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S. LIGHTER

2,255,223

FOLDING BOX

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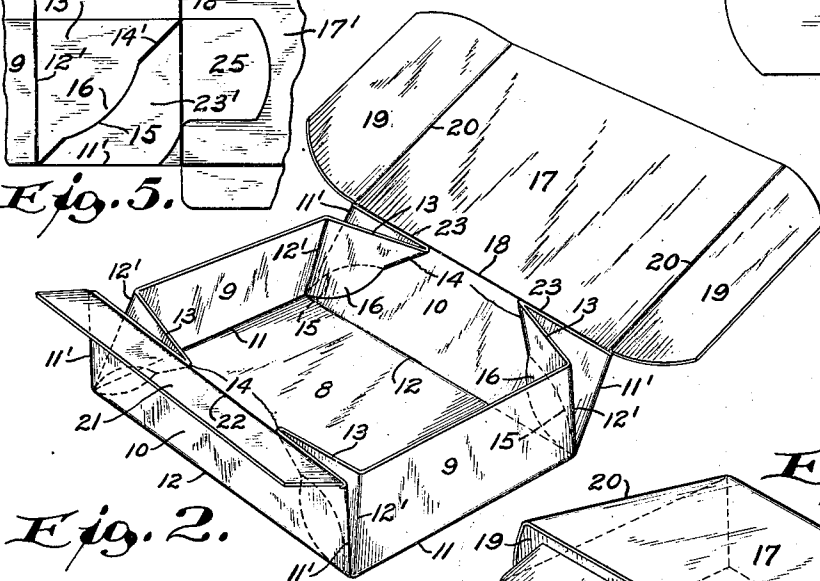
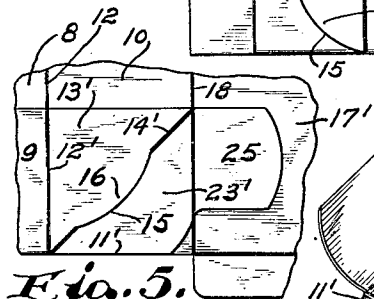
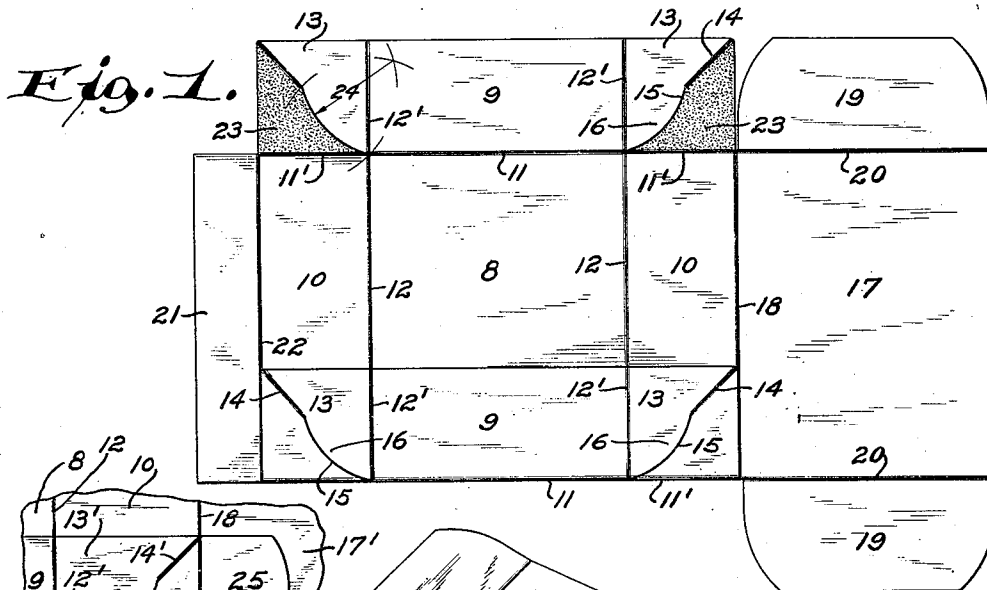


Fig. 2.

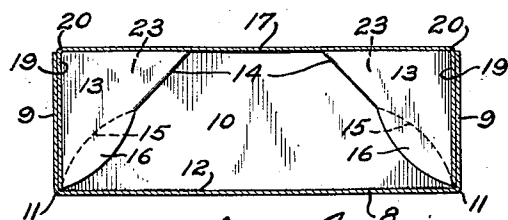


Fig. 4.

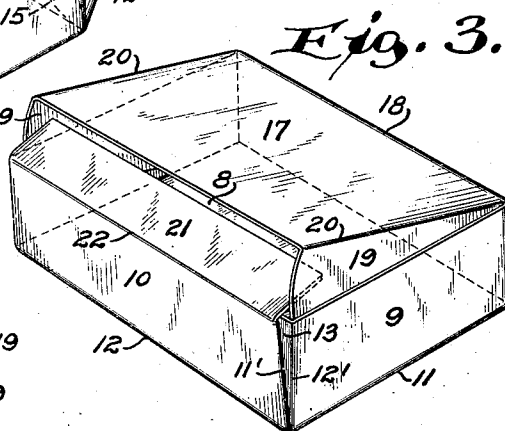


Fig. 3.

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FOLDING BOX

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12 Claims. (Cl. 229—31)

The present invention relates generally to improvements in the art of packaging diverse commodities, and relates more particularly to improvements in the construction and operation of folding boxes formed of sheet material such as cardboard or the like.

Generally defined, an object of my present invention is to provide a new and useful folding box which is simple in construction and efficient in operation.

Some of the more specific objects of the invention are as follows:

To provide an improved carton which may be collapsed into flat formation, and which can be quickly and conveniently distended for loading purposes.

To provide a collapsible box assemblage which may be economically manufactured with minimum waste of stock, and can therefore be sold at extremely moderate cost.

To provide an improved receptacle which may be produced in various sizes from sheet material such as paper stock, and which may be assembled from a single unitary blank to produce a structure in which none of the outer walls are cut, scored or perforated.

To provide an improved knock-down container which may be distended from knock-down condition by merely applying spreading pressure to the two opposite side walls, and which will automatically assume such distended position upon release of the spreading force.

To provide an improved paper carton which may be produced from relatively thin and inexpensive stock, and which is relatively strong and durable and capable of resisting comparatively high external pressures.

To provide a folding box formed of a one-piece blank and having an improved corner construction whereby the assembled boxes will permit superimposed loading or stacking without danger of collapse.

To provide an improved cardboard receptacle which may be made with the aid of punches, dies and automatic machinery, and which when distended and closed provides a proper sealed enclosure.

These and other specific objects and advantages of my present invention will be apparent from the following detailed description.

A clear conception of the various features constituting the present invention, and of the mode of constructing and of utilizing folding boxes made in accordance with the improvement, may be had by referring to the drawing

accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a plan view of a blank which may be used in producing one type of my improved folding box, one of the side portions of the blank having been folded over the bottom and end walls, and adhesively attached at the corners;

Fig. 2 is a perspective view of a box formed from a blank of the type shown in Fig. 1, showing the same initially distended preparatory to loading;

Fig. 3 is another perspective view of the box depicted in Fig. 2, showing the assemblage about to be finally closed;

Fig. 4 is a transverse vertical section through the box of Figs. 2 and 3, the section having been taken along a vertical plane disposed parallel to the cover hinge line; and

Fig. 5 is a fragment of a collapsed box of modified construction.

While the invention has been shown and described herein as having been embodied in a cardboard box of specific shape and dimensions, it is not my intent to thereby unnecessarily restrict the scope or utility of the improvement, which has actually been successfully embodied in folding boxes of various shapes and sizes useful for diverse purposes.

Referring to the drawing, and especially to Figs. 1 to 4 inclusive, the improved folding box illustrated therein may be produced from a one-piece cardboard blank or the like, such as shown in Fig. 1, and this blank comprises a bottom 8 of rectangular shape having side walls 9 and end walls 10 foldably connected thereto along score lines 11, 12, respectively; square corner sections 13 foldably connected to the adjacent side and end walls 9, 10 along continuations 11', 12' of the score lines 11, 12, and each having a diagonal fold line 14 and a curved slit 15 forming a tab 16; a cover 17 foldably connected to one of the end walls 10 along a score line 18 and having opposite side flaps 19 foldable along score lines 20; and a flap 21 foldably connected to the other end wall 10 along a score line 22. The areas 23 of the square corner sections 13, which adjoin the end walls 10, are preferably completely or locally surfaced with adhesive, so that when these corner sections 13 are folded over and pressed against the end walls 10 as shown at the bottom of Fig. 1, the sections 13 and walls 10 will be firmly united at the areas

23. The tabs 16 which interrupt the fold lines 14, may be disposed either near the bottom 8 as shown in Fig. 1, or they may be spaced some distance from the bottom 8; and these tabs are preferably formed as arcs having radii 24 approximately equal to the overall tab lengths, as shown at the upper left hand corner of Fig. 1.

When the box blank has been properly formed and the corner areas 23 have been firmly and permanently secured to the adjacent end walls 10, the collapsed structure will normally lie flat and the cover 17 and flap 21 may then be folded over the bottom 8 and side and end walls 9, 10 so as to occupy minimum space for stacking, storage or shipment to the user. In order to initially distend each box for loading, as shown in Fig. 2, it is only necessary to apply the hands to the inner faces of the collapsed side walls 9, and to exert a sudden outward and upward pull on both of the walls 9 simultaneously. With such pressure applied, the side walls 9 will swing upwardly from the bottom about the score lines 11; and by virtue of their attachment to the end walls 10 through the corner sections 13, the rising side walls 9 will simultaneously swing the two end walls 10 upwardly and toward the bottom 8 about the score lines 12. The flexible and resilient tabs 16 will then snap away from the glued areas 23 past the diagonal score lines 14 and into coaction with the inner faces of the adjacent end walls 10 as shown in Fig. 2, and will thus effectively retain the box in initially distended condition ready for convenient loading. After the commodity which is to be packed has been inserted within the box, the flap 21 may be folded inwardly over the charge along the score line 22, and the cover 17 may thereafter be folded inwardly along the fold line 18. The side flaps 19 of the cover 17 may be folded inwardly and inserted within the side walls 9 as shown in Fig. 3, and the assemblage may thereafter be completely closed and sealed as illustrated in Fig. 4. By reversing the several operations, the folding box may be just as readily restored to its initial folded condition, and during collapsing of the carton, the tongues or tabs 16 will spring back into the plane of the glued portions of the corner sections 13 as shown at the bottom of Fig. 1.

When light cardboard is used to form the box blank, it is preferable to adhesively attach the entire areas 23 directly to the end walls 10 as illustrated in Figs. 1 and 4, but when heavier sheet stock is utilized, the areas 23 may be merely spot glued, or the recessed triangle of each section 13 may be attached to the adjacent cover 17 and flap 21 instead of to the adjacent end walls 10. Such modification is shown in Fig. 5, wherein the corner section 13' has a diagonal fold line 14' and a tongue or tab 16'. The triangular portion 23' of the corner section 13' is provided with a tongue 25 which is adhesively firmly attached to the cover 17, and all of the four corners of the box would preferably be of like construction. At the end of the box remote from the cover 17, the tongues 25 would naturally be secured to the flap 21, and the inner faces of the corner portions 23' while snugly engaging the end walls 10 are not attached directly to these walls in the modified assemblage. The operation of the modified structure both during distension and while being collapsed, is the same as that above described.

From the foregoing detailed description of the construction and operation of my improvement, it will be apparent that the invention provides a new and useful folding box assemblage which is

simple and compact in construction and which may be readily distended and collapsed. The improved box may be quickly and conveniently expanded from flattened condition to initially distended loading position as shown in Fig. 2, by a simple parting motion of the operator's hands, and the flexible and resilient tabs 16 become automatically effective to hold the box structure in expanded condition. When the cover of the box is finally closed and sealed, either by applying adhesive between the cover edge and the flap 21, or by applying binding tape or adhesive strip over the sides of the cover, the four corners of the receptacle are effectively reinforced by the folded corner sections 13, and by the cover side flaps 19, thus effectively resisting external pressures and permitting superimposed stacking of the closed boxes without danger of collapse thereof. It is also noteworthy that my improved formation of the box blank, precludes the existence of perforations or slits in the outer side and end walls, and in the top and bottom of the box, whereby the structure might be weakened and the contents of the box would be made accessible without opening the receptacle. The improved blank may obviously be readily manufactured with the aid of punches, dies and ordinary box making machinery, with minimum waste of sheet stock, and can be produced of various thicknesses and kinds of paper stock at extremely moderate cost. My improved folding boxes have proven highly successful in actual use for packaging diverse commodities and when made in various sizes and shapes, and are quickly collapsible and distended with minimum effort.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of operation, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. In combination, a bottom having side and end walls foldable upwardly therefrom, and a corner section hingedly connecting the adjacent portions of each side and end wall, each corner section being foldable upon itself along a diagonal line dividing the same into hingedly connected complementary portions, and one of said portions of each corner section being permanently attached in surface engagement with the adjoining wall while the complementary portion has an integral tab projecting outwardly beyond the diagonal line.

2. In combination, a bottom having side and end walls foldable upwardly therefrom, and a square corner section connecting each end of each side wall with the adjacent side of the adjacent end wall, each corner section being foldable upon itself along a diagonal line dividing the same into foldably connected complementary triangles, and one of said triangles of each corner section being permanently attached in surface engagement with the adjoining wall while the complementary triangle has an integral resilient tab projecting outwardly beyond the diagonal fold line.

3. In combination, a bottom having side and end walls foldable upwardly therefrom, and a rectangular corner section connecting each end of each side wall with the adjacent side of the adjacent end wall, each corner section being foldable upon itself along a diagonal fold line extending outwardly away from said bottom and dividing the section into two complementary tri-

angles, and one of said triangles of each corner section being permanently attached in surface engagement with the adjoining wall while the complementary triangle has an integral resilient tab projecting outwardly beyond the diagonal fold line.

4. In combination, a box bottom having side and end walls foldable upwardly therefrom, said side walls being disposed over said bottom and said end walls being located outwardly in the plane of said bottom when the box is collapsed, and a corner section foldably connecting each end of each side wall with the adjacent side of the adjacent end wall, each corner section being foldable upon itself along a diagonal line dividing the same into hingedly connected complementary portions, one of said portions of each corner section being permanently attached throughout its entire area with the adjoining wall while the complementary portion has an integral tab projecting outwardly beyond the diagonal line.

5. In combination, a box bottom having side and end walls foldable upwardly therefrom, said side walls being disposed over said bottom and said end walls being located outwardly in the plane of said bottom when the box is collapsed, and a corner section foldably connecting each end of each side wall with the adjacent side of the adjacent end wall, each corner section being foldable upon itself along a diagonal thereof extending away from a corner of said bottom and dividing the section into two complementary hingedly connected portions, one of said portions of each corner section being permanently attached throughout its entire area with the adjoining wall while the complementary portion has an integral flexible tab projecting outwardly beyond the diagonal fold line.

6. In combination, a box formed of a unitary blank having a bottom and side and end walls hingedly connected to the bottom, and a corner section hingedly connected to each end of each side wall and to the adjacent side of the adjacent end wall, each of said corner sections being foldable upon itself along a diagonal thereof and having the portion thereof on one side of said diagonal firmly positioned in surface engagement with the adjacent end wall, and an integral tab formed on the other portion of each corner section and projecting beyond the diagonal fold line thereof.

7. In combination, a box formed of a unitary blank having a bottom and side and end walls hingedly connected to the bottom, a corner section hingedly connected to each end of each side wall and to the adjacent side of the adjacent end wall, each of said corner sections being foldable upon itself along a diagonal thereof and having the portion thereof on one side of said diagonal firmly positioned in surface engagement with the adjacent end wall, an integral tab formed on the other portion of each corner section and projecting beyond the diagonal fold line thereof, and a cover hingedly connected to one of said end walls.

8. In combination, a box formed of a unitary blank having a bottom and side and end walls hingedly connected to the bottom, and a cor-

ner section hingedly connected to each end of each side wall and to the adjacent side of the adjacent end wall, each of said corner sections being foldable upon itself along a diagonal thereof extending away from a corner of the bottom and having the portion thereof on one side of the diagonal fold line firmly secured to the adjacent end wall, and an integral tab formed on the other portion of each corner section and projecting beyond the diagonal fold line thereof.

9. In combination, a box formed of a unitary blank having a bottom and side and end walls hingedly connected to the bottom, a corner section hingedly connected to each end of each side wall and to the adjacent side of the adjacent end wall, each of said corner sections being foldable upon itself along a diagonal thereof extending away from a corner of the bottom and having the portion thereof on one side of the diagonal line of fold firmly secured to the adjacent end wall, an integral tab formed on the other portion of each corner section and projecting beyond the diagonal fold line thereof, and a cover hingedly connected to one of said end walls.

10. In combination, a bottom having side and end walls foldable upwardly therefrom, and an approximately rectangular corner section hingedly connecting the adjacent ends of each side and end wall, each of said sections being foldable upon itself along a diagonal line dividing the section into two adjoining triangles, and one of said triangles being permanently secured in surface engagement with the adjacent wall while the complementary triangle has an integral deflectable tab projecting outwardly away from its diagonal bounding line.

11. In combination, a rectangular bottom having side and end walls foldable upwardly therefrom, and an approximately rectangular corner section hingedly connecting the adjacent ends of each side and end wall, each of said sections being foldable upon itself along a diagonal line extending away from the adjacent corner of the bottom and dividing the section into two complementary triangles, and one of said triangles being permanently secured in surface engagement with the adjacent wall while the complementary triangle has an integral resilient tab projecting outwardly away from its diagonal bounding line.

12. In combination, a box bottom having side and end walls hingedly connected thereto and a cover flap hingedly connected to one of said end walls, a corner section hingedly connected to each side wall and to the adjacent side of the adjacent end wall, each of said corner sections being foldable upon itself along a diagonal thereof and having the portion on one side of said diagonal firmly positioned in surface engagement with the adjacent end wall, an extension formed integral with said firmly positioned corner portion of one of said corner sections and being secured to the adjacent cover flap, and an integral tab formed on the other portion of each corner section and projecting beyond the diagonal fold line thereof.

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