

[54] **CARTON DIVIDER**

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[58] Field of Search 229/15, 42; 217/23,
217/33

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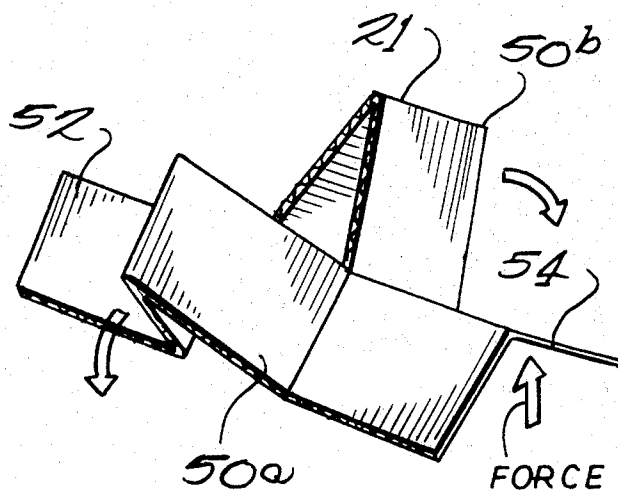
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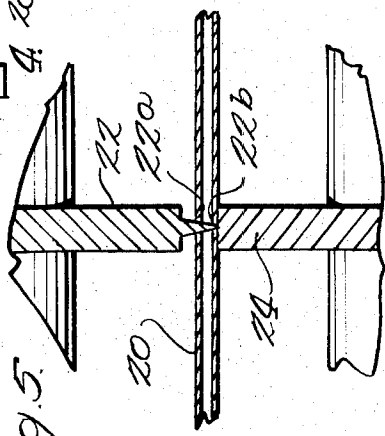
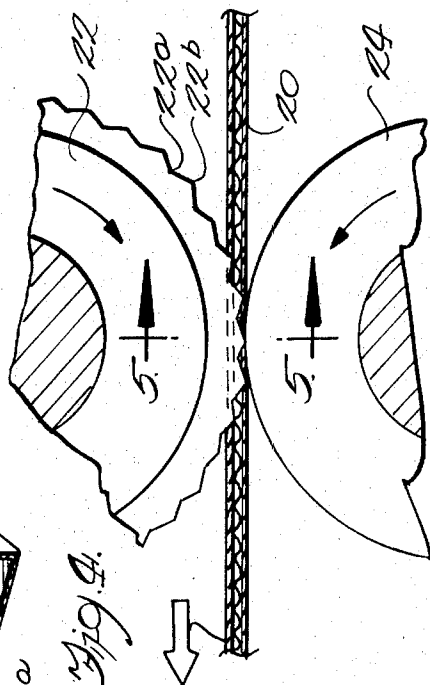
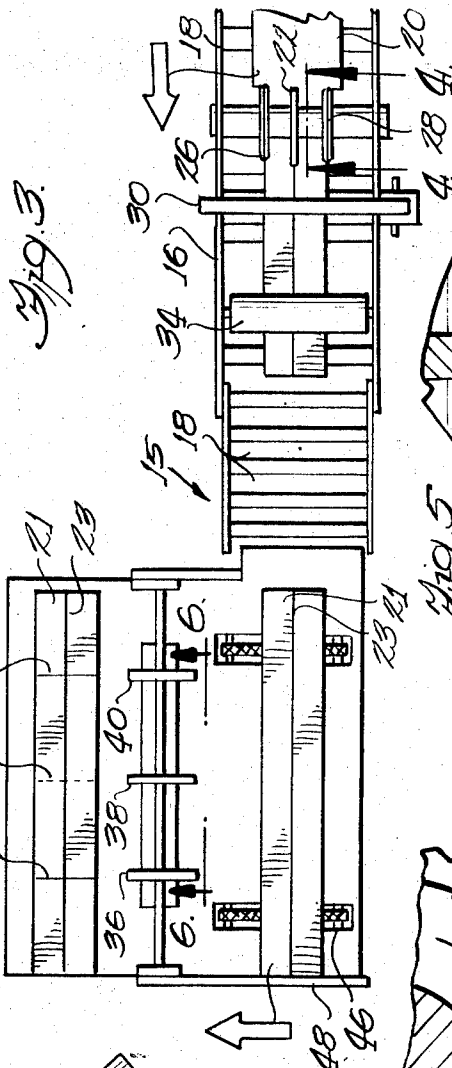
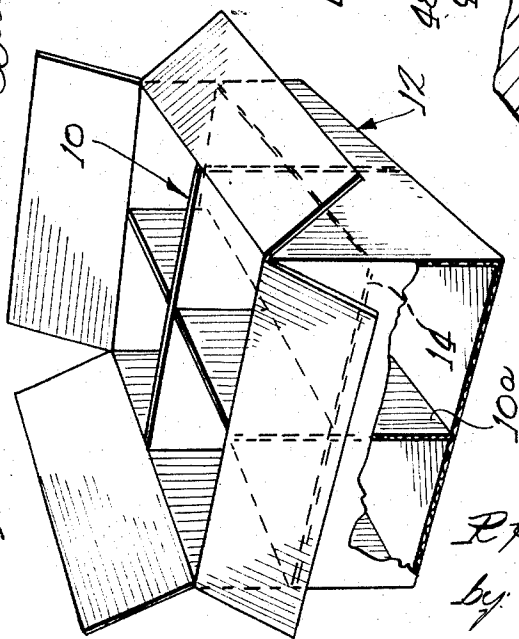
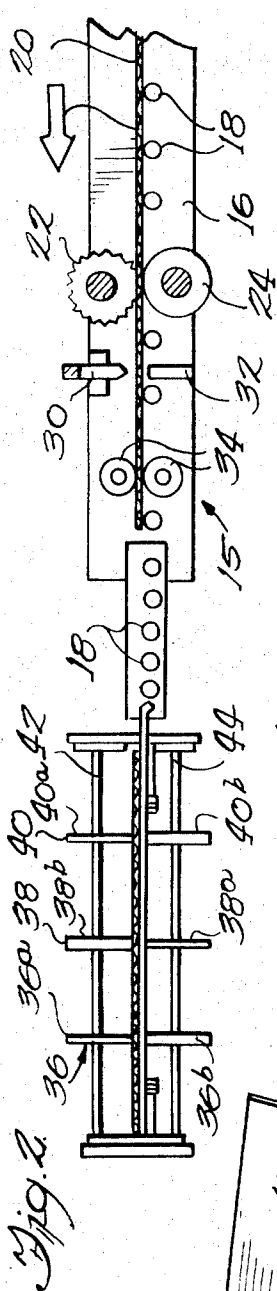
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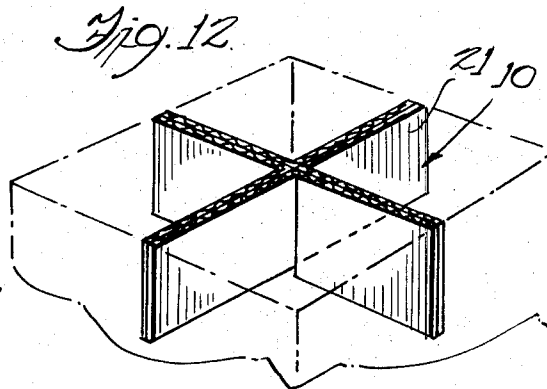
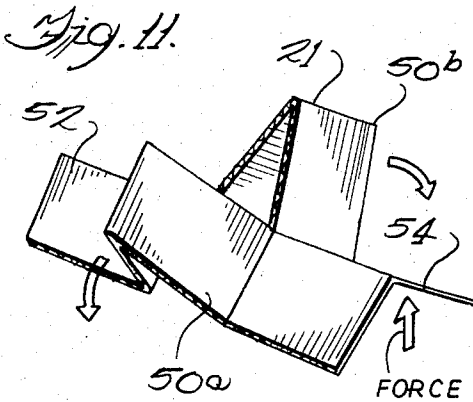
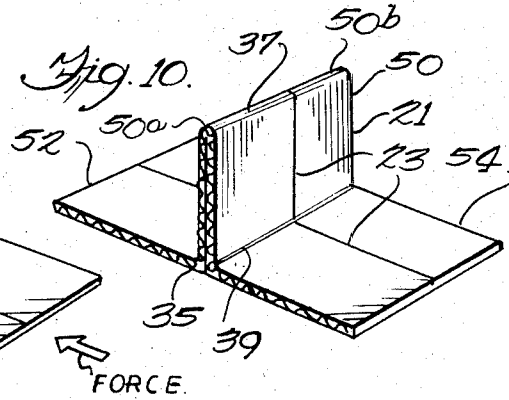
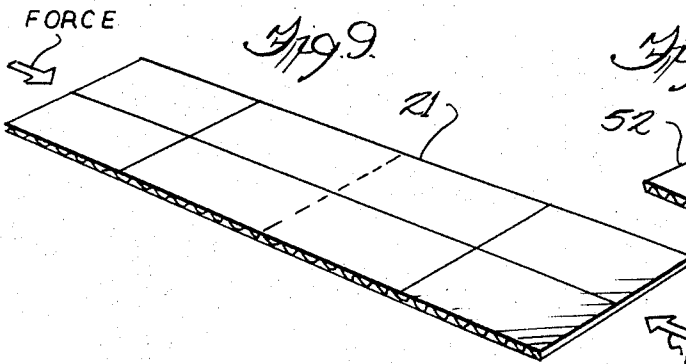
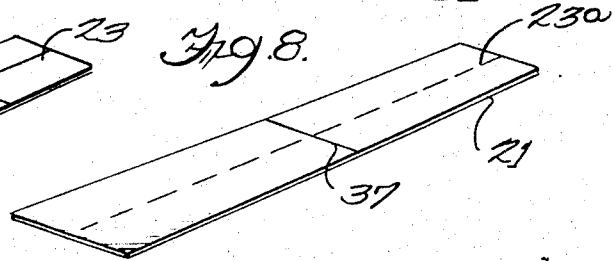
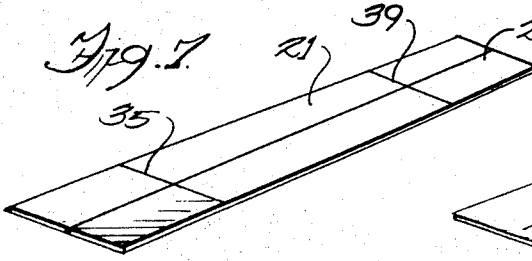
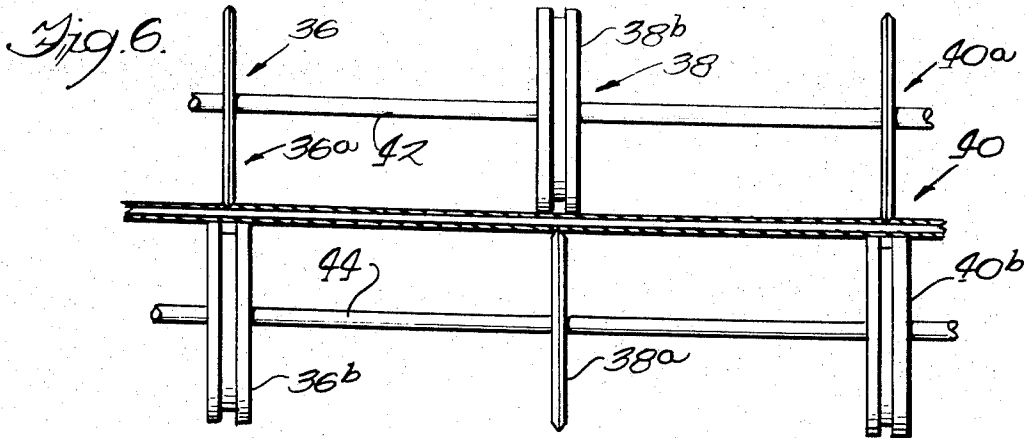
[57] **ABSTRACT**

A carton divider is formed of a rectangular cardboard blank having a slit partially through the thickness of the blank and substantially centrally of the longitudinal dimension thereof. Perforations extend through the remaining thickness of the blank in the slit formed therein. Three equally spaced apart score lines are formed transversely of the slit and perforations. Upon folding the blank along the score lines and then parting the blank along the perforations in the region of the center score line by pulling on both sides of the perforated section, the cardboard blank is then folded into a cross-shaped divider unit. The apparatus for forming the same consists of a conveyor with a single cutting and perforating wheel which forms a slit and perforations in a single operation.

3 Claims, 12 Drawing Figures







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CARTON DIVIDER

BACKGROUND OF THE INVENTION

This invention relates generally to a carton divider and cushion member and to a method and apparatus for forming the same of a single rectangular carton blank.

In shipping cartons containing breakable or perishable items it is sometimes desirable to divide the shipping carton into cells so that a fewer number of items are contained in each cell. The items are cushioned by the divider to prevent bumping or bruising or breaking by contact or pressure exerted by other items in the shipping container. One such carton configuration is equally dividing up a square carton into four equally dimensioned square cells. This is accomplished by forming a cross-shaped carton divider and cushion member which is inserted into the carton. Generally, cross-shaped carton dividers heretofore used are formed of two or more separate pieces of cardboard, one common type having mating half slits substantially centrally of the cardboard unit which slide into one another to form the cross-shaped divider. However, this requires additional manipulation by the packer and only a single thickness of cardboard is afforded between the adjacent cells.

SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide a cross-shaped carton divider and cushion member formed of a single carton blank.

Another object of this invention is to provide a cross-shaped carton divider which has a double thickness of cardboard in each of the wall sections formed thereby.

Another object of this invention is to provide an apparatus for automatically forming cardboard blanks which have slits and perforations formed therein so that the divider can be formed.

A feature of this invention is the use of a single slit and perforating wheel which has a cutting portion extending about one diameter which cuts partially through the cardboard blank and a perforating portion which perforates the remaining thickness of the cardboard blank in the slitted area so that the slit and perforations are formed in a single operation.

Briefly, the carton divider of this invention is formed by a method of cutting and scoring the cardboard blank so that a single hand manipulation of the blank will automatically fold the blank along the score lines and part of the appropriate remaining portion of the blank so that it can be folded upon itself to form the cross-shaped divider member.

Other objects, features and advantages of this invention will be more fully realized and understood from the following detailed description when taken in conjunction with the accompanying drawings wherein like reference numerals throughout the various views of the drawings are intended to designate similar elements or components.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a shipping container wherein cross-shaped divider and cushion members are used and which are constructed in accordance with the principles of this invention;

FIG. 2 is an elevational, somewhat diagrammatic view of apparatus for conveying and forming cardboard

blanks from which the divider is formed in accordance with this invention;

FIG. 3 is a top view of the apparatus of FIG. 2;

FIG. 4 is an enlarged side elevational view showing a fragmentary portion of the slit and perforating wheel of this invention;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is an end view showing the scoring apparatus of this invention which forms transverse score lines along the carton blank;

FIGS. 7 and 8 illustrate the slit, perforation and score lines of the carton blank of this invention; and

FIGS. 9, 10, 11 and 12 illustrate the sequence of folding and parting of the carton blank of this invention to form the cross-shaped divider member.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Referring now to FIG. 1, there is seen a divider and cushion member designated generally by reference numeral 10 which is positioned in a shipping container 12. The divider and cushion member 10 divides the carton 12 into four equal areas, this being only for illustrative purposes and not a limiting feature. Also, a pair of dividers 10 and 10a are in the container 12 with a separating floor or sheet 14 positioned therebetween.

The divider and cushion 10 is constructed on the apparatus 15, as shown generally in FIGS. 2 and 3. The apparatus is shown somewhat diagrammatically and it will be understood that many changes to the structure as shown can be made without departing from the scope of the invention. Preferably the apparatus 15 includes a conveyor 16 formed of a plurality of spaced apart rollers 18 for transporting a cardboard sheet designated generally by reference numeral 20. The cardboard sheet 20 is cut up into blanks 21 which form the divider 10. As shown best in FIGS. 4 and 5, sheet 20 is a corrugated board comprising opposite side sheets 20a and 20b secured to a central or fluted corrugated sheet or core 20c in a known manner.

Most advantageously, a slit and perforator wheel 22 is positioned on the conveyor and adjacent a backup roller 24. The slit and perforator wheel 22 slits partially through the thickness of the cardboard 20 while the remaining thickness is perforated as indicated by reference numeral 23. This is done in a single operation as shown herein, it being understood that separate operations, i.e., a separate slit and a separate perforator wheel, may be used. The sheet of cardboard 20 is here shown as being wider than necessary to form the divider 10 and therefore trimming cutters 26 and 28 are positioned on each side of the slit and perforator wheel 22 to trim the sheet to the desired width to form the blank 21.

The divider blank 21 has a predetermined length which can be selected in accordance with the size of a shipping container into which the divider is to be positioned. The desired length of a carton blank can be sensed by suitable length sensing means, not shown, and actuating means will be controlled thereby to actuate a cutoff blade 30 against a backup pad 32 to sever the cardboard sheet into the proper lengths. The divider blank 21 is then transported along the conveyor by a pair of pinch rollers 34 which grip the sheet on each side thereof and which are drivingly rotated so as to transport a carton blank.

Once the carton blank has the slit partially through its thickness and perforations through the remaining thickness, the blank will then have score lines formed therein, these score lines being represented by reference numerals 35, 37 and 39 and are formed by score wheel sets 36, 38 and 40, respectively. The score lines 35, 37 and 39 are formed transversely of the slit and perforations 23. As best seen in FIG. 6, the score wheel sets 36, 38 and 40 each comprise a narrow wheel 36a, 38a and 40a and a broad grooved wheel 36b, 38b and 40b. The score wheel sets 36 and 40 form the outboard scores 35 and 39 near the end of the blank while the score wheel set 38 forms the center score 37. The score wheel sets are driven by common shafts 42 and 44 and they may be linked or geared together for common rotation by a single drive unit as desired.

When the divider blank 21 is severed from the cardboard sheet 20 by the cutter 30, it is transported onto a transverse unit which shifts the direction of movement of the sheet transverse to its initial conveying path by a pair of transport means 46. An end wall 48 which stops the longitudinal movement of the blank 21 may also include sensing means to initiate energization of the transverse transport means 46 which will direct the blank 21 in the score wheel sets.

Referring now to FIGS. 4 and 5, the details of construction of the slitter and perforator wheel 22 and backup roller 24 are shown. Here the slitter and perforator wheel 22 include a slitting knife edge 22a about a circumference thereof which passes only partially through the thickness of the cardboard sheet 20. As shown in FIG. 4, the knife edge 22a cuts through the upper layer or sheet 20a and the corrugated core 20c. Extending from the knife cutting edge 22a are spaced apart toothlike members 22b which extend completely through the cardboard sheet 20 to cause the perforations to be made through the bottom sheet 20b of corrugated cardboard when such is used to form the blank 21. Therefore, the cardboard blank can be folded along the longitudinal axis thereof by bending the sheet upon itself and against the perforated wall while parting the slit upper wall. To insure that the perforations go completely through the bottom wall of the cardboard sheet 20, the backup roller 24 may have a resilient surface so that the teeth portions 22b will embed slightly therein.

As best seen in FIGS. 7 and 8 the divider blank 21 has the two score lines 35 and 39 near the ends thereof and the center score line, which is on the opposite surface as that of the score lines 35 and 39, is substantially centrally of the blank. The slit is shown in FIG. 7 and designated by reference numeral 23 while the perforations, on the other surface of the blank 21, are shown in FIG. 8 and designated generally by reference numeral 23a. To bend the blank 21 and form the divider and cushion

member 10 in accordance with this invention, the sequence of steps is illustrated diagrammatically by FIGS. 9, 10, 11 and 12. Force is applied against the ends of the blank to cause the center and two outboard score lines to fold the blank and form an upstanding portion 50, this being shown in FIG. 10. The upstanding portion 50 has two segments thereof, 50a and 50b, separated by the slit and perforated line 23. Force is then applied to each of the upstanding segments 50a and 50b so as to part or tear the perforations of the upstanding portion 50 while only folding back the slit and perforated portions along the outboard tab portions 52 and 54, this being shown in FIG. 11. This then causes the outboard portions 52 and 54 to be folded upon themselves along the perforated line 23 to form a cross-shaped divider and cushion member having a double thickness of corrugated cardboard forming each wall section as shown in FIG. 12.

Accordingly, what has been described is a simple and efficient divider and cushion member of unitary construction and method and apparatus for forming the same. While only a single embodiment of the apparatus is illustrated herein and only a single type of divider unit is shown, it will be understood that variations and modifications of this invention may be effected without departing from the spirit and scope of the novel concepts disclosed and claimed herein.

The invention is claimed as follows:

1. A divider and cushion member for cartons and the like comprising in combination a rectangular corrugated cardboard blank including first and second opposite side sheets and a corrugated core sheet, a slit formed in the blank substantially centrally thereof and along the major dimension of the rectangle, said slit being only partially through the thickness of said blank, said slit being substantially entirely through said first sheet and said core, perforations extending along the blank and in the slit to extend through the said second sheet, and score lines extending transversely of said slit and perforations and spaced apart with two score lines being on said first sheet of the blank and the third score line being on said second sheet of the blank, whereby folding the cardboard blank along said score lines and then parting the perforations in the region of the center score line to fold the blank longitudinally upon itself will form a cross-shaped divider member.

2. The divider and cushion member of claim 1 wherein said score lines are equally spaced from the ends and equally spaced from one another.

3. The divider and cushion member of claim 1 wherein said slit and perforations are formed substantially centrally of the cardboard blank.

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