of the end panels and folded to overlie said bearing flaps, said liner panel being in the plane of the overlapped portion of said other side wall panel.

3. The structure defined in claim 1 and including liner panels foldably connected to the end edges of the end panels, and in which the lines of fold connecting the anchoring flaps to the bearing flaps are parallel to the said end edges, the liner panels overlying the bearing flaps and lying in the plane of the overlapped portion of said other side wall panel.

4. A folded tray structure formed of sheet material of substantially uniform thickess including a bottom panel, side wall panels foldably connected to opposite sides of said bottom panel, said side wall panels overlying said bottom panel with the side walls in overlapping relation, reinforcing flaps hingedly secured to said side wall panels along the overlapping edges thereof and secured in surface contact to said side wall panels, end wall panels foldably connected to opposite ends of said bottom panel, connecting flaps foldably connected to opposite ends of said side wall panels and overlying said end wall panels with the connecting flaps in overlapping relation, anchoring flaps foldably connected to said connecting flaps and overlying said end wall panels in surface contact therewith, the anchoring flaps lying in the same plane as the lowermost connecting flap, adhesive means holding said anchoring flaps in said surface contact, bearing flaps foldably connected to said anchoring flaps and doubled thereover to overlie said anchoring flaps, the bearing flaps lying in the same plane as the uppermost connecting flap, and a liner panel hingedly connected to each end wall panel and overlying the corresponding end wall panel, as well as the anchoring flaps and bearing flaps secured thereto.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
Re. 17,975	Bergstein	Feb. 24, 1931
993,919	Wagnitz	May 30, 1911
1,667,017	Tinsley	Apr. 24, 1928
1,736,720	Myers	Nov. 19, 1929
1,758,513	Gross	May 13, 1930
1,778,462	Nourse et al.	Oct. 14, 1930
2,008,443	Froehlig	July 16, 1935
2,009,828	Wild	July 30, 1935
2,083,036	Schmidt	June 8, 1937
2,214,813	Guyer	Sept. 17, 1940
2,220,076	Carruth	Nov. 5, 1940
2,465,588	Hartman	Mar. 29, 1949

FOREIGN PATENTS

Number	Country	Date
12,871	Great Britain	May 29, 1911
463,403	France	Dec. 16, 1913