April 18, 1961 E. L. ARNESON 2,980,310

COLLAPSIBLE TRAY

Filed Sept. 30, 1959

Fig. 1

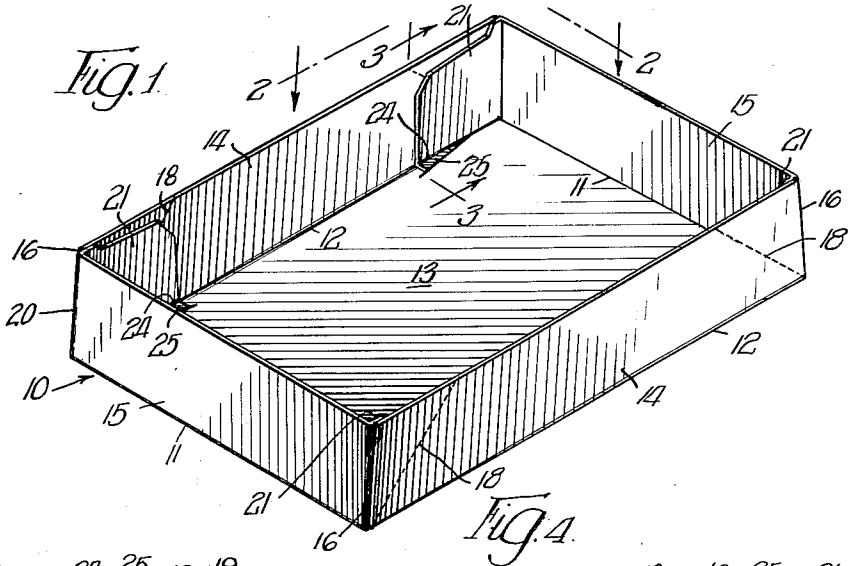


Fig. 4

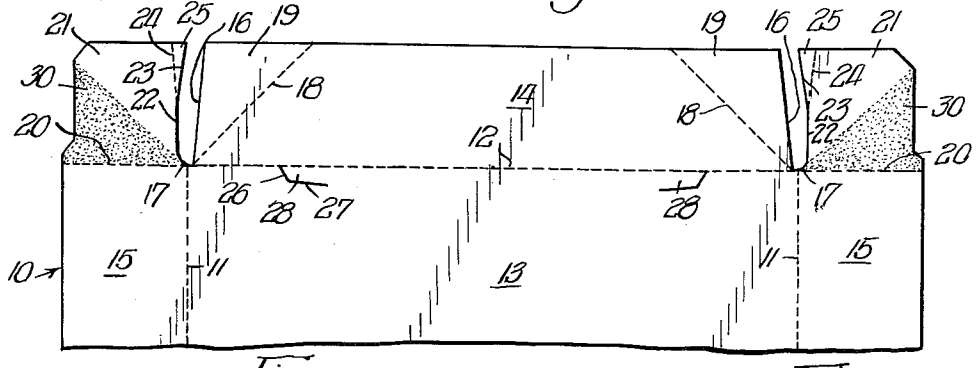


Fig. 5

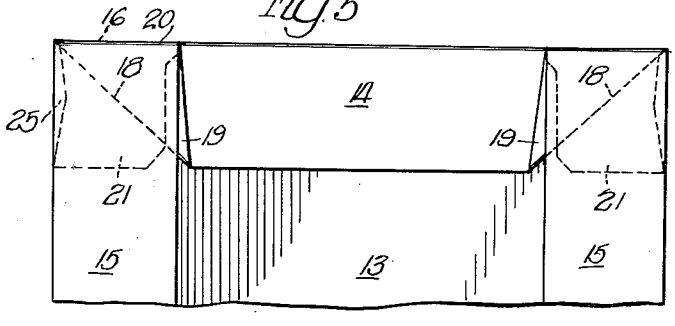


Fig. 2

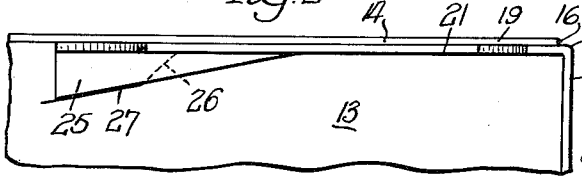
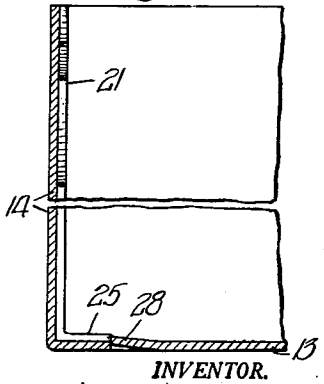


Fig. 3



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United States Patent Office

2,980,310

Patented Apr. 18, 1961

2,980,310

COLLAPSIBLE TRAY

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Filed Sept. 30, 1959, Ser. No. 843,587

6 Claims. (Cl. 229—35)

This invention relates to containers or cartons which are adapted to be formed of paperboard or similar material and is more particularly concerned with improvements in a carton member of the type which is initially fabricated in collapsed or knocked-down condition with a bottom and oppositely disposed pairs of side walls which are hinged to the edges thereof and adapted to be moved into upright relation thereto so as to form an open top tray-like receptacle.

Paperboard containers or cartons of the open top tray type have heretofore been provided in which adjoining side walls are connected so as to be collapsible on the bottom wall by means of a corner construction which comprises a corner connecting flap integrally hinged to the end edge of one of the side walls and having a portion thereof adhesively secured to a triangular portion of the end of an adjoining side wall which is foldable outwardly upon the infolded body of the side wall along a diagonal hinge line so as to permit the walls to collapse on the bottom with the corner connecting flap being hinged into face engaging relation with the inside surface of the side wall with which it is integrally connected. Tray constructions of this character have been employed in the packaging of various products, generally, as sections of a two section telescoping box or as packaging trays which are filled and then overwrapped with a transparent film wrapping material. The main objection to this type of infold construction is that the side walls tend to sag or collapse inwardly, when the tray is set up, resulting in an unsightly condition and making the tray difficult to load. Also, the infolded side walls do not contribute fully to the stacking strength of the carton. Attempts have been made to overcome these objections by tapering one pair of the side walls inwardly at the top and causing the bottom edges of the corner glue flaps to frictionally engage the bottom of the tray so as to hold the side walls to which they are adhesively secured in upright condition. This has not been entirely successful because of the difficulty of obtaining accurate initial folding particularly when the containers are fabricated on conventional carton gluing and folding machinery. The angled hinge forming creases or scores in the side walls do not fold accurately and the bottom edges of all the corner glue flaps may not frictionally engage the bottom of the box.

It is a general object of the present invention to provide an infold construction for a collapsible tray-type carton member in which the corner connecting glue flaps are constructed so as to lock themselves into position when the carton is set up and thereby hold the side walls to which they are attached in vertical relation.

It is a more specific object of the invention to provide a collapsible tray type carton member having a bottom wall, hinged side walls and corner connecting glue flaps with cooperating locking elements on the corner connecting glue flaps and the bottom wall which are operative to positively retain the glue flaps in vertically

disposed relation when the carton is set up and thereby prevent inward collapse or sag of the side walls.

It is a still more specific object of the invention to provide a collapsible tray construction having a bottom and foldably connected side walls in which adjoining side wall forming panels are connected at the corners by flap members integrally hinged to the end edge of one of the side wall panels and adhesively secured to a triangular fold portion of the adjoining side wall panel with the connecting flap having a hinged locking tab on the bottom edge which is movable, when the tray is set up, into edge engaging relation in a cooperating locking slit in the bottom wall of the tray.

These and other objects and advantages of the invention will be apparent from a consideration of the tray construction which is shown by way of illustration in the accompanying drawings wherein:

Figure 1 is a perspective view of a collapsible tray which embodies therein the principal features of the invention and which is shown in set up empty condition;

Figure 2 is a fragmentary plan view, to an enlarged scale, showing a corner portion of the set up tray;

Figure 3 is a cross section taken on the line 3—3 of Figure 1 to an enlarged scale;

Figure 4 is a plan view showing a part of the inside face of a blank which is cut and scored to provide the tray shown in Figure 1; and

Figure 5 is a plan view of the portion of the blank shown in Figure 4 with the wall forming panels folded into collapsed tray forming condition.

Referring first to Figure 4 of the drawings, there is illustrated a side portion of the blank **10** which is cut and scored or creased to divide the same into the wall forming elements necessary for fabricating the tray structure shown in Figure 1. The blank as shown in Figure 4 is symmetrical about its longitudinal and transverse center lines, only one side section or half of the blank being shown, it being understood that the opposite side of the blank is cut and scored in an identical manner. Since the blank is symmetrical about both center lines, each corner construction is the same and only one thereof will be described in detail.

The blank **10** is divided by longitudinally spaced, transversely extending score lines **11** and laterally spaced, longitudinally extending score lines **12** into a bottom wall forming panel **13**, two side wall forming panels **14** and two end wall forming panels **15**, the wall forming panels **14** and **15** being adapted to hinge into upright position relative to the bottom wall forming panel **13** when the tray is set up. At each corner of the blank the side wall panel **14** is freed at its end from the corner section of the blank by cutting on an end edge forming line **16** which extends diagonally outwardly and towards the transverse center of the blank from a point in the score line **12** which is slightly spaced towards the center of the blank from the intersection **17** of the transversely and longitudinally extending score lines **11** and **12**. The line **16** is preferably cut so that it is at an angle of approximately 6 degrees relative to the transverse score line **11** or 84 degrees relative to the longitudinal score line **12**. The end wall panel **14** is also provided with a diagonal fold or hinge line **18** which bisects the angle between the hinge forming score line **12** and the end edge **16** of the panel **14**. The fold or hinge line **18** may be a crease or score line or a perforation line, as shown, so as to insure ready folding of the triangular end portion **19** of the panel **14** about the same.

The score line **12** is extended at the end of the blank, as indicated at **20**, to divide from the end wall panel **15** a corner connecting flap **21** which may be cut back at the end edge of the blank, as shown, and which is cut

along its opposite edge on the angularly related lines 22 and 23. The edge forming line 23 is approximately parallel with the end edge 16 of the end wall 14 and is spaced therefrom as shown with its outer end terminating approximately at the transverse score line 11 extended. The edge forming line 22 is parallel with the transverse score line 11 and offset a short distance therefrom in the direction of the end of the blank. A score line 24, which is on a radius extending from the intersection 17 of the score lines 11 and 12 and passing through the intersection of the two edge lines 22 and 23 divides the glue flap 21 and provides, between the score line 24 and the edge line 23, a relatively small triangular shaped locking tab 25 which is adapted to fold on the score line 24. A locking slit for cooperation with the locking tab 25 is provided in the bottom wall forming panel 13, which slit comprises the angularly related cutting lines 26 and 27 extending from the side edge forming score line 12 into the body of the panel and spaced a predetermined distance from the intersecting point 17 of the edge forming crease lines 11 and 12. The tongue-like portion 28 which is formed between the cutting line 27 and the score line 12 is adapted to be sprung downward to expose the edge formed by the cutting line 27 for abutting engagement with the edge 23 of the locking tab 25 as hereinafter described.

In setting up the tray the outside face of the triangular section of the corner connecting flap 21 (the bottom face as shown in Figure 4) is provided with an adhesive as indicated at 30. The side walls 14 are folded in about the score lines 12 into face engagement with the bottom wall 13 while the end flaps 19 of the side walls are folded outwardly about the score or perforation line 18. The corner connecting flaps 21 are then folded inwardly about the score lines 20 into face engagement with the end wall panels 15 after which the end wall panels 15 are folded inwardly about the score lines 11 which brings the adhesive coated section 30 of each corner connecting flap 21 into engagement with the folded back triangular end section 19 of the adjacent side wall 14, with the end edge 16 and the corner hinge forming score line 20 approximately coinciding. This completes the assembly of the tray and provides the collapsed container as shown in Figure 5.

To set up the tray for use, the side and end walls 14 and 15 are hinged upwardly about the bottom edge forming score lines 11 and 12 of the bottom wall panel 13, into upright position, which automatically pulls the corner connecting flaps 21 into upright position with the bottom edges moving across the surface of the bottom wall panel 13 and the locking tabs 25 automatically hinging about the score lines 24 as the corner connecting flaps 21 move into their final position in face engagement with the ends of the side walls 14. The edge 23 of each locking tab 25 is moved outside of the slit line 27 and the pressure of the tab 25, as it resists the hinging movement, together with the pressure exercised by the welt of the crease score line 12 tends to cause the tongue 31 to move downwardly a sufficient distance to permit the edge 23 of the locking tab to engage in abutting relation with the exposed edge at the slit 27. Thus automatic locking of the corner connecting flaps 21 in their extended or erected position is achieved and any inward movement of the side wall 14 is resisted thereby holding the latter in upright erected position. The end walls are toed or slanted in a small amount due to the cutting of the end edges 16 of the side walls on an angle which is less than 90 degrees relative to the score line 12.

While specific materials and particular details of construction have been referred to in describing the form of the tray illustrated, it will be understood that other materials and different details of construction may be resorted to within the spirit of the invention.

I claim:

1. A paperboard container formed from a generally rectangular blank which is cut and scored to provide a bottom wall forming panel and side wall forming panels hinged to opposite edges thereof and adapted to be swung into upright side wall forming relation with the bottom wall panel, oppositely disposed side walls having corner connecting flaps hinged to opposite ends thereof and each of said flaps being separated from the adjacent side wall by cutting on lines which provide an upwardly and inwardly tapered edge on the end of said adjacent side wall and a small triangular shaped locking tab on the opposed edge of the corner connecting flap which is foldable about its connecting edge, said corner connecting flap having a triangular inner portion thereof adhesively secured to the inner face of a triangular shaped hinged section on the end of said adjacent side wall, and said bottom wall having a small slit adjacent the hinge connection thereof with said adjacent side wall whereby when the container is set up the free edge of the locking tab on the corner connecting panel may be moved into position to be engaged in abutting relation with the outwardly facing edge of the bottom material which is exposed by said slit so as to lock the corner in upright position.

2. A paperboard container formed from a generally rectangular blank which is cut and scored to provide a bottom wall forming panel and side wall forming panels hinged to opposite edges thereof and adapted to be swung into upright side wall forming relation with the bottom wall panel, oppositely disposed side walls having corner connecting flaps hinged to opposite ends thereof and each of said flaps being separated from the adjacent side wall by cutting on lines which provide an upwardly and inwardly slanted edge on the end of said adjacent side wall and a small triangular shaped locking tab on the opposed edge of the corner connecting flap which is foldable about its connecting edge, said corner connecting flap having a portion thereof adhesively secured to the inner face of a triangular shaped section which is hinged on the end of said adjacent side wall, and said bottom wall having a small angular slit adjacent the hinge connection thereof with said adjacent side wall whereby when the container is set up the free edge of the locking tab on the corner connecting flap is moved into abutting relation with an outwardly facing edge formation which results from said slit so as to lock the corner connecting flaps in upright position.

3. A paperboard container formed from a generally rectangular blank which is cut and scored to provide a bottom wall forming panel and two pairs of side wall panels hinged to opposite edges thereof and adapted to be swung into upright side wall forming relation with the bottom wall panel, one pair of said side walls having corner connecting flaps hinged to opposite ends thereof and each of said flaps being separated from the adjacent side wall by cutting on lines which provide an outwardly tapered edge on the end of said adjacent side wall and a small triangular shaped locking tab on the opposed edge of the corner connecting flap, said corner connecting flap having a portion thereof secured to the inner face of a hinged section on the end of said adjacent side wall, and said bottom wall having a small slit extending inwardly of the hinge connection thereof with said adjacent side wall whereby when the container is set up the corner connecting flap is swung to drag the free edge of the locking tab across the bottom panel and into abutting relation with the outwardly facing edge which results from said slit so as to lock the connecting flap in upright position.

4. In a paperboard container which is formed from a generally rectangular blank which is cut and scored to provide a bottom wall forming panel and side wall panels hinged to opposite edges thereof and adapted to be swung into upright side wall forming relation with the bottom wall panel, corner connecting flaps hinged to opposite ends of oppositely disposed side wall panels and each of said flaps being separated from the adjacent side wall on

cutting lines which provide an inwardly inclined edge on the end of said adjacent side wall and a relatively small locking tab hinged to the oppositely disposed edge of the corner connecting flap, said corner connecting flap having a portion thereof adhesively secured to the inner face of an inwardly foldable section on the end of said adjacent side wall, and said bottom wall having a small slit spaced inwardly of the hinge connection thereof with said adjacent side wall in position to receive in abutting engagement the inwardly facing free edge of the locking tab on the corner connecting panel when the container is set up and the locking tab is folded into face engagement with the inner face of the bottom wall.

5. A paperboard blank cut and scored to provide, when set up, a rectangular open top tray, said blank having spaced pairs of longitudinal and transverse scores which define a bottom wall forming panel in the center of the blank and side wall panels adapted to hinge about opposite edges thereof and to be swung into upright side wall forming relation with the bottom wall panel when formed into a tray, the oppositely disposed side wall panels having corner connecting flaps separated from opposite ends thereof by hinge forming score lines and each of said flaps being separated from the adjacent side wall forming panel by cutting lines which provide an outwardly tapered edge on the end of said adjacent side wall panel and a small triangular shaped locking tab on the opposed edge of the corner connecting flap which is separated therefrom by a hinge forming score line, a triangular shaped section at the end of each said adjacent side wall which is separated therefrom by a diagonal hinge forming score line and said bottom wall panel having a small angular slit adjacent the score line separating the same from said adjacent side wall panel which is adapted, when the container is set up, to provide an abutment edge for cooperating with the edge of the locking tab on the corner connecting panel.

6. A tray-like collapsible container formed from a blank of flexible sheet material which is cut and scored to provide a bottom wall panel and two pairs of upwardly hinged side wall panels, the side wall panels of each pair thereof being integrally hinged to oppositely disposed edges of the bottom wall panel, corner connecting flaps integrally hinged to opposite ends of one pair of said side wall panels and lying against the inner surfaces of the other pair of said side wall panels in the erected condition of the container, said corner flaps each being secured to a foldable end portion of the adjacent side wall panel whereby the container side walls are inwardly collapsible, said corner flaps each having an integral locking tab hinged to the bottom edge which is resiliently urged against the upper surface of the bottom wall panel, and said bottom wall panel having a slit therein for cooperation with each of said locking tabs which slit extends in the same general direction as the bottom edge of the corner flap and which is spaced inwardly of the edge of the bottom wall panel so as to provide an outwardly facing abutment edge for engagement with the inwardly facing edge of the locking tab thereby to hold the corner flap in upright position.

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