STACKABLE PACKING TRAYS

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ABSTRACT

A stackable packing tray having a bottom and four side walls is constructed from a cardboard blank having a quadrilateral bottom panel, side panels extending from each side of the quadrilateral and first and second tabs at each apex of the bottom panel. The first tab is integral with a first side panel and secured by glue or staples to the outside of the second side panel at the same apex thereby forming a corner of the tray. The second tab is integral with the second side panel and is similarly secured to the inside of the first side panel. The second tab includes a corner brace and support panel which acts as a brace for giving the tray great rigidity and strength in stacking and a support for supporting the bottom panel of a superposed tray. The lower portion of the corner of the superposed tray is partially covered by the corner of the tray there-beneath which is formed by the first side panel and its first tab. The corner brace panel can be triangular or rectangular. The second tab may be divided into strips. Space taken up by the second tab inside the tray may be reduced by making the corner brace and support panel asymmetrical with respect to the edge of the associated corner and eliminated by arranging the second tab along the top edge of the associated corner.

31 Claims, 17 Drawing Figures
STACKABLE PACKING TRAYS

The present invention relates to stackable packing trays and more particularly to cutout blanks of cardboard, paperboard or other foldable material from which the stackable packing trays are formed.

An aim of the invention is to provide a tray of very great rigidity and very high stacking strength.

For this purpose, the invention consists in a stackable packing tray of the type formed from a cutout cardboard blank, at the four corners of the tray the sides panels are secured in pairs by means of a first tab integral with one of the sides panels extending at least in part laterally the height of the one side panel being slightly greater than the height of the other side panel and bendable, the first tab coming into contact along the outside surface of the other side panel, and a second tab integral with the other side panel from which it extends laterally and is adapted to come into contact along the inside surface of the one side panel, means integral with the other side being provided for forming at each corner of the tray corner brace and support means enabling stacking and disposed below the upper edge of the said one side panel.

The mutual fastening of the side panels of the assembled tray provides it with a very great rigidity.

This rigidity is further increased by the provision of the corner brace and support means at the corners of the assembled tray.

The corner brace and support means also enable the stacking of the trays. Indeed, when two trays according to the invention are stacked, the lower corners of the upper tray are supported on the corner brace and support means of the tray therebeneath. The corner brace and support means may be constructed as shown in the description, i.e., panels cutting off the corners, the upper edge of which will function as the stacking support per se, or triangular tabs or tongues which may be bent over horizontally in each corner. Further, the transverse wedging of the upper tray is ensured in each corner of the tray by the first mentioned tabs which form, with the end portions of the side panels integral therewith, the corners of the tray extending beyond the upper edge of the corner brace and support means and covering the lower parts of the corners of the tray thereabove.

Preferably, the tabs are formed by cutouts inside the rectangle bounded by the outer edges of the side panels of the unfolded cardboard blank forming the tray. This provides great savings of material, rejecting being minimized.

Other features and advantages of the invention will become apparent from the following description of embodiments of the above blank and the resulting packing tray, merely given by way of example with reference to the accompanying drawings in which:

FIG. 1 is a plan view of the blank for a stackable tray according to the invention;

FIG. 2 is a perspective view of the tray formed by folding the blank of FIG. 1;

FIG. 3 is a detail plan view of a corner of the tray in which the second tab is divided in two strips or tab portions, the top strip forming the corner support for stacking trays and the lower strip forming a right dihedral angle;

FIG. 4 is a perspective view of corner of FIG. 3;

FIG. 5 is a plan view of a portion of a blank forming the corner of the tray with a triangular corner brace and support panel extending from the bottom of the corner;

FIG. 6 is a perspective view of the tray formed by the blank of FIG. 5;

FIG. 7 is a top view of a corner with a fold at the centre of the corner brace panel for packing rounded or cylindrical articles;

FIG. 8 is a perspective view of a corner with a triangular corner panel formed in the upper strip of a tab divided in two portions the lower strip forming a right dihedral angle as in the embodiment of FIG. 4;

FIG. 9 is a plan view of a blank for a tray with a shifted or symmetrical triangular corner brace panel and a domed bottom panel;

FIG. 10 is a plan view of the cover for the tray of FIG. 9;

FIG. 11 is a perspective view of the domed bottom tray of FIG. 9;

FIG. 12 is a plan view of a blank for a tray having a right angled corner brace and support means;

FIG. 13 is a view of a corner of the tray formed by folding the blank of FIG. 12;

FIG. 14 is a top view of the corner of FIG. 13 of the assembled tray;

FIG. 15 is a perspective view of a corner of a tray with a shifted or asymmetrical corner brace panel without a cutout in the bottom;

FIG. 16 is a plan view of the portion of a blank forming a corner in which the corner brace and support means is a triangular tab with a tongue glued on its outside surface; and

FIG. 17 is a perspective view from the outside of the corner formed by the blank of FIG. 16.

A tray blank is shown in FIG. 1 comprising a substantially rectangular bottom panel 1, two opposed longitudinal side panels 2 and two opposed lateral side panels 3.

The side panels 2 are folded up along the fold lines 4 and the side panels 3 are folded up along the fold lines 5. In their central portions, the lateral side panels 3 are provided with cutouts 6, the height of the end portions of the lateral side panels 3 is substantially greater than the height of the longitudinal side panels 2.

The side panels are fixed in pairs at the four apices of the bottom panel 1 by means of a first tab 7 integral with the side panel 3 and a second tab 8 integral with the side panel 2.

Each tab 7 extends the side panel 3 laterally, the upper edge 7a of the tab 7 being a continuation of the upper edge 3a of the side panel 3. The tabs 7 are folded up relative to their associated side panel 3 along the fold lines 9 which are very slightly inclined outwardly relative to the edge 3b of the side panel 3.

The second tab 8 comprises a first fold line 10 joining the outer edge 2a to the fold line 4 at a point on the fold line 4 located at a distance equal to the distance of the top of the resulting corner from the bottom of the resulting corner of the tray. Preferably, the fold line 10 is slightly inclined outwardly relative to the fold line 4. The tab 8 comprises two panels or parts separated by a fold line 11 substantially parallel to the fold line 10 and located in the middle of the tab 8.

As it can be seen in FIG. 1, the tabs 7 and 8 are cut out from a rectangle bounded by the edges 2a and 3a of the side panels of the blank, the tabs 7 and 8 being of
complementary configuration in order to minimize cardboard or paperboard waste.

FIG. 2 shows a tray formed by folding the blank shown in FIG. 1. During the folding, the tabs 7 are folded up at right angles with respect to the side panels 3 so that the inside surface of the tabs 7 come into contact with the outside surface of the side panels 2. The tab 8 is folded so that the outside surface of the part 8b comes into contact with the inside surface of the side panels 3 whereby the part 8a forms a panel cutting off the corners of the tray from the interior thereof.

The securing of the tabs is preferably effected by gluing, the glue being applied on one face of the blank shown in FIG. 1. Indeed, by referring to FIG. 1 it can be seen that it is simply necessary to apply glue at least partially along the exposed face of the tabs 7 as well as on the part of the exposed face of the side panels 3 against which the parts or panels 8b of the tabs 8 come into contact.

It is evident that by such an assembly of the blanks the resulting trays have very great rigidity and excellent strength in stacking.

If a second tray identical to the tray in FIG. 2 is placed on the tray illustrated in FIG. 2, the four corners of the bottom panel 1 of the top tray will be inserted in the corners upstanding at the four apices of the bottom panel of the lower tray and formed by the tabs 7 and by the upper portions of the end portions of the side panels 3. The slight incline of the fold lines 9, 10 and 11 is intended to facilitate this insertion by slightly opening the side panels 2 and 3 outwardly towards the top.

Further, the upper tray is supported on the upper edge of the parts or panels 8a cutting off the corners from interior of the tray constitute the corner braces and supports at each corner of the tray.

The upper tray is therefore perfectly held (against movement) in all three directions.

FIGS. 3 and 4 show a modification of the embodiment of FIGS. 1 and 2. In this embodiment, the tab 8 is divided into two (half-sized) tabs by a longitudinal cut 12, the upper tab portion or strip of the two-pronged tab again provides a corner brace and support with parts or panels 8a and 8b whereas the lower tab portion or strip 8c of the tab mating with the corner, overlies the side panel 3 owing to the presence of the fold line 13.

In the embodiment of FIGS. 5 and 6 there is a reorganization of the corners, the rectangular corner brace panel 8a of the tab 8 is replaced by a triangular corner brace panel 8d bounded by fold line 10a terminates at its lower (FIG. 5) or inner (FIG. 4) end at the intersection of the bottom panel 1 and the fold lines 4 and 5 hingedly connected to the side panels 2 and 3 which produces an even greater stacking strength, because of the fact that it is supported at precisely each of the corners of the bottom panels.

In order to facilitate the loading of the tray with rounded articles or cylindrical articles, another fold line 14 is provided along the median of the triangular panel 8d causing the corner brace panel to approach the surrounding corner of the tray thereby enabling an automated loading of articles in one or two rows.

FIG. 8 illustrates an embodiment similar to that of FIGS. 3 and 4 in which the corner brace panel is of triangular configuration as in the case of the preceding embodiment.

FIGS. 9 and 11 show a tray in which the corner brace panel 8d is offset, it may be arranged at 45° (symmetrically with respect to the corner edge) as in the preceding embodiments or off-centre and asymmetrically with respect to the edge of the associated corner towards one of the panels forming the corner of the tray.

In the embodiment illustrated in FIGS. 9 and 11, the corner brace panel is shifted towards the side panel 3. The bottom panel of the tray which is domed by means of part-circular fold lines 4a and 5a is especially designed for moist articles or articles conserved in ice.

This curve-sided bottom panel facilitates the outflow of water from the tray and prevents the collapse of the tray at its centre.

In order to permit the outflow of water from the tray, perforations 20 are provided at the four corners of the tray and are disposed above the shifted or asymmetrical corner brace panels of the tray there beneath which enables the outflow to occur inside the spaces defined by the asymmetrically arranged triangular corner brace panels 8d and the side panels 7 and 3 thereby protecting the articles conserved in the tray there beneath. This tray could also be constructed with an ordinary flat bottom panel.

This tray has the peculiarity of being assembled by four gluing spots or four stapling points on the side panels 7 to the first tabs 7. The inner tab panel 8b having a stacking function has a locking lug 15 which is adapted to be held in the notches 16 in the cover 17 (FIG. 10), the cover 17 being supported along the major portion of its periphery on the top of the side panels 2 as well as on the shifted triangular corner brace panels 8d extended by the tab portions 8b. Slots 18 are provided in the side panels 3 for locking the locking lugs 19 of the cover 17 (having a central groove 28) for forming a slight dome when it is positioned on a tray and thereby enabling a proper stacking of the superposed tray and a perfect squaring of the panels.

In the organization of the corner in the embodiment of FIG. 12, a fold line 21 folding in a direction opposite to that of the panels of the associated corner forms a square therewith which will be pushed outwardly once the tray assembled by means of perforation 23 provided at the corner defined by the side panel 3 and the tab 7 (FIG. 14). In this version of the invention, it is possible to re-fold the corner once glued owing to a diagonal fold line 23 provided in the side panel 2 thereby enabling the delivery of flattened pre-assembled trays to the user (FIG. 13).

FIG. 15 illustrates a tray corner which employs the asymmetrical or shifted triangular corner brace panel of FIG. 9. In this version, the tab portion 8b is integrated into the side panel 3. The fold line 11b acts as a hinge during assembly so that the gluing is effected between the tab panel 8b and the side panel 3. The triangular corner brace panel is then shifted a maximum distance towards the side panel 3 thereby facilitating the loading of rectangular articles in the tray.

In order to maximize the space available for packing rectangular articles in the tray, an embodiment is provided (FIGS. 16 and 17) in which the corner brace panel becomes a plane panel 24. A triangular panel 25 acting as the stacking surface extends from the side panel 2 and has a tongue 26 which passes behind the panel 24 and by a suitable configuration is introduced into the opening 27 cut in the side panel 3 for this reason.

In this embodiment, three gluing points are necessary: on the tongue 26 and the side panel 3 and the tab 7 thereby making available the entire interior of the
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tray for receiving articles. This tray may also have a longitudinal surface for increasing the rigidity of the side panels and the stacking stability of superposed trays by an extension of the triangular panel 25 to include a longitudinal surface panel.

In all these embodiments, it is possible to interchange the longitudinal and lateral side panels without adversely affecting the design or the rigidity of the tray.

What we claim is:

1. In a blank of the type when set up forms a stackable tray including a polygonal bottom panel and four side panels each joined thereto by an associated fold line, the improvement comprising means defining at each corner of the bottom panel a polygonal area of material bounded at least in part by a lateral edge of each adjacent side panel for forming a stacking and securing panel internally of the set up tray at each corner thereof, a first side panel at each corner having a height greater than that of a second side panel at each corner, a tab projecting from each first side panel lateral edge and being adapted for securement to the exterior of its adjacent second side panel, the tab of each first side panel having an edge additionally setting-off at least in part said stacking and securing panel, and at least a single fold line in each stacking and securing panel for dividing the same into a stacking panel joined to its associated second side panel at the lateral edge and a terminal securing panel joined by said at least a single fold line to its associated stacking panel whereby upon the securement of each terminal securing panel to its associated first side panel the stacking panel thereof spans its associated bottom panel corner spaced inwardly from its apex to form a stacking edge spaced below an uppermost edge of the associated side panel.

2. The improvement in the blank as defined in claim 1 wherein each second side panel lateral edge and its associated at least a single fold line are in spaced generally parallel relationship.

3. The improvement in the blank as defined in claim 1 wherein each lateral edge of each first panel is defined by a cut line and a fold line, and said lastmentioned fold line joins each tab to its associated first side panel.

4. The improvement in the blank as defined in claim 1 wherein each lateral edge of each first panel is defined by a cut line and a fold line, and a portion of said cut line in part sets-off said polygonal area of material and a portion of said bottom panel at each corner thereof.

5. The improvement in the blank as defined in claim 2 wherein each lateral edge of each first panel is defined by a cut line and a fold line, and said lastmentioned fold line joins each tab to its associated first side panel.

6. The improvement in the blank as defined in claim 2 wherein each lateral edge of each first panel is defined by a cut line and a fold line, and a portion of said cut line in part sets-off said polygonal area of material and a portion of said bottom panel at each corner thereof.

7. The improvement in the blank as defined in claim 5 wherein a portion of said cut line in part sets-off said polygonal area of material and a portion of said bottom panel at each corner thereof.

8. The improvement in the blank as defined in claim 1 wherein each second side panel lateral edge is defined by a pair of offset noncolinear fold lines.

9. The improvement in the blank as defined in claim 1 including a second tab disposed between each first-mentioned tab and the adjacent first side panel, and each second tab being joined by a fold line to its associated second side panel and adapted for securement to its associated adjacent first side panel.

10. The improvement in the blank as defined in claim 8 including a second tab disposed between each first-mentioned tab and the adjacent first side panel, and each second tab being joined by a fold line to its associated second side panel and adapted for securement to its associated adjacent first side panel.

11. The improvement in the blank as defined in claim 1 wherein each said at least a single fold line and the lateral edge of its associated second side panel define therebetween an acute angle opening in a direction away from their associated bottom corner.

12. The improvement in the blank as defined in claim 11 including another fold line between each said at least a single fold line and the lateral edge of its associated second side panel defining with both an acute angle opening in a direction away from their associated bottom corner thereby forming said stacking panel into a pair of triangular stacking panel portions.

13. In a blank of the type when set up forms a stackable tray including a polygonal bottom panel and four side panels each joined thereto by an associated fold line, the improvement comprising means defining at each corner of the bottom panel a polygonal area of material bounded at least in part by a lateral edge of each adjacent side panel for forming a stacking and securing panel internally of the set up tray at each corner thereof, a first side panel at each corner having a height greater than that of a second side panel at each corner, a tab projecting from each first side panel lateral edge and being adapted for securement to the exterior of its adjacent second side panel, the tab of each first side panel having an edge additionally setting-off at least in part said stacking and securing panel, and each said stacking and securing panel having a locking projection projecting therefrom in the same direction as the first-mentioned projection associated therewith.

14. The improvement in the blank as defined in claim 1 wherein each said stacking panel has a locking projection projecting therefrom in the same direction as the first-mentioned projection associated therewith.

15. In a blank of the type when set up forms a stackable tray including a polygonal bottom panel and four side panels each joined thereto by an associated fold line, the improvement comprising means defining at each corner of the bottom panel a polygonal area of material bounded at least in part by a lateral edge of each adjacent side panel for forming a supporting panel internally of the set up tray at each corner thereof, a first side panel at each corner having a height greater than that of a second side panel at each corner, a tab projecting from each first side panel lateral edge and being adapted for securement to the exterior of its adjacent second side panel, the tab of each first side panel having an edge additionally setting-off at least in part said supporting panel, a stacking panel projecting from each second side panel in the same direction as its associated first side panel projecting tab, and means for securing a portion of each said stacking panel in sandwiched relationship between its associated side and supporting panels.

16. The improvement in the blank as defined in claim 15 wherein said last-mentioned means is defined by an
interlocking opening formed in each first side panel
and a tongue carried by each associated second side
panel projection received therein.

17. A stackable tray comprising a polygonal bottom
panel and four upstanding side panels each joined
thereto by an associated fold line, a first side panel at
each corner of said tray having a height greater than
that of a second side panel at each corner, a tab pro-
jecting from a lateral edge of each first side panel,
means securing each tab to an exterior surface of its as-
associated second side panel whereby said tray is retained
in its erected condition, each second side panel being
joined by a first fold line to at least a single stacking
panel, each stacking panel being joined by a second
fold line to a terminal securing panel, means securing
each securing panel to its associated first side panel,
each stacking panel having an uppermost stacking edge
disposed below an uppermost edge of its associated
second side panel, and each stacking panel spans its as-
associated corner between its first and second side panels
inward spaced relationship to an apex of the associ-
associated corner.

18. The stackable tray as defined in claim 17 wherein
said first and second fold lines are in generally parallel
relationship to each other and are disposed in vertical
relationship to said bottom panel.

19. The stackable tray as defined in claim 17 includ-
ing another tab disposed beneath said stacking panel,
said another tab being joined by a third fold line to an
associated second side panel, and means securing each
another tab to an interior surface of its associated first
side panel.

20. The stackable tray as defined in claim 19 wherein
said first through third fold lines are in generally paral-
el relationship to each other and are disposed in verti-
cal relationship to said bottom panel.

21. The stackable tray as defined in claim 19 wherein
said first and second fold lines are in upward diverging
relationship to each other.

22. The stackable tray as defined in claim 21 wherein
said first and second fold lines converge at each associ-
cated corner apex.

23. A stackable tray comprising a polygonal bottom
panel and four upstanding side panels each joined
thereto by an associated fold line, a first side panel at
each corner of said tray having a height greater than
that of a second side panel at each corner, a tab pro-
jecting from a lateral edge of each first side panel,
means securing each tab to an exterior surface of its as-
associated second side panel whereby said tray is retained
in its erected condition, each second side panel being
joined by a first fold line to a stacking panel, each
stacking panel having a stepped upper edge defined by
a vertically upwardly directed locking projection, said
stepped upper edge being defined by an uppermost
dege of said locking projection and a lowermost edge of
a remaining portion of said stacking panel, and each
uppermost edge being disposed between its associated
lowermost edge and an uppermost edge of its associ-
ated first side panel.

24. The stackable tray as defined in claim 23 includ-
ing a generally planar support contoured to the general
configuration of the interior of said tray, notch means
in said support for interlockingly receiving said locking
projections, and said support being supported by said
lowermost edges.

25. The stackable tray as defined in claim 24 wherein
said support includes tongues, said side panels include
openings, and said tongues are received in said open-
ings.

26. The stackable tray as defined in claim 24 wherein
said second side panels have upwardly directed projec-
tions having uppermost edges in generally horizontal
alignment with said first-mentioned projection upper-
most edges for additionally supporting said support.

27. The stackable tray as defined in claim 25 wherein
said second side panels have upwardly directed projec-
tions having uppermost edges in generally horizontal
alignment with said first-mentioned projection upper-
most edges for additionally supporting said support.

28. A stackable tray comprising a polygonal bottom
panel and four upstanding side panels each joined
thereto by an associated fold line, a first side panel at
each corner of said tray having a height greater than
that of a second side panel at each corner, a tab pro-
jecting from a lateral edge of each first side panel,
means securing each tab to an exterior surface of its as-
associated second side panel whereby said tray is retained
in its erected condition, each second side panel being
joined by a first vertically upstanding fold line to a ter-
mainal panel, each terminal panel being in side-by-side
relationship with its associated first side panel, a stack-
ing panel disposed in a generally horizontal plane and
spanning its associated corner between the first and
second side panels thereof, each stacking panel being
joined by a fold line to its associated second side panel,
each stacking panel being disposed below an upper-
most edge of its associated first side panel, and means
securing each stacking panel in its generally horizon-
tally disposed position.

29. The stackable tray as defined in claim 28 wherein
said securing means includes a tongue carried by each
stacking panel connected to its associated first side
panel.

30. The stackable tray as defined in claim 28 wherein
said securing means included a tongue carried by each
stacking panel received in an opening formed in its as-
associated first side panel.

31. The stackable tray as defined in claim 30 wherein
each tongue is sandwiched between an associated first
side panel and terminal panel.

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