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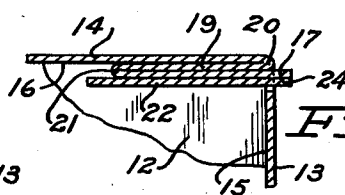
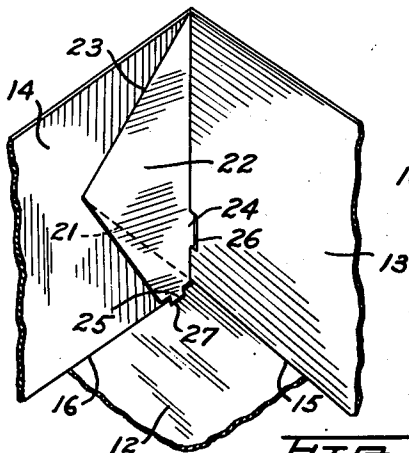
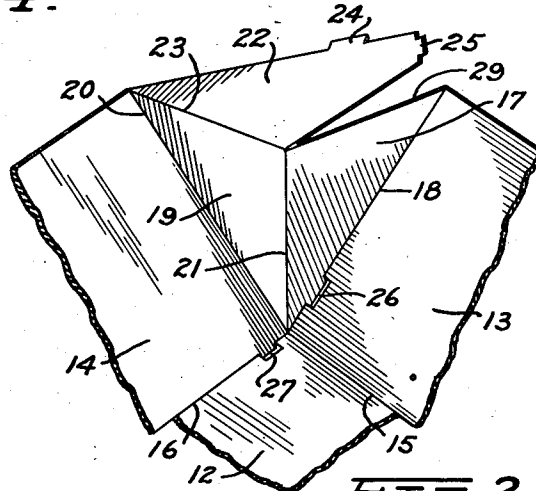
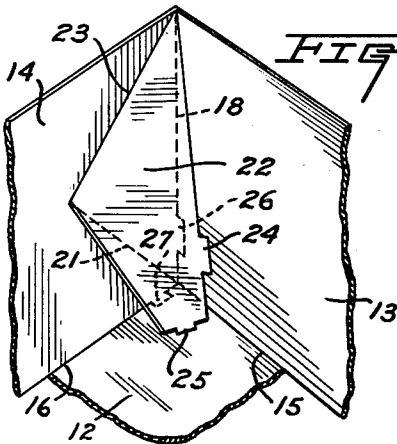
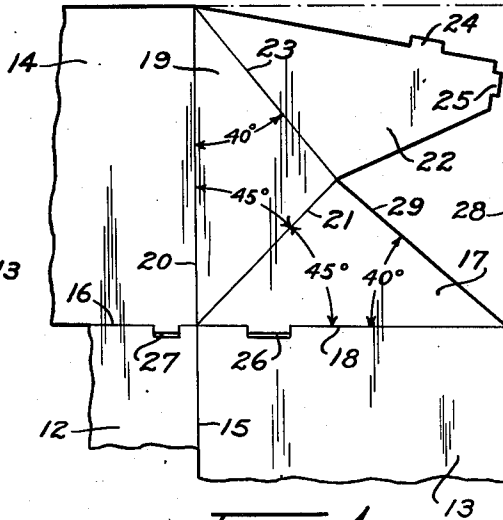
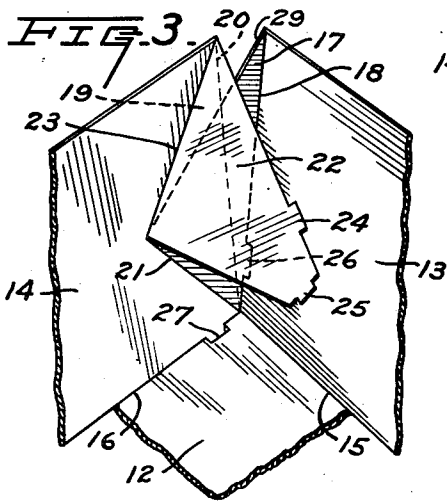
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2,435,283

CARTON

Filed Nov. 18, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

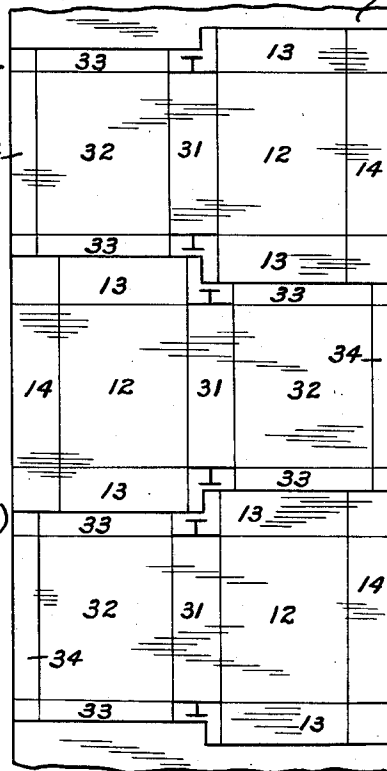
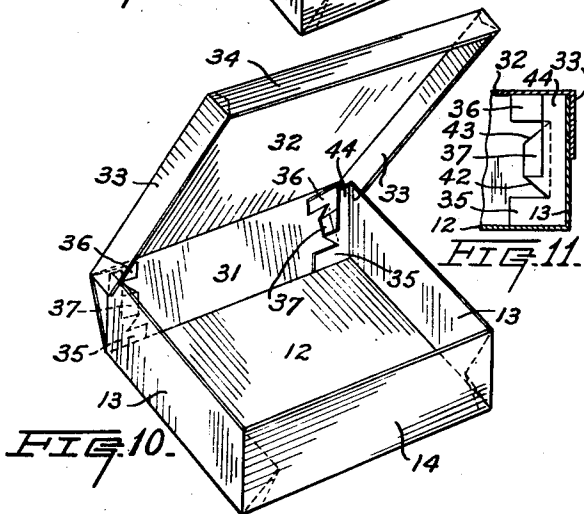
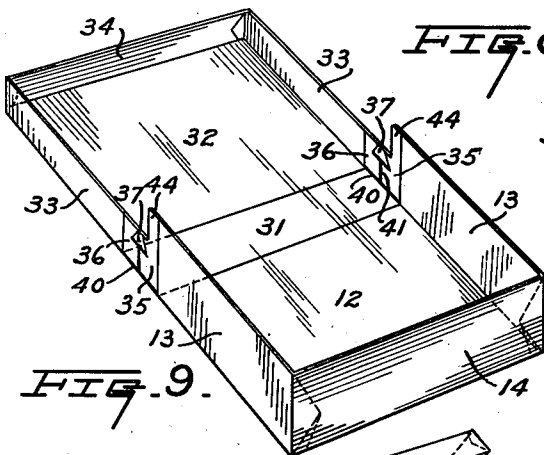
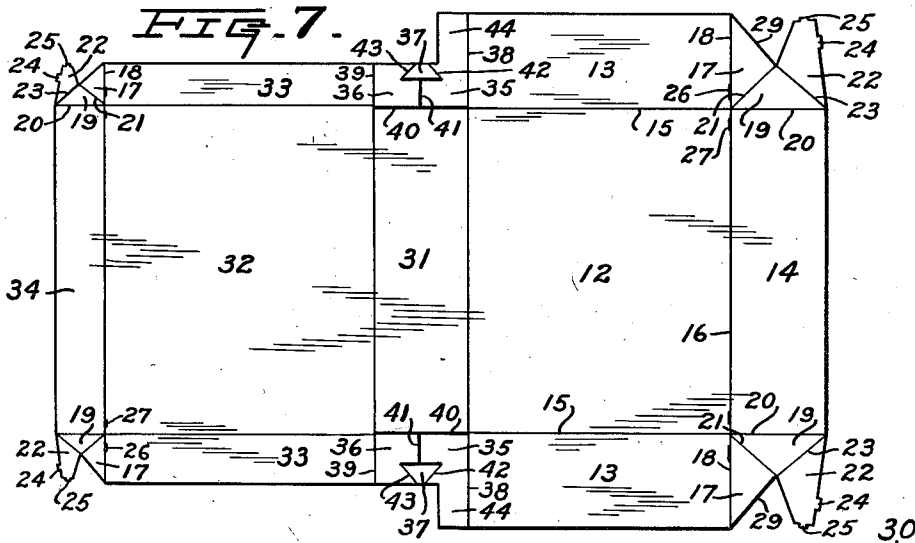


**FIG. 11.**

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## UNITED STATES PATENT OFFICE

2,435,283

## CARTON

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Application November 18, 1944, Serial No. 564,027

6 Claims. (Cl. 229—36)

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This invention relates in general to improvements in the art of packaging diverse commodities, and relates more specifically to improvements in the construction of collapsible cartons formed of cardboard or other sheet material.

The principal object of my invention is to provide a new and useful carton assemblage which is simple and durable in construction, which may be readily assembled or collapsed, and which may also be produced in quantities with minimum waste of stock.

Various types of so-called collapsible or knock-down cartons each formed of a unitary cardboard blank, have heretofore been proposed and used extensively for diverse purposes, and in some of these prior box assemblages the covers have been made integral with the bodies. It has also been common practice in the manufacture of the prior cardboard cartons wherein the cover and body of each box are formed of a single blank, to form the cover side and end walls of lesser height than that of the corresponding body walls in order to permit staggering or reverse nesting of the blanks in the production of stock so as to avoid excessive waste of material. It has furthermore been customary to provide various kinds of corner assemblages for cartons of different types, some of which could be collapsed for compact storage of the blanks; and in some of the combined cover and body structures, foldable intermediate sections were also provided between the side walls of the cover and bottom of each box adjoining the opposite ends of the rear walls which connected the cover and bottom panels. While many of these prior box assemblies are quite satisfactory for their intended purpose, most of the cartons having the covers formed integral with the bodies are either too complicated and costly, not adapted to be readily assembled and collapsed, insufficiently strong and durable, and incapable of being formed of desirably heavy stock. The corners and intermediate connecting sections of these prior combination cover and body cartons are also inferior and objectionable in many respects, and in most cases these sections do not provide sufficient strength, they cannot be rapidly assembled with ease, they distort the final structure if formed of heavy stock, and they do not positively lock the boxes in assembled condition.

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

To provide an improved carton corner assem-

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blage applicable to both the cover and body side and end walls of a box, and which will most effectively lock the corners in assembled condition, while being readily collapsible whenever so desired.

To provide a rigid and durable corner assemblage and lock for box corners or the like, which may be produced from the blank stock originally disposed within the corners rectangles, and which when assembled provides great corner strength and reinforcement while occupying minimum space.

To provide an improved corner assemblage for cardboard boxes or the like, which may be quickly set up into a rigid self-sustaining corner structure, from the flat blank, without the use of adhesive or other fastening media, and which is also advantageously applicable to blanks for cartons having the covers and bodies formed integral.

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

A clear conception of the features constituting my present improvement, and of the mode of constructing the blanks and of assembling and utilizing cartons built in accordance with this invention, may be had by referring to the drawings 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 corner fragment of my improved collapsible carton blank, showing the same in collapsed or flattened condition, but cut and scored ready for folding;

Fig. 2 is a perspective view of the blank fragment of Fig. 1, with the side and end walls elevated approximately half way;

Fig. 3 is another perspective view looking into the same corner, showing the side and end walls almost, but not fully erected and the locking section of the assemblage about to be swung within the corner;

Fig. 4 is still another perspective view of the same corner, showing the side and end walls fully erected, and the locking section of the corner assembly about to be snapped into final locking position;

Fig. 5 is a further similar perspective view showing the corner assemblage finally assembled and locked;

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Fig. 6 is an enlarged transverse section through one of the finally assembled corners;

Fig. 7 is a plan view of one of my improved complete carton blanks having the cover and box panels connected by a common foldable end wall, while the side and end walls of the cover and body are provided with improved collapsible corners such as shown in Figs. 1 to 6 inclusive, and the side walls are foldably connected by an improved foldable section assemblage;

Fig. 8 is a plan view of a fragment of stock showing the mode of nesting or staggering the blanks of Fig. 7 in order to eliminate waste of stock;

Fig. 9 is a perspective view of a carton partially assembled from a blank such as shown in Fig. 7, with the cover and bottom panels lying in the same plane, preparatory to loading of the box;

Fig. 10 is a similar perspective view showing the carton cover partly closed; and

Fig. 11 is a transverse vertical section through the finally closed box, looking toward one of the improved foldable reinforcing connections between the cover and bottom side walls.

While the invention has been shown by way of illustration as having been applied to a one-piece carton having an integral cover provided with side and end walls approximately one-half as high as the corresponding body walls, it is not my desire or intent to thereby unnecessarily limit the scope of the improvement, since some of the improved features are advantageously applicable to other types of boxes.

Referring especially to Figs. 1 to 6 inclusive of the drawing, the improved carton corner construction shown therein comprises in general, a single blank of cardboard or the like having a flat rectangular bottom panel 12 provided with a side wall 13 and an end wall 14 foldably connected to the bottom edges along score lines 15, 16 respectively; a triangular corner section 17 foldably connected to the end edge of the side wall 13 along a score line 18; a second triangular corner section 19 foldably connected to the end edge of the end wall 14 along a score line 20, and also being foldably connected to the first mentioned corner section 17 along a diagonal score line 21; and a third approximately triangular corner section 22 foldably connected to the free edge of the second corner section 19 along a score line 23 and having two integral locking tongues or tabs 24, 25 projecting outwardly from its free edges and cooperable respectively with slots or openings 26, 27, the former formed adjacent to the score line 18, and the latter formed near the score line 16.

All of the corner sections 17, 19, 22, as well as the bottom panel 12, the walls 13, 14, and the locking tabs 24, 25 are formed integral with each other from a single blank of cardboard or the like, and in order to eliminate excessive waste of stock when producing the blanks, all of the sections 17, 19, 22 and tabs 24, 25 are disposed within the stock originally confined within the corresponding corner square or rectangle represented by the dot-and-dash lines 28 in Fig. 1. In order to insure proper folding of the corner sections 17, 19 into erect position and interlocking of the tabs 24, 25 with the slots 26, 27, when the corner structure is being assembled, the inclination of the score line 23 and of the corresponding free edge 29 of the two triangular sections 19, 17, relative to their fold lines 20, 18, should be approximately 40°; and the score line 21 should be disposed at an angle of 45° relative to

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the lines 20, 18, as indicated in Fig. 1. The two locking tongues or tabs 24, 25 should not be scored, and should extend outwardly at right angles to each other so as to finally snap into the slots 26, 27 respectively and interlock therewith as shown in Figs. 5 and 6.

The improved corner assemblage shown in Figs. 1 to 6 inclusive may obviously be applied to any corner of a box body or to the corners of a cover having side and end walls depending therefrom, and when properly cut and scored, the carton blanks may either be stacked in compact piles, or the walls 13, 14 of each blank may be quickly and conveniently erected and locked into assembled condition. When thus assembling a corner, the several successive steps depicted in Figs. 2 to 5 inclusive, may be followed, and as shown in Fig. 2, the first step is to partially elevate the side and end walls 13, 14 by swinging them about their hinge lines 18, 20, thereby causing the triangular sections 17, 19 to fold inwardly along the score line 21. Continued upward swinging of the walls 13, 14 will cause the triangular sections 17, 19 to swing toward the end wall 14 and this swinging may be augmented by bringing the locking section 22 inwardly and folding it downwardly over the edge 29 as illustrated in Fig. 3. After the walls 13, 14 have been brought to erect position as in Fig. 4, the triangular section 22 with its locking tabs 24, 25 may be swung about the fold line 23 toward the superimposed sections 17, 19 as in Fig. 4; and continued swinging of the section in this manner will eventually cause the locking tabs 24, 25 to snap into and to interlock with their respective receiving slots 26, 27, and to thereby firmly lock the corner structure in assembled condition as clearly shown in Figs. 5 and 6. This final positioning of the corner sections 17, 19, 22 and of the tabs 24, 25 materially reinforces the walls 13, 14 at the corner, while occupying very little space; and in order to dismantle the corner assemblage, it is only necessary to release the locking tabs 24, 25 and to reverse the assembling steps.

As previously indicated, the improved corner assemblage of Figs. 1 to 6 inclusive, may be applied to various types of box bodies and covers; and in Figs. 7 to 11 inclusive, the corner structure has in fact been applied to the four outer corners of a one-piece carton having its bottom panel 12 hingedly connected by a rear wall 31 with a cover panel 32 which is provided with side walls 33 and an end wall 34, and with the improved corner assemblages interconnecting the walls 33, 34. The cover panel 32 is slightly wider than the bottom panel 12, and the rear wall 14 is slightly wider than the front end wall 14, while the cover end wall 34 is approximately one-half the width of the body end wall 14 and the cover side walls 33 are likewise only approximately one-half the width of the body side walls 13. The outer or front cover corners while being somewhat smaller than the body corners which coast therewith when the box is closed, due to the reduced width of the walls 33, 34, are constructed identically the same; and the blanks of the successive cartons may obviously be reversely nested or staggered, and cut from a continuous band or ribbon of stock 30 as depicted in Fig. 8, without excessive waste of stock. As indicated by the surface shade lines, the grain of the stock 30 preferably runs lengthwise of the carton blanks, and these blanks may obviously be compactly stacked for storage or shipment.

The corresponding side walls 13, 33 on the op-

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posite sides of each blank are preferably interconnected by means of improved assemblages such as shown in Figs. 7, 9, 10 and 11, each formed of a number of foldably connected sections 35, 36, 37 adapted to reinforce the rear corners of the box when the cover is closed. In each of these intermediate foldable assemblages, the section 35 is hingedly connected to the adjacent body side wall 13 along a score line 38, and the section 36 is likewise hingedly connected to the adjacent cover side wall 33 along a score line 39, but the sections 35, 36 are not attached to the adjacent end of the rear wall 31 but are separated therefrom by a slot or cut 40 in order to prevent buckling or bulging of the rear wall 31 when relatively thick or heavy stock 30 is utilized. The sections 35, 36 are moreover segregated or separated along their adjoining edges by means of slots or cuts 41, but these sections 35, 36 are foldably connected to the intermediate section 37 along diagonal score lines 42, 43 respectively. The section 35 of each of the improved side wall connecting assemblages, is also provided with an extension 44 which terminates mid-way between the ends of the blank, and these extensions 44 though not absolutely necessary cooperate with the sections 35, 36 to ultimately reinforce or support the cover.

As previously indicated, the completed blanks as shown in Fig. 7, may be compactly stacked, and when it becomes desirable to assemble the cartons, the successive blanks may first be folded and interlocked as shown in Fig. 9 so that all of the side walls 13, 33 and end walls 14, 34 will be locked in erect position. The rear wall 31 will then lie in the common plane of the panels 12, 32, and the intermediate connecting assemblages will also be in upright position. The goods may then be packed within the open boxes, and it will be observed that in the case of shirts and dresses, these may be spread throughout the entire length of the open box assemblage. In order to thereafter close the box, it is only necessary to swing the cover forwardly, whereupon the intermediate connecting assemblages between the side walls 13, 33, will readily fold in the manner illustrated in Fig. 10, thereby permitting the cover to approach its closing position over the body. The through cuts 40, 41 facilitate such closing of the carton, and when the cover panel 32 has finally come to rest upon the upper edges of the body side walls 13 and end wall 14, the extensions 44 and the corresponding cut edges of the sections 35, 36 will coact with the bottom and cover panels 12, 32 thereby providing stiff reinforcing columns or struts, as clearly illustrated in Fig. 11. The box cover may thereafter be readily lifted and swung into open position, and during such opening of the carton, the structure will again assume the position shown in Fig. 9.

From the foregoing detailed description it will be apparent that my present invention provides an improved carton which besides being simple, compact and durable in construction, may be readily assembled or collapsed. All four corners of the improved box structure are thoroughly reinforced by means of the improved corner assemblages and the improved intermediate connecting assemblages, and the outer corner assemblages most effectively lock themselves into proper position and maintain the corners in assembled condition without necessity of utilizing separate fastening means. The improved intermediate connecting assemblages which are disposed between the body walls 13 and the cover walls 33, while providing considerable reinforcement for

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the assembled box structure, effectively prevent possible distortion or buckling of the rear wall 31, by virtue of the fact that the sections 35, 36 are segregated from the opposite ends of the wall 31. The disposition of the corner locking assemblages within the rectangles originally occupied by the stock at the corners of the blank, and the reduction in width of the cover walls, obviously permits the successive blanks to be produced with minimum waste of stock, and these blanks may obviously be produced from relatively heavy and durable stock with the aid of punches and dies and at minimum cost. The double lock afforded by the tabs 24, 25 insures holding of the corner sections in most compact and locked condition, and prevents undesirable separation thereof, and the improved cartons may obviously be utilized for packing diverse articles such as shirts, dresses, scarfs, or other dry goods, as well as commodities such as cakes, buns and other comestibles.

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 appended claims may occur to persons skilled in the art.

I claim:

1. A carton formed of a single blank having a bottom and top panel at least one of which is provided with side and end walls foldably connected to the panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said second mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said walls, and tongues projecting in several directions from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and another formed in said panel adjacent to the other wall so as to firmly hold the three-ply corner section assemblage snugly against said other wall and to lock the walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at 45° angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at approximately 40° angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangle.

2. A carton formed of a single blank having a bottom and top panel at least one of which is provided with side and end walls foldably connected to the panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said sec-

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ond mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said walls, and two tongues projecting at right angles away from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and the other formed in said panel adjacent to the other wall so as to firmly hold the three-ply corner section assemblage snugly against said other wall and to lock the walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at 45° angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at approximately 40° angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangle.

3. A carton formed of a single blank having top and a bottom panel hingedly connected by a rear wall and each provided with side and end walls foldably connected to the adjacent panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of each complementary set of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said second mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said complementary walls, and tongues projecting in several directions from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and another formed in said panel adjacent to the other complementary wall so as to firmly hold the three-ply corner section assemblage snugly against said other walls and to lock said set of walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at 45° angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at approximately 40° angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangles.

4. A carton formed of a single blank having top and a bottom panel hingedly connected by a rear wall and each provided with side and end walls foldably connected to the adjacent panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of each complementary set of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said second mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said comple-

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mentary walls, and two tongues projecting at right angles away from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and the other formed in said panel adjacent to the other complementary wall so as to firmly hold the three-ply corner section assemblage snugly against said other wall and to lock said set of walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at 45° angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at approximately 40° angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangles.

5. A carton formed of a single blank having a bottom and top panel at least one of which is provided with side and end walls foldably connected to the panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said second mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said walls, and tongues projecting in several directions from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and another formed in said panel adjacent to the other wall so as to firmly hold the three-ply corner section assemblage snugly against said other wall and to lock the walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at like acute angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at lesser acute angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangle.

6. A carton formed of a single blank having a bottom and top panel at least one of which is provided with side and end walls foldably connected to the panel and being disposable either perpendicular to or flatly collapsed into the plane of said panel, the adjacent end edges of said side and end walls being foldably interconnected by a set of three approximately triangular corner sections one of which is foldably connected to one of said wall edges and another of which is likewise connected to the other of said wall edges and to said first mentioned section while the third section is foldably connected to said second mentioned section whereby said three sections are foldable from flat position in the plane of said panel into three-ply substantially triangular formation in engagement with one of said walls, and two tongues projecting at right angles away from said third section and being insertible in slots one formed near the end edge of the wall which is not engaged by the folded corner sections and the other formed in said panel adjacent to the other wall so as to firmly hold the three-ply corner sec-

tion assemblage snugly against said other wall and to lock the walls in upright position, the direct connected edges of the first and second corner sections of the flat blank being disposed at like acute angles with respect to both wall end edges and the other swinging edges of these two sections being disposed at lesser acute angles relative to the end edges of their supporting walls, and all of said sections and locking tongues being formed from blank stock originally disposed within the corner rectangle.

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# REFERENCES CITED

The following references are of record in the file of this patent:

## UNITED STATES PATENTS

| Number    | Name      | Date          |
|-----------|-----------|---------------|
| 1,755,722 | Bachmann  | Apr. 22, 1930 |
| 1,865,635 | Klein     | July 5, 1932  |
| 2,090,375 | Rosenthal | Aug. 17, 1937 |
| 2,367,410 | Lighter   | Jan. 16, 1945 |