Oct. 25, 1960 H. V. BOLDING 2,957,617

COLLAPSIBLE BOX

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FIG.1

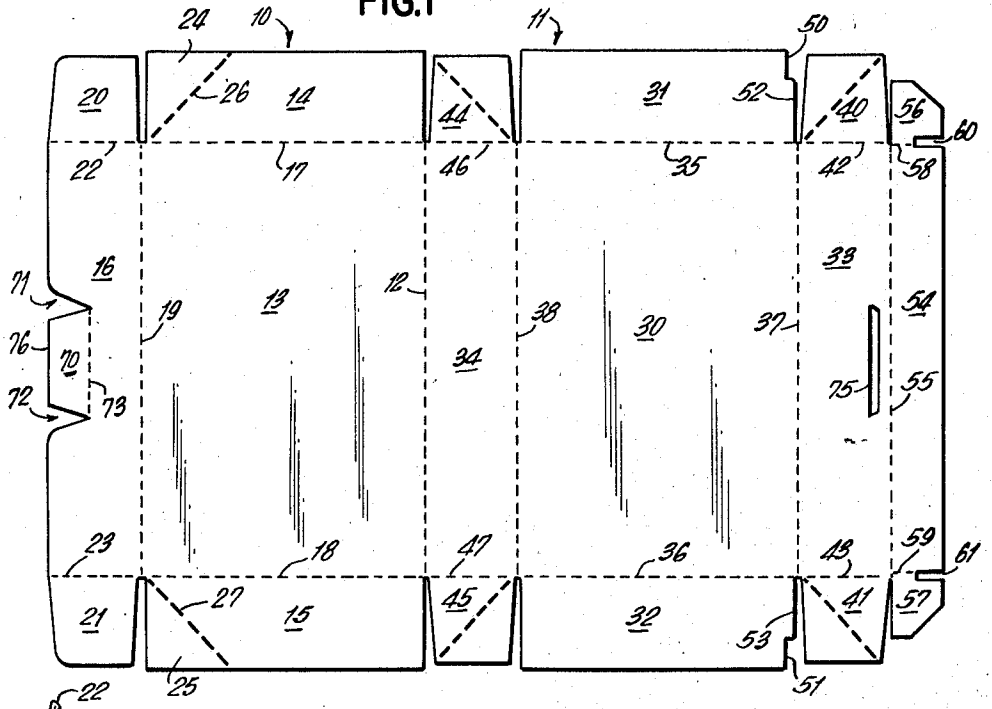


FIG.2

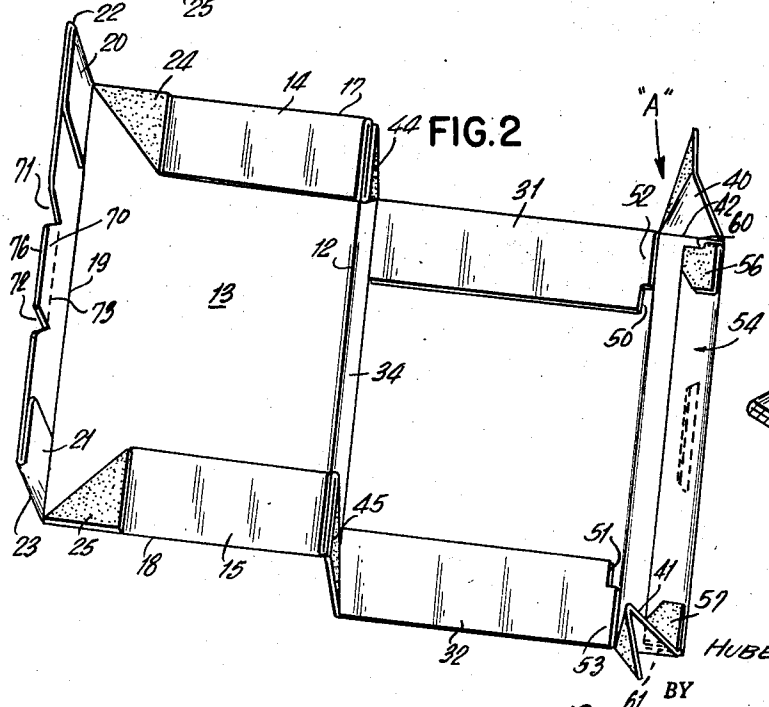
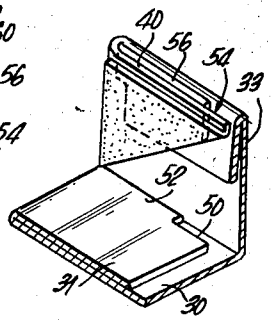


FIG.3



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COLLAPSIBLE BOX

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FIG. 4

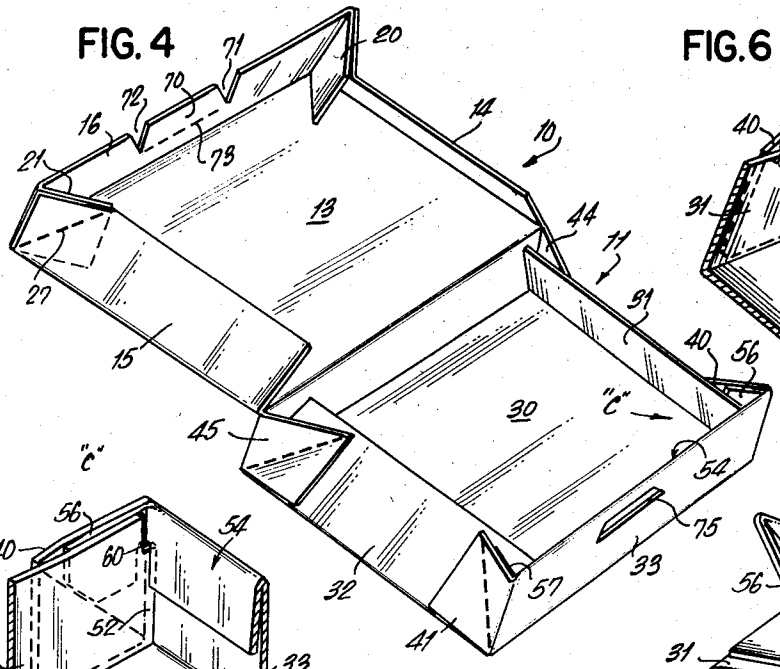

FIG. 6

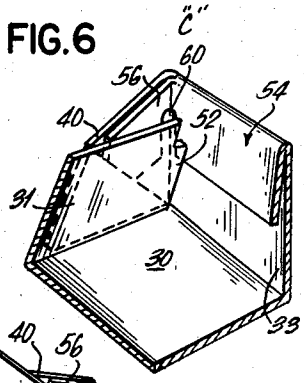

FIG. 5

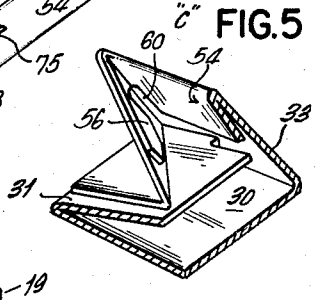

FIG. 7

FIG. 11

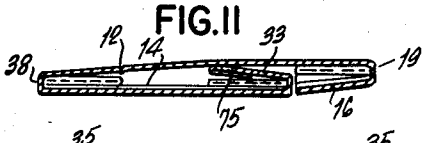

FIG. 8

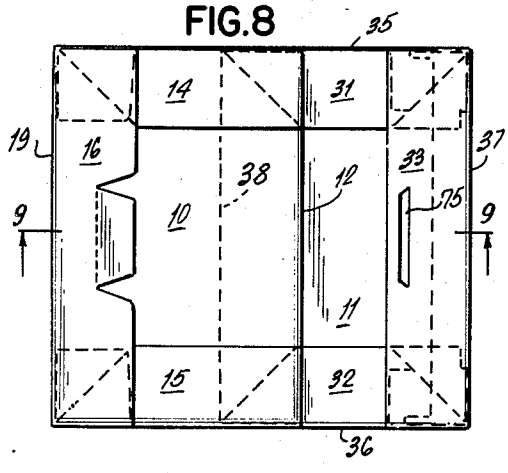

FIG. 10

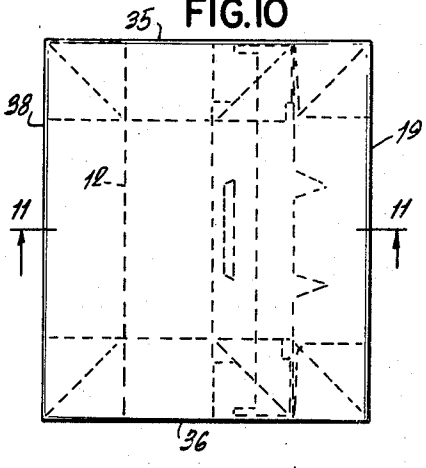

FIG. 9

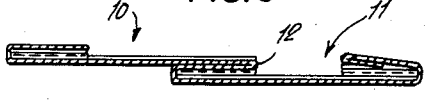

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FIG. 12

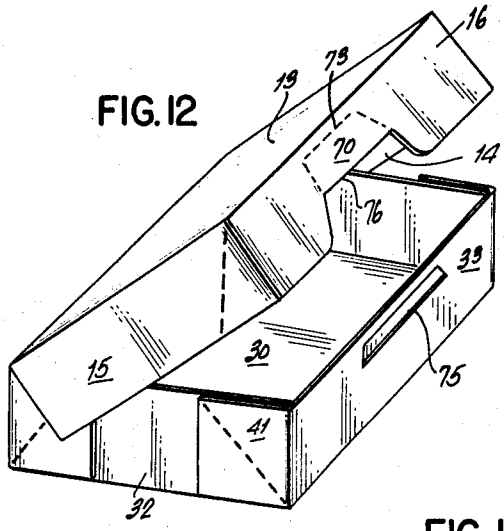


FIG. 13

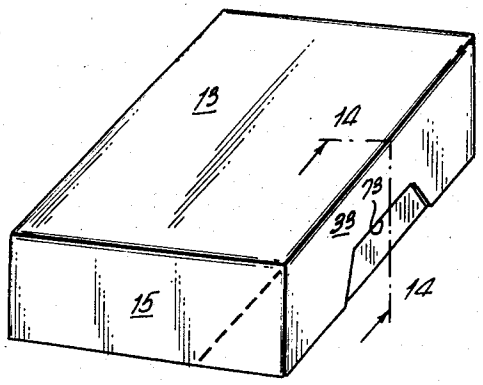


FIG. 15

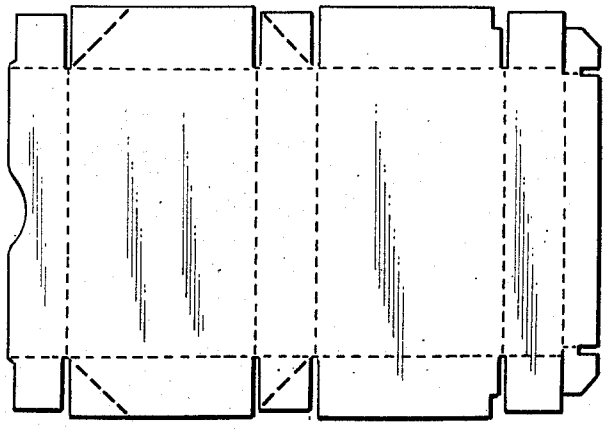


FIG. 14

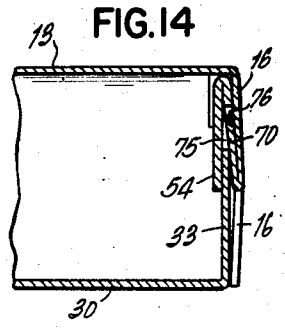
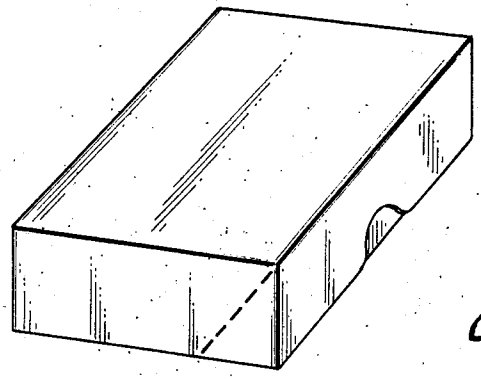


FIG. 16



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United States Patent Office 2,957,617 Patented Oct. 25, 1960

2,957,617

COLLAPSIBLE BOX

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Filed Jan. 20, 1960, Ser. No. 3,529

5 Claims. (Cl. 229—36)

The present invention, generally, relates to collapsible boxes and, more particularly, to a new and improved structural arrangement for a collapsible box.

Efforts in the past have been directed toward the provision of structural arrangements for foldable cartons having covers hinged thereto so that the carton and cover may be formed as a unit from a single blank. The carton forming blanks are cut from large sheets or rolls of material such as paper board, and the cutting and scoring operations are performed automatically at high speeds by machinery.

An object of this invention is to provide a new and improved structural arrangement for a box or carton.

A further object of this invention is to provide a new and improved arrangement for a collapsible box to lock the tray portion of the box in an erected position.

Another object of the invention is to provide a new and improved blank arrangement adapted for assembly into a hinged cover box or container.

Still another object of the invention is to provide a new and improved box or carton which is adapted to be set up or erected from a substantially flat, folded condition.

A still further object of the invention is to provide structural means to retain the side panels of a collapsible box or carton in a substantially erect condition.

It is also an object of this invention to provide a lock means from the same material of which the box is formed to resist the opening of the cover from a closed position.

In general, the invention relates to a collapsible box having cover and tray portions formed from a single blank. The tray is formed with a bottom panel and with front, back and two side panels hinged thereto. The back panel is flexibly connected with the two side panels so that it is foldable over the sides when the tray is in a collapsed condition. A first tab is hinged at each end of the front panel, and a score line extends diagonally across each of these tabs. A flap is hinged along the upper edge of the front panel to fold inwardly adjacent the inner face of the front panel, and a second tab is hinged along only a portion of each end of this flap. This second tab is attached to the inner face of the first-mentioned tab. One end of the side panels is provided with a third tab extending therefrom to be received within a slot formed between each second tab and flap when the box is erected from a collapsed condition.

In one form of the invention, a small flap is formed in the free edge of the cover front panel so that, when folded inwardly, the edge of the small flap is received within a slot located in the front panel of the tray. This arrangement provides an effective locking means to resist the opening of the cover when the cover is closed over the tray.

All of the above objects are accomplished by means of such structure and relative arrangement of parts thereof as will fully appear by a perusal of the description below and by various specific features which will be hereinafter set forth. For a more complete understanding of these and other objects of the present invention,

reference may be had to the description which follows and to the accompanying drawings, in which:

Figure 1 is a plan view illustrating a blank from which a collapsible box in accordance with the invention is formed;

Figure 2 is a view of the blank shown in Figure 1 partially erected;

Figure 3 is a perspective view of one corner of the box shown in Figure 2 and identified by the letter "A";

Figure 4 is a perspective view of the box of Figures 1 and 2 shown more completely erected;

Figure 5 is a view in perspective showing an enlarged corner identified by the letter "C" in Figure 4;

Figure 6 shows the corner "C" of Figure 5 in a partially erected condition;

Figure 7 is a perspective view of the corner "C" of Figures 5 and 6 in its fully erected, locked condition;

Figure 8 is a plan view of the collapsible box in its fully collapsed, partially folded condition;

Figure 9 is a cross-sectional view taken along the line 9—9 in Figure 8;

Figure 10 is a view similar to that shown in Figure 8 with the box in its fully folded condition;

Figure 11 is a cross-sectional view taken along the line 11—11 in Figure 10;

Figure 12 is a perspective view similar to that shown in Figure 4 with the box in its fully erected, partially closed condition;

Figure 13 is a perspective view of the box shown in Figure 12 with the lid or cover in a fully closed condition;

Figure 14 is a cross-sectional view taken along the line 14—14 in Figure 13;

Figure 15 is a plan view of a blank for a collapsible box similar to that shown in Figure 1 without a cover locking means; and

Figure 16 is a perspective view of a fully erected and closed box formed from the blank shown in Figure 15.

Referring now to Figure 1 of the drawings, the numeral 10 identifies, generally, the cover portion of the collapsible box, and the numeral 11 identifies the tray portion of the box. The cover 10 is hinged to the tray 11 along a line 12.

The cover 10 is provided with a top panel 13, and hinged to the top panel 13 along line 17, 18 and 19, respectively, the side panels 14 and 15 and a front panel 16. To assemble the cover 10, the two side panels 14 and 15 and the front panel 16 are folded along their respective hinge lines to a position substantially perpendicular to the top panel 13. An end flap 20 and an end flap 21 are connected at opposite ends of the front panel 16 along hinge lines 22 and 23, respectively, and, in the assembly of the cover 10, the end flaps 20 and 21 are attached to the inside of the respective side panels 14 and 15 only at the triangular portions 24 and 25.

Assembly of the cover 10 is accomplished conveniently by folding each respective side panel 14 and 15 over the top panel 13 as shown in Figure 2 of the drawings. The portions 24 and 25 of each respective side panel 14 and 15 are folded back over the outer faces of the side panels, also as shown in Figure 2. Any suitable adhesive is applied only to those portions 24 and 25. The end flaps 20 and 21, then, are folded over to lie against the inside face of the front panel 16, and the front panel 16 is folded along the hinge line 19 until the end flaps 20 and 21 are attached firmly to the portions 24 and 25.

In the collapsed condition of the cover 10, the members 20 and 21 are folded against the inner face of the panel 16, and the side panels 14 and 15 are folded against the inner face of the top panel 13. With the front panel 16 folded over adjacent the inner face of the top panel 13 and with the members 20 and 21 attached to the portions

24 and 25, the cover 10 is erected from its collapsed condition by raising only the side panels 14 and 15. The raising of the side panels 14 and 15 automatically raises the front panel 16 as illustrated in Figure 4 of the drawings and as will be described in greater detail presently.

The tray portion of the box, identified by the numeral 11, is formed, as shown in Figure 1, with a bottom panel 30 from which are hinged side panels 31 and 32, a front panel 33 and a back panel 34. The side panels 31 and 32 are foldable along hinge lines 35 and 36, respectively. The front panel 33 is foldable along a hinge line 37, and the back panel 34 is foldable along a hinge line 38.

The panels 33 and 34 have tabs at both ends. The end tabs 40 and 41 are hinged along lines 42 and 43, respectively, to opposite ends of the front panel 33. Similarly, the end tabs 44 and 45 are hinged along lines 46 and 47, respectively, to opposite ends of the back panel 34.

Each of the end tabs 40, 41, 44 and 45 is scored diagonally so that approximately half of each end tab is foldable back over itself. As shown in Figure 1, the diagonal score lines for the end tabs 40 and 41 extend outwardly from the real or imaginary intersections of the hinge lines 35 and 37 on the one hand and the hinge lines 36 and 37 on the other hand. Similarly the diagonal score lines for the end tabs 44 and 45 extend outwardly from the real or imaginary intersections of the hinge lines 35 and 38 on the one hand and 36 and 38 on the other hand.

The forward ends of the side panels 31 and 32 are notched at 50 and 51, respectively, to a depth at least as thick as the blank forming tabs 52 and 53, respectively. The purpose of these end tabs 52 and 53 will be described presently.

An elongated flap 54 is hinged to the front panel 33 along the line 55 so that it can be folded against the inner face of the front panel 33. End tabs 56 and 57 extend, respectively, from opposite ends of the flap 54, and these tabs 56 and 57 are hinged to the flap 54 along lines 58 and 59, respectively. Slots 60 and 61 extend part way along the hinge lines 58 and 59, respectively from the free end of the flap 54.

With the flap 54 folded inwardly over the inner face of the front panel 33 and with the tabs 56 and 57 folded toward each other against the flap 54 (see Figure 2), the slots 60 and 61 in the flap 54 form recesses which are in position to receive the end tabs 52 and 53, respectively. The adhesive coated sides of the tabs 56 and 57 are attached to the overlying surfaces of the tabs 40 and 41 which are folded back along the hinge lines 42 and 43 for this purpose. In this connection, it will be noted that a corner of each tab 56 and 57 is severed to remove the portion that would otherwise extend over the diagonal score lines on the tabs 40 and 41, respectively.

In assembling the heavy portion, the side panels 31 and 32 are folded toward each other so as to overlie the bottom panel 30, as shown in Figure 2. Then the end tabs 40, 41, 44 and 45 are folded along the hinge lines 42, 43, 46 and 47, respectively, so as to overlie their respective panels 33 or 34. From this position, each end tab 40, 41, 44 and 45 is folded back over itself along its diagonal score line as illustrated in Figure 2. Only the now exposed portions of these tabs are provided with a suitable adhesive material and are attached to the upper surfaces of the respective side panels 31 and 32.

The box in its collapsed and folded condition is illustrated in Figures 10 and 11 of the drawings and from this condition, the box is erected by lifting and folding back the cover along the hinge line 12 to the position shown in Figures 8 and 9. From this position and as best shown in Figure 4, the cover is erected by raising the side panels 14 and 15 of the cover 10 and the tray is erected by lifting any two opposite panels, the remaining panels of the cover 10 and tray 11 being erected automatically through the connections with the panels which are lifted.

One corner of the tray 11, illustrated by the letter "C," is shown in various stages of erection in Figures 5, 6 and 7. In Figure 5, for example, the corner "C" is shown as the tray is begun to be erected. In Figure 6 the corner "C" is shown in an almost completely erected position with the end tab 52 approaching the slot 60. It should be noted in comparing the two Figures 5 and 6 that the flap 54 is pulled slightly away from the inner face of the front panel 33 by the tab 56 as it moves toward a position approximately perpendicular to the front panel 33. The corner "C" is shown in its fully erected condition in Figure 7 with the end tab 52 fully received within the slot 60 to anchor the tray 11 in its erect condition.

To lock the cover portion 10 of the box in a closed condition so that it will resist opening, a flap 70 is formed within the surface of the front panel 16 of the cover 10 by two notches 71 and 72, and the flap 70 is foldable back into the inner portion of the cover 10 along a hinge line 73. A slot 75 is formed in the front panel 33 of the tray 11 adjacent the upper edge thereof and adjacent the hinge line 55 to receive the locking flap 70 when the cover 10 is closed over the tray 11.

The operation of the cover lock is illustrated in Figures 13 and 14 of the drawings. Figure 14 illustrates in cross section the relative position between the flap 70 and the slot 75 wherein the edge 76 of the flap 70 is received in abutting relation with the upper edge of the slot 75.

The collapsible box of the invention without the cover locking feature is illustrated in Figures 15 and 16 which show, respectively, the blank from which the box is formed and the completely erected box.

It should be noted that a structural arrangement in accordance with the invention provides a box that is completely free on the inside from joints containing adhesives. The relatively smooth inner surfaces of the box precludes transfer of any impurities into food or other contents of the box. Also, the material from which the box of the invention is formed may be any convenient material such as, for example only, paper board coated with wax, polyethylene, etc.

The following claims are intended to define the valid scope of the invention over the prior art and to cover all changes and modifications falling within the true spirit and valid scope of the invention.

I claim:

1. A collapsible box comprising a bottom panel, a front panel, a back panel, two side panels, each of said front, back and side panels being hinged to said bottom panel, foldable connections between opposite ends of said back panel and each side panel, a tab hinged to and extending from opposite ends of said front panel, a score line extending diagonally across each of said hinged tabs, each of said hinged tabs being affixed to its respective side panel along one side only of its diagonal score line, a locking tab at the forward edge of each side panel, a flap hinged along the upper edge of said front panel to fold over the inside face of said front panel, and a notch formed at both ends of said flap to receive said locking tab, said locking tabs to lock the front and side walls in erected condition.

2. A collapsible box comprising a bottom panel, a front panel, a back panel, two side panels each of said front, back and side panels being hinged to said bottom panel, foldable connections between opposite ends of said back panel and each side panel, a tab hinger to and extending from opposite ends of said front panel, a diagonal score line in each of said tabs, the portion of said tab on one side of said diagonal score line being affixed to its respective side panel, a locking tab at the forward edge of each side panel, a flap hinged along the upper edge of said front panel to fold back against the inside face of said front panel, said flap including tabs hinged at opposite ends of said flap, each of said flap tabs being fixed-

ly attached to the other portion of the tab hinged to the front panel and a slot at each end of said flap to receive said locking tab when the collapsible box is erected to maintain the side and front panels substantially erect.

3. A collapsible box having a tray portion comprising a bottom panel, a front panel, a back panel, two side panels, each of said front, back and side panels being hinged to said bottom panel, a tab hinged to and extending from opposite ends of said front panel, a score line extending diagonally across said tab, the portion on one side of said diagonal score line being affixed to its respective side panel, a locking tab at the forward edge of each side panel, a flap hinged along the edge of said front panel to fold back against the inside face of said front panel, said flap including tabs hinged at opposite ends of said flap, each hinged tab of the flap being attached to one of the hinged tabs of the front panel, said flap having a slot therein at each end thereof to receive the corresponding, locking tab of said side panel when the collapsible box is erected to maintain the tray substantially erect, and a diagonally scored tab extending from each end of said back panel and having a portion thereof fixedly attached to the corresponding side panel.

4. A collapsible box as set forth in claim 3 including a cover hinged to the back panel, said cover having erectable side and front panels hinged thereto, a rearwardly hinged locking flap forming part of said front panel of

said cover, and a slot formed in the front panel of the tray portion for receiving said locking flap when the cover is closed.

5. A collapsible and erectable tray comprising a bottom panel and four side walls panels hinged to the bottom panel to overlie the bottom panel in the collapsed condition of the carton, and to stand upright with respect thereto in the erected condition of the carton, diagonally folded motion-transmitting tabs joining adjacent side walls together to raise automatically two of the side walls when the other two are raised manually, one portion of each diagonally folded tab being hinged to a side wall and the other portion thereof being connected to an adjacent side wall, an internal flap hinged to one side wall and lying adjacent the inner face of the side wall, a tab hinged to an end of the internal flap and being connected to the hinged portion of the corresponding diagonally folded tab, a slot defined between the internal flap and the tab hinged thereto, and locking means carried by an edge of the side wall adjacent the side wall which carries the internal flap for engaging said slot to lock the adjacent side walls in upright positions.

References Cited in the file of this patent

UNITED STATES PATENTS

2,650,751 Goers ---------- Sept. 1, 1953