June 7, 1949. A. G. EDTMILLER 2,472,698

KNOCKDOWN CARTON

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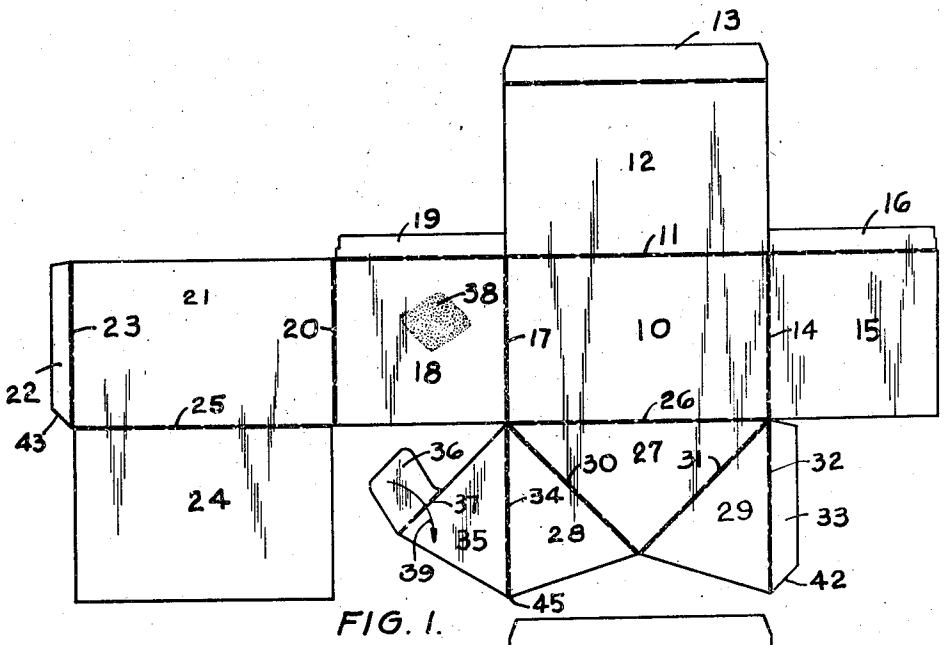


FIG. 1.

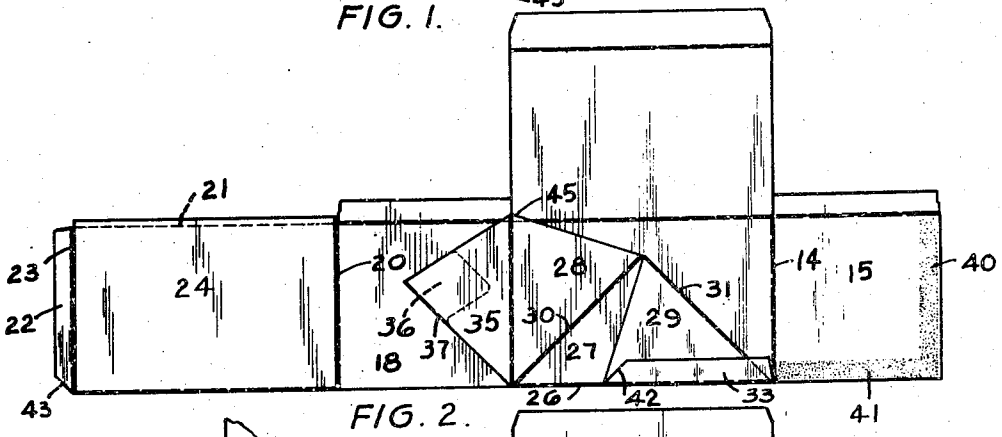


FIG. 2.

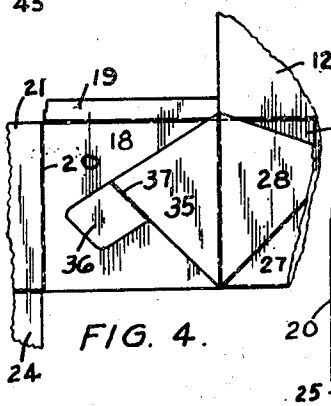


FIG. 4.

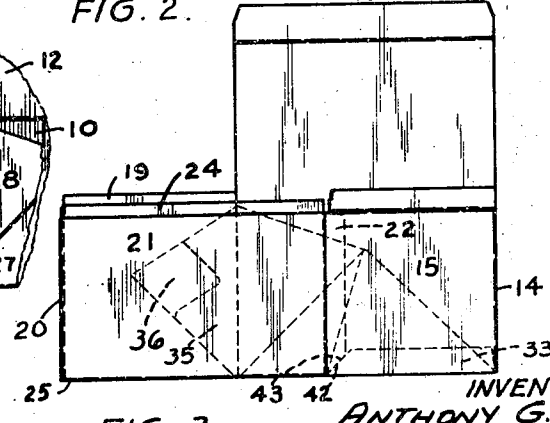


FIG. 3.

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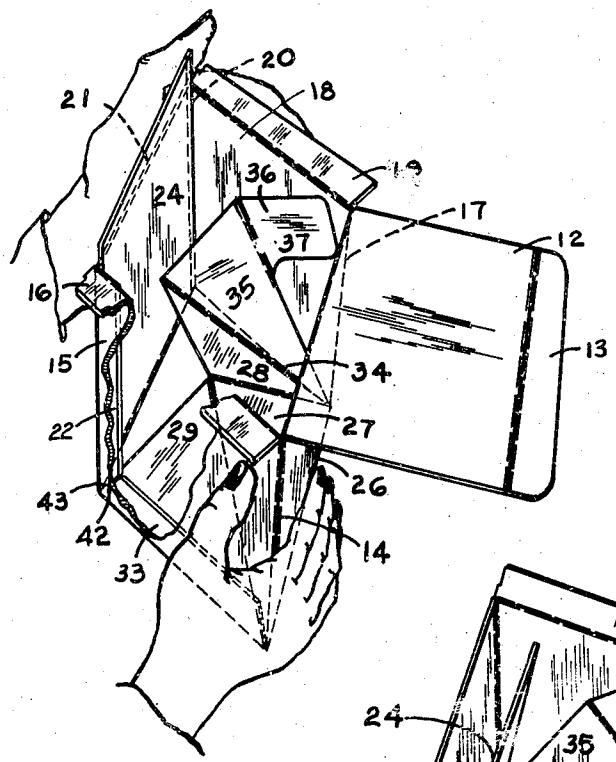


FIG. 5.

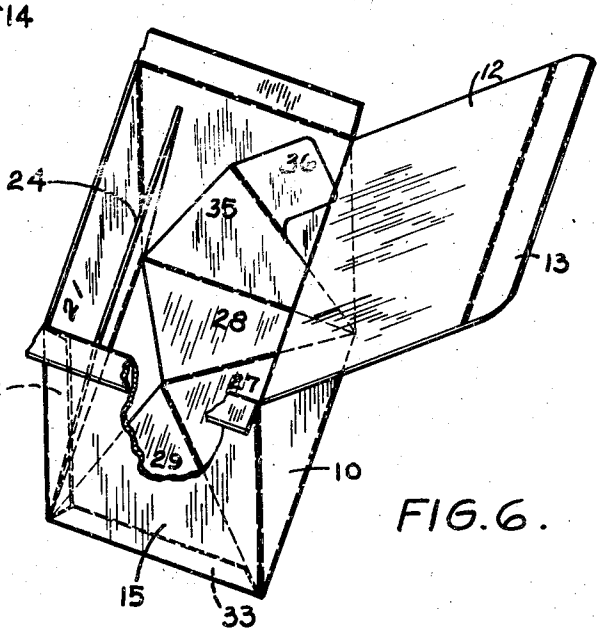


FIG. 6.

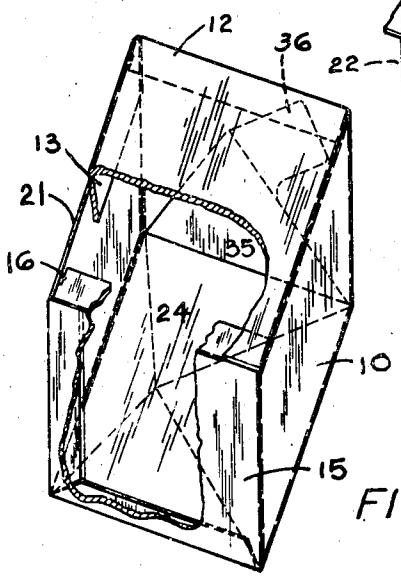


FIG. 7.

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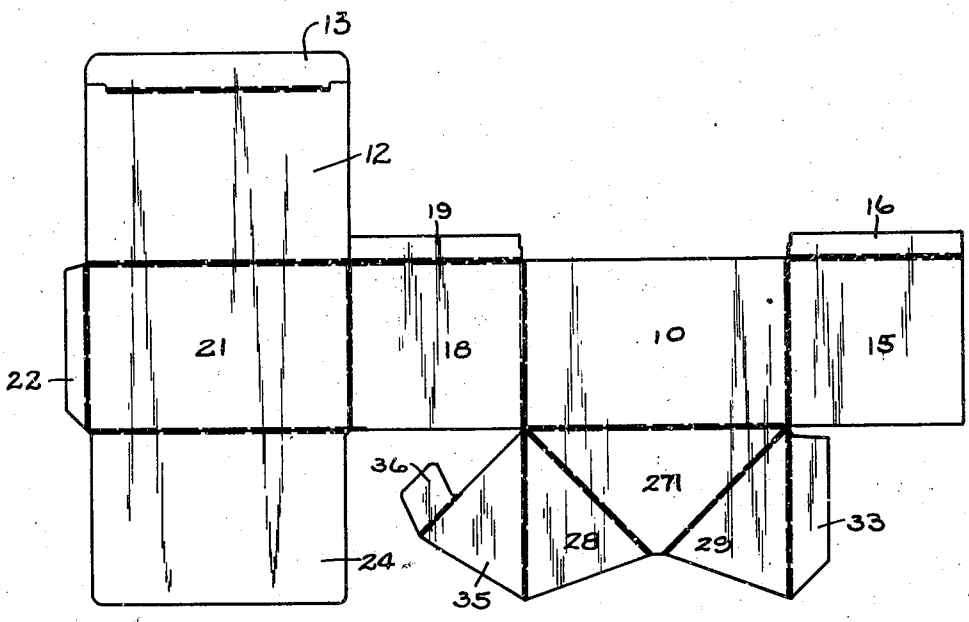


FIG. 8

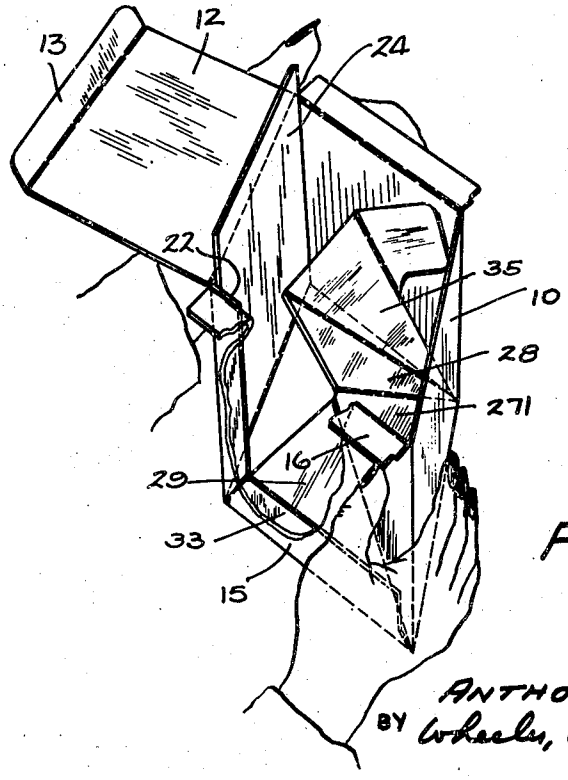


FIG. 9

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KNOCKDOWN CARTON

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Application September 20, 1947, Serial No. 775,182

14 Claims. (Cl. 229—41)

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This invention relates to improvements in knock-down cartons, this term including carriers.

It is a primary object of the invention to provide in simple and easily manufactured form a paper board carton of the type which can be shipped flat and erected with the utmost speed and facility simply by pressure at diagonally opposite corners of the glued and folded blank.

It is my further object to provide a carton which will have substantial strength notwithstanding the foregoing considerations. It is also my object to provide a carton blank of such a character as to facilitate gluing and manufacture.

Other objects will appear in more detail from the following disclosure of the invention.

In the drawings:

Fig. 1 is a plan view of a carton blank embodying the invention as it appears when cut, and with a first application of adhesive made thereto.

Fig. 2 shows the blank with its initial fold and a second application of adhesive made thereto.

Fig. 3 shows the blank with its folding and gluing completed in readiness for shipment.

Fig. 4 is a fragmentary detail view similar to a portion of Fig. 2 and illustrating a modified embodiment of the invention.

Fig. 5 is a view in perspective showing the blank partially erected by manual pressure at its diagonally opposite corners, a portion of a side wall being broken away.

Fig. 6 is a view in perspective similar to Fig. 5 showing a successive stage in the erecting operation.

Fig. 7 is a view in perspective showing the completely erected and closed carton, portions of a side wall and the cover being broken away to expose its interior construction.

Fig. 8 is a plan view similar to Fig. 1 showing a modified blank embodying my invention.

Fig. 9 is a view in perspective similar to Fig. 5 showing the partially-erected carton resulting from the blank of Fig. 8.

In the following description of the structure of the blank and the completed carton, the description of the parts is, of course, relative according to the intended position of use.

The blank as initially cut and as illustrated in Fig. 1 comprises a number of panels and flaps which are hingedly movable respecting each other due to the scoring of the paper board from which the blank is cut. There is a back panel 10 to which is connected upon score line 11 a top panel 12 provided with a tucking flap 13. Connected to one end of the back panel 10 upon score line 14 is an end panel 15 provided with flap 16.

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Connected to the other end of the back panel 10 upon score line 17 is another end panel 18 having a flap 19. To end panel 18 is connected upon score line 20 a front panel 21 having a gluing flap 22 connected thereto upon score line 23. The front flap 21 is also provided with a false bottom panel 24 which is connected to its bottom margin upon score line 25.

Connected to the bottom margin of the back panel upon score line 26 are the several panels 27, 28 and 29 which together constitute the box bottom. Panel 27 may comprise an isosceles triangle or trapezoidal figure with converging sides and is joined to triangular panel 28 upon score line 30 on one of such sides, and to triangular panel 29 upon score line 31 on another of such sides. Connected to the side margin of panel 29 upon score line 32 is a gluing flap 33. Connected to the opposite side margin of panel 28 upon score line 34 is a supporting panel 35 having a gluing tab 36 at its outer free corner and joined thereto upon score line 37. In completing the folding and gluing of the blank in order that it may be erected as a carton, the first step is the application to the end panel 18 of a spot of glue at 38 which is ultimately to connect the tab 36 to the end panel.

The tab 36 is next folded over onto the face of panel 35 as indicated by the arrow 39 in Fig. 1.

Panels 27 and 28 of the bottom assembly are now folded onto the face of the back panel 10 as shown in Fig. 2, while, at the same time, the bottom panel 29 is folded outwardly onto the face of panel 27, and the gluing flap 33 is folded inwardly onto the face of panel 29. This folding operation will bring the supporting panel 35 onto the face of panel 18, and it will engage the gluing tab 36 with the glued area 38 to effect a connection of the gluing tab with the end of the carton to suspend the bottom assembly foldably therefrom.

While this is being done, the false bottom panel 24 may be folded onto the face of the front wall 21, or as shown in Fig. 2. Portions of the end wall 15 are now provided with glue at 40 and 41 near the outer and bottom margins of the end wall respectively.

It will be noted that the gluing flap 33 has a mitered end 42. The gluing flap 22 has a similarly mitered end at 43. When the front wall panel 21 and superimposed false bottom panel 24 are now folded over the end wall panel 18 upon the hinge provided by score line 20, the width of the end wall panel is such that the mitered corner 43 of gluing flap 22 will fit and register with the mitered corner 42 of gluing flap 33 as shown in dotted lines in Fig. 3.

The end wall 15 is now hinged inwardly on score line 14 to bring its glued area 41 into contact with the gluing flap 33 and its glued area 40 into contact with the gluing flap 22. Pressure is preferably now applied to the parts until the glue has set. The carton is now complete in its knock-down form and in readiness for shipment flat to the point of use.

In Fig. 4, I have illustrated a modified embodiment in which the gluing tab 36, instead of being folded beneath the supporting panel 35 as a preliminary to its adhesive attachment to the end panel 18, is left outstretched in a flat position and is glued in that position to the end panel 18. It will, in this position, provide the necessary hinged connection between the supporting panel and the end wall to enable the box to function properly in erection, but those skilled in the art will recognize that the resulting structure will not be as strong because a load imposed on the erected carton will tend to weaken the hinged bond of the Fig. 4 construction and to peel the tab 36 from its adhesive connection with the end wall 18, whereas these forces do not operate where the tab is glued in the preferred manner suggested in Figs. 1, 2 and 3.

When it is desired to erect the carton for use, the operator has only to clasp it at its diagonally opposite corners represented by fold lines 14 and 20 as shown in Fig. 5. Pressure applied at these corners will cause the other diagonally opposite corners, as represented by fold lines 23 and 17, to move apart, the front end and back wall panels gradually assuming rectangular outline.

As the sides of the box move toward their ultimate positions, the supporting panel 35 will swing downwardly upon the hinge score 37 into face contact with end wall 18, and the bottom panels 27, 28 and 29 will swing downwardly upon their respective hinge score lines 26, 34 and 32 toward horizontal position. In the flat or shipping position of the carton, the panel 35 was folded flat upon tab 36 and panel 18, while the bottom panels 27 and 28 were folded flat upon the back panel 10, and bottom panel 29 was folded flat upon glue flap 33 and the end panel 15.

As soon as the apex 45 at the end of fold line 24 connecting panel 28 and 35 moves into registry with the corner of the box and out of sliding engagement with the false bottom 24, the false bottom will be free to swing downwardly from its position in face contact with the front panel 21, thereby covering the bottom panels 27, 28 and 29 and closing the triangular opening between the bottom panels and the front wall which is shown at 46 in Fig. 6.

It will be noted that the length and disposition of the supporting panel 35 is such that its free swing margin, as represented by fold line 34, will, in the ultimate position which it reaches in Fig. 6, register with the bottom margin of the end panel 18 where it provides support for the false bottom 24 without any direct connection between the bottom panel 28 and the end wall 18. Fig. 7 shows the ultimate position of the parts with the box erected and closed as in use. It will be apparent from a study of Figs. 6 and 7 that any load imposed on the false bottom 28 is sustained by the several bottom panels 27, 28 and 29. Such portion of the load as is resting on the bottom panel 28 is transmitted through the supporting panel 35 and the gluing tab 36 to the end wall 18. In the preferred position of the gluing tab, such load is distributed throughout the adhesive area. In the alternate position of the gluing tab shown in Fig. 4, the load is sustained directly on the hinging score line 37 and, instead of being distributed throughout the tab 36 under tension, the load is imposed on such tab under compression and tends to peel the tab from the end wall and to break down the hinging score line 37.

With the parts properly dimensioned and connected as shown, the carton is virtually self-erecting, requiring a minimum number of hand operations for opening it into position for use.

The carton as herein disclosed is well adapted for gluing and folding upon a carton manufacturing machine of the type known commercially as an "infolding" machine. A somewhat analogous carton designed for manufacture on the more common "outfolding" machine is disclosed in my companion application executed of even date. As more particularly disclosed in said companion application, the alternative embodiment therein illustrated may be asembled and glued and erected with substantially the same facility as the carton specifically described above, but the end flap equivalent to bottom flap 28 is supported by a false end wall which does not require gluing to the end panel and is held in position by engagement of its front margin with the front panel of the completed carton. Generic claims, as well as claims specific to the embodiments herein disclosed, are presented herewith.

That the several panels need not be connected in the precise order is illustrated by the modified embodiments shown in Figs. 8 and 9. This is substantially identical with the device shown in Figs. 1 to 3 with the exception that the cover flap 12 is attached to the wall panel 21 instead of the wall panel 10. Insofar as the various wall panels may be designated as front or rear by referring to the position of the cover flap, this change automatically results in panel 21 becoming the rear panel, and the false bottom 24 being disposed against the rear panel instead of the front panel. Of course, these expressions are purely relative, and so far as the folding feature and disposition of the false bottom are concerned, it will be apparent that either panel 10 or panel 21 may comprise the front panel, and either may comprise the rear panel according to the viewpoint of the user, and regardless of the particular disposition of the cover flap.

The construction shown in Figs. 8 and 9 further demonstrates the fact that a slight change in proportions may result in blunting the apex of panel 27 so that this panel may take the form indicated at 27' in Figs. 8 and 9. Except as above noted, the blank and the resulting carton may be identical with the construction already described. Various other changes in the order in which the panels are connected may be made without departing from the scope of this invention.

I claim:

1. A carton blank comprising four side wall panels in higed connection, one of said panels being provided at the end of the series with a gluing tab for connection with another of said panels at the opposite end of the series to complete the carton wall structure, of a set of triangular bottom panels having fold lines connecting two of such panels to the sides of a third and the remaining side of the third panel to one of said side wall panels, the fold lines joining the several bottom panels being substantially at 45 degrees from the corners of the side wall panel last mentioned, one of said first two triangular bottom panels being provided with a gluing tab

and another being provided with a supporting panel hingedly connected to it and adapted for positioning in substantial face contact with a side wall panel contiguous in the blank to the side wall panel last mentioned.

2. The blank described in claim 1 in which said supporting panel has a gluing tab with which it is hingedly connected and which is adhesively attached to said contiguous side panel.

3. The blank set forth in claim 1 in which said supporting panel has a free margin so disposed that in the erected position of the carton it will extend upwardly at a corner of the carton at one side of said contiguous panel.

4. The combination set forth in claim 1 in further combination with a false bottom connected with a side panel opposite the side panel with which said third triangular bottom panel is connected, said false bottom being folded in the blank upon the panel with which it is hingedly connected and adapted in the erected carton to fold outwardly into horizontal position overlying the triangular bottom panels aforesaid.

5. In a blank for a knock-down and readily erectable carton having side and end walls, the combination with a wall panel thereof having a contiguous end panel in hinged connection with it, of a central triangular bottom panel having one margin in hinged connection with the side wall panel first mentioned and having other margins defined by score lines extending diagonally at approximately 45 degrees from the ends of said margin, other triangular bottom panels hingedly connected with the bottom panel aforesaid upon said score lines and bounded by end score lines in approximate parallelism, a gluing flap connected to one of said last mentioned triangular bottom panels upon one of said parallel score lines, and a supporting panel connected with the other triangular bottom panel upon the other of said parallel score lines, said supporting panel being free in the blank of wall and end panel connection.

6. In a blank for a knock-down and readily erectable carton, the combination with a wall panel thereof having a contiguous end panel in hinged connection with it, of a central triangular bottom panel having one margin in hinged connection with the side wall panel first mentioned and having other margins defined by score lines extending diagonally at approximately 45 degrees from the ends of said margin, other triangular bottom panels hingedly connected with the bottom panel aforesaid upon said score lines and bounded by end score lines in approximate parallelism, a gluing flap connected to one of said last mentioned triangular bottom panels upon one of said parallel score lines, a supporting panel connected with the other triangular bottom panel upon the other of said parallel score lines, and a gluing tab hingedly connected with a margin of said supporting panel remote from the last mentioned score line, said supporting panel having a margin aligned with its hinged connection with the gluing tab and substantially at 45 degrees to the hinged connection between the supporting panel and the bottom panel with which it is connected.

7. A knock-down carton comprising front, rear and end walls in corner-hinged connection and collapsed into substantially parallel planes with each end wall aligned with one of the walls first mentioned, a folding false bottom connected to one of the walls first mentioned and folded flat thereon, and a folding bottom comprising three

hingedly connected triangular panels, one of which has a base margin in hinged connection with one of the walls first mentioned and has its other two sides in upwardly foldable hinged connection with the other triangular panels, one of said other panels having hinge means connecting it with one of said end walls and the remaining other panel being provided with a supporting panel, lying flat against the other end wall in hinged connection therewith.

8. A knock-down carton comprising front and rear panels and end panels in consecutive series and a gluing tab connecting the panels at the end of the series, each end panel and one of the panels first mentioned being aligned, and the aligned panels being in substantially parallel planes, a triangular bottom panel connected hingedly to the back panel, second and third triangular bottom panels having upwardly foldable hinged connection with the other margins of the triangular bottom panel first mentioned, a gluing tab connected with the second bottom panel and adhesively attached to an end panel contiguous with the back panel, and a supporting panel hingedly connected to the third bottom panel and having a free margin disposed to coincide with the hinged connection between the front panel and one of the end panels when the carton is erected, said supporting panel being free of marginal connection with any of the front, rear, and end panels and having tab means connecting it with the last mentioned end panel intermediate the margins of such end panel.

9. A knocked-down carton comprising front and rear panels and end panels in consecutive series and a gluing tab connecting the panels at the end of the series, each end panel and one of the panels first mentioned being aligned, and the aligned panels being in substantially parallel planes, a triangular bottom panel connected hingedly to the back panel, second and third triangular bottom panels hingedly connected with the other margins of the triangular bottom panel first mentioned, gluing tab connected with the second bottom panel and adhesively attached to an end panel contiguous with the back panel, and a supporting panel hingedly connected to the third bottom panel and having a free margin disposed to coincide with the hinged connection between the front panel and one of the end panels when the carton is erected, said supporting panel having an upper margin extending diagonally from the corner between the first mentioned bottom panel and the back panel and being provided with a gluing tab hingedly connected with the supporting panel upon an extension of such margin, said tab being in adhesive connection with the end panel which is contiguous to the rear panel at said last mentioned corner.

10. The carton defined in claim 9 in which the front panel is provided with a false bottom hingedly connected to its lower margin and initially folded upon the front panel, said false bottom being movable upon its hinged connection with the front panel downwardly within the supporting panel to overlie the triangular bottom panels.

11. A collapsible carton comprising four side wall panels having hinged corner connections with each other, a triangular bottom panel in hinged connection with one of said wall panels and defined by score lines extending diagonally from two of said corners, second and third triangular bottom panels connected with the bot-

tom panel first mentioned upon the respective score lines aforesaid, a gluing flap hingedly connected marginally with the second triangular bottom panel and adhesively connected with one of said walls, and a supporting panel having a hinged connection with the third triangular bottom panel and extending upwardly therefrom in immediate proximity to a wall of the carton opposite that with which the gluing flap is connected, an intermediate wall of the carton opposite that with which the first triangular bottom flap is connected being provided with a false bottom resting upon the several bottom flaps and marginally abutting the supporting and gluing flaps.

12. The device of claim 11 in which the carton bottom is open between the second and third triangular bottom panels and the wall with which the false bottom is connected, the opening affording access to the false bottom to facilitate the upward folding of such bottom preliminary to collapsing the carton.

13. The combination set forth in claim 11 in which the supporting panel has a gluing tab

folded upon the supporting panel between it and the wall to which the supporting panel is adjacent and adhesively connected with said wall.

14. The combination set forth in claim 11 in which the supporting panel is provided with a gluing tab in substantially the plane of the supporting panel but hingedly connected with the supporting panel and adhesively joined to the wall to which the supporting panel is adjacent.

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