

Dec. 18, 1962

G. O. KING, JR., ET AL
COLLAPSIBLE CONTAINER

3,069,063

Filed April 23, 1962

2 Sheets-Sheet 1

FIG. 1

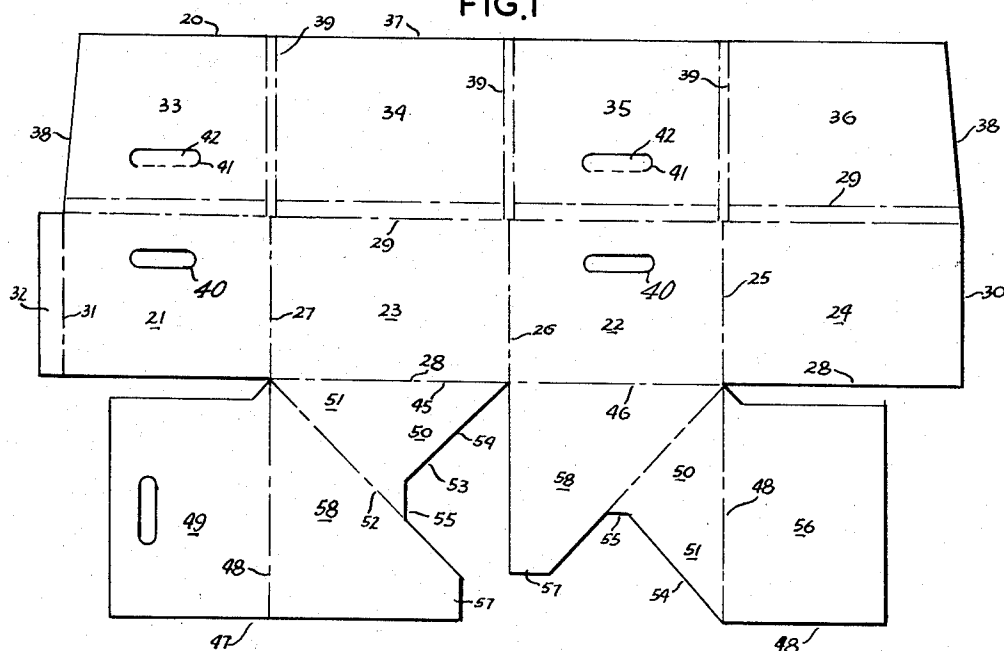
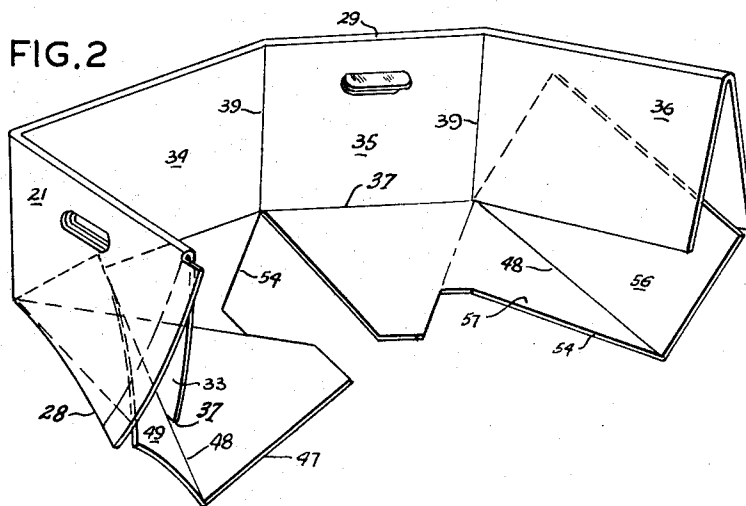


FIG. 2



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FIG. 3

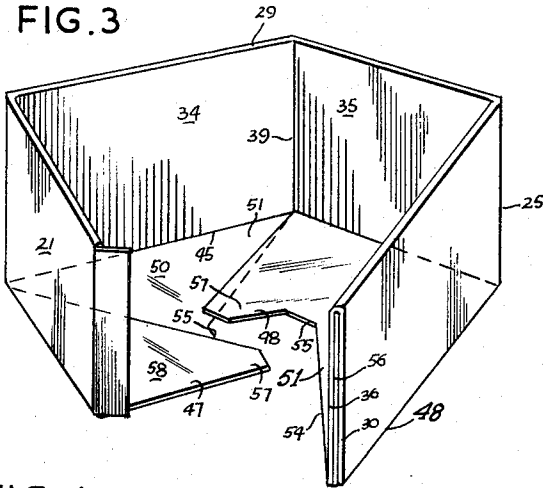


FIG. 6

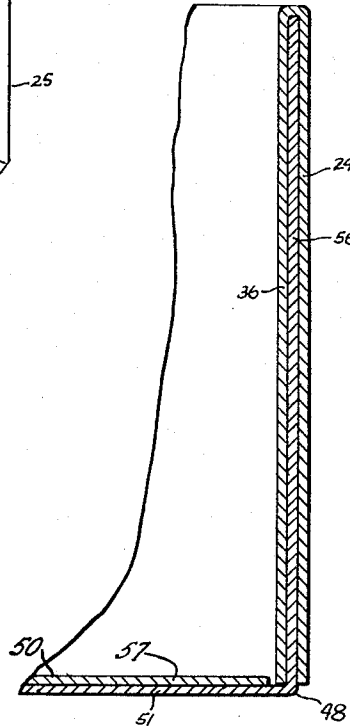


FIG. 4

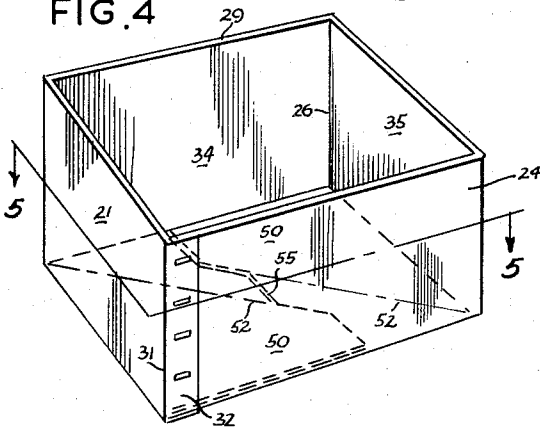
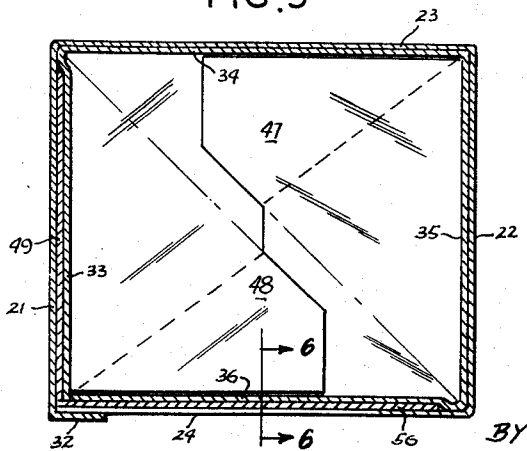


FIG. 5



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COLLAPSIBLE CONTAINER

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10 Claims. (Cl. 229-41)

This invention relates to improvements in collapsible tote boxes and more particularly to such cartons formed from a foldable blank of material and having reinforced side walls which provide very advantageous stacking qualities and added cushioning and protection for the contents of the container.

One of the important features of the invention is the provision of a blank of material so cut and scored as to be adaptable to form a carton which may be readily erected from a collapsed condition by the mere exertion of pressure on the opposed corner folds of the collapsed carton. Another object is to provide a carton with a locking bottom which positively and automatically becomes locked in bottom closure condition upon erection of the container walls to tubular form. A further object is to provide a carton with an automatic locking bottom with reinforced wall construction so as to provide a margin of safety in the storage and handling of the containers filled with heavy or fragile articles. Still another object is to provide a carton of the described character which may be reused repeatedly and may be collapsed or re-erected without complicated manipulation of the container parts or the use of any extraneous equipment or materials.

These and other objects and advantages of the invention will be readily apparent from the description to follow. The invention resides in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportions and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

FIGURE 1 is a plan view of a carton blank embodying the invention;

FIGURES 2 and 3 are perspective views of progressive stages of the erection of the carton;

FIGURE 4 is a perspective view of the carton fully erected;

FIGURE 5 is a view of a transverse section through line 5-5 of FIGURE 4;

FIGURE 6 is a transverse view through line 6-6 of FIGURE 5.

The blank 20 from which the carton is formed is shown in FIGURE 1 and is described in terms equally applicable to the erected carton. In the blank 20 the vertical end wall panels 21-22 are foldably connected in alternating relation to the side wall panels 23 and 24, the fold connections are determined by corner scores 25-27. Said vertical wall panels are further defined by a bottom edge 28 and a top edge determined by edge score 29, a free side edge of the blank is denoted at 30 which further defines a side edge of wall panel 24. The outer side edge of end wall panel 21 is determined by corner score 31 which serves as the hinge connection of the securing tab 32. Inner side and end wall panels 33-36 are foldably connected to the side and end wall panels 21-24 by the top edge score 29 and are further defined by a bottom edge 37 and free side edges 38. Said inner wall panels 33-36 are separated by corner scores 39.

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For convenience in handling, suitable handholes 40 may be provided in the end wall panels 21 and 22 and registering handholes provided in the inner panels 33 and 35. The handholes may be provided with hinge tabs 42 as shown in the inner end wall panels 33 and 35 for purposes of reinforcement and convenience in handling.

The self-locking bottom portion of the blank 20 and attendant side wall reinforcing panels are attached to the above described vertical wall forming portions of the blank along the bottom edge 28 and more particularly by the side wall 23 bottom score 45 and end wall 22 bottom score 46.

A first section 47 of the bottom forming portion of the blank is foldably connected to side wall 23 and is divided by end score 48, in alignment with corner score 27, to determine an inner end wall reinforcement panel 49 and bottom closure panel 50. The diagonal fold 52 is disposed to bisect the angle formed by bottom score 45 and end score 48 and divides the bottom closure panel 50 into side portion 51 and end portion 53. The diagonal fold 52 is adapted to effect collapsing of the bottom panel 50 as will be hereinafter described. The side bottom closure panel 50 is further determined by a free ledge 53 which includes a diagonal portion 54 which may be conveniently disposed to bisect the angle formed by bottom score 45 and a projection of corner score 26. The diagonal portion 54 of the free edge is interrupted by the locking edge 55 which is disposed transversely of the length of the container at its mid-length and extends to a junction with the line of the fold connection 52.

A second section 48 of the bottom forming portion of the blank is foldably connected to end wall 22 and is similar to the beforementioned section 47 except that the side and end portions 51 and 53 of the bottom closure panel 50 are in transposed position with the end bottom closure panel 53 hingedly connected to the vertical wall forming portions of the blank by the end wall bottom score 46, said section also including a reinforcement panel 56, which, in the erected condition of the blank is disposed between the inner and outer wall panels 24-36 and thus constitutes a side wall reinforcement panel.

The container is erected, as shown in FIGURE 2, by infolding the inner wall panels 33-36 over their respective end wall and side wall panels 21-24 about the top edge score 29 so that the inner wall panel bottom edge 37 is disposed at or adjacent the wall panel bottom edge 28. The outermost panels 33 and 36 are infolded in right angular relation to the respective adjacent wall panels and simultaneously the bottom closure sections 47 and 48 are folded from the normal plane of the blank and the reinforcing panels 49 and 56 are inserted intervening the wall panel and inner wall panel on an end and side of the container respectively. The folding is then continued, as shown in FIGURE 3, until the extremities 57 of the end bottom closure panels 53 are disposed overlapping the opposed side bottom closure panels 51 and with the locking edges 55 in edgewise abutting relation. Thus the portions 51 of the bottom closure panels 50 intervening the diagonal free edge portion 54 and the fold connections 45 and 48 to the vertical walls underlie the other bottom closure panel 50 in each case and there is attained a locking engagement of these bottom panels 50 with the beforementioned portions and extremities extending in part interiorly and in part exteriorly of the closure panels and intervening said overlapping portions are the locking edges 55 in edgewise abutting relation.

As beforementioned the inner wall panels 33-36 are infolded in flatwise relation to their respective vertical wall panels 21-24 and it is desirable in order to accommodate these inner wall panels 33-36 to the interior dimensions of the outer vertical wall panels to provide

them with special corner scores or connections 39 which will relieve the tension on the outer wall panel corner scores 25—27 and 31. As shown in FIGURE 1, the inner wall panel corner scores 39 are preferably formed with parallel spaced apart score lines to provide a greater width of flexibility. Alternatively, the entire area defined between the parallel scores may be depressed or mashed, when the carton is constructed of corrugated fiberboard to attain the desired area of flexure. In a similar manner, the outer side and end walls 21—24 are in spaced relation to the inner wall panels 33—36 as determined by the double top edge score 29 in order to accommodate the intervening vertical wall reinforcement panels 49 and 56.

The fully erected container is shown in FIGURE 4 wherein the securing tab 32 is secured to the opposed free marginal edge 30 of the blank 20 by staples or other well known means. Preferably the staples are driven through the securing tab 32, marginal edge 30 and the underlying portions of inner wall panel 36 and reinforcing panel 56. However, if the side wall reinforcing panel 56 is constructed to substantially conform to side wall panel 24, the foldably connected bottom closure panel 50 may be adequately supported for most uses of the container without the reinforcing panel 56 being fixably secured to the side wall panel 24 or inner panel 36.

FIGURE 5 shows a cross sectional view through line 5—5 of FIGURE 4. This view more particularly shows the disposition of side wall reinforcing panel 56 disposed intervening vertical side panel 24 and inner side panel 36; and end wall reinforcing panel 49 intervening vertical end wall 21 and inner end wall 33. Thus the opposed pair of end wall and side wall, 22 and 23 respectively, and their attendant inner panels 34—35 are of two ply construction. It is to be noted that said two ply walls are integrally, foldably connected to the bottom sections 47 and 48 by bottom scores 45—46 and the three ply walls are connected to these bottom sections by the fold connection 48 to the reinforcing panels 49 and 56, as best shown in FIGURE 2.

FIGURE 6 is a cross sectional view through line 6—6 of FIGURE 5. This view shows, for example, a three ply wall construction including vertical wall panel 24, reinforcing panel 56 and inner side wall panel 36. The reinforcing panel 56 is connected to the side wall portion 51 of bottom closure 50 by the hinged connection defined by end score 48. The view further shows the overlapping portion 57 of the opposed bottom closure panel 50.

The container is simply and instantaneously collapsible to a flattened condition for shipment and storage by inwardly deflecting the bottom closure panels while exerting slight pressure on the opposed corner scores 26 and 31 until the vertical wall panels are in flatwise substantially parallel relationship to each other with the bottom closure panels 50 infolded therebetween about the collapsing scores 52. Since the bottom closure panels are free of any permanent engagement such as stitches, adhesive or other extraneous securing means and are also free of any inner locking engagement which would require special manipulation to disengage these container parts, the bottom closure panels 50 are free to fold inwardly of the container walls independently of each other and into a spaced apart disposition in the collapsed container.

While the container is described in accordance with one commercial embodiment which is an open top tote box, it is readily apparent that for many uses a top closure may be desired and this closure may be of any suitable type adapted to use with the container as for example a telescoping inverted tray like cover member.

It is to be understood that the particular embodiment of the invention described is illustrative and not restrictive. The invention may be susceptible of embodiment

in other modified forms; all such modifications which are similar or equivalent hereto come equally within the scope of the claims next appearing.

What we claim is:

1. A collapsible carton having vertical side and end walls hingedly connected at the side edges thereof and a bottom closure which is automatically erectable upon folding the carton vertical wall to tubular relation, said bottom closure comprising a first section and a second section with the first section foldably connected to the bottom edge of one vertical side wall and the second section foldably connected to the bottom edge of one end wall panel, each of such sections including a bottom closure panel with portions in overlapping relation to the other section bottom closure panel and a locking edge in edgewise abutment with the other closure panel locking edge, the overlapping portions of each closure panel extending in part interiorly and in part exteriorly of the other closure panel, collapsing scores in each bottom closure panel extending from the locking edge to one pair of diagonally opposite corners of the carton, said collapsing scores disposed in bisecting relation to the respective carton corners, the closure panels adapted to folding independently inwardly of the carton about the collapsing scores.

2. The collapsible carton of claim 1 wherein the vertical walls are comprised of substantially counterpart inner and outer panels, vertical wall reinforcing panels hingedly connected to each of said bottom closure sections, and the reinforcing panel joined to the first section disposed intervening an end wall inner and outer panels and the reinforcing panel joined to the second section disposed intervening a side wall inner and outer panels.

3. The collapsible carton of claim 2 wherein the inner and outer vertical wall panels are hingedly connected at their top marginal edges providing a reinforced collapsible carton of unitary construction.

4. The collapsible carton of claim 3 wherein the inner wall panels are hingedly joined at their side edges, the hinge connections disposed in aligned relation with the hinge connections of the outer panels and of a width sufficient to provide flexible side margins so that said inner panels are adapted to disposition within the connected together outer wall panels.

5. The collapsible carton of claim 1 wherein the bottom closure panels are each defined in part by free edges, said free edges extending from the respective locking edges to each of a second pair of diagonally opposite corners, the locking edges disposed transversely of the container bottom closure at the mid-length thereof and extending from the respective collapsing scores to the said free edges.

6. A collapsible rectangular carton having vertical side and end walls hingedly connected by corner scores and a bottom closure which is automatically erectable upon folding the walls to tubular relation, the bottom closure comprising a first section and a second section with each such section integrally foldably connected to the bottom edge of one of an adjacent pair of side and end walls with the opposite adjacent pair of side and end walls having a free bottom edge, the sections each including a vertical wall reinforcing flap disposed in flatwise relation to the other adjacent pair of side and end walls, the sections each including bottom closure panels with portions in overlapping relation to the other section bottom closure panel and a locking edge in edgewise abutment with the other closure panel locking edge, the overlapping portions of each closure panel extending in part interiorly and in part exteriorly of the other closure panel, collapsing scores in each bottom closure panel extending from the locking edge to one pair of diagonally opposite corners of the carton, said collapsing scores disposed in bisecting relation to the respective carton corners, the bottom closure panels adapted to relative movement one from another upon collapsing of the carton.

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7. The collapsible carton of claim 6 wherein the vertical walls are comprised of substantially counterpart inner and outer panels and the vertical wall reinforcing panels being disposed intervening the inner and outer panels of the opposite adjacent pair of side and end walls having a free bottom edge.

8. The collapsible carton of claim 7 wherein the inner and outer vertical wall panels are hingedly connected at their top marginal edges providing a reinforced collapsible carton of unitary construction.

9. The collapsible carton of claim 8 wherein the inner wall panels are hingedly joined at their side edges, the hinge connections disposed in aligned relation with the hinge connections of the outer panels and of a width sufficient to provide flexible side margins so that said

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inner panels are adapted to disposition within the connected together outer wall panels.

10. The collapsible carton of claim 6 wherein the bottom closure panels are each defined in part by free edges, said free edges extending from the respective locking edges to each of a second pair of diagonally opposite corners, the locking edges disposed transversely of the container bottom closure at the mid-length thereof and extending from the respective collapsing scores to the said free edges.

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