

March 19, 1946.

V. R. PANTALONE

2,397,041

CARTON

Filed Sept. 25, 1943

3 Sheets-Sheet 1

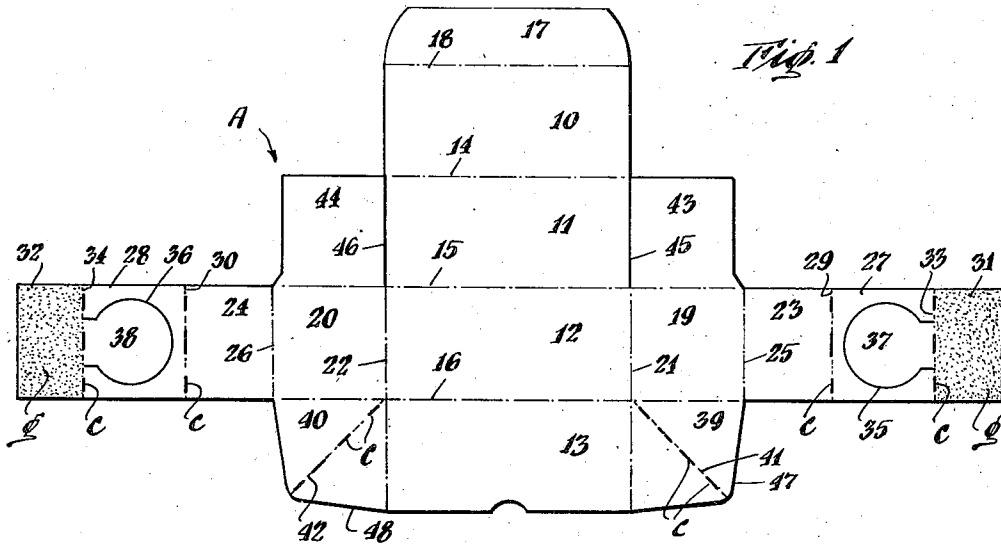


Fig. 2

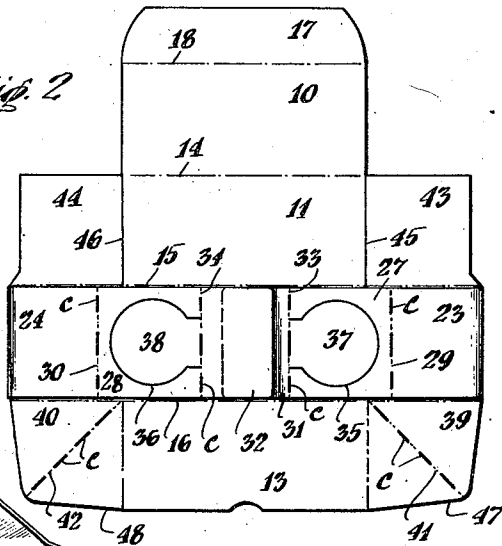
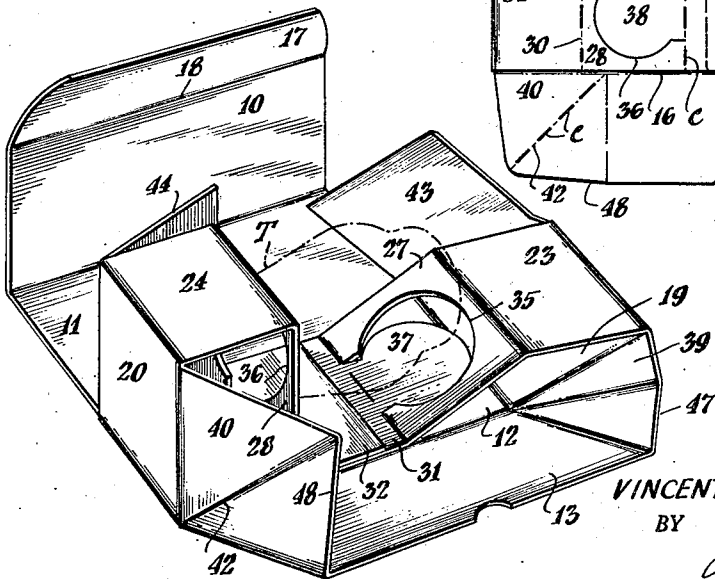


Fig. 3



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Fig. 4

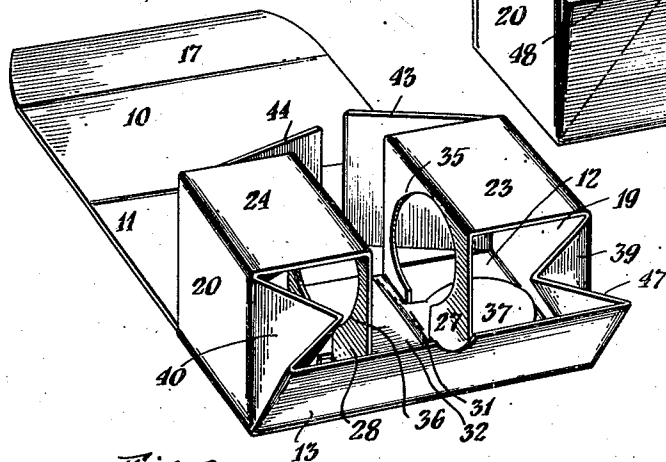


Fig. 5

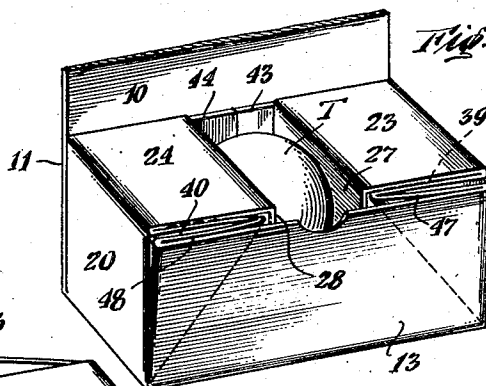


Fig. 6

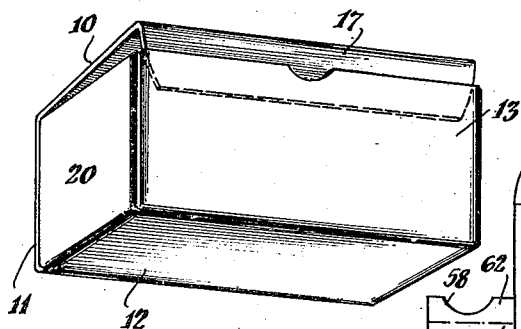
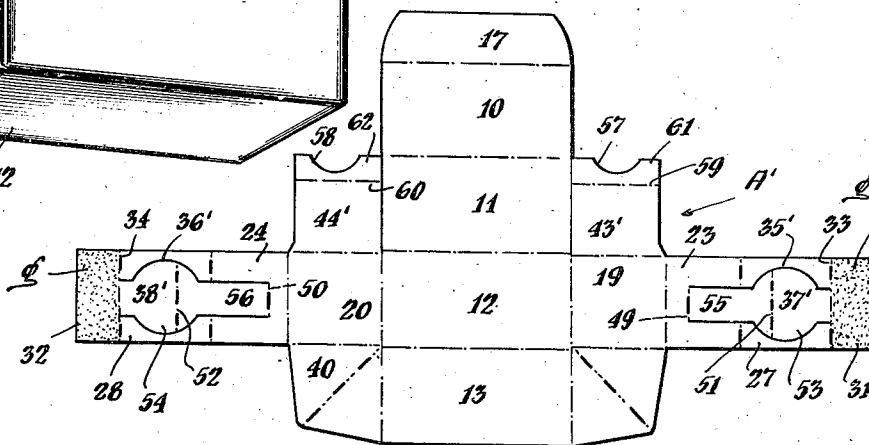


Fig. 7



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Fig. 8

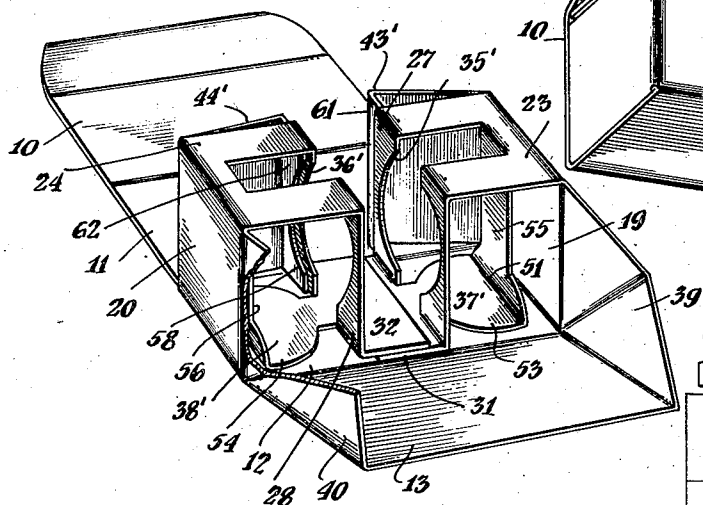


Fig. 11

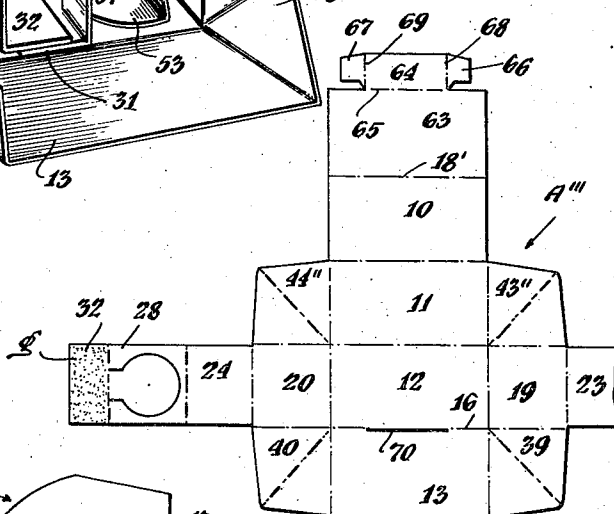
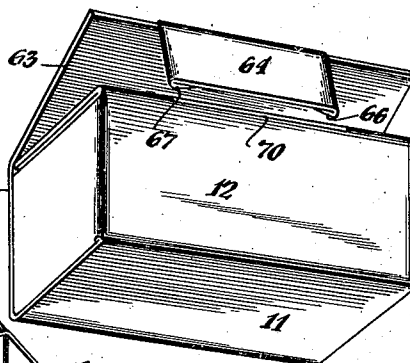


Fig. 9

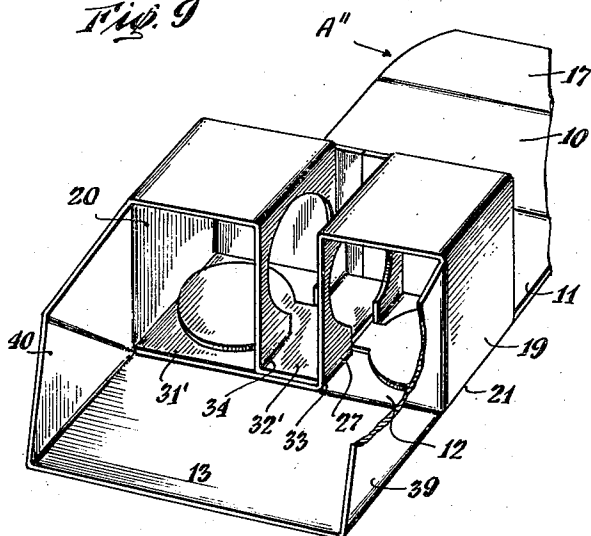


Fig. 10

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2,397,041

CARTON

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Application September 25, 1943, Serial No. 503,751

10 Claims. (Cl. 229—6)

This invention relates to receptacles for the packaging of fragile articles such as radio tubes, electric light bulbs, and the like.

It provides a collapsible container or carton made from paperboard, or other suitable foldable material, the carton being of rigid and durable construction to provide efficient protection of the fragile contents against damage in transport, storage and handling.

The carton, according to this invention, is so constructed as to permit prefabrication of a carton blank on conventional machinery into a collapsed flat shell which requires little space for storage and shipment and which may easily be set up without the aid of machinery or tools when needed for the packaging of tubes, light bulbs, or similar articles.

A structural feature of cartons according to this invention resides in the collapsible and erectable elements of the carton which operate to grasp the tube or light bulb while the carton is being erected. After erection the tube or bulb is held firmly in a position out of contact with the outside walls of the carton.

In the construction of a preferred form of carton according to this invention bracing elements are provided which maintain the collapsible elements of the carton in their erected position and which automatically move into their proper bracing position while the carton is being set up.

These and various other features, objects and advantages of the invention will appear more fully from the detailed description which follows accompanied by drawings showing for the purpose of illustration preferred embodiments of the invention.

The invention also consists in certain new and original features of construction and combination of parts hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a plan view of the inside face of a blank from which the improved carton may be formed;

Fig. 2 is a plan view of a prefabricated collapsed blank ready to be expanded into a carton;

Fig. 3 is a perspective view of the carton in the

process of being set up from the blank shown in Fig. 2;

Fig. 4 is a perspective view of the carton at a further advanced stage of assembly;

Fig. 5 is a perspective view of the expanded and filled carton before closure;

Fig. 6 is a perspective view of the closed carton;

Fig. 7 is a plan view of the inside face of a modified form of blank from which a carton may be formed;

Fig. 8 is a perspective view of the blank shown in Fig. 7 in erected and and semi-assembled condition;

Fig. 9 is a perspective view of another form of blank requiring no gluing operations, the blank being shown in expanded and semi-assembled condition;

Fig. 10 is a plan view of the inside face of another form of blank which may be assembled into a pilfer-proof carton; and

Fig. 11 is a perspective view of the blank shown in Fig. 10 after erection into a carton, the carton being about to be closed by insertion of a pilfer-proof locking tab assembly.

Similar reference characters refer to similar parts throughout the several views of the drawings.

The blank A, shown in Fig. 1, may be cut and scored from a large sheet or roll of paperboard or other suitable material on an automatic cutting and scoring machine. Only one side of the blank need be finished or imprinted since only one surface of the blank is presented as the outside face of the assembled carton.

The blank A comprises wall sections or panels 10, 11, 12 and 13, hingedly connected with one another along score lines 14, 15 and 16. For convenience of description the sections or panels 10 and 13 are called terminal wall sections, and the sections 11 and 12 lying therebetween will be called intermediate wall sections. A closure flap 17 is hinged to the terminal wall section 10 along a score line 18.

End wall sections or panels 19 and 20 are hingedly connected to opposite ends of the intermediate wall section 12 along score lines 21 and 22.

Spacing sections or elements 23 and 24 are hingedly connected to the end wall sections 19 and 20 along score lines 25 and 26 and form extensions of the respective end wall sections.

Supporting panels 27 and 28 form extensions of the respective spacing elements 23 and 24 and are hingedly connected thereto along score lines 29 and 30.

Securing tabs 31 and 32 form extensions of

the respective supporting panels 27 and 28 and are hingedly connected thereto along score lines 33 and 34.

The central portion of each of the supporting panels is separated from the remaining portion of the panel by cut lines 35 and 36 so as to form hinged center flaps 37 and 38.

Bellows fold sections 39 and 40 are hingedly connected to the end wall sections 19 and 20 along the score line 16 and to the wall section 13 along the score lines 21 and 22. The bellows fold sections have crease lines 41 and 42 which are preferably scored and in addition partially cut at C to facilitate the folding of the bellows fold along the crease lines.

Partially cut score lines may also be employed at either side of the supporting panels 27 and 28 at 33, 29 and 30, 34 respectively to facilitate the assembly of the carton.

Fold-in flaps 43 and 44 are hingedly connected to the end wall sections 19 and 20 along the score line 15 and are severed from the adjoining wall section 11 by cuts 45 and 46 respectively.

The container-forming blank A, shown in Fig. 1, may be assembled into a collapsed container on an automatic strip gluing and folding machine of standard design. This machine operates to apply a strip of adhesive to the inside face of the securing tabs 31 and 32 as indicated by g and thereafter folds the blank about the score lines 25 and 26 so that the securing tabs 31 and 32 become adhesively secured relative to the intermediate wall panels 12 which they overlie.

At the end of the folding and gluing operation the blank has the form shown in Fig. 2 and constitutes a collapsed carton which may be stacked and shipped in collapsed, flat condition requiring only a minimum of space. The collapsed carton may be expanded without the aid of mechanical means for the insertion of a radio tube or bulb into the carton as will now be described.

The carton may be erected by moving the end wall sections 19 and 20 into a position at right angles to the intermediate wall section 12 to which they are hinged. This may be done by hand or by automatic machinery if large quantities of tubes or bulbs are being packaged.

As shown in Fig. 3, the erection of the end panel 20 causes a simultaneous erection of the supporting panel 28 connected to the end panel by the spacing element or section 24. The same operation causes a folding of the bellows fold section 40 about the score line 22 into the position shown in Fig. 3.

Simultaneous with the erection of the structure comprising the supporting panel 28, the spacing section 24 and the end wall section 20, or thereafter, the folding flap 44 is folded about the score line 15 into the position shown in Fig. 3. A bulb or tube T may then be inserted into the aperture provided by the cut line 36, the diameter of the aperture being such that the tube or bulb is firmly held, and the dimensions of the panel being preferably such that there is sufficient clearance between the tube or bulb and the enclosing wall panels.

The structure comprising the opposite end wall section 19, the spacing section 23 and the supporting panel 27 is then erected in a similar manner causing the supporting panel 27 to move into supporting engagement with the other end of the bulb or tube as is clearly apparent from Fig. 3.

During further erection of the carton, while the terminal wall section 13 is being raised to a position at right angles with respect to the wall

section 12, the bellows fold sections 39 and 40 are simultaneously folded about their crease lines 41 and 42, as is apparent from Fig. 4, which shows the carton in semi-erected condition but without contents for the sake of clearness. The insertion of a tube or bulb causes the center flaps 37 and 38 to lie upon the wall section 12 in the hollow space formed by the erected end structures of the carton.

As the assembly continues the wall section 11 is folded about the score line 15 into a position also at right angles with respect to the wall section 12 and parallel to the ultimate vertical position of wall section 13.

The folding up of wall section 13 to its ultimate vertical position automatically completes the in-folding of the bellows fold sections about their crease lines 41 and 42 and causes the outer edges 47 and 48 of the bellows fold members to engage the underside of the spacing sections 23 and 24, thus bracing the erected structure against collapsing, a feature which results in considerable rigidity of the assembled carton. Fig. 5 shows the position of the outer edges 47 and 48 of the bellows fold members immediately before the wall section 13 reaches its final vertical position at right angles to the wall section 12 which structurally forms the bottom of the carton.

As shown in Fig. 5, the bellows fold sections 39 and 40, together with the terminal wall section 13, also form a convenient pocket into which the closure flap 17 may be inserted in order to retain the carton in closed position, as indicated in Fig. 6.

A modified form of blank A' is shown in Fig. 7. It comprises wall sections 10, 11, 12 and 13, end wall sections 19 and 20, connecting or spacing sections 23 and 24, supporting panels 27 and 28, and securing tabs 31 and 32. Bellows fold sections 39 and 40 are hingedly connected to the end wall sections 19, 20 and the wall section 13 respectively.

The cut lines 35' and 36' circumscribing the central portions of the supporting panels are of such outline as to result in double-hinged center flaps 37' and 38', hinged with one end at the score lines 33 and 34 and with the other end at score lines 49 and 50. Crease lines 51 and 52 extend across the face of the center flaps dividing the flaps into base portions 53 and 54 and cushioning panel portions 55 and 56.

The fold-in flaps 43' and 44' are provided with cutout portions 57 and 58 and score lines 59 and 60 permitting the end portions 51 and 52 of the fold-in flaps to be folded in and tucked under the supporting panels 27 and 28 as appears from Fig. 8. In the erected carton the cushioning panel portions 55 and 56 formed by the doubled hinged center flaps form a wall intermediate the supporting panels 27 and 28 and the end wall panels 19 and 20. The cushioning portion prevents an inserted bulb or tube from coming into contact with the end wall panels and constitutes an additional safety feature of the carton.

In Fig. 9 a carton is shown made from a blank A' requiring no gluing operations. The blank corresponds to the blank A shown in Fig. 1 except for the dimensions of the end tabs 31' and 32'. The end tab 31' lies in contact with the wall section 12 and abuts with its outer edge the end wall section 20 at the score line 22. The end tab 32' overlies the end tab 31' and abuts the supporting panel 27 at the score

line 33. For the purpose of added rigidity the carton is so dimensioned that the ends of the center flaps 37 and 38 abut the end wall sections 19 and 20 at the score lines 21 and 22 respectively, the score lines 33 and 34 being interrupted so as to provide no hinges for the center flaps and causing the center flaps to remain in the same plane with the end tabs 31' and 32'.

A pilfer-proof carton and a blank therefor are shown in Figs. 10 and 11. The blank A''' corresponds in all major points to the blank A, shown in Fig. 1, except for the provision of a second pair of bellows fold sections 43'' and 44'' and the provision of an additional wall section or panel 63 hingedly connected to the wall section 10 along a score line 18'. A locking tab 64 is hingedly connected to the wall section 63 along a score line 65 and includes locking ears 66 and 67 hingedly connected to the body portion of the locking tab 64 along score lines 68 and 69. The score line 16 of the blank includes a cut 70 permitting insertion of the locking tab after filling of the carton.

The filled carton about to be closed and locked is shown in Fig. 11. The closing is accomplished by bending locking ears 66 and 67 into contact with the body portion of the locking tab 64 and insertion of the tab in this prefolded condition through the slit formed by the cut 70. After insertion the locking ears return to their original position and extend beyond the length of the slit 70 thus locking the carton which cannot be opened without destruction of the locking tabs.

The illustrated forms of cartons and blanks provide rigid and inexpensive receptacles for fragile articles such as radio tubes, light bulbs or the like. They possess considerable resistance to deformation and efficiently protect the contents against breakage.

An outstanding feature is the preparation and prefabrication of the carton blanks by the carton manufacturer into collapsed shell form for shipment to the tube or bulb manufacturer. The collapsed cartons require only a minimum of space for shipping and storage and may be erected and filled either manually or mechanically in a minimum of time.

While certain novel features of the invention have been disclosed in the foregoing description and are pointed out in the annexed claims it will be understood that various omissions, substitutions or changes may be made without departing from the spirit and the teachings of this invention.

What is claimed is:

1. A carton formed from a single blank of paperboard material including side wall sections connected together to provide a generally tubular construction; a pair of end sections hingedly connected to opposite ends of one wall section; a spacing member hingedly connected to each of said end sections; and a supporting section hingedly connected to each of said spacing members; a securing tab hingedly connected to each of said supporting sections and secured relatively to said wall section, the center portion of each of said supporting members being separated from the remaining portion by a cut so as to form a double-hinged center flap hinged to said supporting section and to said securing tab respectively, the center flap forming a cushioning member intermediate said supporting section and said end wall section.

2. A carton blank comprising a plurality of side

5 wall sections hingedly connected together; a pair of end wall sections hingedly connected to opposite ends of a side wall section; a spacing section hingedly connected to and forming an extension of each of said end wall sections; a supporting section hingedly connected to and forming an extension of each spacing section; and a securing tab hingedly connected to and forming an extension of each of said supporting sections, the center portion of each of said supporting members being separated from the remaining portion by a cut so as to form a double-hinged center flap hinged to said supporting section and to said securing tab, respectively.

3. A prefabricated carton blank ready for erection to form a carton, said blank comprising at least four side wall sections hingedly connected together; a pair of end wall sections hingedly connected to opposite ends of a side wall section; a spacing section hingedly connected to and forming an extension of each of said end wall sections; a supporting section hingedly connected to and forming an extension of each of said spacing sections; a securing tab hingedly connected to and forming an extension of each of said supporting sections and secured relatively to said side wall sections, the center portion of each of said supporting members being separated from the remaining portion by a cut so as to form a double-hinged center flap hinged to said supporting section and to said securing tab, respectively, said spacing sections, supporting sections and securing tabs forming two erectable and collapsible tubular structures in which said center portion forms a cushioning member intermediate said supporting section and end wall section; and a pair of bellows fold sections, each bellows fold section being hingedly secured to one of said end wall sections and to another side wall section, respectively.

4. A carton formed from a single blank of paperboard material including side wall sections connected together to provide a generally tubular construction; a pair of end sections hingedly connected to opposite ends of one wall section; a spacing member hingedly connected to each of said end sections; an inner supporting section hingedly connected to each of said spacing members; a securing tab hingedly connected to each of said supporting sections and secured relatively to said one wall section, said end sections, spacing members, and supporting sections forming erectable and collapsible structures adapted to support the ends of an article; and a pair of bellows fold sections hingedly connected to opposite ends of another wall section and to said end sections respectively, said bellows fold members having free edges so shaped as to fit underneath, and support, the erected spacing members, said bellows fold members bracing said erected structures endwise against collapsing.

5. A carton formed from a single blank of paperboard material comprising a plurality of side wall sections including intermediate and terminal sections hingedly connected together to provide a generally tubular construction; a pair of end sections hingedly connected to opposite ends of one intermediate wall section; a spacing member hingedly connected to each of said end sections; a supporting section hingedly connected to each of said spacing members; a securing tab hingedly connected to each of said supporting sections and secured relatively to said one intermediate wall section; said end sections, spacing members and supporting sections forming an

erectable and collapsible structure; a pair of bellows fold sections hingedly connected to opposite ends of a terminal wall section and to said end sections, respectively, said bellows fold sections being foldable against the side of said erected end sections, spacing members and supporting sections to brace the erected structure endwise against collapsing; and a tuck in closure flap hingedly connected to the other terminal wall section, the tuck flap being insertable between the folded bellows sections and the one terminal wall section respectively to hold said other terminal wall section in carton closed position and brace said one terminal wall against downfolding.

6. A pre-glued carton blank ready to be set up into a rigid hollow carton comprising a plurality of side wall sections hingedly connected together, a pair of end wall sections hingedly connected to opposite ends of one side wall section; a spacing section hingedly connected to and forming an extension of each of said end wall sections; a supporting section hingedly connected to and forming an extension of each spacing section, said supporting section having an aperture adapted to receive an article; a securing tab hingedly connected to and forming an extension of each of said supporting sections; said securing section being attached to said one side wall section, said end wall sections, spacing sections, and supporting sections forming erectable and collapsible structures; a pair of bellows fold sections, each bellows fold section being hingedly secured to one of said end wall sections and another side wall section, respectively to brace said structures when erected, against collapsing, and a tuck flap hingedly connected to one of said side wall sections, said tuck flap being insertable between the side wall section to which the bellows sections are hinged and the folded bellows sections.

7. A pre-glued carton blank ready to be set up into a rigid hollow carton comprising a plurality of side wall sections hingedly connected together, a pair of end wall sections hingedly connected to opposite ends of one side wall section; a spacing section hingedly connected to and forming an extension of each of said end wall sections; a supporting section hingedly connected to and forming an extension of each spacing section, said supporting section having an aperture adapted to receive an article; a securing tab hingedly connected to and forming an extension of each of said supporting sections, said securing tab being attached to said one side wall section, said end wall sections, spacing sections, and supporting sections forming expansible and collapsible structures adapted to support an article inserted between said supporting sections; a side tab hingedly secured to each of said end wall sections; and a pair of bellows fold sections, each bellows fold section being hingedly secured to one of said end wall sections and the side wall section adjacent said one side wall section, respectively, said bellows sections bracing in folded condition said erected structures end-wise against collapsing.

8. A prefabricated carton blank ready for setting up to form a carton, said blank comprising at least four side wall sections including terminal and intermediate sections hingedly connected to-

gether; a pair of end wall sections hingedly connected to opposite ends of an intermediate side wall section; a spacing section hingedly connected to and forming an extension of each of said end wall sections; a supporting section hingedly connected to and forming an extension of each of said spacing sections, said supporting sections having an aperture adapted to receive an article; a securing tab hingedly connected to and forming an extension of each of said supporting sections said securing section being secured relatively to said intermediate side wall section, said spacing sections, supporting sections and securing tabs forming two erectable and collapsible tubular structures; a pair of bellows fold sections, each bellows fold section hingedly secured to one of said end wall sections and to a terminal side wall section, respectively; and a tuck flap hingedly connected to the other terminal side wall section, said tuck flap being insertable between said one terminal side wall section and said bellows section when folded, thereby securing said other terminal side wall section in place, said bellows sections bracing said tubular structures end-wise against collapsing.

9. A container comprising, side walls, two end walls hinged to opposite ends of one of said side walls; a spacing member constituting a hinged extension of each of said end walls; a supporting member constituting a hinged extension of each of said spacing members; and a securing member constituting a hinged extension of each of said supporting members, said securing members being secured relatively to said one end wall, said end walls, spacing, and supporting members forming an erectable and collapsible tubular structure, said supporting members having apertures adapted to receive an article placed in the erected container; and a pair of substantially square bellows fold members hingedly connected with two edges meeting at a common corner to opposite ends of a side wall adjacent said one side wall and to said end walls, respectively, the remaining two edges of said bellows fold members being so shaped as to fit and engage the underside of said spacing members when folded to maintain the tubular structure in the erected position.

10. In a collapsible carton the combination of two major panels hingedly connected along a longitudinal score line; four minor panels hingedly connected along lateral score lines with one another and with one of said major panels so as to form an erectable and collapsible sleeve structure therewith, the last minor panel being attached to said one major panel, said longitudinal score line being substantially at right angles to said lateral score lines; and a substantially square bellows fold member hingedly connected along two edges meeting at a common corner with the other major panel and with one minor panel, the two free edges of said bellows fold member being so shaped as to engage the underside of one of said minor panels to maintain said structure in an erected position with the last named minor panel parallel to said one major panel.

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