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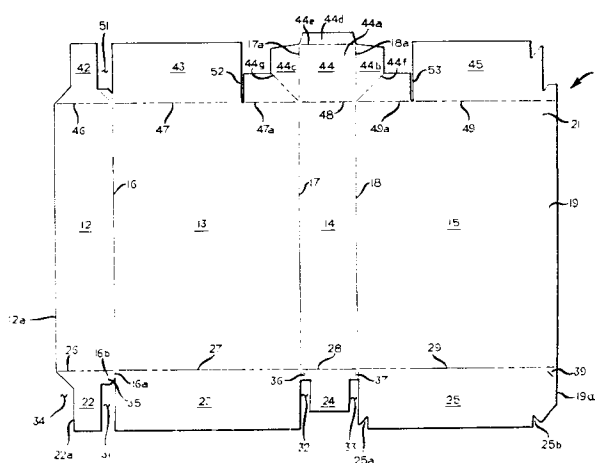
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54 **Carton and blank therefor of polymeric material.**

57 A six-sided or parallelepiped carton and a blank (11) therefor is disclosed. The carton is formed by folding the die-cut blank of a generally rigid, unitary blank of a polymeric material, in which a major portion of the thickness of the blank preferably comprises an expanded polymeric material, at least some of the corners at one end of such carton being self-sealed by webbed areas or gussets (35, 36, 37 and 39), which comprise portions of such blank but which may be of reduced thickness relative to the major portions of the remainder thereof, and a die-cut blank which is adapted to be formed into such a carton.

The gussets are formed in areas at the closed ends of slots (31, 32, 33 and 34) extending partially between flaps (22, 23, 24 and 25) connected to main panels (12, 13, 14 and 15) of the carton and blank at fold lines (26, 27, 28 and 29 respectively).

The other end of the carton may be similarly formed and sealed or may conveniently be provided with a reclosable pour-out spout.



DESCRIPTIONCARTON AND BLANK THEREFOR OF POLYMERIC MATERIAL.

This invention relates generally to a six-sided carton which is formed from a generally rigid,
5 unitary, foldable, sheet-like blank of polymeric material, and more particularly to a carton of such character in which at least some of the corners are sealed by means, which are a part of such blank, to seal the contents of the carton and to thereby prevent
10 the egress of the contents of the carton and the entry of oxygen and moisture from the atmosphere into the carton.

It is quite common to utilize a six-sided carton which is formed by folding a generally rigid, unitary,
15 foldable, sheet-like blank of paperboard or other fibrous material for many packaging applications, for example in the packaging of breakfast cereals and in the packaging of powdered laundry detergents. These cartons usually require separate means to help prevent
20 the contents of the carton from escaping through the gaps or spaces which are normally formed at the corners of such cartons, and to help prevent oxygen and moisture from the atmosphere from attacking the contents of the carton. Such separate means may take
25 the form, for example, of a separate sealed bag which is placed in the carton and in which, in turn, the packaged product is placed.

The present invention seeks to avoid the necessity for such separate means.

30 Generally rigid polymeric materials, including expanded or foamed polymeric materials, offer many advantages over paperboard as a material of construction, including attractive appearance, relatively low cost, moisture imperviousness and good
35 strength and rigidity characteristics in relationship

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to thickness and weight, and for these reasons these materials have captured important segments of packaging markets which were once held by paperboard. To date, however, polymeric materials have not been
5 able to displace paperboard or other fibrous materials as the material of construction for folding boxes or cartons for breakfast cereals and other dry or particulate products to any great extent, this being at least in part due to the problems which relate to
10 the sealing of the corners of such cartons.

According to the present invention then, there is provided a six-sided carton which is formed from a unitary die-cast blank of a sheet-like, generally rigid, foldable material, which carton comprises four
15 sides formed in a tubular configuration from four serially connected panels in such blank by bending along fold lines at the junctures between such panels, the first and fourth of such panels being joined to one another in a joint, and having means for closing
20 one end of the tubular configuration. The carton of the invention is characterised in that the material is polymeric and the carton comprises a self-sealing end structure formed at the other end of said tubular configuration by the inward folding of four flaps
25 which comprise portions of the blank, each of said flaps depending from and being foldable with respect to one of said panels along fold lines at the junctures therebetween, the flaps being separated from one another by slots which extend from the marginal
30 edges of the flaps only partially to the fold lines at the juncture between the flaps and the panels to define, between the unslotted portions of the flaps and the fold lines at the junctures between the panels and flaps, gusset areas each of which, when the end
35 structure is formed by the inwardly folding of the flaps to the panels, lies between an adjacent pair of said flaps to seal the corner therebetween.

Preferably, at least a major portion of the blank comprises an expanded polymeric material, which has thickness, strength, rigidity and weight characteristics that are suitable for the packaging of many products which are now packaged in paperboard cartons, and which, because of the compressibility of such expanded polymeric materials, can be provided with integral means to seal the corners of such cartons, thereby eliminating the need for an inner bag or other separate means for accomplishing the sealing of the corners. Such sealing function is accomplished by providing the afore-mentioned gussets in at least some of the end flap portions of the blanks adjacent the scored lines therein which define the lines along which the blank is folded to form the carton, and by compressing these webbed areas or gussets to permit them to be folded into relatively thin sealing means lying between the folded over end flaps which define one or both of a pair of the sides of the carton, usually the top and bottom, at the corners of such sides.

Also according to the present invention a sheet-like, generally rigid, unitary die-cut blank of foldable material which is adapted to be formed into a six-sided carton comprises four serially connected and generally rectangularly-shaped panels foldably separated from one another along scored fold lines therebetween, a flap depending from an edge of each of the panels and foldably separated therefrom along scored fold lines respectively, to form a bottom structure for the carton, is characterised in that the material is polymeric and the flaps are partially separated from one another by slots extending from the marginal edges of the flaps only partially to the scored fold lines separating adjacent flaps from the

panels to which they are foldably separated, the slots defining, with the scored fold lines, gusset areas which are adapted to seal the corners of the bottom structure formed from the depending flaps when said
5 blank is folded into a carton, and that means extending from the opposite edges of the panels are provided and are adapted to form a top structure of the carton when said blank is folded into a carton.

The present invention will now be further
10 described by way of example, with reference to the accompanying drawings, in which:-

Fig.1 is a plan view of a preferred embodiment of a blank in accordance with the present invention, viewed from its outer face,

15 Fig.2 is an enlarged fragmentary schematic view showing a portion of the blank of Fig.1,

Fig.3 is a schematic view showing the blank of Fig.1 in a preliminary stage of the forming of a carton therefrom,

20 Fig.4 is a schematic view showing a partially formed carton which has been formed from the blank of Fig.1,

Fig.5 is an enlarged fragmentary schematic view showing a portion of a carton as it is being formed
25 from the blank of Fig.1,

Fig.6 is a further enlarged fragmentary schematic view of a portion of a carton as it is being formed from the blank of Fig.1,

Fig.7 is an enlarged fragmentary schematic view of
30 the portion of the carton which is depicted in Fig.6 at a subsequent stage of its formation,

Fig.8 is a schematic view of the assembled carton which has been formed from the blank of Fig.1,

Fig.9 is a schematic view showing a pour-out spout
35 feature of the carton which has been formed from the blank of Fig.1,

Fig.10 is an enlarged fragmentary schematic view of a portion of a carton as it is being formed in an alternative manner from the blank of Fig.1, and

5 Fig.11 is an enlarged fragmentary schematic view of the carton which is depicted in Fig.10 at a subsequent stage of its formation.

As is shown in Fig.1, there is provided a die-cut blank, generally indicated by reference numeral 11, from which a parallelepiped or six-sided carton may be
10 formed. In the case of a blank for a carton for the packaging of a breakfast cereal, blank 11 may be advantageously formed from expanded general purpose or impact polystyrene in a thickness of the order of 36-40 mils (0.036-0.040 in.) and of a density of the
15 order of 6-8 pounds per cubic foot. Preferably blank 11 is also provided with thin layers of a non-expanded polymeric material such as polyethylene on the opposed surfaces thereof for improved resistance to moisture vapour transmission. These surface layers, for
20 example 1.5 mils in thickness on the outside surface and 0.5 mils in thickness on the inside surface, can be formed on a core of expanded polystyrene by co-extrusion, extrusion coating or lamination in a known manner, and preferably involve the use of a
25 suitable agent to effect bonding of these dissimilar materials, such as ethylene vinyl acetate, which can be utilized between the layers or in one or both of the adjoining layers. In any case, the blank comprises serially connected rectangularly-shaped
30 panels 12, 13, 14, 15 which are integrally connected to one another and which are formed by scoring blank 11 along fold lines 16, 17 and 18. Also formed in blank 11 is a flap 19 which is integrally connected to panel 15 along fold line 21, which may also be formed
35 by scoring.

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As is depicted in Figures 3 and 4, the forming of a carton from blank 11 involves folding the blank along fold lines 16, 17, 18 and 21 into a tubular configuration, to bring panel 12 into a position
5 overlying flap 19 to form the side seam of the carton. Panel 12 and flap 19 are joined to one another in this tubular configuration by heat sealing or by the use of an adhesive, or by other known means for forming a joint in a carton.

10 The portion of the carton which normally comprises the bottom of the carton when it is in an upright position is formed by a series of flaps 22, 23, 24 and 25 which are integrally attached to panels 12, 13, 14 and 15, respectively, along fold lines 26, 27, 28 and
15 29. Flaps 22, 23, 24 and 25 are separated from one another by slots 31, 32 and 33 which, to form the corner sealing means in the corners of the bottom structure of the carton, extend only partially to the fold line comprising fold lines 26, 27, 28 and 29.

20 For the same reason, the outermost marginal portion of the edge 22a of flap 22 is inwardly offset from the edge 12a of blank 11 to form slot 34 in conjunction with edge 19b of extension 19a of flap 19 on assembly. Slot 31 helps to define, with an extension 16a of fold
25 line 16 and a fold line 16b extending from the juncture of fold lines 27 and 16 outwardly to flap 22, a generally triangularly shaped gusset portion 35 in blank 11. This gusset is compressed to substantially less than its original thickness in the die-cutting
30 operation which is utilized to form blank 11, for example to about the thickness of the scored fold lines or about no more than one half the original thickness of blank 11. Similar triangularly shaped compressed gusset areas 36 and 37 are formed between
35 the ends of slots 32 and 33, respectively, and another

triangularly-shaped compressed gusset area 39 is formed in the extension 19a which extends beyond score line 29, almost to the end of flap 25.

5 As is partially shown in Figure 5, the end structure for the carton to be formed from blank 11 is formed by folding end flaps 22 (and 24) to extend inwardly from panels 12 (and 14) and generally at right angles thereto. One of the remaining flaps, shown as flap 25, is then inwardly folded to overlie
10 flaps 22 (and 24), and the remaining flap, shown as flap 23, is then inwardly folded to overlie flap 25. The innermost of flaps 23 and 25, shown as flap 25, may be advantageously provided with triangularly-shaped notched areas 25a and 25b in its outer corners
15 to engage one of the pair of gusset areas, shown as gusset areas 36 and 35 respectively, to help rigidify the corner areas of the bottom of the carton. In any case, gusset areas 35 and 39 are brought into positions overlying flap 22, and gusset areas 36 and
20 37 are brought into position overlying flap 24, to effectively seal the corners formed at the bottom of the carton. The superimposed flaps may then be joined to one another, as by heat-sealing, to permanently secure the bottom structure of the carton.

25 While the top structure of the carton formed from blank 11 may be identical to the heretofore described bottom structure, in a preferred embodiment it is provided at one end thereof with a reclosable pour-out spout in accordance with the invention covered in
30 co-pending United States Patent Application Serial No. 638,145. Thus, the top corner away from the reclosable pour-out spout is formed by flap 42 which is attached to panel 12 along fold line 46 similar to the attachment of flap 22 along fold line 26, and by
35 partial flaps 43 and 45 which are attached to panels

13 and 15 along fold lines 47 and 49, respectively, flap 43 being separated from flap 42 by partial depth slot 51 (which is similar to slot 31). The pour-out feature is provided by irregularly shaped flap 44 which is attached partially to panel 14 along fold line 48 and partially to panels 13 and 15 along inwardly extending portions 47a and 49a of fold lines 47 and 49, respectively. Flap 44 is comprised of a rectangularly-shaped central portion 44a and generally L-shaped portions 44b and 44c which extend outwardly from opposite sides of central portion 44a and which are foldable relative to central portion 44a along fold lines 18a and 17a respectively. Fold lines 18a and 17a, in turn, respectively comprise extensions of fold lines 18 and 17. Flap 44 also comprises an outwardly extending marginal tab portion 44d which is attached to central portion 44a along fold line 44e. Additionally, the legs of L-shaped portions 44b and 44c are separated from one another along fold lines 44f and 44g, respectively, and the edges of flap 44 are separated from flaps 43 and 45 by narrow slots 52 and 53 respectively.

In one assembly of the top structure of the carton, after the tubular structure of Figure 4 has been formed, L-shaped portions 44b and 44c of flap 4 are folded outwardly along lines 44f and 44g, respectively, as is shown in Figures 6 and 7, to bring the now-folded L-shaped portions 44b and 44c into positions extending outwardly from central portion 44a. As is shown in Figure 8, the outwardly projecting folded L-shaped portions are then folded downwardly to overlies carton sides 15 and 13, respectively, and they are secured in these positions until the first opening of the carton by means of a short length of removable pressure sensitive tape 61.

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The package is shown in a partially inverted position in Figure 9 and in an opened position with the structure formed from flap 44 constituting a pour-out spout, and the package can be reclosed, as is
5 desirable when only a portion of the contents is withdrawn, by reclosing the pour-out spout into the configuration depicted in Figure 8, and the reclosed carton can be secured in such position without the need for reapplying tape 61, or a replacement
10 therefor, by bending tab portion 44d of flap 44 downwardly to insert it in the slot defined by slots 52 and 53 of blank 11.

An alternative assembly of the top structure of the carton is shown in Figures 10 and 11, wherein the
15 L-shaped portions 44b and 44c are folded inwardly along lines 44f and 44g respectively upon themselves, thereby avoiding the overlap on sides 15 and 13 resulting from the assembly shown in and described with reference to Figures 8 and 9.

20 The best mode known to carry out this invention has been described above in terms sufficiently full, clear, concise and exact as to enable any person skilled in the art to make and use the same. It is to be understood, however, that certain modifications of
25 the above-described mode of practicing the invention can be made by a skilled artisan without departing from the scope of invention as defined by the appended claims.

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CLAIMS

1. A six-sided carton formed from a unitary die-cut blank (11) of a sheet-like, generally rigid, foldable material, which carton comprises four sides formed in a tubular configuration from four serially connected panels (12, 13, 14 and 15) in such blank by bending along fold lines (16, 17, 18) at the junctures between such panels, the first (12) and fourth (15) of such panels being joined to one another in a joint, and having means for closing one end of the tubular configuration, characterised in that the material is polymeric and the carton comprises a self-sealing end structure formed at the other end of said tubular configuration by the inward folding of four flaps (22, 23, 24 and 25) which comprise portions of the blank, each of said flaps depending from and being foldable with respect to one of said panels along fold lines (26, 27, 28 and 29) at the junctures therebetween, the flaps being separated from one another by slots (31, 32, 33 and 34) which extend from the marginal edges of the flaps only partially to the fold lines (26, 27, 28 and 29) at the juncture between the flaps and the panels to define, between the unslotted portions of the flaps and the fold lines at the junctures between the panels and flaps, gusset areas (35, 36, 37 and 39) each of which, when the end structure is formed by the inwardly folding of the flaps (22, 23, 24 and 25) to the panels, lies between an adjacent pair of said flaps to seal the corner therebetween.

2. A carton as claimed in claim 1, characterised in that a major portion of the polymeric material of the blank comprises an expanded polymeric material.

3. A carton as claimed in claim 1 or 2, characterised in that the interior of such carton is adapted directly to contact the contents of the carton.

4. A carton as claimed in claim 1, 2 or 3, characterised in that a major portion of the thickness of the blank comprises an expanded polystyrene material, the blank is formed by die-cutting, and in
5 that each of the gusset areas is compressed in the die-cutting step to a thickness of no more than about one-half of the thickness of the blank, to reduce the thickness of the corners of the self-sealing end structure.

10 5. A carton as claimed in any one of claims 1 to 4, characterised in that the outer marginal edge of one (25) of the end structure flaps contains notched areas (25a, 25b) which are aligned with a pair (36, 35) of the folded over gusset area flaps and which
15 engage such folded over gusset areas to rigidify the bottom structure of the carton.

6. A sheet-like, generally rigid, unitary die-cut blank of foldable material which is adapted to be formed into a six-sided carton, comprising four
20 serially connected and generally rectangularly-shaped panels (12, 13, 14 and 15) foldably separated from one another along scored fold lines (16, 17 and 18) therebetween, a flap (22, 23, 24 and 25) depending from an edge of each of the panels and foldably
25 separated therefrom along scored fold lines (26, 27, 28 and 29) respectively, to form a bottom structure for the carton, characterised in that the material is polymeric and the flaps are partially separated from one another by slots (31, 32, 33 and 34) extending
30 from the marginal edges of the flaps only partially to the scored fold lines (26, 27, 28 and 29) separating adjacent flaps from the panels to which they are foldably separated, the slots defining, with the scored fold lines (26, 27, 28 and 29), gusset areas
35 (35, 36, 37 and 39) which are adapted to seal the

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corners of the bottom structure formed from the depending flaps when said blank is folded into a carton, and that means extending from the opposite edges of the panels are provided and are adapted to form a top structure of the carton when said blank is folded into a carton.

7. A blank as claimed in claim 6, characterised in that a major portion of the thickness of the blank is formed from an expanded polymeric material and in that each of the gusset areas is compressed in the die-cutting step to a thickness of no more than about one-half of the thickness of the panel portions of the blank.

8. A blank as claimed in claim 7, characterised in that the expanded polymeric material comprises expanded polystyrene.

9. A blank as claimed in claim 6 or 7, characterised in that one of the depending flaps (25) is provided with a pair of notches (25a and 25b) in its marginal edge, each of which notches is adapted to engage a gusset area (36 and 35) when the flaps are folded to form a bottom structure in the carton to help rigidify such bottom structure.

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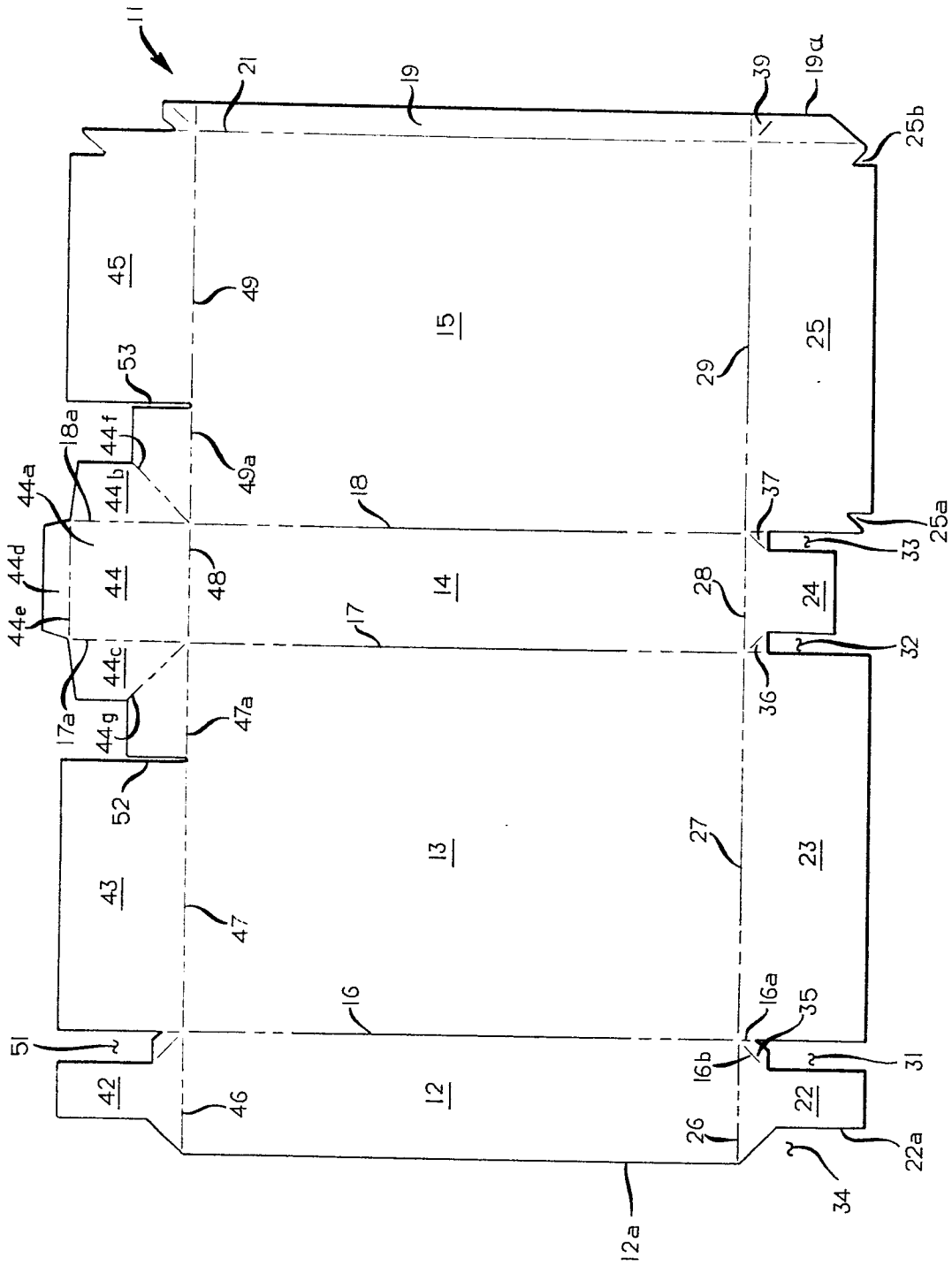


FIG. 1

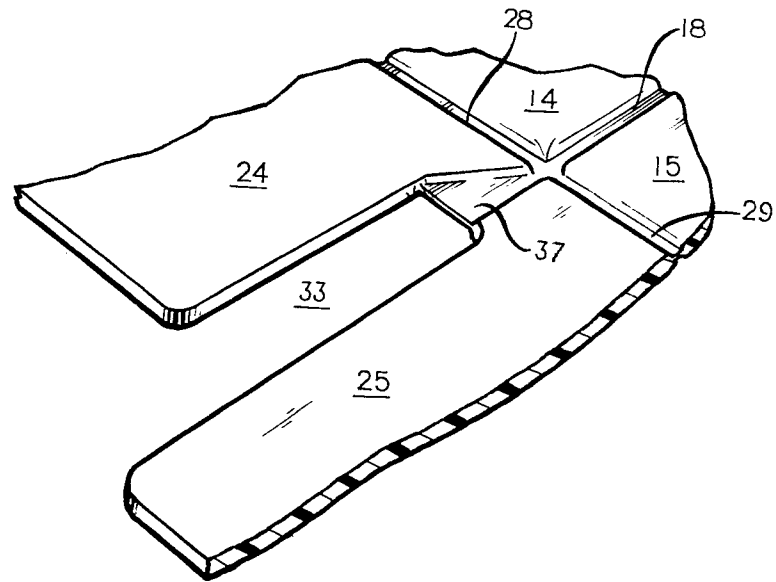


FIG. 2

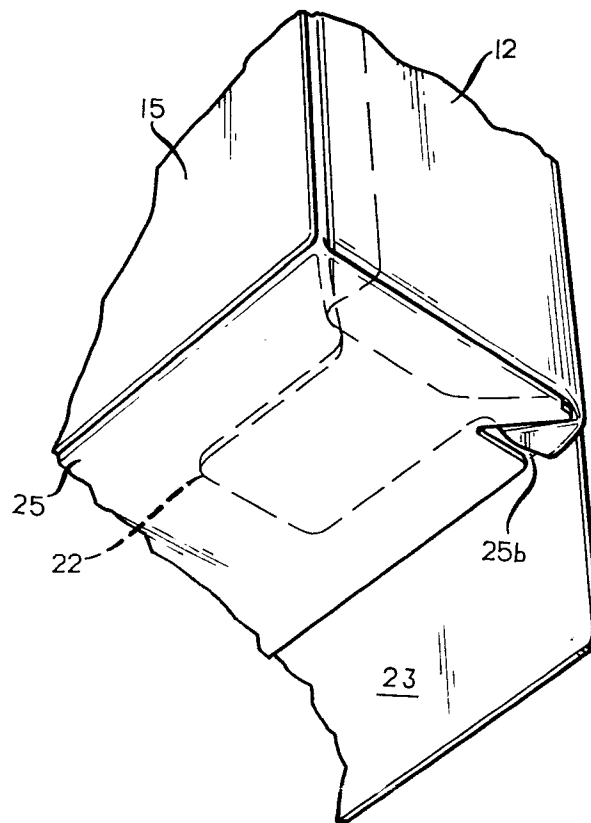


FIG. 5

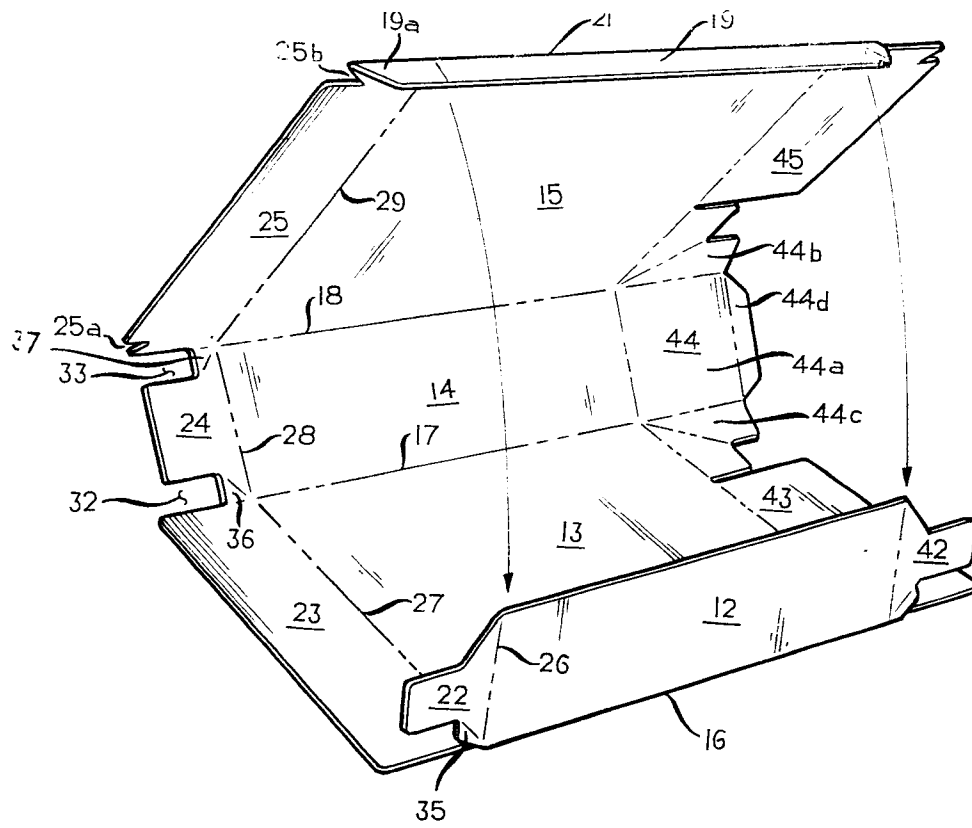


FIG. 3

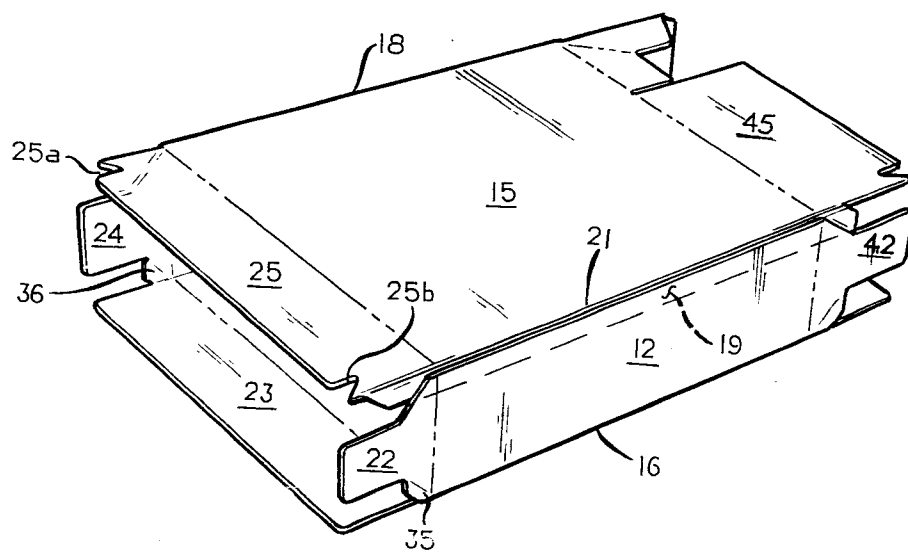


FIG. 4

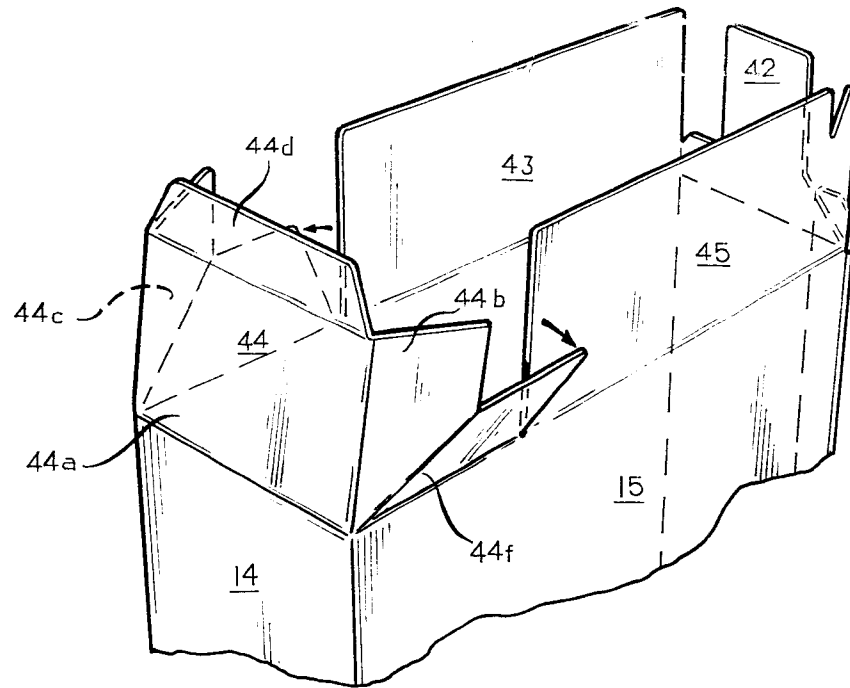


FIG. 6

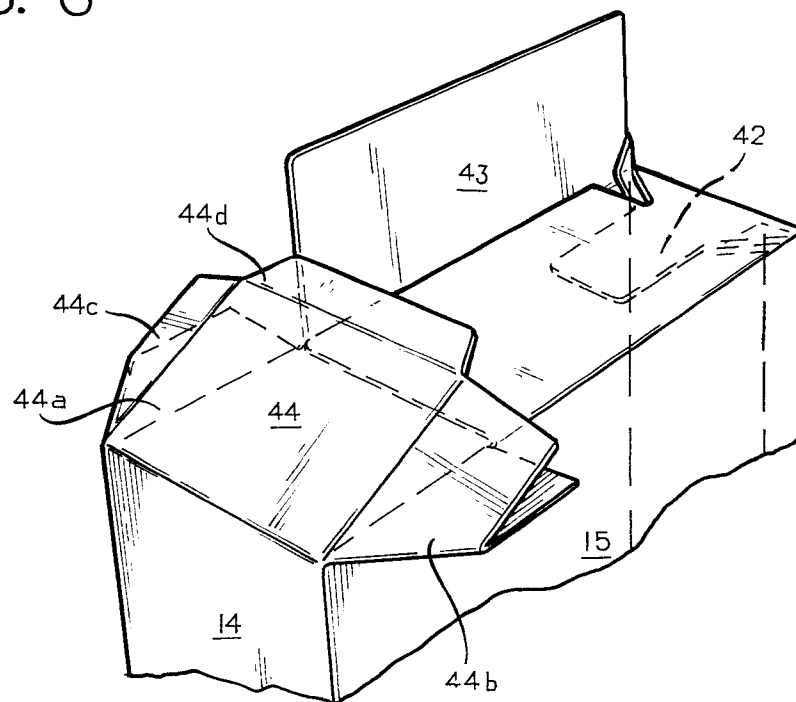


FIG. 7

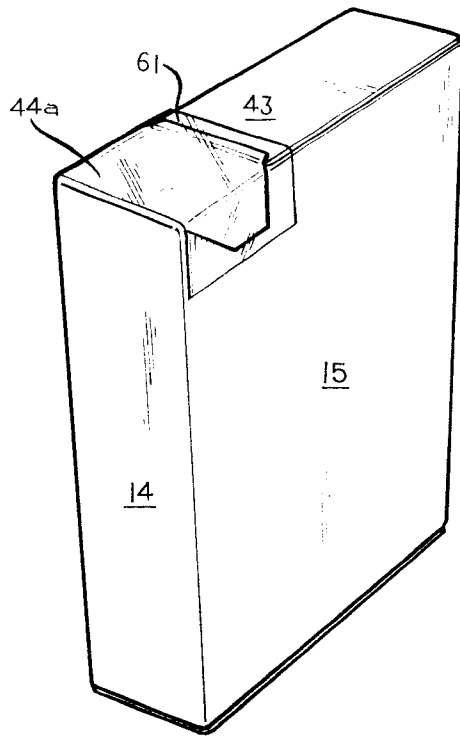


FIG. 8

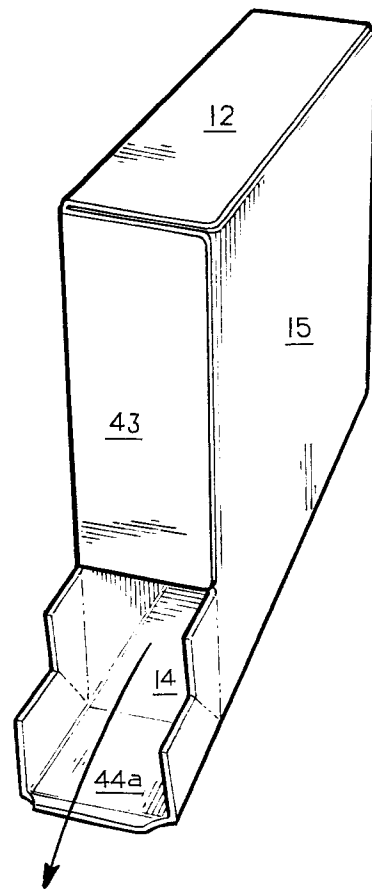


FIG. 9

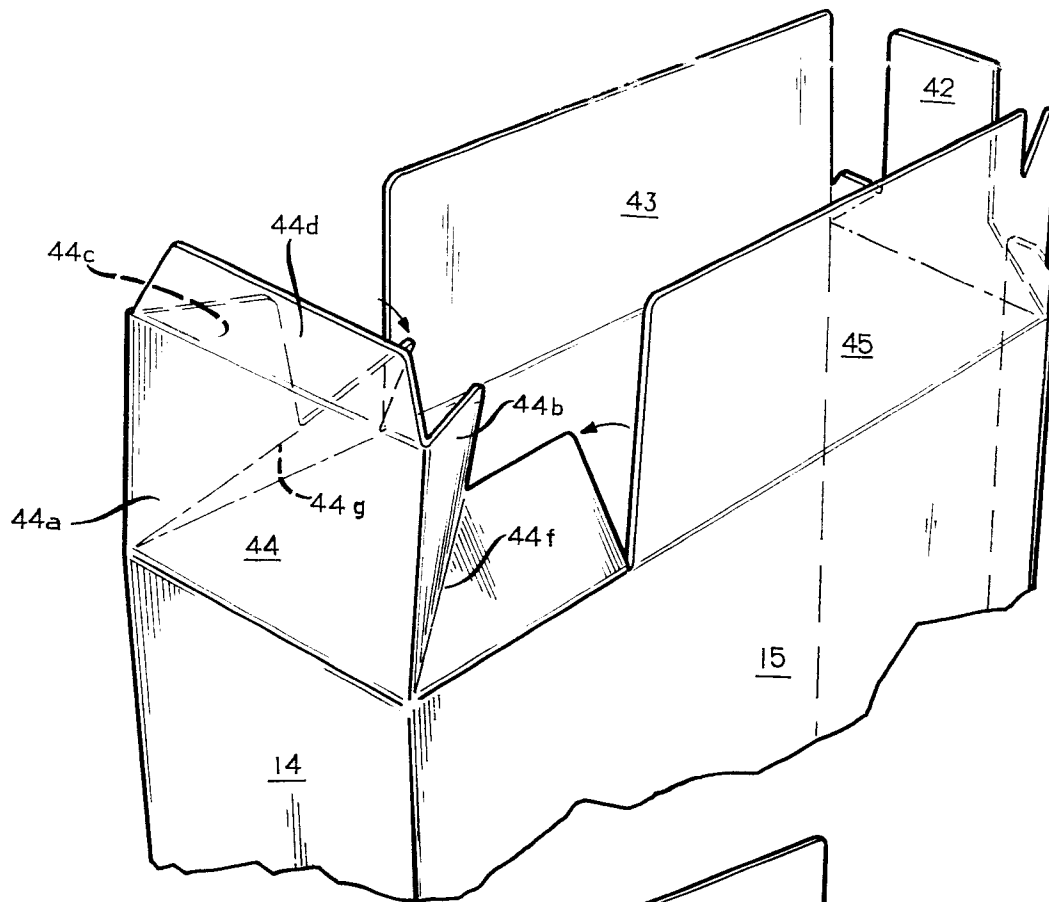


FIG. 10

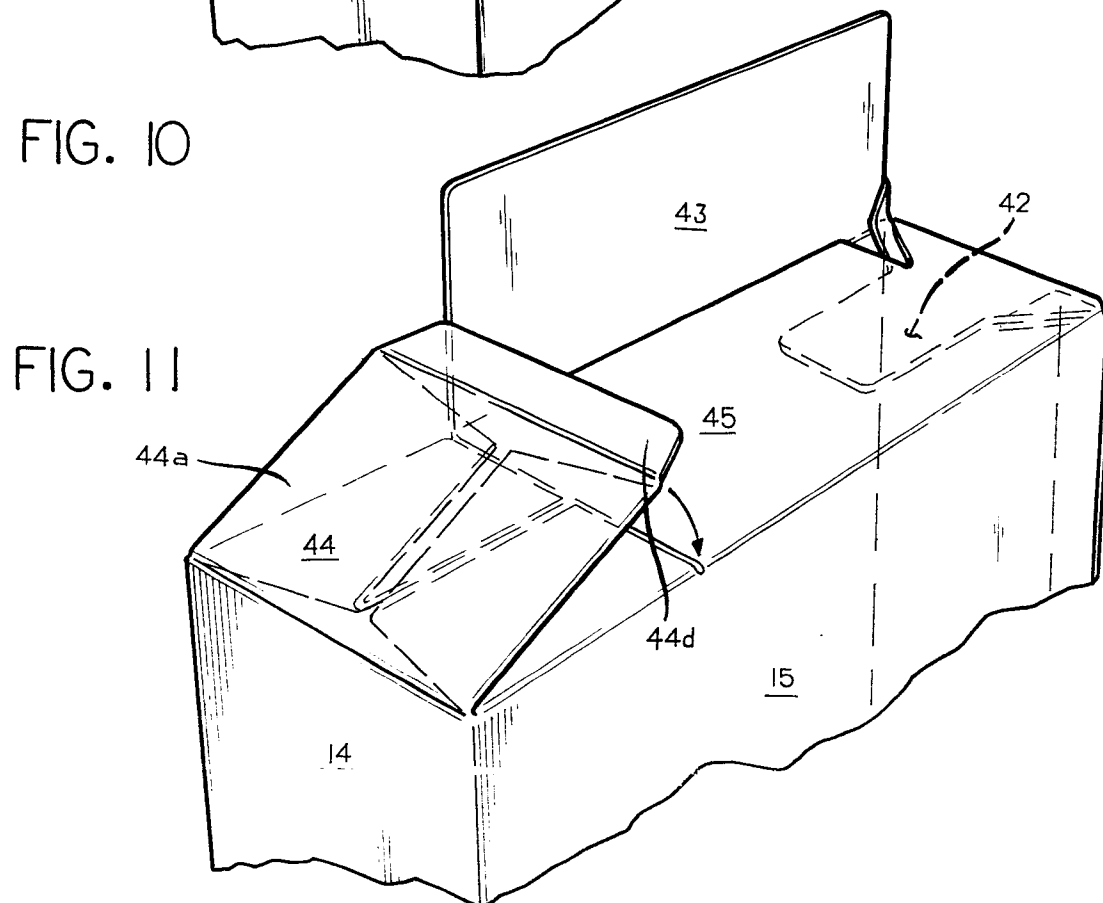


FIG. 11