

# United States Patent

Struble

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[54] **SHIPPING CARTON FOR FRAGILE ARTICLES AND BLANK FOR PRODUCING THE SAME**

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[73] Assignee: Diamond International Corporation, New York, N.Y.

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**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 881,996, Dec. 4, 1969, abandoned.

[52] U.S. Cl. .... 229/39 B, 206/46 FR

[51] Int. Cl. .... B65d 5/10

[58] Field of Search .... 206/45.19, 46 FR; 229/39 R, 229/39 B

[56] **References Cited**

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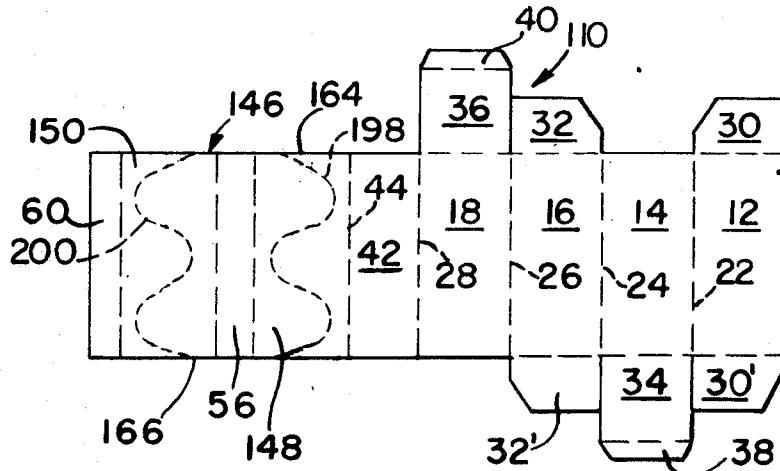
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[57] **ABSTRACT**

This disclosure relates to improvements in tubular cartons and blanks for accommodating and protecting different sized fragile articles in which a one-piece blank is cut, scored and assembled to provide a rectangular sleeve incorporating therein longitudinally extending generally parallel cushioning walls having formed therein weakened or perforated rupture sections which are progressively severed as an article is inserted in the sleeve to conform and protectively accommodate the article.

**3 Claims, 8 Drawing Figures**



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FIG. 1.

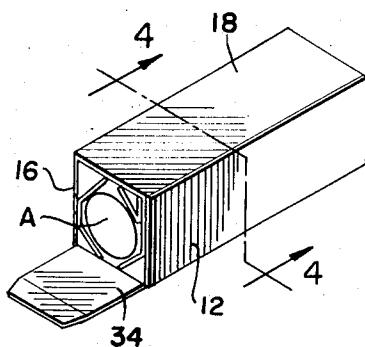


FIG. 2.

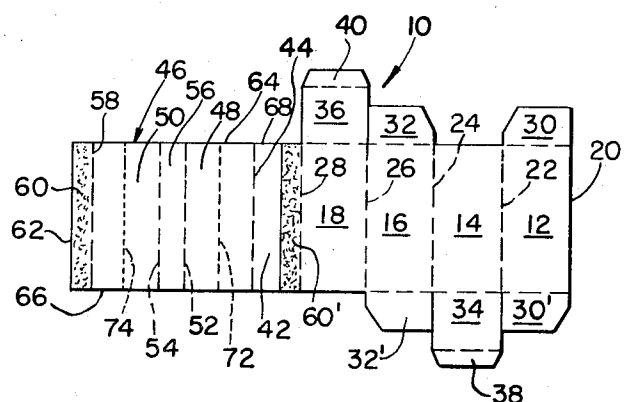


FIG. 3.

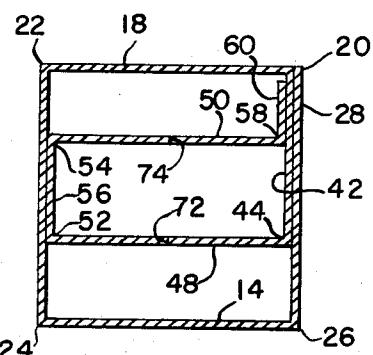


FIG. 2a.

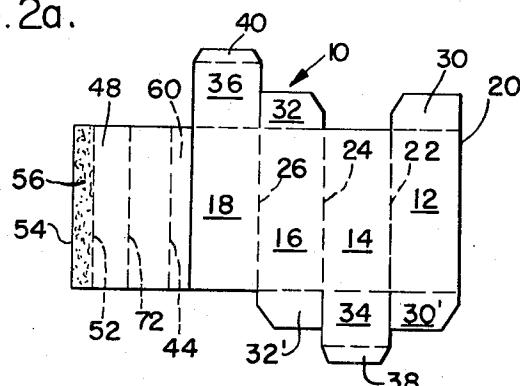


FIG. 4.

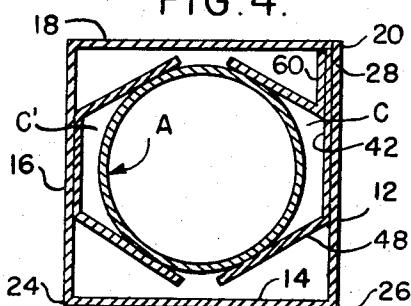


FIG. 2.b.

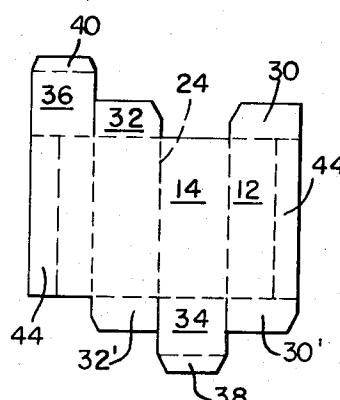


FIG. 2.c.

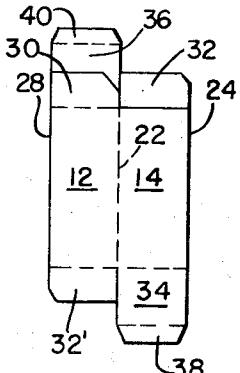
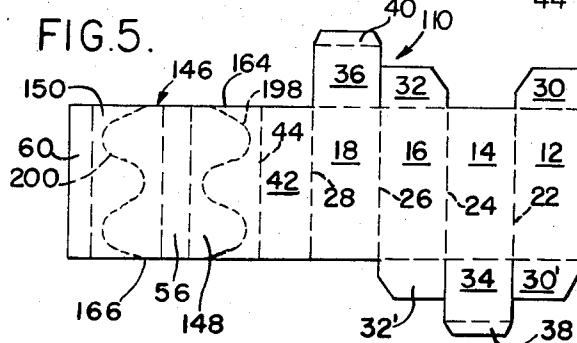


FIG. 5.



## SHIPPING CARTON FOR FRAGILE ARTICLES AND BLANK FOR PRODUCING THE SAME

This is a continuation-in-part of application Ser. No. 881,996, filed Dec. 4, 1969, now abandoned.

Tubular cartons for packaging fragile articles are continually being developed. In the art of vacuum tubes, transistors, etc., and particularly where many components are miniaturized, tolerances are rigidly controlled and thus such components must be protectively packaged against any type of shock which will disturb the designed construction.

Primary objects of the present invention are to provide a novel blank and carton in which a tubular sleeve incorporates therein novel cushioning portions, and more particularly in which interior walls are provided with rupture sections permitting a fragile article to be readily inserted in the carton and providing portions which accommodate to the configuration of the article and protectively support it against shock, mechanical damage and the like.

These, together with other and more specific objects and advantages of the invention, will become apparent from a consideration of the following description of an exemplary embodiment when taken in conjunction with the drawing forming a part hereof, wherein:

### IN THE DRAWING

FIG. 1 is a perspective view of a tubular sleeve carton incorporating the invention having a fragile article package therein;

FIG. 2 is a reduced scale plan view of a blank from which one embodiment of the carton or tubular packaging sleeve is produced;

FIG. 2a is a view similar to FIG. 2 showing a first step of assembling the blank of FIG. 2;

FIG. 2b is a view similar to FIG. 2a showing the next step of assembly in the blank of FIG. 2;

FIG. 2c is a view similar to FIG. 2b showing the blank of FIG. 2 in its assembled, folded-flat condition prior to being erected to the condition illustrated in FIGS. 1 and 3;

FIG. 3 is an enlarged sectional view of a carton assembled from the blank of FIG. 2 (similar to FIG. 4) without a fragile article inserted therein;

FIG. 4 is a sectional view taken on the plane of line 4-4 of FIG. 1; and

FIG. 5 is a reduced-scale plan view similar to FIG. 2 and showing an alternate embodiment.

Referring to the drawings in detail, and first considering FIG. 2, a one-piece blank 10 is produced from any suitable material such as paperboard, plastic laminates, etc. The blank 10 comprises four rectangular outer wall panels 12, 14, 16 and 18, in which panel 12 includes a free outer margin 20 parallel to hinge lines 22-28 hingedly connecting the adjacent panels to each other as is conventional. The transverse margins of the panels conveniently include cover flaps 30, 30' and 32, 32' at opposite ends of outer wall panels 12 and 16, respectively, and alternate side wall panels 14 and 18 respectively include closure panels or cover flaps 34 and 36, respectively, each of which includes a foldable tuck flap 38 and 40, respectively.

Hingedly connected to the fold line 28 is a glue flap 42 having hingedly connected to its side margin 44 a cushioning panel array indicated generally at 46. The cushioning panel array comprises, from the fold line

44, a pair of cushioning panels 48 and 50 hingedly connected by mutually parallel fold lines 52 and 54 to a spacing panel 56. The outer margin of the cushioning panel 50 has hingedly connected to a marginal fold line 58 a securing or spacing panel 60. The outer margin of the spacing or securing panel 60 is defined by free edge 62, and the upper and lower margins of the cushioning panel array 46, as indicated at 64 and 66, are colinear with the upper and lower margins 68 and 70 of the glue flap 42, as well as with the upper and lower margins of the outer wall panels 12-18, defined either by free margins or by fold lines.

Extending vertically between the upper and lower margins 64 and 66 of the cushioning panels 48 and 50, and bisecting these panels, are rupturable tear-lines 72 and 74, respectively.

Assembly of blank 10 is as follows:

Referring to FIG. 2, adhesive is applied to the exposed surface of flap 60, and flap 60, together with cushioning panel 50 and spacing panel 56, are folded at fold line 52 so that panel 60 will adhere to area 60' with edge 62 bordering and immediately adjacent fold line 28; see FIG. 2a. A suitable mastic or glue is then applied to the exposed surface of connecting panel 56; see FIG. 2a, and the earlier-folded cushioning panel array 46, as indicated at 46', is folded on the fold line 28 to the position shown in FIG. 2b wherein panel 56 adheres to area 56' as shown by phantom lines on FIG. 2a.

With the panels thus assembled, and without further description, a cushioning sleeve as indicated in FIG. 3 will be automatically erected when the rectangular outer sleeve is erected, i.e., when wall panels 14 and 18 are oriented into spaced parallel relation as seen in FIG. 3.

Next, as seen in FIG. 2b, adhesive is applied to the glue flap 44, as indicated by the shading, and will adhere to area 44' when panels 12 and 14 are simultaneously folded on fold line 24 to overlie panels 16 and 18, respectively. When this is accomplished, the blank of FIG. 2 will be assembled in the condition illustrated in FIG. 2c and will remain in a folded flat storable or shipping condition until it is to be erected to the condition shown in FIG. 3.

Erection of the assembled blank is accomplished by applying pressure at opposite fold lines 24 and 28 in the manner indicated by the direction arrows indicated on FIG. 2c, resulting in the tubular protective sleeve carton being assembled to the condition shown in FIG. 3 with the inner severable sleeve panels 48 and 50 being in spaced relation ready to receive a longitudinally inserted article A.

The article A (see FIG. 4) has a diameter or maximum dimension less than the distance between outer wall panels 12 and 16; and in this exemplary embodiment, for purposes of convenience, the article is indicated as having a circular cross-section, being a radio tube, for example. As the article A is inserted between the panels 48 and 50, the lines 72 and 74 are ruptured or severed thus providing essentially V-shaped opposed cushioning channels C and C' which suspend and maintain the article A away from the inner surfaces of walls 12-18.

Applicant has provided a one-piece shipper sleeve for fragile articles in which a one-piece blank provides

through fold and score lines an outer packing sleeve and an inner protecting sleeve. Shocks on the outer surfaces of the outer wall panels 12-18 will be absorbed by the inner wall panel segments forming the channel C, C' and direct lateral shock will not subject the article A to damage.

For purposes of illustration, applicant has shown the article A as being substantially adjacent to the end of the tubular protective sleeve. However, suitable means will be provided at opposite ends of the packing sleeve 10 to prevent any damage to the end portions of the article being protected and shipped.

Referring to FIG. 5, a blank having all of the structure shown in FIG. 2 is indicated generally at 110. In this embodiment, all similarly functioning and structural portions are indicated by the same reference numerals used in FIG. 2, and the blank of FIG. 5 is assembled and erected in the same manner as heretofore described in detail with respect to FIGS. 2-2c and 3. Additionally, those portions which have been modified are further identified with reference numerals similar to those used in FIG. 2, however, the prefix one hundred is added. For example, the cushioning panel array 146, in addition to being connected to the glue flap 42 at fold line 44 and including a separating panel 56 and second glue flap 60, includes modified cushioning panels 148 and 150.

The modification of the blank in FIG. 5 consists of sinusoidal or undulating tear lines 198 and 200 which start from the upper margins 164 and extend down to 30 the lower margin 166 moving alternately with the peaks, as illustrated.

When the blank of FIG. 5 has been assembled and erected in the manner heretofore described with respect to the blank of FIG. 2, the sinusoidal tear lines 35 198 and 200 will provide an irregular break-away surface on the cushioning channels C, C' formed in the manner illustrated in FIG. 4 when an article A is inserted between the cushioning panels 148 and 150.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

What is claimed is:

1. A one-piece collapsible tubular carton for packaging fragile articles including four foldably connected outer walls,

adjacent pairs of said walls being juxtapositionable to a foldable-flat condition; and

a pair of spaced inner cushioning panels integrally hinged at side edges thereof to inner surfaces of one pair of opposed outer walls and spaced intermediate of the other pair of opposed outer walls when the carton is erected as a tube, said cushioning panels each including a continuous frangible portion extending through upper and lower margins and defining resilient, opposed channels with respect to articles having a dimension greater than the spacing between said cushioning panels formed when the article is inserted between the cushioning panels, with each of said frangible portions being in the form of a single weakened, undulating line extending opposite of each other between the upper and lower margins of said cushioning panels.

2. A one-piece planar blank for producing a foldable-flat packaging sleeve for fragile articles comprising: four rectangular outer wall panels hingedly connected on mutually parallel hinge lines, said outer wall panels including upper and lower linear margins; end closure flaps hingedly connected to upper and lower margins of certain of said outer wall panels; a connecting flap hingedly connected along one side wall of one outer wall panel; the improvement comprising:

a cushioning panel array comprising in series from said connecting flap a first cushioning panel, a spacing panel, a second cushioning panel, and a terminal spacing panel,

said cushioning panels having a width equal to that of a pair of alternate outer wall panels, said cushioning panels each having a continuous rupturable portion extending through upper to lower margins for forming resilient opposed channels in the assembled and erected packaging sleeve, each of said rupturable portions being defined by a single undulating weakened line extending from the upper through the lower margins of said cushioning panels.

3. The blank as claimed in claim 2 in which said cushioning panel array and connecting flap include upper and lower margins colinear with the respective upper and lower margins of said outer wall panels.

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