

[54] **PACKING CONTAINER**

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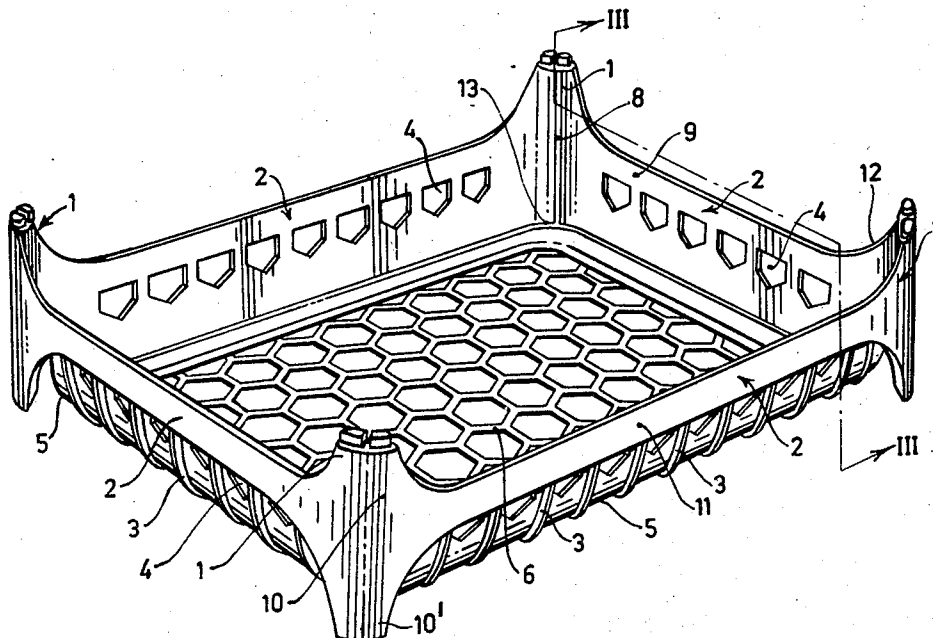
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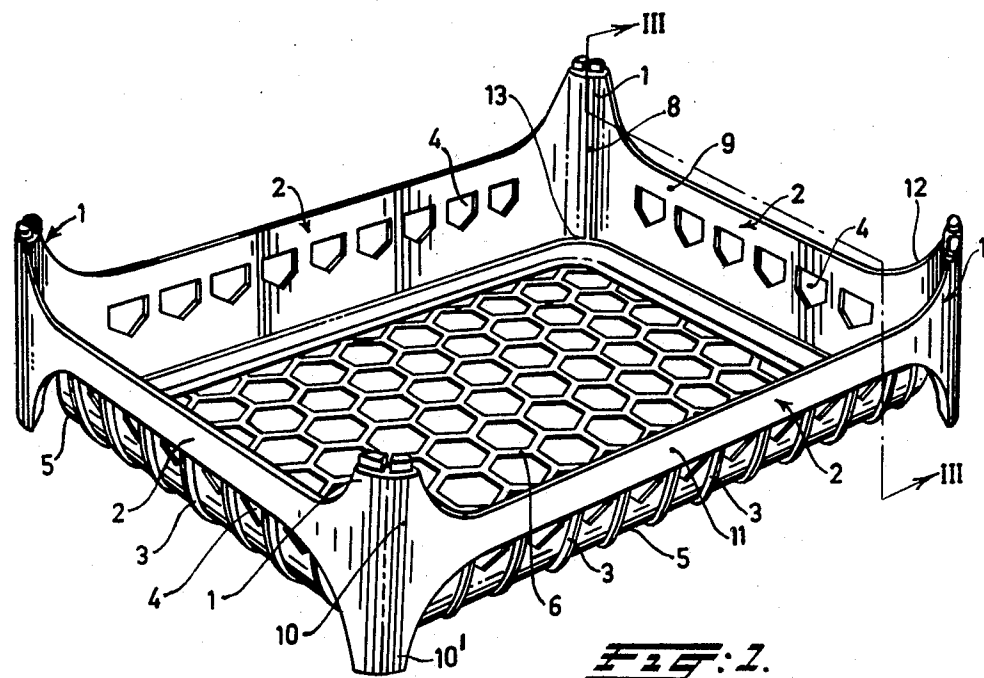
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[57] **ABSTRACT**

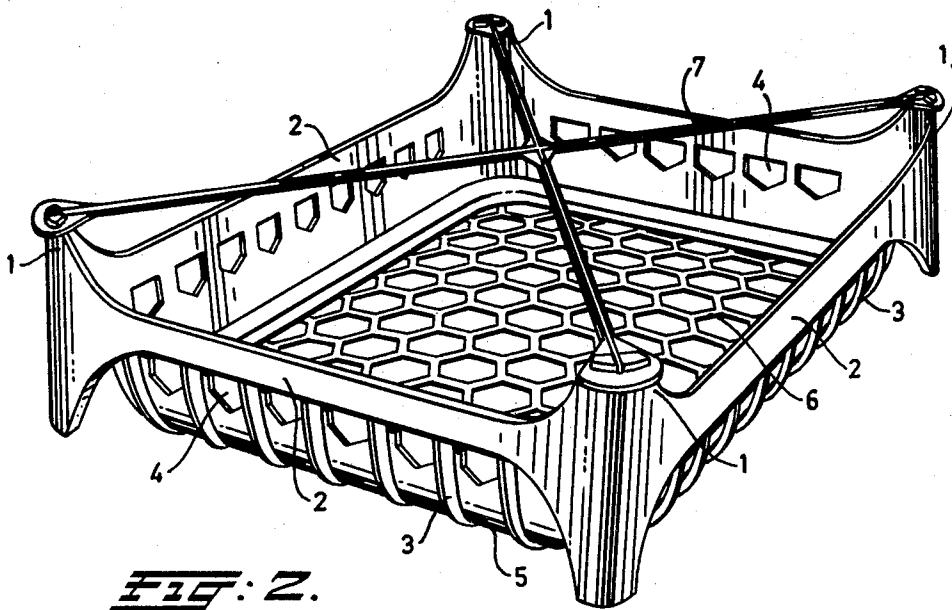
A packing container of synthetic thermoplastic material is in the form of a rectangular bin having vertical supporting members at each corner interconnected by horizontal bearing members spaced downwardly from the tops of the support members and defining the upper edges of the bin. A bottom wall has its edges merging into the bearing members and is spaced above the lower ends of the corner support members. The entire structure of the corner support members, bearing members and the bottom wall is a single unitary member. A cross tape may be interconnected between the upper ends of the corner support members and may be so dimensioned so as to be under tension. The bottom portion of the bottom wall may be provided with a regular pattern of openings to receive fruit or the like which is being packed in the container.

**8 Claims, 7 Drawing Figures**





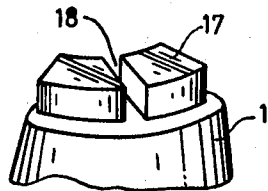
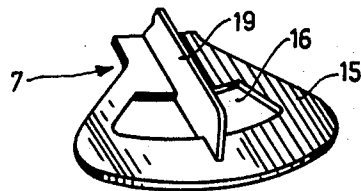
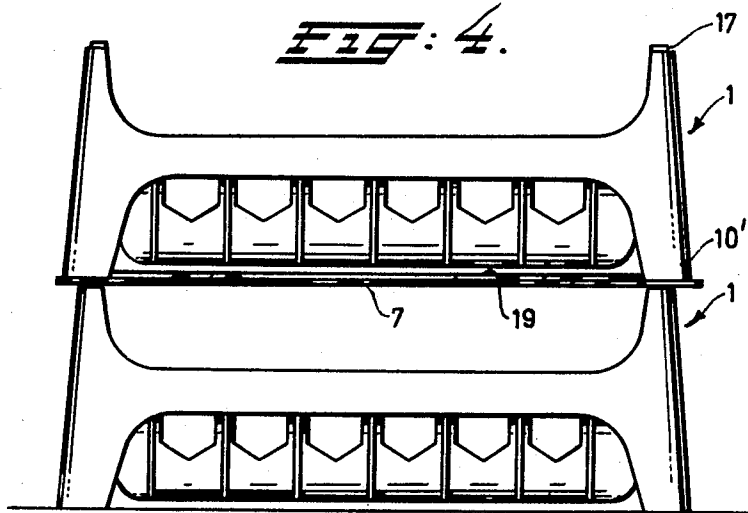
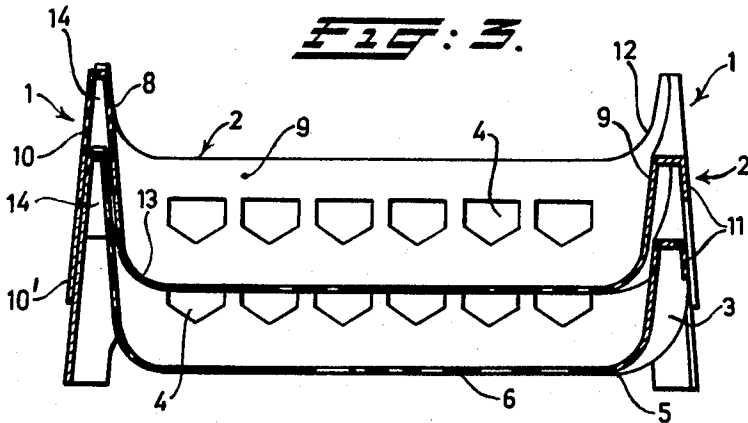
**FIG. 1.**



**FIG. 2.**

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**PACKING CONTAINER**

The present invention relates to a packing container for fruit and the like, more particularly, such a packing container formed from a piece of thermoplastic material into the shape of a unitary rectangular bin which can be readily stacked with similar containers.

A known form of a packing container, especially for fruit, comprises a rectangular bin having vertical corner supports protruding upwardly so as to support a similar bin stacked thereon and spaced from the edge of the first bin. Such packing containers have been described as "legged bins," and are generally used for the transportation of tomatoes, grapes, plums and other fruits. The upwardly protruding corner supporting members provide a space between the bottom wall of one bin and the contents of the bin stacked underneath. This spacing permits the circulation of fresh air which is of particular importance with many kinds of fruits in order to prevent any growth of molds on those fruits which may become damaged.

This general type of legged bin has been made in a wide variety of forms. However, these packing containers have generally one or more disadvantages so that no bin has ever come into wide-spread use. The ideal packing container should meet a number of requirements which are contradictory. Such a packing container should have sufficient strength to transport fruits and to withstand rough handling but at the same time the cost and the weight of the container should be as low as possible. The cost factor is particularly important since many of the packing containers are used only once, particularly in export, and then are discarded. Such containers should also be simple in construction so as to avoid, if at all possible, any assembly on the part of the user.

It is therefore the principal object of the present invention to provide a novel and improved packing container particularly for fruits and the like.

It is another object of the present invention to provide a packing container in the form of a rectangular bin and shaped from an integral piece of thermoplastic material at a low cost.

It is a further object of the present invention to provide a packing container of thermoplastic material having a simple structure including sides, corner supports and a bottom.

According to one aspect of the present invention a packing container for fruit and the like may comprise a rectangular bin having vertical support members at each corner thereof and horizontal bearing members extending between the corner support members. The bearing members are spaced downwardly from the top ends of the corner support members and define the upper edges of the bin. A bottom wall includes a bottom portion and has its edges merging upwardly into the inner faces of the bearing members. The bottom portion of the bottom wall is spaced above the lower ends of the corner support members. The vertical support members, the bearing members and the bottom wall is of a single integral plastic member with the bottom wall having a smaller thickness than the vertical support and bearing members.

A cross tape may be interconnected between the top ends of the corner support members and is dimensioned so as to be under tension when secured in position.

The vertical corner supports have a substantially inverted U-shaped section with the legs thereof diverging in a downward direction so as to facilitate stacking of the packing containers. The horizontal bearing members may also have an inverted channel shape so that the container has maximum rigidity and strength obtained with a minimum of material in forming the container.

Other objects and advantages of the present invention will be apparent upon reference to the accompanying description when taken in conjunction with the following drawings, which are exemplary, wherein;

FIG. 1 is an overall perspective view of a packing container according to the present invention;

FIG. 2 is an overall perspective view of the packing container of FIG. 1 but with a cross tape interconnected between the upper ends of the corner supports;

FIG. 3 is a sectional view taken along the line III—III of FIG. 1 and showing the relationship of two stacked containers;

FIG. 4 is an elevational view of two stacked containers with the lower container having a cross tape upon which the upper container is positioned;

FIG. 5 is a perspective view in enlarged scale of the structure on the upper end of a corner support and the end of a cross tape which is secured on this corner structure;

FIG. 6 is a perspective view of a modified corner support member of the present invention; and

FIG. 7 is a sectional view taken along the line VII—VII of FIG. 6.

Proceeding next to the drawings wherein like reference symbols indicate the same parts throughout the various views a specific embodiment and modifications of the present invention will be described in detail.

As may be seen in FIG. 1 the packing container comprises a rectangular bin having vertical support members 1 in each of its four corners. Extending between the support members 1 are horizontally disposed bearing members 2 which form the upper edges of the side walls of the bin. The support members 1 and bearing members 2 are sufficiently rigid to give shape and firmness to the container. The bin further comprises a bottom wall having a bottom portion 4 which curves upwardly along its edges to form portions 5 which merge into the inner faces of the supporting members 2. A plurality of reinforcing ribs 3 are formed on the outer faces of the merging portions 5 between a plurality of openings 4 formed immediately below the supporting members 2. The ribs 3 may have a horizontal triangular cross section and the thickness of the ribs at the top may be equal to the width of the supporting members 2 but decreases progressively downwardly as the lower ends of the ribs merge into the bottom portion 6.

The ribs 5 function to support the bin from the bearing members 2. However, the ribs 5 may be positioned only between the opposite walls of the bearing member 2 having a U-shaped cross section as shown in the drawings so that the ribs 5 will then function as reinforcing elements.

The bottom portion 6 is provided with a plurality of openings to define a honeycomb structure with the articles being smaller than the smallest article to be packed within the container. The bottom portion may also be

formed as a grid and so constructed that when the container is empty the bottom portion will bulge slightly upwardly.

The components of the packing container as described above are formed of a synthetic plastic material such as polyolefines, vinyl or vinylidene polymers or copolymers such as polyvinylchloride and preferably polystyrene whether or not of the high impact quality. The thickness of the components varies from 0.5 to 2.0 mm. with the thinner portions forming the bottom wall and the thicker portions being found in the corner support members and bearing members. Only a relatively small amount of plastic material is required to manufacture this container by known injection molding techniques and the resulting cost per unit container is relatively small.

As may be seen in FIG. 3, the corner support members 1 and the bearing members 2 have substantially inverted channel cross sections. This cross section together with the diverging downwardly of the opposing legs of both the corner supports and the bearing members facilitates stacking of the containers when they are empty.

As may be seen in FIGS. 1 and 3 a U-shaped corner supporting member 1 has an inner leg 8 which merges on either side into an inner leg 9 of the adjacent U-shaped bearing members 2. In a similar manner the outer leg 10 of a corner support merges into the outer leg 11 of the adjacent U-shaped bearing support members 2. The merging of the inner and outer legs results in curved or rounded merging portions as may be seen in FIGS. 1 and 2. The upper edges of the bearing members 2 merge at 12 into the corner supports 1 as can be seen in FIGS. 1 and 3. In a similar manner, the lower end of the inner leg 8 of a corner support member merges at 13 into the bottom portion 6 of the bin. The lower end 10' of the outer leg is straight and extends below the bottom portion 6 to form a support when the container is rested upon a surface.

The substantially U-shaped cross section of the corner support members 1 and the bearing members 2 imparts greater rigidity and strength to the container with a minimum use of material. Further, the divergence of the legs of both the corner support members and bearing members provides good nesting characteristics to facilitate stacking of empty containers as shown in FIG. 3.

The slight divergence of the legs 9 and 11 of the bearing members 2 has no direct relationship to the nesting characteristics of a container. This divergent property of the legs of the bearing members 2 results in part from tightly finishing in a horizontal direction the outer and inner sides of the bearing members 2 and the corner support members 1.

Each corner support 1 may be provided with a reinforcing partition 14 extending diagonally therein as may be seen in FIG. 3. The partition extends from the inner face of the top end of a corner support downwardly a short distance so that the lower edge of the partition will rest on the top of a corner support of a next lower container when a plurality of empty containers are stacked in the manner as shown in FIG. 3. In this position the reinforcing ribs disposed on the merging portions of the bottom of the bin will not contact the upper edge of the bearing member of the packing

container nested therebelow. The presence of these four reinforcing partitions within the corner support members provide great stability when a number of these packing containers are stacked to form a relatively high stack.

For certain applications the reinforcing partition 14 may be extended downwardly through the entire height of a corner support member. While such an arrangement would provide an extremely strong packing container it would become more difficult to stack properly such containers.

A cross tape 7 having widened portions 15 on each of its four ends is connected between the tops of the corner supports of a container as shown in FIG. 2. Each widened portion 15 is provided with an opening 16 and a vertical reinforcing rib 19 extends along the top of each cross tape and over the opening 16 as may be seen in FIG. 5. The opening 16 receives a projection portion or saddle 17 mounted on the upper end of a corner support member 1. The saddle 17 is provided with a slot 18 which receives the reinforcing rib 19 to form a snap closure.

The cross tape may be made in one piece but may also be formed of two separate tapes which are applied diagonally across the bin. The cross tape is so dimensioned that it is taut when connected between the corner supports as shown in FIG. 2. By positioning such a cross tape over the container after it has been packed considerably greater rigidity is imparted to the container so that its bin construction per se can have a relatively light and thin configuration while nevertheless providing the container with all the desired properties.

The cross tape may also comprise four cross tapes each having a length substantially equal to one-half the diagonal distance of the container. One of the tapes may be provided with openings to receive beads molded on the ends of the other three tapes so that a quick connection between the cross tapes can be obtained.

When a number of packing containers have been filled and the cross tapes placed in position they are stacked by positioning the lower ends of the corner supports of one container onto the widened portion 15 of a cross tape of the next lower container as shown in FIG. 4. Since the lower end of a corner support fits around a saddle 17 on the upper end of a corner support on a container therebelow, the stacked containers will be prevented from shifting with respect to each other after they have been stacked. The slot 18 in the saddle 17 on the top of a corner support may be also used to receive the lower edge of a diagonal partition 14 of another container stacked thereon when the containers are empty. The lower ends 10' of the corner supports of a container may also rest on the top ends of corner supports 1 of a next lower container wherein the top ends have been broadened in the vicinity of the saddle 17. This construction may be employed when the cross tape 7 is provided with a bead at its end which can be snapped into a suitable recess formed in the saddle 17 on either side of the slot 18.

It is preferable that the cross tape be so dimensioned that it is under slight tension when positioned between the corner supports. Under certain conditions it may be also advantageous to so dimension the cross tape that it is necessary to press the corner supports slightly in-

wardly in order to position the tape opening 16 over the saddles 17. This construction will also produce a tension in the cross tape which will facilitate supporting the uppermost ones of a stack of containers.

In FIGS. 6 and 7 there is shown a modification of the container which cannot be nested upon a similar container. These packing containers rest either upon the ground or upon the top of another container. The corner supporting member 1 has a rear or inner wall 21 which is integral with the bin and so improves the rigidity of the bin that a cross tape is not necessary. A pair of vertical walls 27 and 28 are attached perpendicularly to the outer edges of the rear wall 21 and are formed so as to be integral with bearing members 2 as may be seen in FIG. 6. The upper end of the channel-shaped structure formed by rear wall 21 and side walls 27 and 28 is closed with an end wall 24 and the lower end is closed by an end wall 22. A raised rim or rib 25 is provided on the outer peripheral edge of the top end wall 24 to facilitate the stacking of a similar container thereon. The corner support is further strengthened by a framework which may comprise diagonal reinforcing partitions 23, a vertical partition 26 and/or additional horizontal partitions 22.

While the modified container of FIGS. 6 and 7 cannot be nested with a similar container, this modified container is easier to manufacture by injection molding than the container of FIG. 1 and also is more rigid and has greater strength.

A bridging portion 29 may be provided between the corner support side walls 27 and 28 and the bearing members 2. However, the member 29 may be omitted without affecting significantly the strength of the container. All of the components of this modified container are preferably of the same thickness so that a relatively large container may be formed from a minimum amount of thermoplastic material.

It is understood that this invention is susceptible to modification in order to adapt it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within the invention as may fall within the scope of the appended claims.

What is claimed is:

1. A packing container for fruit and the like comprising a rectangular bin having a vertical supporting member at each corner thereof, horizontal bearing members extending between said vertical support members spaced downwardly from the top ends thereof and defining the upper edges of the bin, a bottom wall having a bottom portion and its edges merging into the bearing members and spaced above the lower ends of said support members, said vertical support members, bearing members and the bottom wall being of a single integral plastic member, taut cross tape means extend-

ing diagonally from the tops of said corner support members, means for securing said cross tape means to said support member tops, the corner support members of vertically stacked containers being positioned on said cross tape means, projection means on the tops of said corner support members, there being widened portions on the ends of said cross tape means and having openings therein to receive said projection means, said projection means having a diagonal slot therein, and upright reinforcing ribs on said cross tapes extending across the end opening thereof and positionable in said diagonal slot.

2. A packing container as claimed in claim 1 wherein said cross tapes have a length slightly less than one-half the diagonal distance of the packing container so that the tapes are under tension after being connected upon the corner support members.

3. A packing container as claimed in claim 2 wherein the bottom portion of the bottom wall is grid-shaped.

4. A packing container as claimed in claim 3, wherein the bottom portion of the bottom wall is in the shape of a honeycomb.

5. A packing container as claimed in claim 1, wherein each of said corner support members comprises two spaced vertical walls extending outwardly normally from said rear wall, said two vertical walls being integral with said bearing members.

6. A packing container as claimed in claim 5, and comprising a plurality of reinforcing partitions extending between said two vertical walls.

7. A packing container as claimed in claim 5, and comprising end walls closing the upper and lower ends of the corner support members, and an upstanding rib at the outer peripheral edge of the upper end wall.

8. A packing container for fruit and the like comprising a rectangular bin having a vertical support member at each corner thereof, horizontal bearing members extending between said vertical support members, a bottom wall having a bottom portion merging into the said bearing members, said vertical support members, bearing members and bottom wall being of a single integral plastic member, and a taut cross tape means extending diagonally from the tops of said corner support members, means for securing said cross tape means to said support member tops, the corner support members of vertically stacked containers being positioned on said cross tape means and projection means on the tops of said corner support members, there being widened portions on the ends of said cross tape means and having openings therein to receive said projection means, a diagonal slot in said projection means, and upright reinforcing ribs on said cross tape means extending across the end opening thereof and positionable in said diagonal slot.

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