Jan. 4, 1966 E. J. KNAPP ETAL 3,227,357

CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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FIG. 1

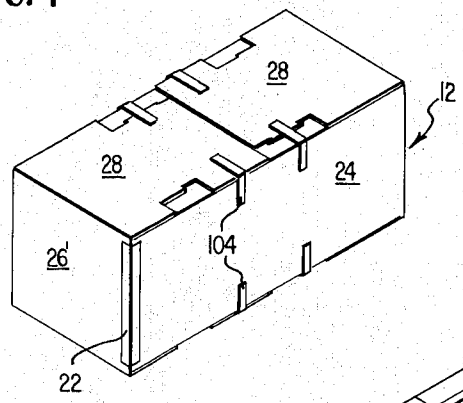


FIG. 2

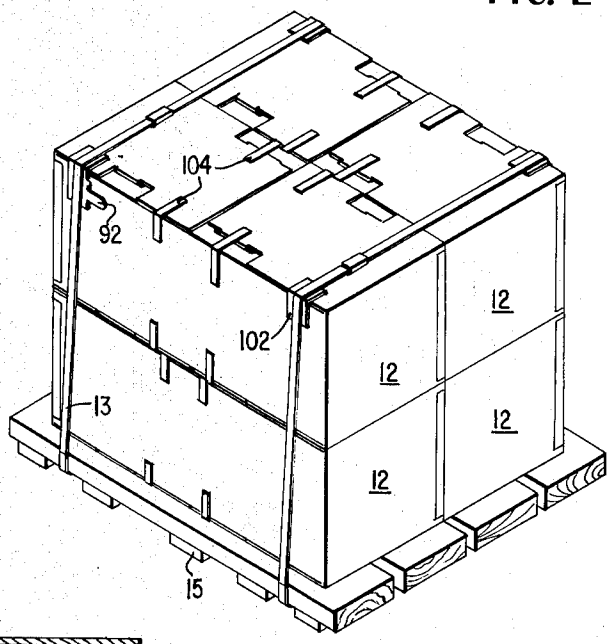
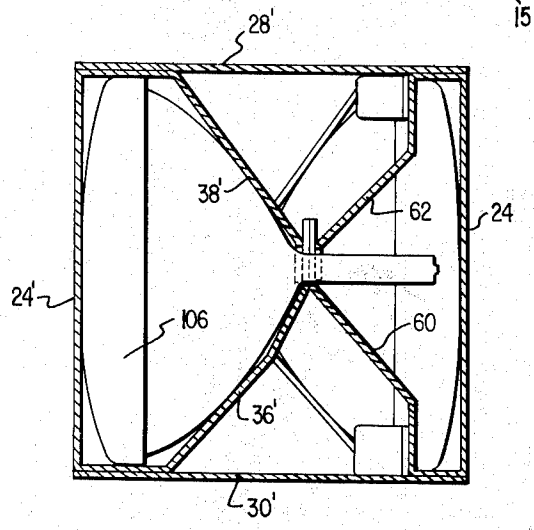


FIG. 11



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CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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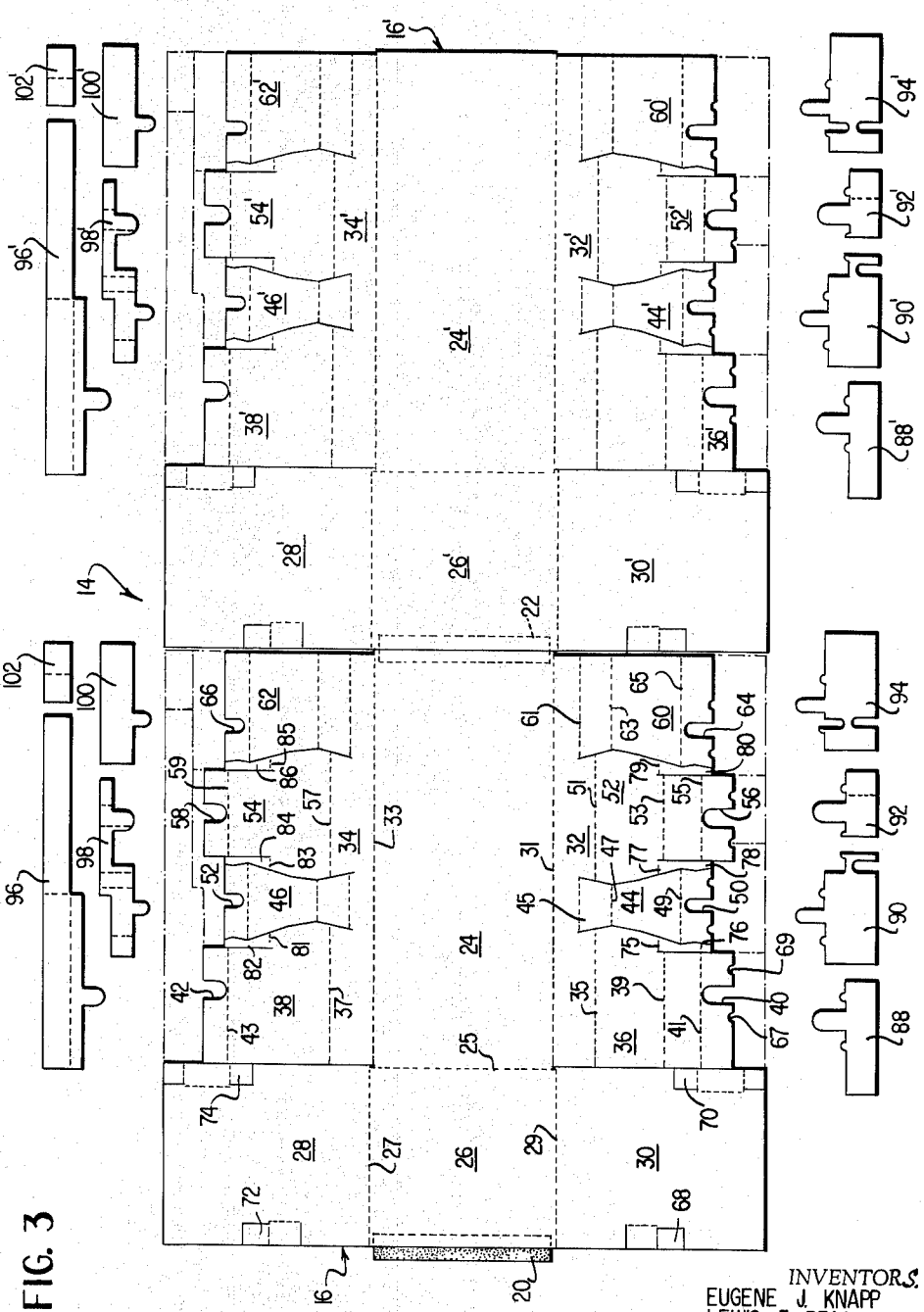


FIG. 3

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CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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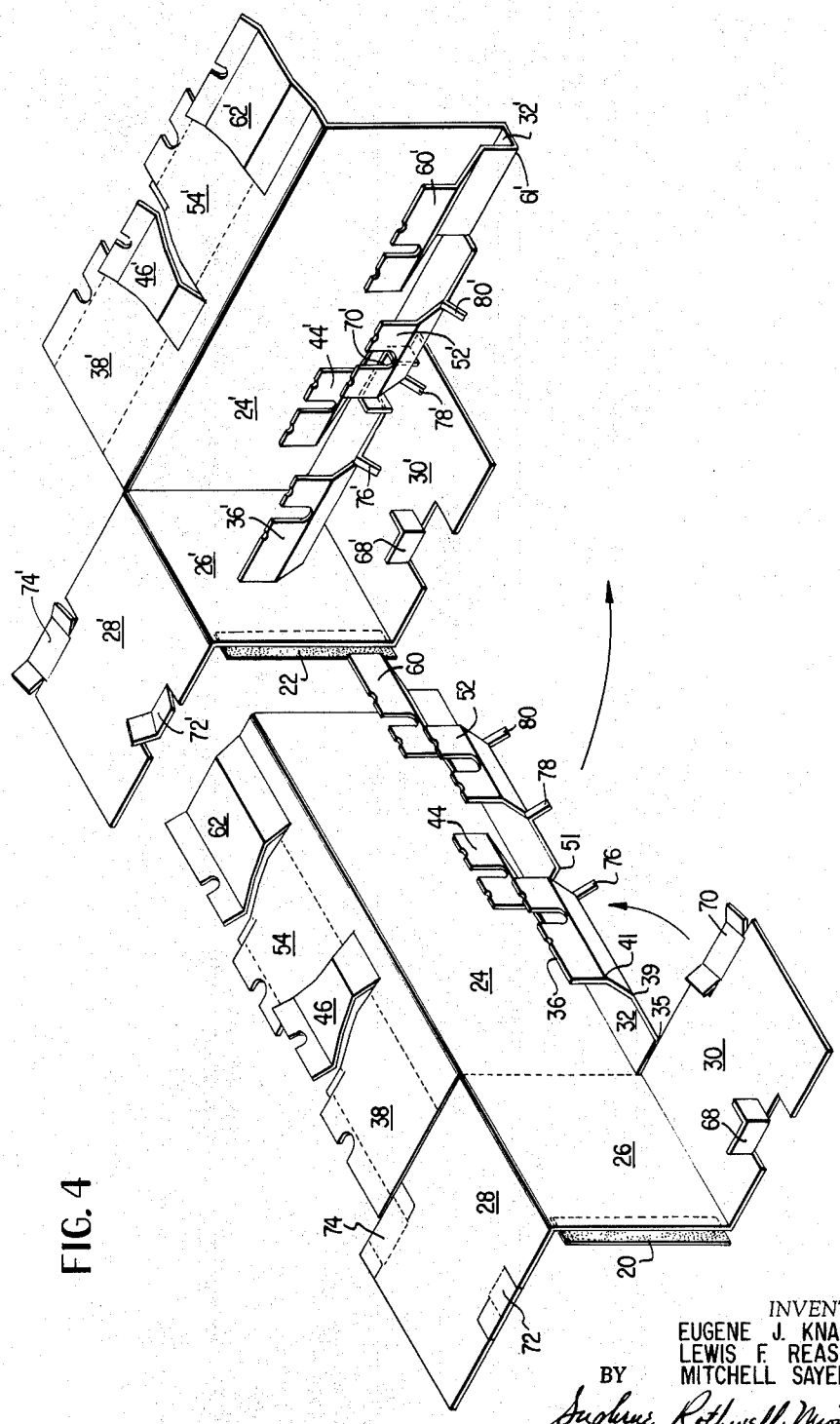


FIG. 4

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CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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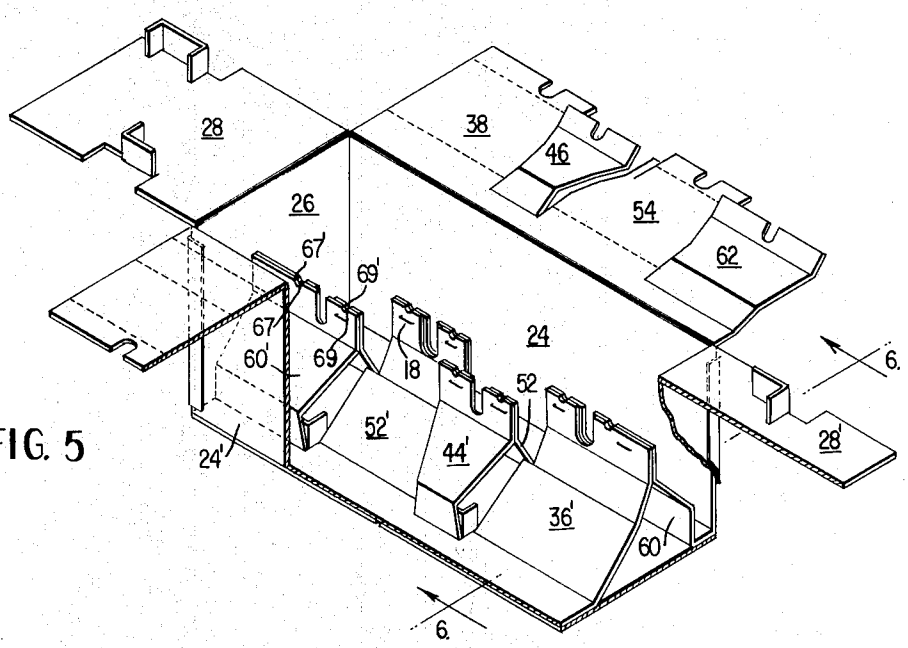


FIG. 5

FIG. 6

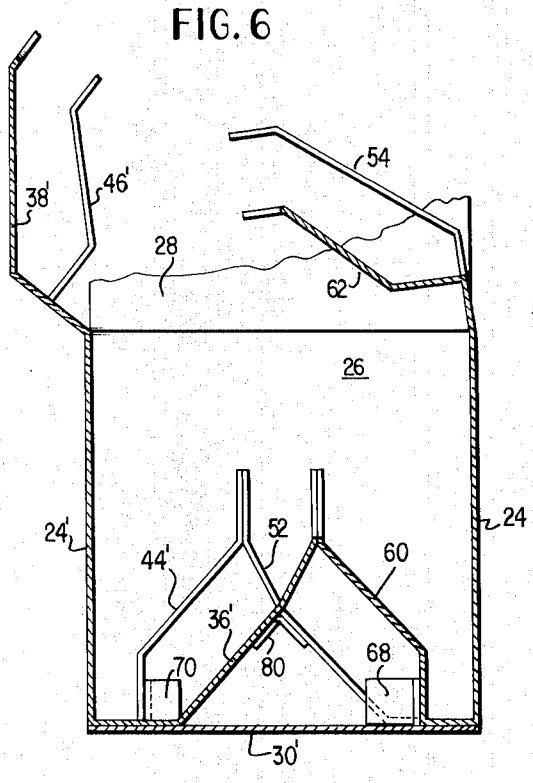
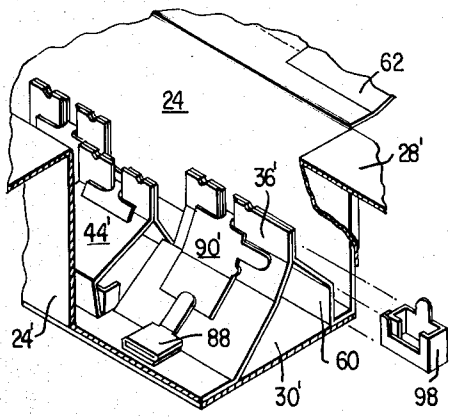


FIG. 7



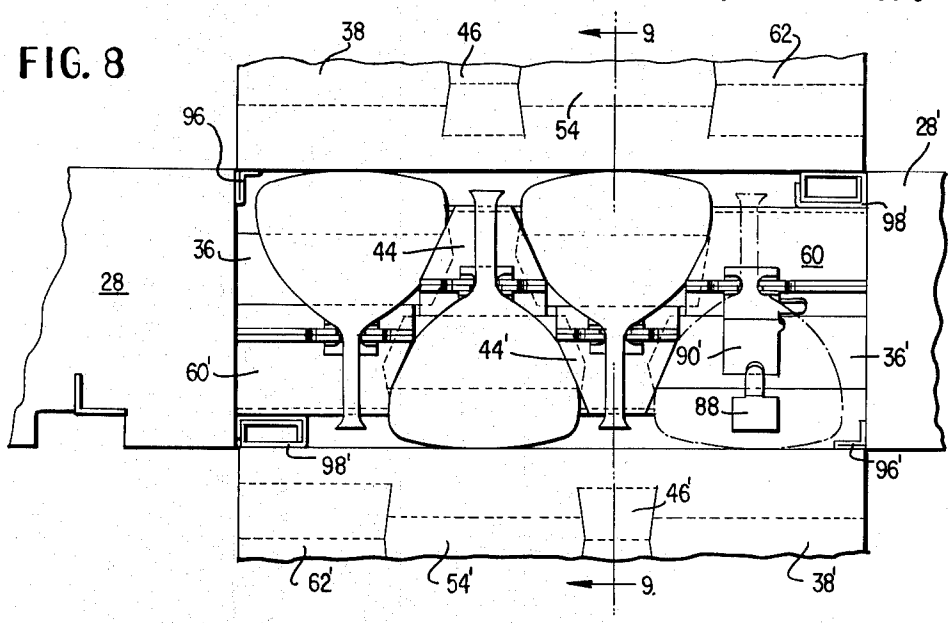
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CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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FIG. 8



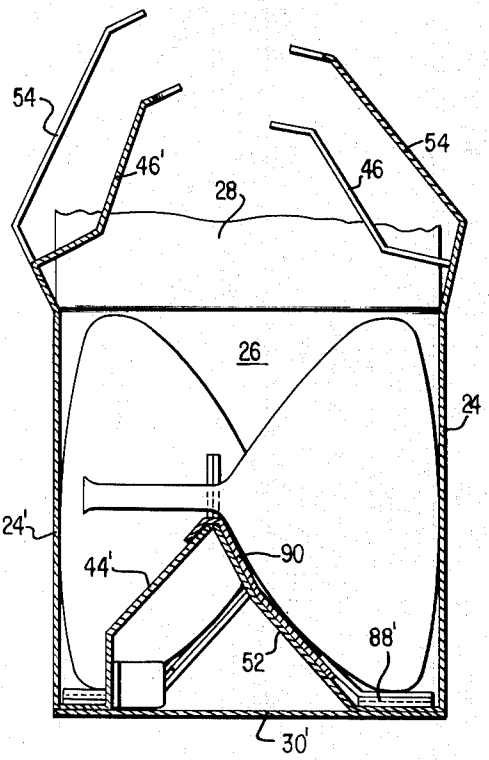
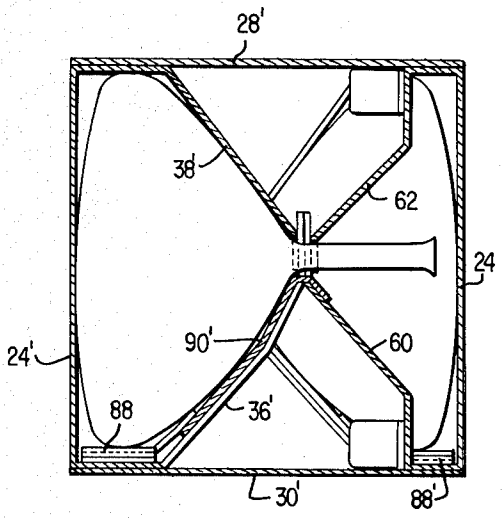


FIG. 9

FIG. 10



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3,227,357

CONTAINERS FOR TV BULBS, TUBES AND THE LIKE

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13 Claims. (Cl. 229—39)

This invention relates to improvements in the art of containers, especially those suitable for packing and shipping TV bulbs, tubes and the like.

In the known art of packing a number of TV tubes in a single package, prior containers have been relatively complex in assembly and have been built from high cost materials due primarily to the protection requirements for relatively heavy and expensive television glassware and the strength requirements for rehandling and reshipping the glassware during the processing.

Corrugated paperboard is known as an excellent material for glassware packaging not only because of its low cost but also its good cushioning qualities and the fact that it can be changed to accommodate new or revised ware configurations with relative ease in making the required tooling changes. Furthermore, corrugated paperboard can be readily obtained and is inexpensive to ship or store in the flat or knocked down state and can readily be printed upon.

Paperboard cartons for packing multiple television tubes are known in the art; however, these prior cartons are complicated, expensive and difficult to pack. They are made up of a large number of different pieces of corrugated paperboard (e.g. 26 pieces for an 8 tube carton) and some of these many pieces are frequently ruined in storing or packing, making assembly and inventory most difficult. Most of the individual pieces require folding, stapling, and have a complex interrelationship. Because of the foregoing, these individual pieces are often misassembled or left out resulting in a carton containing improperly braced and supported glassware. For different size cartons utilized for packing different numbers of tubes, improper pieces may be substituted at different times with similar results. It is therefore an object of this invention to provide a TV glassware carton made of a unique shape using significantly less material, which is easier to pack and repack due to its being a corrugated paperboard blank foldable to supply maximum support and bracing, and having a minimum number of pieces all supplied from the same blank, whereby assembling and handling are greatly simplified and material costs are drastically reduced.

Television glassware is presently packed in bulk cartons within economical shipping dimensions and then the packages of the glassware TV bulbs are shipped to tube manufacturers for finishing and the installation of cathode ray guns. The resulting finished TV tubes are then repacked in the same cartons and shipped to the television set makers where the tubes are assembled into cabinets to make finished television sets, and the packing material is discarded by the set manufacturer. It is a further object of this invention to provide a container for television tubes and the like which is adapted for use in the shipping of both glassware bulbs and the finished tubes to a television set maker, while at the same time being inexpensive enough to allow discarding of the material.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings.

FIG. 1 is a perspective view of the container of this invention in its erected and folded shape.

FIG. 2 is a perspective view showing four containers formed in accordance with this invention fitted together and strapped to a pallet to form a modular shipping unit.

FIG. 3 is a plan view of the blank of the container of this invention.

FIG. 4 is a perspective view of the container of this invention in its partially folded condition illustrating the operations of folding the blank.

FIG. 5 is a perspective view with a portion broken away, showing the container of this invention after it is partially erected and ready for loading of the television glassware.

FIG. 6 is a sectional view taken along line **6—6** of FIG. 5.

FIG. 7 is a perspective view of one end of a partially folded carton with a portion broken away for the sake of clarity, illustrating the use of certain of the filler pieces for reinforcing.

FIG. 8 is a top plan view of the carton of this invention after it has been partially folded illustrating the loading of TV glassware therein.

FIG. 9 is a sectional view taken along line **9—9** of FIG. 8.

FIG. 10 is an end sectional view showing the carton with TV bulbs loaded therein for shipment to a TV tube manufacturer.

FIG. 11 is a further sectional view somewhat similar to FIG. 10 but showing a finished TV tube and the condition of the carton in shipping the finished tube to a TV set maker, in which certain filler pieces have been discarded.

In general, this invention provides a container for TV glassware formed from a single piece blank with the optional use of certain auxiliary filler pieces which may be struck from within rectangular confines of the original blank. The container is a rectangular parallelepiped with top and bottom flaps extended in a unique configuration to brace, support, protect and position the glass TV bulbs or tubes. Maximum strength is obtained from the position of the folds and therefore the positions of the supporting flaps. Overfolding top and bottom flaps of the containers completely close the carton to prevent entry of foreign objects, and these flaps further include interlocking tuck flaps to further contribute to overall strength and rigidity. The interrelated flaps stiffen the structure and hold individual pieces of ware away from each other. Filler pieces necessary to build up extra thickness of corrugated board for cushioning are made as parts of the overall blank and are left attached to the carton blank until required for bulb packing and assembly, thereby eliminating any need for separate inventory of filler pieces. Because of its relatively large size and to facilitate fabrication, handling and assembly, a carton blank may be made from two identical blank halves which may be fastened together.

Referring now to the drawings for more detail of the structure, there is shown in FIG. 1 a completed and folded carton **12** for containing and protecting four TV bulbs or tubes. To illustrate the modular concept of this invention, four cartons **12** such as shown in FIG. 1 may be strapped by steel strapping **13** to a pallet **15** or the like for handling as a palletized load.

A blank **14** from which the corrugated container of this invention is formed is shown in detail in FIG. 3. The blank may be formed from two identical blank halves **16**, **16'** and these halves may be secured together at both ends by any suitable adhesive tape strips **20** and **22**, such as cloth, paper, or reinforced materials. Since blank **16** is identical to blank **16'**, only blank **16** will be described in detail in the blank state and identical refer-

ence numerals primed will indicate the corresponding components, fold lines, etc., of blank half **16'**.

The blank half **16** includes a relatively large rectangular side panel **24** separated by a fold line **25** from an end panel **26**. Foldable from the end panel **26** are top and bottom flaps **28** and **30** respectively, defined by fold lines **27** and **29**, respectively. Adjacent the long sides of panel **24** are panels **32** and **34** separated from panel **24** by fold lines **31** and **33**. Support flaps **36** and **38** extend outwardly from panels **32** and **34**, and are foldable therefrom along fold lines **35** and **37**. Flap **36** includes a pair of fold lines **39** and **41** and a notch **40** at its outer end. The outer edge of flap **38** includes a similar U-shaped notch **42** adapted to mate with notch **40** and a single fold line **43**.

Adjacent to flaps **36** and **38** and foldable from panels **32** and **34** are further support flaps **44** and **46**. These flaps also include U-shaped notches **50** and **52** in their outer edges. Flap **44** is foldable along fold lines **45**, **47** and **49**, which are identical to fold lines in flap **46**.

Adjacent flaps **44** and **46** are another set of ware supporting flaps **52** and **54**, flap **52** being foldable along fold line **51** and including further fold lines **53** and **55**; while top flap **54** is foldable along fold line **57** and includes a further fold line **59**. The outer edges of these flaps include U-shaped notches **56** and **58**, respectively.

End flap **60** is foldable from panel **32** along fold line **61** and includes further fold lines **63** and **65**, top end flap **62** is identical and has similar fold lines. The flaps **60** and **62** further include U-shaped notches **64** and **66**, respectively. It it noted that the bottom support flaps **36**, **44**, **52** and **60** include a pair of further U-shaped registry depressions **67** and **69** adjacent and on boths sides of U-shaped notches **40**, **50**, **56** and **64** therein.

The outer bottom flap **30** includes infolding tuck flaps **68** and **70** while the outer top flap **28** includes similar infolding tuck and interlocking flaps **72** and **74**.

Interlocking and support flaps **76**, **78**, **80**, **82**, **84** and **86** are folded from fold lines **75**, **77**, **79**, **81**, **83** and **85**, respectively, to provide support as will be explained.

As can be seen from the blank shown in FIG. 3, further components can be struck from the same generally rectangular piece of cardboard, these components are known as filler pieces and in the embodiment illustrated are filler pieces **88**, **90**, **92**, **94**, **96**, **98**, **100** and **102**. Different shaped filler pieces may be used for different configuration of the TV tubes, as they change the different filler pieces would be used differently.

The filler panels **88**, **90**, **92**, **94**, **96**, **98**, **100**, **102** illustrated are specifically for a 23" 92° LW bulb pack and could be eliminated or altered for other types of tubes. The filler pieces are cut and creased to be made into the innerpacking filler pieces during final assembly of the pack. The filler pieces are secured to the rest of the blank during fabrication and flat blank shipment by nicks or interrupted cuts. Therefore, the original rectagnular blank is shipped complete as illustrated in phantom lines of FIG. 3. The pieces are then torn from the rest of the blank during set-up or assembly of the pack, thus reducing the possibility of lost or mislaid components.

The carton in its erected position is best described by describing the assembly or set-up operations and the loading of the TV bulbs and tubes into the carton.

The carton is first squared up in a somewhat conventional manner. Referring to FIG. 4, panels **24** and **26** are folded at right angles to one another as illustrated by panels **24'** and **26'**. Similarly, panel **32** is folded at right angles to panel **24**. Bottom flap panel **30** is then folded at right angles to end panel **26** as shown in FIG. 4, and when panel **26** is folded at right angles to flap **24**, the bottom flaps **30** and **30'** will underlie flaps **32**, **32'** and provide the outside bottom of the carton. Fold lines **35**, **35'**, **45**, **45'**, **51**, **51'**, **61** and **61'** are folded as shown in FIG. 4 so that their corresponding panels extend generally upwardly. The tuck flaps **68**, **68'** and **70**, **70'** on panels **30** and **30'** are folded into the space below the base of flaps **44**, **44'** and then the bottom panels **30** and **30'** are taped in place.

The next step is folding the additional fold lines **39**, **39'**, **41**, **41'**, **47**, **47'**, **53**, **53'**, **55**, **55'**, **63**, **63'** **65** and **65'**. Matching panels **36–60'**, **44–52'**, **52–44'**, and **60–36'** are aligned face to face as shown in FIG. 5 with the edge notches **67**, **67'**, **69**, **69'**, assisting in exact alignment. The panels are then secured together by any suitable means such as foldably locking cleaned out material, or stapling them together with staples **18**.

The flaps **68–68'** and **70–70'** will cause the lower end of panels **60'–60** and **44–44'** to be generally perpendicular to panel **32**, see FIGS. 4, 5, 6 and 7. Meanwhile the corresponding matching panels **36–36'** and **52'–52** will lie at an obtuse angle to panel **32**. The alternate protruding flaps allow the glassware to be supported in staggered relation and prevent adjacent pieces of glassware from touching.

The interlocking side tabs **76**, **78**, **80**, folded from fold lines **75**, **77**, **79**, support their opposing counterparts **76'**, **78'**, **80'**.

The filler pieces **98**, **98'** are then folded into a square section and placed in opposite corners between the panel **62** and panel **24** as shown in FIGS. 6 and 7. The score lines allow panels **98**, **98'** to be so folded.

It is noted that all flaps constituting the top of the glassware support and bracing, namely flaps **38**, **38'**, **46**, **46'**, **54**, **54'**, **62** and **62'** are folded back out of the way to facilitate the remaining assembly and loading of the TV glassware. FIG. 5 shows the assembly at this stage.

The special filler pieces illustrated in FIG. 3 are for packing 23" 92° LW TV bulbs, and when the bulb is shipped from the glass manufacturer to the tube manufacturer for the insertion of the cathode ray gum, etc., the filler pieces are utilized in the following described manner.

It has already been noted above that filler pieces **98**, **98'** are folded and placed in opposite corners as shown particularly in FIG. 8. Filler pieces **88**, **88'** and **100**, **100'** are placed on the bottom panel **32**, **32'** adjacent panels **36'** **36'**, **52**, **52'**. To provide a cushioning effect for the glassware, these panels may be folded as shown in FIGS. 7, 9 and 10, or may be used in single thickness as desired. Filler pieces **90**, **90'**, **92** and **92'** are placed in the large notches at the outer end of the panels **36**, **44**, **52** and **60**, and are braced by the tongues on filler pieces **88**, **88'**, **100** and **100'**, as shown for example in FIG. 7.

The four TV bulbs to be placed in the carton may then be loaded in the carton in a staggered manner as shown in FIG. 8. The notches in the flaps which have been stapled together brace and support the neck of the bulbs while the face of each bulb rests on the cushioning filler pieces, as shown in FIGS. 9 and 10. In other words, supporting flaps **36**, **60'**, **44**, **52'**, **52**, **44'**, **60**, **36'** hold the yoke sections of the TV bulbs firmly and they support the bulb on the edge of the face by filler pieces while the panels **36**, **36'**, **52**, **52'**, lying at obtuse angles will rigidly support the back of the bulb, see FIGS. 9 and 10. Corner pads **96**, **96'** are then folded and inserted in opposite corners between the carton and the tube face sides as shown in FIG. 8. Pieces **102**, **102'**, **92** and **92'** are used as pads for steel strapping to secure four of these cartons to the wooden pallets as shown in FIG. 2.

The next step in assembly with the ware loaded in the open top carton is the folding of notched flaps **38**, **38'**, **46**, **46'**, **54**, **54'**, **62**, **62'** into position so these flaps lie between the glass tube faces in the same manner as the bottom panels. The outer ends of flaps **46**, **54'**, and **62**, **38'** are inserted over the glass neck outside the outer end of stapled flaps **44–52'** and **60–36'** as shown for example in FIGS. 10 and 11. The alternate flaps **38**, **62'** and **54–46'** are also folded over the funnels and tucked to the outside of their corresponding previously stapled flaps **36–60'**, **52–44'**. When all the flaps are in place, the outer top flaps **28**, **28'** are folded down with the tabs **72**, **72'**, **74**, **74'**, folded and inserted next to the lower end

of flaps **46**, **46'**, **62** and **62'** similar to that arrangement for the bottom of the carton.

The outer top flaps **28**, **28'** are then squared up and taped in a closed position by tape **104**, like the bottom flaps. See FIGS. 1 and 2. FIG. 2 shows two such loaded cartons stacked on each wooden pallet with two more on top, and with the pieces **92**, **92'**, **102** and **102'** used as corner pads for the strapping. This provides a pallet pack for sixteen TV bulbs or tubes. Rail car and truck dimensions dictate pallet sizes for economical shipping.

When it is desired to remove the glass TV bulbs, at the gun manufacturer's plant, unpacking is accomplished by cutting the steel strapping **13** and the top tape **104**, then opening the top flaps **28**, **28'**, and pulling up on the flaps **38**, **38'**, **46**, **46'**, **54**, **54'**, **62**, **62'** to expose the ware for removal from the carton.

After the tube manufacturer has inserted the ray gun and otherwise manufactured the glassware into a completed TV tube he may use the same carton for repacking the tubes without the use of filler pieces **98**, **98'**, **100**, **100'**, **88**, **88'**, **90**, **90'** and **94**, **94'** due to the size change caused by the addition of laminated cap **106** to the tube. Corner pads **96**, **96'** and the four strap pads **92**, **92'**, **102**, **102'** are reused in the repacking of the completed bulb as shown in FIG. 11.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

We claim:

1. A paperboard carton foldable from a blank provided from within a generally rectangular blank border to provide a container for a variety of articles such as television bulbs and tubes and the like, the carton comprising; a pair of side panels positioned opposite one another when the carton is erected, an end panel foldable from each side panel, each end panel being connected to each side panel to provide the ends of the carton when folded at right angles to the side panel, a top panel foldable from each side of each end panel at right angles thereto, a bottom panel foldable from each side of each end panel at right angles thereto, the two top and two bottom panels providing covers for the top and bottom of the carton respectively, infolding tube support panels extending inwardly from the top and bottom of opposite side panels, the tube support panels each including a plurality of separate and adjacent tube support flaps, the flaps including an edge configuration to support and a folded face to brace adjacent staggered TV bulbs and tubes.

2. A carton as defined in claim **1** further comprising separate bracing pieces provided from within the rectangular blank border, the bracing pieces being foldable to brace the corners of the folded carton.

3. A carton as defined in claim **1** further comprising infolding locking tabs on each of the top and bottom panels interlocking with the infolding tube support panels.

4. A carton as defined in claim **1** further comprising separate filler pieces provided from within the rectangular blank border and positionable between a supported TV bulb and the infolding tube support panels to further cushion and support the tubes and bulbs, and each said top panel having a length such that when folded it provides about one-half of the outer top of the carton, and each said bottom panel having a length such that when folded it provides half of the bottom of the carton.

5. A carton as defined in claim **1** further comprising strap cushion pieces provided from within a rectangular border of the blank.

6. A carton as defined in claim **1** wherein there are four infolding tube support flaps in each panel with adjacent flaps of different lengths for bracing and supporting four staggered TV tubes and bulbs.

7. A carton as defined in claim **6** wherein two of the four flaps are longer than the other two of the four flaps so that each set of two flaps supports the necks of TV tubes and bulbs positioned thereon in a staggered fashion.

8. A carton as defined in claim **1** wherein matching infolding tube support panels extending from the bottom of adjacent sides are secured together by holding means.

9. A carton as defined in claim **8** wherein the edge configuration of the support panels includes a U-shaped notch for the neck of a TV tube and bulb.

10. A carton as defined in claim **9** further comprising means defining aligning notches on the adjacent edges of the infolding panels extending from the bottom of adjacent sides.

11. A paperboard carton as defined in claim **1** made from the identical blanks each forming half of the total blank and each blank including one side panel, one end panel, one top panel, one bottom panel, and two sets of support panels, the two blanks being secured together by adhesive straps securing the end of a side panel to the end of an end panel of the other blank.

12. A carton as defined in claim **11**, further comprising interlocking flaps on at least some of the infolding tube support panels for supporting and bracing the same.

13. A paperboard carton foldable from a blank to provide a container for a variety of articles such as television bulbs and tubes and the like, the carton comprising; a pair of side panels positioned opposite one another when the carton is erected, an end panel foldable from each side panel, each end panel being connected to each side panel to provide the ends of the cartons when folded at right angles to the side panel, a top panel foldable from one edge of each end panel at right angles thereto, and having a length such that when folded each top panel provides about one-half of the outer top of the carton, a bottom panel foldable from an opposite edge of each end panel at right angles thereto and having a length such that each bottom panel provides half of the bottom of the carton, a plurality of infolding tube support panels extending inwardly from the top and bottom of opposite side panels, the tube support panels including a plurality of separate adjacent flaps, the flaps of one tube support panel cooperating with the flaps of another tube support panel of the other side panel to provide an edge configuration to support and a folded face to brace adjacent staggered TV bulbs and tubes.

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