Oct. 23, 1962 R. G. KRAMER 3,059,830

ONE-PIECE CARTON FOR PROTECTING FRAGILE ARTICLES

Filed Nov. 7, 1961

3 Sheets-Sheet 1

Fig. 1

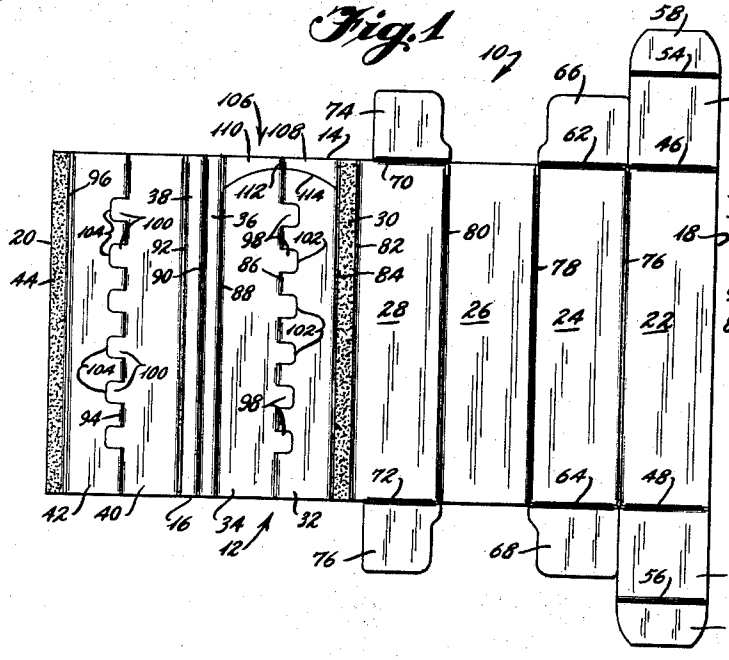


Fig. 4

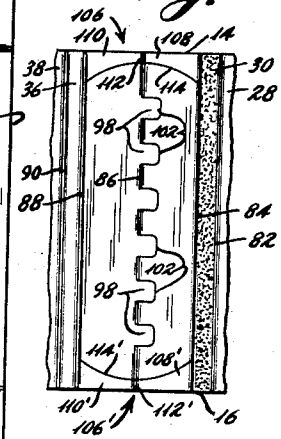


Fig. 2

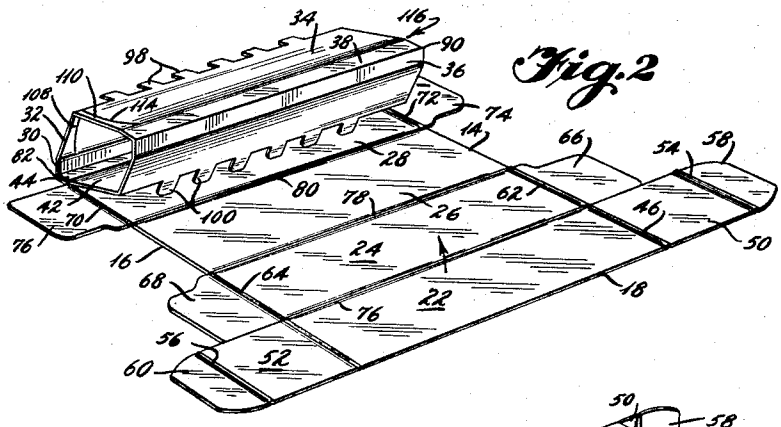
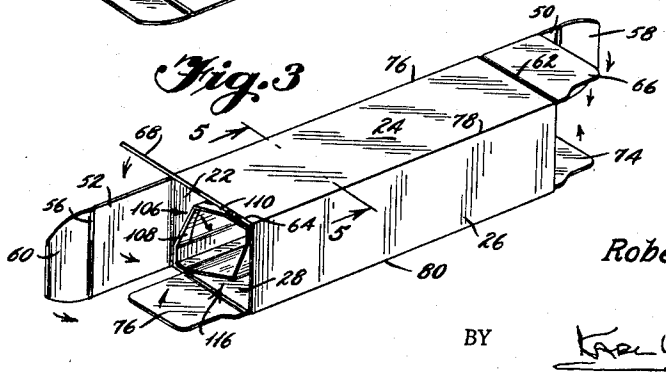


Fig. 3



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Fig. 5

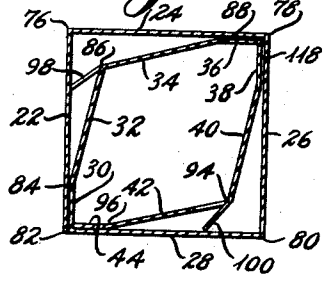


Fig. 6

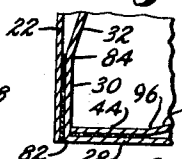


Fig. 7

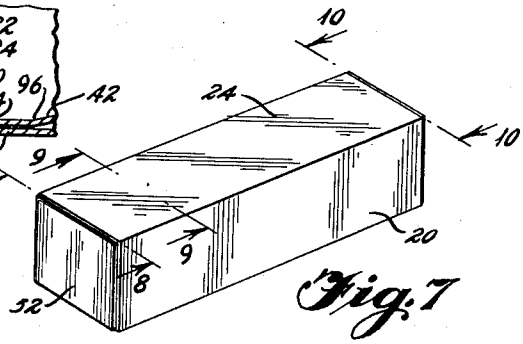


Fig. 8

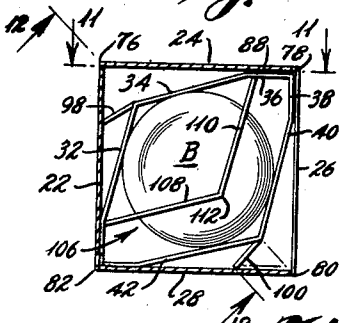


Fig. 9

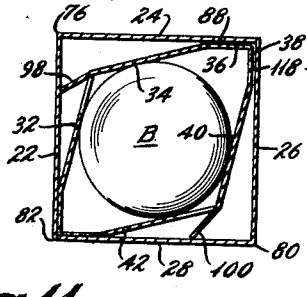


Fig. 10

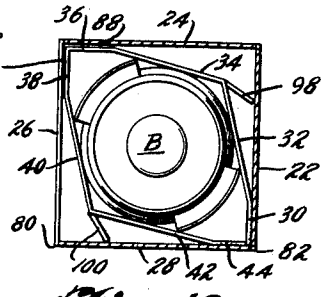


Fig. 11

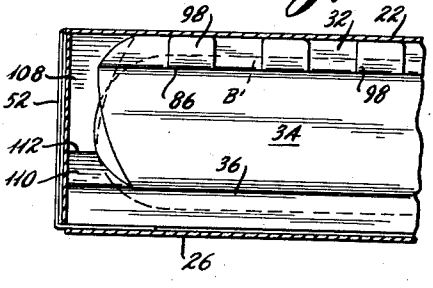
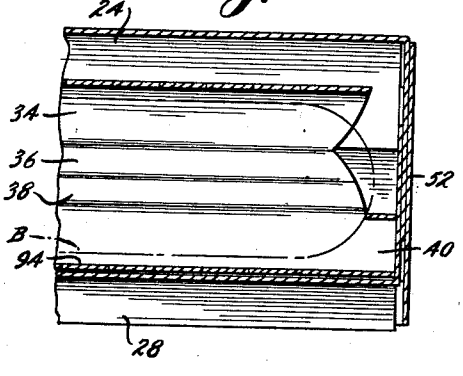


Fig. 12



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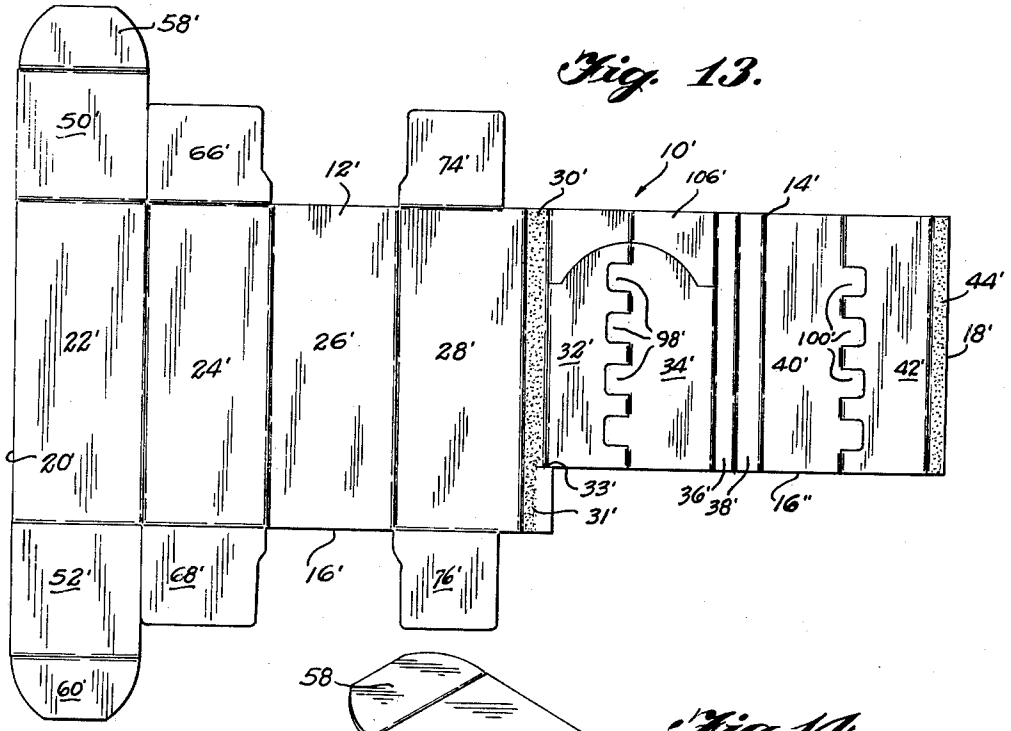


Fig. 13.

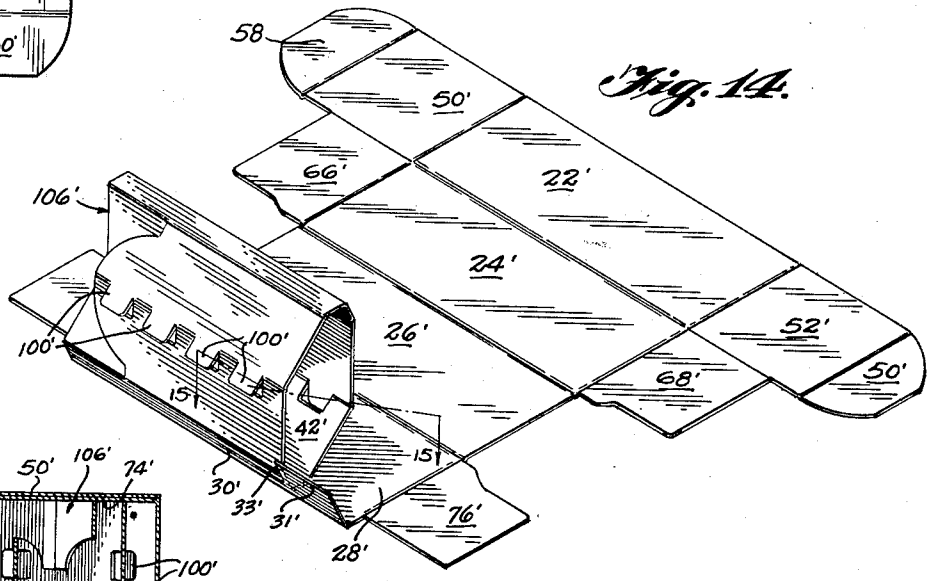


Fig. 14.

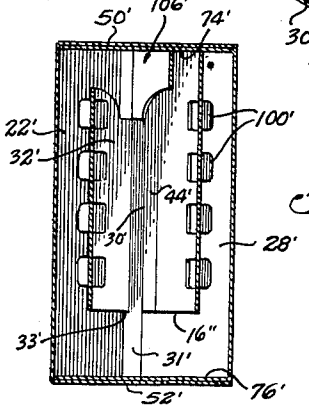


Fig. 15.

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ONE-PIECE CARTON FOR PROTECTING FRAGILE ARTICLES

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17 Claims. (Cl. 229—39)

This invention relates generally to improvements in cartons and more particularly to a novel shock-proof cushion receptacle particularly adapted for the packaging of fragile articles, such as radio tubes, electronic components and the like, without requiring corrugated board and packing elements.

A primary object of the present invention is to provide a novel blank and carton constructed from paperboard or the like which is readily adapted for use in automatic erecting and packing equipment, which includes a novel inner liner sleeve for protecting a packaged article from shock to the exterior surfaces of the completed package as well as protecting at least one end portion of the article being packed.

Other objects and many of the attendant advantages of the present invention will become apparent on a consideration of the following specification and accompanying drawings, wherein:

FIG. 1 is a plan view of the novel blank of the invention looking at the outer surface thereof;

FIG. 2 is a perspective view showing the novel carton in a partially erected condition, illustrating the manner in which the inner liner sleeve is initially formed;

FIG. 3 is a perspective view showing the completely erected carton formed from the blank of FIG.1 with the end flaps thereof open;

FIG. 4 is a fragmentary plan view of a modified pair of inner liner sleeve panels used to form two end cradles in the novel carton;

FIG. 5 is a transverse section taken substantially on the plane of line 5—5 of FIG. 3;

FIG. 6 is an enlarged view of a fragmentary portion of FIG. 5, illustrating the manner in which the novel carton is glued in its finally erected condition;

FIG. 7 is a perspective view of the novel carton with the end flaps thereof closed;

FIG. 8 is a vertical section taken substantially on the plane of line 8—8 of FIG. 7;

FIG. 9 is a vertical section taken substantially on the plane of line 9—9 of FIG. 7;

FIG. 10 is a vertical section taken substantially on the plane of line 10—10 of FIG. 7;

FIG. 11 is a fragmentary longitudinal section taken substantially on the plane of line 11—11 of FIG. 8;

FIG. 12 is a fragmentary vertical section taken substantially on the plane of line 12—12 of FIG. 8;

FIG. 13 is a plan view of a modified blank of the invention, similar to FIG. 1, with the blank oriented 180° with respect to the position of the blank shown in FIG. 1;

FIG. 14 is a perspective view, somewhat similar to FIG. 2, showing the manner in which the modified inner liner sleeve is initially formed during erection of the novel carton; and

FIG. 15 is a vertical section taken diagonally through opposite corners of a carton erected from the blank of FIG. 1 on a plane substantially passing through line 15—15 of FIG. 14 after the container is erected.

Referring to the drawings in detail, and first considering FIG. 1, the novel blank is indicated generally at 10 and is produced from any suitable paperboard material or the like. The blank includes an elongated body portion 12 which is substantially rectangular and includes an upper margin 14 parallel to a lower margin 16 and normal to the margins 14 and 16 are end margins 18 and 20. The blank 10 comprises a series of linearly disposed hingedly connected panels including a first side wall panel 22, a second side wall panel 24, a third side wall panel 26, a fourth side wall panel 28, a first glue flap panel 30, a first inner liner sleeve panel 32, a second inner liner sleeve panel 34, a first corner panel 36, a second corner panel 38, a third inner liner sleeve panel 40, a fourth inner liner sleeve panel 42, and a second glue flap panel 44. The first side wall panel 22 has hingedly connected at opposite ends thereof fold line 46 and 48 co-linear with the upper and lower margins 14 and 16, respectively, cover flaps 50 and 52, respectively, which are hingedly connected at fold lines 54 and 56 to end tabs 58 and 60, respectively. The second side wall panel 24 has hingedly connected at fold lines 62 and 64 end flaps 66 and 68, respectively. The fourth side wall panel 28 has hingedly connected at fold lines 70 and 72 end flaps 74 and 76, respectively.

The glue flap panels 30 and 44 have a suitable adhesive material applied to the outer surface thereof as indicated by the stippling thereon, the glue being applied by automatic equipment as is conventional in the art.

The panels 24–44 are connected by means of a plurality of mutually parallel fold lines normal to and terminating at the upper lower margins 14 and 16 as indicated at 76–96.

It will be noted that the side wall panels 22–28 are of an equal width, the glue flap panels 30–44 and corner panels 36, 38 are of an equal width, and the inner liner sleeve panels 32, 34 and 40, 42 are of the same width. It will be noted that the combined width of one of the inner liner sleeve panels 32, 34 or 40, 42 and that of one of the glue flap panels 30, 44 or 36, 38 is less than the width of one of the side wall panels 22–28. These dimensions insure that the inner liner sleeve in the erected carton will be spaced from the inner surface of the rectangularly disposed side wall panels with the exception of those portions of the glue flap panels secured to the side wall panels. This structure and function will be described in detail relative to the erected carton when considering FIGS. 5, 6 and 8–11.

The inner liner sleeve panels 32, 34 and 40, 42 have formed therebetween cushioning extensions 98 and 100, respectively, which are formed by C-shaped cut lines 102 and 104, respectively, extending laterally from the respective fold lines 86 and 94 into the inner liner sleeve panels 32 and 42, respectively. It will be obvious to those skilled in the art, although not shown, that the C-shaped cut lines 102 and 104 could be reversed, whereby the C-shaped cut lines extend from the fold lines 86 and 94 into the inner liner sleeve panels 32 and 34. Additionally, the C-shaped cut lines could alternately extend into panels 32, 34 and 40, 42.

The inner liner sleeve panels 32 and 34 have formed therein adjacent the margin 14 a support cradle portion indicated generally at 106 which comprises hingedly connected segments 108 and 110 terminally connected to the fold lines 84 and 88, and intermediately connected by a fragmentary portion 112 of the fold line 86. The support cradle 106 is formed by an arcuate cut line 114 extending away from the margin 14, the configuration of the cut 114 being determined by the formation of the end surface of the fragile article to be protected in the erected carton. For example, in the preferred embodiment, the arcuate cut line 114 will engage and support a concave end surface of an elongated bulb, for example, of the character utilized in photographic projectors. Further, although the support cradle 106 is disclosed as being formed between the inner liner sleeve panels 32 and 34, this construction could alternatively be incor-

porated in the adjacent inner liner sleeve panels 40 and 42.

Additionally, as indicated in FIG. 4, a second support cradle 106' may be provided at the lower end of the blank and includes segments 108' and 110' terminally connected at opposite ends to the fold lines 84 and 88, being formed by the arcuate cut line 114'. It will be readily apparent to those skilled in the art that the second support cradle 106' could be incorporated in the adjacent side wall panels 40, 42, or a support cradle could be provided in each of the adjacent pairs of inner liner sleeve panels 32, 34 or 40, 42. In other words, the particular structure provided by the cushioning extensions 98 and 100 and the support cradles 106 and 106' can be reversed and such construction is to be considered within the scope of the invention, as will subsequently be defined in the appended claims.

Considering FIG. 2, the manner in which the novel carton is erected from the blank 10 is illustrated; initially, the marginal edge 20 of the glue flap 44 is disposed in parallel relationship to the fold line 82, the outer glued surface thereof being juxtaposed on the inner surface of the side wall panel 28 to form an elongated inner liner sleeve indicated generally at 116 which has a polygonal cross section and which is formed from the eight panels 30, 32, 34, 36, 38, 40, 42 and 44. When this first gluing operation takes place, the inner liner sleeve 116 will be broken at the fold lines 84–96 and the cushioning extensions 98 and 100 will project in substantially coplanar relationship with respect to the inner liner sleeve panels 34 and 40, it being noted that the terminal edges of the cushioning sections 100 will abuttingly engage the inner surface of the side wall panel 28, as clearly seen in FIG. 2.

After the first gluing operation, the side wall panel 26 is folded about fold line 80 to be disposed normal to the side wall panel 28 and the side wall panel 24 is folded about fold line 78 to be disposed normal to the side wall panel 26, and the side wall panel 22 is folded about the fold line 76 and is secured to the outer surface of the glue flap panel 30. This results in the construction disclosed in FIG. 3, and previously used reference characters are applied to this figure in order to indicate the manner in which the various blank portions are oriented in the assembled carton.

It will be noted that the support cradle 106 which is made of portions 108 and 110, is still in coplanar relationship with the inner liners 32 and 34, respectively. After the carton has been erected, as shown in FIG. 3, the support cradle is moved diagonally, as indicated by the direction arrow, to form the construction most clearly seen in FIG. 8.

Considering FIGS. 5 and 6, it will be readily observed the manner in which the gluing of glue flaps 44 and 30 takes place, it being noted that the glue flap 44 is secured on the inner surface of side wall panel 28 adjacent the fold line 82, and the side wall panel 22 is glued on the outer surface of the first glue flap panel 30. Further, the glue flap panels 30, 44 will be disposed at substantially right angles in juxtaposed relation with respect to the inner surfaces of the side wall panels 22 and 28, respectively. Additionally, the corner panels 36 and 38 will also be disposed at substantially right angles to the corner formed between the side wall panels 24 and 26. However, these panels will be in spaced relationship from the inner surfaces of these intersecting panels as indicated at 118. The cushioning extensions 98 and 100 will respectively engage the inner surfaces of the side wall panels 22 and 28, and the inner sleeve panels 32, 34 and 40, 42 will be in spaced relation from the inner surfaces of intersecting side wall panels 22, 24 and 26, 28, respectively. It will be noted that the inner sleeve has a polygonal cross section, i.e., having eight sides, which is substantially symmetrical about a plane extending diagonally through the corners identified at the fold lines 78 and 82.

It will be noted in FIG. 8 that the support cradle 106, when displaced diagonally from the inner liner sleeve panels 32 and 34, will extend beyond the diagonal plane extending through the corners 78 and 82 and the arcuate cut 114 will substantially conform to an arcuate portion of the lower surface of an elongated bulb B disposed in the erected carton.

Referring to FIGS. 13–15, there is disclosed a modified blank 10' which incorporates a shortened inner liner sleeve to afford increased space for mounting flanges, rings or the like disposed on the base of lamps being packaged in the novel container.

In this embodiment, like primed reference numerals will be used to identify similarly functioning parts of the previously described embodiment.

The blank 10' includes an elongated body portion 12' which is substantially rectangular and includes an upper margin 14' parallel to a lower margin 16' normal to end margins 18' and 20'. The blank comprises a series of linearly disposed, hingedly connected panels including a first side wall panel 22', a second side wall panel 24', a third side wall panel 26', a fourth side wall panel 28', a first glue flap panel 30', a first inner liner sleeve panel 32', a second inner liner sleeve panel 34', first and second corner panels 36' and 38', respectively, a third inner liner sleeve panel 40', a fourth inner liner sleeve panel 42' and a second glue flap panel 44'.

The blank 10' includes cover flaps 50' and 52' hingedly connected to the first side wall panel 22' and the cover flaps 50' and 52' are hingedly connected to end tabs 58' and 60', respectively. The second side wall panel 24' has hingedly connected thereto flaps 66' and 68', respectively, and the side wall panel 28' has hingedly connected thereto end flaps 74' and 76'. This structure is the full equivalent and substantially identical with that of the previously described embodiment.

The inner liner sleeve panels 32', 34' and 40', 42' have formed therebetween cushioning extensions 98' and 100', respectively, which function in the same manner as those cushioning extensions in the previously described embodiment.

The inner liner sleeve panels 32' and 34' have formed therebetween a support cradle portion indicated generally at 106' and functioning in the manner previously described with respect to FIGS. 1–12.

It will be noted in the embodiment of FIGS. 13–15 that the panels 32'–44' are of a reduced width wherein the margin 16'' is parallel to the previously mentioned margins 14', 16' but spaced inwardly therefrom. This construction results in a shorter length inner liner sleeve as clearly seen in FIGS. 14 and 15. However, the first glue panel 30' extends the entire length of the panels 22'–28' including an extension portion 31' which extends beyond the margin 16'' just mentioned. To facilitate formation of the inner liner sleeve from the panels 30'–44', the margin 16'' extends inwardly into the first glue flap panel 30' as indicated at 33'.

This construction facilitates erection of the inner liner sleeve as well as provides a relatively long attaching glue flap 30' to provide a good base to which the margin 20' of the first side wall panel 22' will be secured in the carton erected from the blank 10'.

In all other respects, the blank 10' is substantially identical in structure and function with respect to blank 10 disclosed in FIGS. 1–12. Accordingly, it is not believed that further description as to the manner of erection, formation of the inner liner sleeve, etc. is necessary.

Thus, there has been disclosed a novel carton produced from a one-piece blank which affords economy of automatic erection and packing, desirable protection for relatively fragile items, such as projecting tubes, electronic components, etc., and which fully conforms with the objects of the invention heretofore set forth.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not to be limited to what is shown in the drawings and described in the specification, but only as set forth in the appended claims.

What is claimed is:

1. In a blank for producing cartons to protect fragile articles comprising parallel side margins extending at opposite edges of a series of twelve panels disposed in the following order: first, second, third and fourth side wall panels, a first glue-flap panel, first and second inner liner sleeve panels, first and second corner panels, third and fourth inner liner sleeve panels, and a second glue-flap panel, said panels including a plurality of parallel score lines extending between adjacent panels normal to the side margins, a plurality of cushioning extensions spaced longitudinally along the fold line between the adjacent first and second and the fold line between the adjacent third and fourth inner liner sleeve panels, said cushioning extensions comprising portions severed from at least one of each of said pair of adjacent inner liner sleeve panels, one of said pair of adjacent inner liner sleeve panels including a cradle-cut, extending transversely across the fold line between one of said adjacent pair of inner liner sleeve panels adjacent one side margin of said blank and terminating at the fold line bordering one of said glue flap panels and one of said corner panels for providing a diagonal support cradle in the carton erected from said blank.

2. In a blank as set forth in claim 1; and a second cradle-cut similar to that first described and disposed adjacent the opposite side margin of said blank.

3. In a blank as set forth in claim 1; said cradle-cut being arcuate for conforming to the rounded end of an article packed in the carton produced from said blank.

4. In a blank as set forth in claim 1; said cushioning extensions comprising C-shaped cuts extending from the fold line between the adjacent inner liner sleeve panels into the first and fourth inner liner sleeve panels.

5. In a blank as set forth in claim 1; said corner and glue-flap panels being of equal width, said inner liner sleeve panels being of equal width, said side wall panels being of equal width, the combined width of one of said inner liner sleeve panels and one of said glue-flap panels being less than the width of one of said side wall panels.

6. In a blank as set forth in claim 1; said side wall panels including end flap panels at opposite side margins for forming end closures on a carton erected from said blank.

7. In a blank as set forth in claim 1; said first glue flap panel extending the entire length of said side wall panels, said first and second inner liner sleeve panels, first and second corner panels, third and fourth inner liner sleeve panels and second glue flap panel being of a length less than that of the side wall panels and first glue flap panel and terminating at a margin parallel to the side margins of said side wall and first glue flap panels.

8. A one-piece container for fragile articles comprising four rectangularly disposed side wall panels, end closure means at opposite ends of said side wall panels, and a tubular inner liner sleeve extending longitudinally of said side wall panels and disposed diagonally from opposite corners between adjacent side wall panels, said inner liner sleeve being secured at one of said opposite corners to the inner surface of each of said adjacent side wall panels and being spaced from the remaining inner surface portions of said side wall panels, said inner liner sleeve including a cradle portion at one end thereof and displaceable from one side of said inner liner sleeve adjacent the lower end thereof and intersecting the plane extending diagonally through the opposite corners formed by said side wall panels.

9. A one-piece container as set forth in claim 8, said tubular inner liner sleeve being of a length less than said side wall panels for affording increased space within the container to accommodate enlarged portions of articles packed in the container.

10. The structure of claim 8, said cradle portion comprising segments formed from portions displaced from each of one of said adjacent pair of inner liner sleeve panels by a cut extending transversely of the fold line therebetween, each of said segments being hingedly connected to one of said glue-flap and corner panels.

11. The structure of claim 8, said inner liner sleeve including a second cradle portion similar to that described and disposed adjacent the other end of said inner liner sleeve.

12. The structure of claim 8, said inner liner sleeve comprising a polygonal cross section substantially symmetrical about a plane extending diagonally through said opposite corners formed by said side wall panels, said sleeve including opposed pairs of inner liner sleeve panels foldably connected on a longitudinal fold line parallel to and spaced from the corners intermediate the corners between which said inner liner sleeve is diagonally disposed, each of one of said opposed pairs of inner liner sleeve panels including cushion extensions formed therein and at the longitudinal fold line therebetween and terminally engaging on adjacent inner surface portions of an adjacent inner surface of one of said side wall panels.

13. The structure of claim 12; said inner liner sleeve comprising eight panels foldably connected on parallel fold lines and including two similar glue-flap panels secured in juxtaposed relation on the inner surface of the adjacent side wall panels at one corner immediately adjacent the fold line between said adjacent side wall panels.

14. The structure of claim 13, said inner liner sleeve including a second cradle portion similar to that described and disposed adjacent the other end of said inner liner sleeve.

15. The structure of claim 13; said inner liner sleeve including a pair of corner panels equal in width to said glue-flap panels and disposed parallel to and spaced from the other of said opposite corners, said pairs of inner liner sleeve panels extending at an angle less than 90° from adjacent edge margins of the glue-flap panels and corner panels to which they are hingedly connected.

16. The structure of claim 14; said cradle portion comprising segments formed from portions displaced from each of one of said adjacent pair of inner liner sleeve panels by a cut extending transversely of the fold line therebetween, each of said segments being hingedly connected to one of said glue-flap and corner panels.

17. A one-piece container for fragile articles comprising four rectangularly disposed side wall panels, end closure means at opposite ends of said side wall panels, and a tubular inner liner sleeve extending longitudinally of said side wall panels and disposed diagonally from opposite corners between adjacent side wall panels, said inner liner sleeve including a cradle portion at one end thereof and displaceable from one side of said inner liner sleeve adjacent the lower end thereof and intersecting the plane extending diagonally through opposite corners formed by said side wall panels.

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