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Nestable crate for containers

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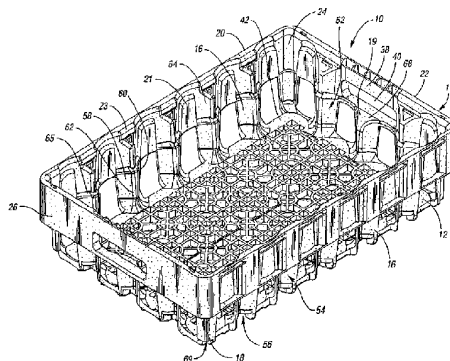
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(54) Title: NESTABLE CRATE FOR CONTAINERS



(57) Abstract: A nestable crate (10) for bottles includes a floor portion (12) having a floor top surface, a floor bottom surface and a plurality of bottle support areas. A wall structure (20, 22) is connected to the floor portion and forms a containment area therewith. The wall structure has a periphally extended upper band portion (14) with an interior surface (24) and an exterior surface (24), and also has a single-walled lower wall construction comprising adjacent column members (16) which extend between the upper band and the floor portion. The wall structure includes sidewalls (20) and end walls (22), and adjacent column members (16) have curved facing surfaces (21) extending inwardly into the containment area. The inner surface of the upper band portion, one of the plurality of bottle support areas, and the facing surfaces define a plurality of bottle receiving pockets extending around the periphery of the wall structure.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

NESTABLE CRATE FOR CONTAINERS

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates to a nestable crate for transporting and storing containers, and particularly bottles.

10 2. Background Art

15 Bottles, particularly those used to contain soft drinks and other beverages, are often transported and stored in crates having a bottom surrounded by four sidewalls. These crates generally are configured to be stacked on top of each other both when empty and when loaded with bottles. These crates are known in the art generally as full-depth and half-depth crates. Half-depth crates are shorter than full-depth crates, thus providing for greater visibility of the crates' contents.

20 Full-depth and half-depth crates are not designed to nest with one another and do not significantly stack, and thus do not store efficiently when. They typically have vertical exterior surfaces from top to bottom, and minimal wall stock, for providing a minimal overall length and width to allow for as much bottle density and as little crate structure as possible, in order to provide for pallet optimization, with little or no pallet overhang. The bottom of these crates extends downwardly and inwardly
25 offset from the sidewalls defining a crate footprint. The stacking feature of such crates is typically limited to this bottom footprint, which is received within the rim of a like container to achieve more stable stack. One design is shown in U.S. Design Patent No. D 361,663.

30 These crates are designed to balance many factors, including the need for structure and strength against having a footprint appropriately sized to provide pallet optimization. However, to achieve significant degree of nesting with such crates, beyond that described above, would require a larger footprint, a more significant

sidewall structure and more taper in the walls, and therefore detracts from the aforementioned pallet optimization.

On the other hand a third type of crate, low-depth crates, have generally
5 been designed for bottles having a straight, cylindrical body with tapering tops. Unlike
their half-depth and full-depth counterparts, low-depth crates typically have a led
construction with tapered sidewalls — thus leading to greater pallet overhang — in order
to provide for a nesting height of typically 50% between like crates. Bottles placed in
low-depth and half-depth crates extend above the sidewalls of the crates. Thus, when
10 loaded with bottles and in a stacked orientation, containers in such crates must be able
to support the weight of other cases stacked on top of them. Once loaded with bottles,
crates are typically stacked on top of each other in layers on top of a pallet, which is
then lifted and moved about by forklifts. However, many low depth nestable crates
may lack the features for maintaining loaded bottles in a substantially vertically upright
15 position to bear the compressive load of crates stacked thereon.

Further, it is common for entire layers of crates to be lifted and moved
about by way of an automated product lifting and handling device which can be
installed on a conventional forklift and enables the lifting of an entire layer of product
20 from a pallet. Briefly, such devices typically grab each side of a layer of crates and use
compressive loads to keep the layer intact, transferring forces from the sidewalls of the
crate to the bottles therein, to the sidewalls of an adjacent crate, and so on.
Unfortunately, some crates may not provide sufficient surface area or vertical sidewall
construction, which would hinder or prevent the use of the automatic handling
25 machinery. The often tapered sidewalls of a low-depth crate is just one example.

Thus, there is a need for an improved crate for storing and transporting
containers, and particularly beverage containers. Such crate should be nestable to
provide for more efficient storing and handling of the crates when emptied. Further,
30 such crates should maintain bottles stored therein in a generally upright position. The
crates should also be able to nest with various types of crates, including similar crates
and non-similar half-depth and full-depth crates. Moreover, when similar crates are in

layered orientation, such crates should be capable of being lifted by automated lifting machinery.

SUMMARY OF THE INVENTION

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The present invention provides a nestable crate for bottles, said crate comprising:

10 a floor portion having a floor top surface and a floor bottom surface, the floor top surface including a plurality of bottle support areas for supporting bottles; and

15 a low-depth wall structure connected to the floor portion and forming a containment area therewith, the wall structure having a peripherally extending upper band portion having an interior surface with bottle contact portions and an exterior surface, the low-depth wall structure further having a single-walled lower wall construction comprising adjacent column members which extend between the upper band portion and the floor portion, the wall structure including sidewalls and end walls, and adjacent column members having concave facing surfaces extending inwardly into the containment area, wherein at least one of the sidewalls and end walls includes a
20 handle opening extending therethrough defined by an upper handle member and a lower handle member, with at least one column member from the lower handle member to the floor portion,

25 wherein the bottle contact portions, bottle support areas, and the facing surfaces define a plurality of bottle receiving pockets extending around the periphery of the wall structure for maintaining bottles in a vertically upright manner.

Preferably, the upper band member has an inner surface with a plurality of nesting members aligned with corresponding column members, such that an outer
30 surface of the column members are configured to receive the nesting members of a like crate when in a nesting orientation.

Preferably, the bottle contact portion has a concave shape.

35 More preferably, the band also includes a bottle contact surface that has a curvature corresponding to the pair of facing surfaces.

Preferably, the nesting members have a double-walled construction.

Preferably, the bottle contact portion has a single-walled construction.

5 Preferably, the upper band member and each adjacent pair of columns
define a window there between which is disposed below the upper band portion.

BRIEF DESCRIPTION OF THE DRAWINGS

10 FIGURE 1 is a perspective view of a first embodiment of a nestable
bottle crate according to the present invention;

FIGURE 2 is a top plan view of the crate of Figure 1;

15 FIGURE 3 is a front side elevational view of the crate of Figure 1, the
rear side elevational view being a mirror image thereof;

 FIGURE 4 is a left end elevational view of the crate of Figure 1, the
right end elevational view being a mirror image thereof;

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FIGURE 5 is a bottom plan view of the crate of Figure 1;

FIGURE 6 is a bottom perspective view of the crate of Figure 1;

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FIGURE 7 is a perspective sectional view of the crate of Figure 1 nested within a first prior art half-depth crate;

5 FIGURES 8a and 8b show, respectively, a perspective view and a cross-sectional view, of a second embodiment of a crate according to the present invention nested within a second prior art straight-walled half-depth crate;

10 FIGURE 9 is a perspective view of a third embodiment of a nestable bottle crate according to the present invention;

FIGURE 10 is a top plan view of the crate of Figure 9;

FIGURE 11 is a bottom plan view of the crate of Figure 9;

15 FIGURE 12 is a front side elevational view of the crate of Figure 9, the rear side elevational view being a mirror image thereof;

20 FIGURE 13 is a left end elevational view of the crate of Figure 1, the right end elevational view being a mirror image thereof;

FIGURE 14 is a sectional view taken along the lines 14-14 of Figure 10;

FIGURE 15 is a sectional view taken along the lines 15-15 of Figure 10;

25 FIGURE 16 is a sectional view taken along the lines 16-16 of Figure 10;

FIGURE 17 is a sectional view taken along the lines 17-17 of Figure 10;

30 FIGURE 18 is a sectional view taken along the lines 18-18 of Figure 10.

FIGURE 19 is a cross-sectional view showing two crates of Figure 9 nested and with a bottle disposed in the upper crate; and

FIGURE 20 is a top plan view of the crate of Figure 9 with bottles disposed therein.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

In accordance with the present invention, provided in Figures 1-7 is a first embodiment of a nestable bottle crate 10 which is suitable for holding containers 5 (shown as bottles in Figures 19-20) therein. Crate 10 is preferably formed from a plastic material, such as high density polyethylene (HDPE), by an injection molding or other suitable plastic molding process. Crate 10 is also preferably formed as a unitary member with all components integrally connected. Containers 5 may be used for beverages and have a generally cylindrical shape. Referring to Figure 1, crate 10 includes a floor member 12, and also includes a wall structure that has a top band 14 (or upper wall member) and a plurality of columns 16 (or lower wall member) extending around the periphery of the floor member 12 for connecting floor member 12 to top band 14. Columns 16 are arranged along the sides of crate 10. Crate 10 also includes corner column members 18 at each of the corners of crate 10. The wall structure includes sidewalls 20 and end walls 22. Crate 10 may have a rectangular or square shape. A compartment is defined by the wall structure and the floor member.

As shown in Figure 1, top band 14 extends around the periphery of crate 10 and includes a sidewall 20 having a plurality of bottle contact areas 21 which are illustrated as single-walled, while having a double-walled construction 23 between adjacent bottle contact areas 21. In addition, end walls 22 are illustrated as having a double-walled construction, but may also be formed with single wall portions. Top band 14 has an interior surface 24 and an exterior surface 26. Top band 14 is oriented generally perpendicular to floor member 12 and is spaced above floor member 12 a sufficient height to prevent bottles stored therein from tipping. As illustrated in a later embodiment of Figures 19-20, bottles 5 stored within crate 10 along the side and end walls 20, 22, are disposed adjacent their corresponding bottle contact surfaces. Figure 2 shows that interior surface 24 has a curved or cylindrically shaped bottle contact surface 21, but it is contemplated that it may also be a flat surface.

Top band 14 provides the desired strength and rigidity to crate 10, while allowing for a relatively lighter weight crate by its partial single-walled construction. Exterior surface 26 of top band is generally vertically disposed.

5

A handle portion 38 is also included in the band member 14 of end walls 22 by which a user may grasp crate 10. An opening 40 is disposed below handle member 38 through which a user's fingers may extend for handling crate 10 in association with handle 40. The central end wall columns define an inwardly extending
10 nesting ledge 68, which provides an additional stop during nesting.

Floor member 12 has an open lattice pattern that provides for a relatively lightweight crate and allows drainage. Floor member 12 is generally flat and planar and includes support areas 42 arranged in rows and columns to define one or
15 more arrays. In the embodiment shown, a 4x6 array accommodates 24 20-oz bottles. Of course, this is by example and not limitation as the crate may be designed to support various quantities and sizes of bottles, without departing from the teachings herein. As shown in Figure 9, upper surface 244 of floor 212 may also include a plurality of relatively low profile ribs 46,48 extending upwardly and across upper surface. Such
20 ribs help provide stiffness to bottom 212.

As shown in Figures 5-6, floor bottom surface 45 has recesses below each receiving area 42 for receiving the tops of bottles 5 disposed in a crate stacked therebelow. The recesses are defined by downstanding rib members 49 that impede
25 crate 10 from freely sliding along the top of bottles 5 beneath it, and makes it less likely that the bottles in a lower crate will tip.

The various embodiments of the crate according to the present invention are nestable with similar crates, as illustrated in Figure 19, which shows a cross-section
30 of crates 210 and 210' nested together and holding a bottle 5. When in a nested arrangement, upper crate 210 fits into lower crate 210' so that the lower edge 235 of top band 214 rests upon the upper edge 231' of top band 214'.

With reference again to Figures 1-6, columns 16 along walls 20 and 22 of crate 10 that connect floor member 12 to band 14 are positioned between adjacent support areas 42 along the periphery of floor member 12. The wall structure has window openings 50 between columns 16, adjacent support members 42 and below band 14. Window openings 50 allow for visibility into crate 10, and also receive surface 21 of a lower crate when nested. The height of column 16 is sufficient to prevent containers 5 from tipping when transported, and allow the tops of containers 5 to extend above top band 14. Columns 16 have a generally single-walled construction, and have an interior surface 52 and a corresponding exterior surface 54. Exterior surface 54 of column 16 includes a centrally disposed recessed area 56 which, when nested with a similar crate, receives the corresponding inwardly disposed inner surface 64 of top band 14 disposed above and in vertical alignment with column 16 and have a common centerline therewith. Surfaces 64 provide nesting support and bottle stability.

Interior surface 52 of column 16 is generally vertical and includes angled bottle surfaces 58 and 60 which meet at a centrally oriented, vertically disposed, inwardly directed lower surface or edge 62. In a preferred embodiment, bottle contact surface 21 is cylindrically planar with column surfaces 58, 60. Upper inner surface 64 is disposed slightly outward from column inner surface 52, to provide a transition ledge 65 therebetween. Top band 14 is offset outwardly from columns 16 such that nesting is achieved, both with similar crates (Figure 19) and non-similar half-depth crates 400 with a similar footprint and which has a generally vertically wall structure, as previously described (Figures 8a-8b).

Columns 16 should also be strong enough to support the band 14 should containers 5 push against band 14. Columns 16 are generally defined by two arcuate faces 58, 60 intersecting at a central edge 62, and may have a relatively larger area and cross-section at their bottoms, thus being more robust in their connection with floor member 12. Opposed surfaces 58,60 of column 16 have a curvature generally mirroring that of adjacent bottles 5, such that the adjacent facing surfaces 58 of one column and 60 of an adjacent column cradle the bottles 5 therein.

With reference to Figures 1-2, corner columns 18 do not project inwardly into crate 10, but remain peripherally disposed, thereby providing a more secure corner pocket for a bottle stored therein. The degree of containment of corner bottle support area 42a results from the adjacent end and side columns 16a, 16b, as shown in Figure 2.

Figures 1, 6 and 7 illustrate another feature of crate 10 according to the present invention. As shown, the bottom surface of corner columns 18 and floor 12 define a recessed corner nesting area 69. Thus, as shown in Figure 7, when crate 10 is nested within a prior art half-depth crate 500 that has a corner projection 503, nesting area 69 receives a portion of corner projection 503 to enhance the stackability and nestability of such containers.

As previously noted, typical half-depth crates may only stack (not nest) with similar half-depth crates due to their construction, while low-depth crates typically are nested within similar low-depth crates. Thus, crates according to this invention provide for dual application in that it may nest within similar container 210' (Figure 19), and it also nests within a half-depth crate 400 of different construction (Figures 8a-8b), as illustrated by second embodiment of crate 110. Accordingly, crates according to the present invention provide efficient bottle containment having an optimally sized footprint similar to a non-nestable half-depth crate, while allowing for nestability both with similar crates and with non-nestable half-depth cases having a similar footprint. As shown in Figure 8b, the outer surface of top band 114 is vertically disposed and coplanar with the outer surface of half-depth crate 400.

Figures 9-20 illustrate a third embodiment of a crate 210 according to the present invention. Features similar to those of the first embodiment have a corresponding reference number with a "2" prefix. Crate 210 includes a sidewall 220 and end wall 222 construction having a top band 214 with an interior surface 224 and an exterior surface 226. Exterior surface 226 of top band 214 is defined by a plurality of ribbed members projecting therefrom, which includes a plurality of horizontally disposed ribbed members which are oriented generally parallel to each other and designated as upper rib portion 230, intermediate rib portion 232, and lower rib portion

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234. Upper and lower rib portions 230 and 234 define, respectively, the upper edge 231 and lower edge 233 of band member 214. Exterior surface 226 also includes a plurality of vertically disposed rib portions 236 extending around the perimeter of band member 214. Exterior surface 226 is vertically disposed and has little or no taper associated therewith.

5

Ribs 230-236 enhance the strength of crate 210 while using relatively less material and are particularly advantageous when used in association with automate lifting devices. When crates 210 are stacked upon a pallet in layers, these ribs define a generally planar surface by which the lifting device may grasp crates efficiently. Upon gripping, a compressive force is distributed among the crates and ribs 230-236 may serve to catch onto corresponding ribs of an adjacent crate to enhance the support of adjacent crates and impede the separation and translation down of crates in a layer. When adjacent crates 210 are in a layer of crates being lifted, should one crate begin to slip, it is contemplated that, for example, upper horizontal rib 230 of crate 210 may cooperate with ribs 232 and 236 of the adjacent crate to impede slippage.

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Columns 216 that define side pockets 267 of crate 210 provide significant containment and wrap-around for bottles adjacent sidewalls 220 and end walls 222, as well as in the corners. This provides for more bottle surface contact and thus better bottle and load stability.

20

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

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In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

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It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A nestable crate for bottles, said crate comprising:
 - a floor portion having a floor top surface and a floor bottom surface, the floor top surface including a plurality of bottle support areas for supporting bottles; and
 - a low-depth wall structure connected to the floor portion and forming a containment area therewith, the wall structure having a peripherally extending upper band portion having an interior surface with bottle contact portions and an exterior surface, the low-depth wall structure further having a single-walled lower wall construction comprising adjacent column members which extend between the upper band portion and the floor portion, the wall structure including sidewalls and end walls, and adjacent column members having concave facing surfaces extending inwardly into the containment area, wherein at least one of the sidewalls and end walls includes a handle opening extending therethrough defined by an upper handle member and a lower handle member, with at least one column member from the lower handle member to the floor portion,
 - wherein the bottle contact portions, bottle support areas, and the facing surfaces define a plurality of bottle receiving pockets extending around the periphery of the wall structure for maintaining bottles in a vertically upright manner.
2. The crate of claim 1, wherein the interior surface of the upper band portion includes a plurality of nesting members aligned with corresponding column members, such that an outer surface of the column members are configured to receive the nesting members of a like crate in a nesting orientation.
3. The crate of claim 2, wherein the nesting members have a double-walled construction.
4. The crate of claim 1, wherein the bottle contact portion has a concave shape.
5. The crate of claim 4, wherein the bottle contact portion has a curvature corresponding to the facing surfaces.
6. The crate of claim 1, wherein the bottle contact portion has a single-walled construction.

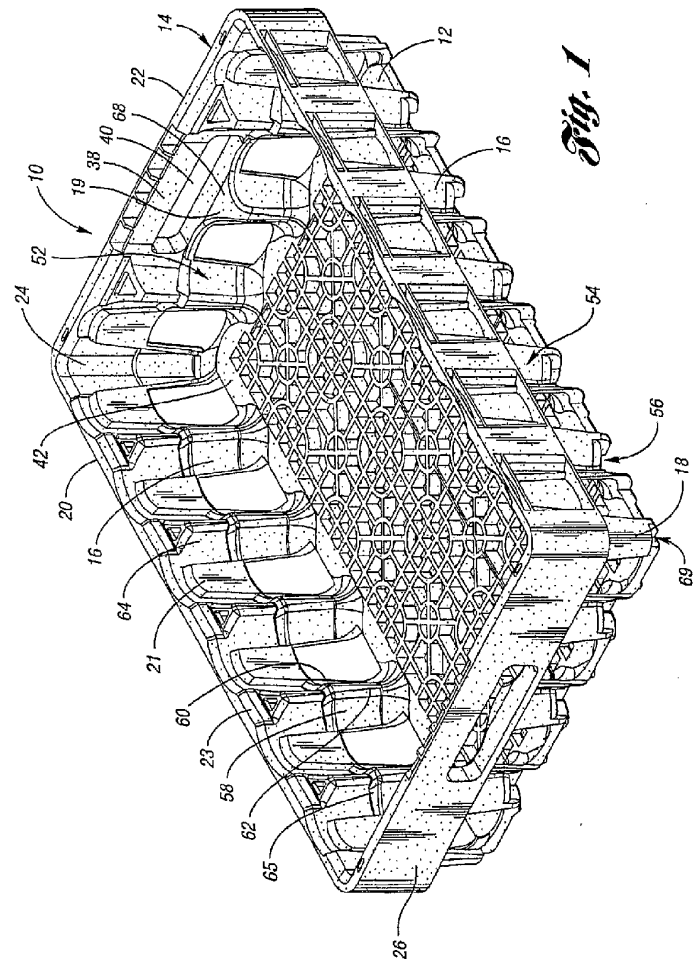
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7. The crate of claim 1, wherein the upper band member and each adjacent pair of columns define a window there between which is disposed below the upper band portion.
- 5 8. A nestable crate for bottles according to claim 1 and substantially as herein described with reference to the accompanying drawings.

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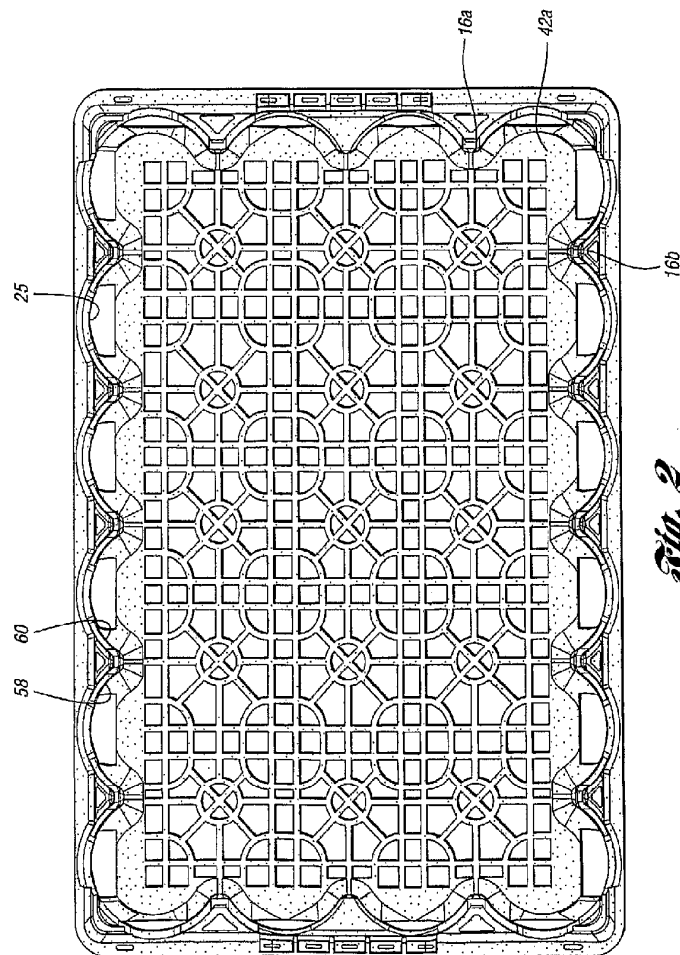
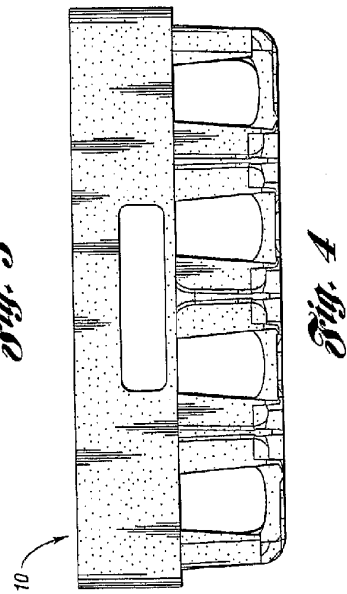
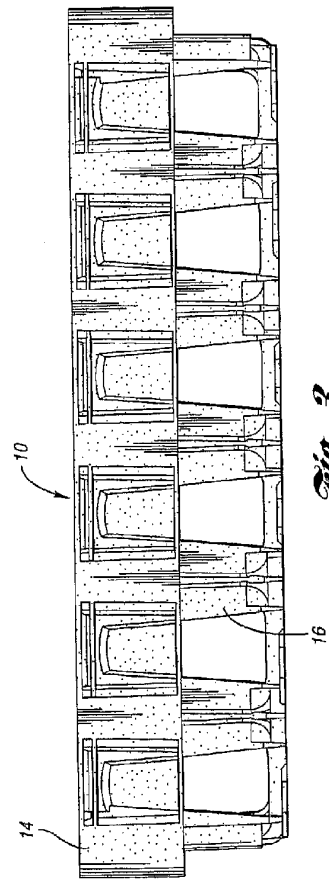


Fig. 2

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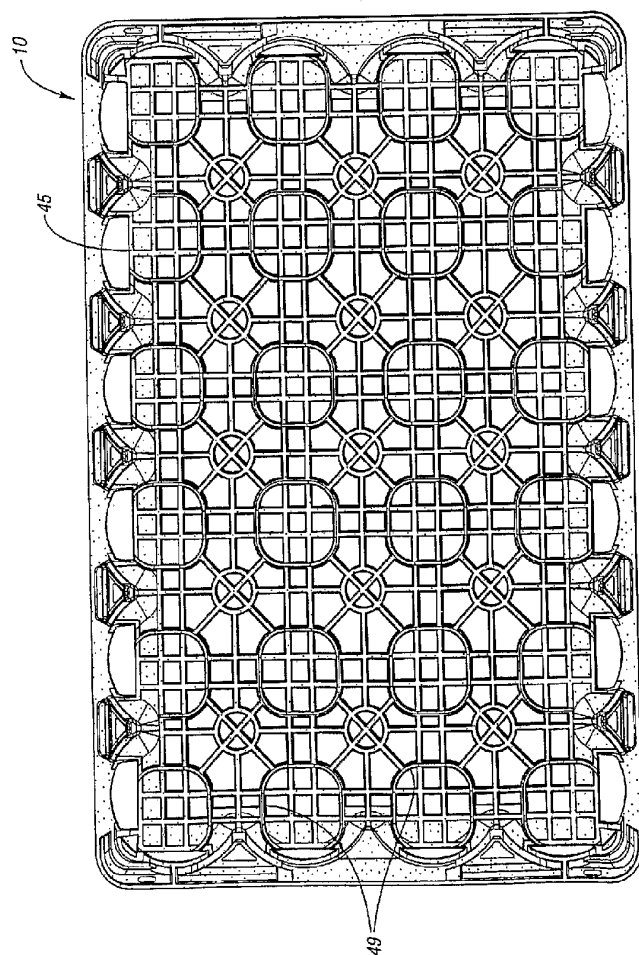


Fig. 5

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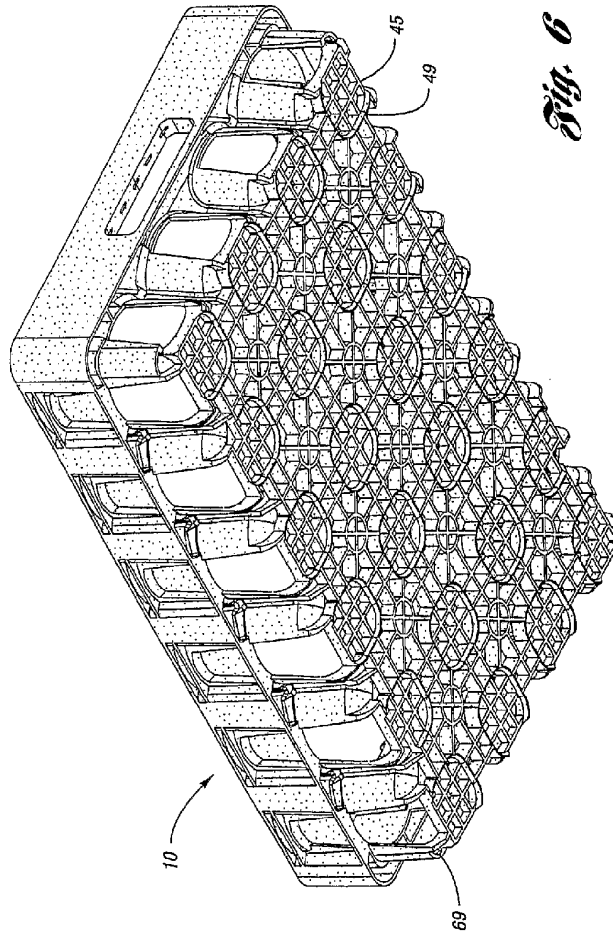


Fig. 6

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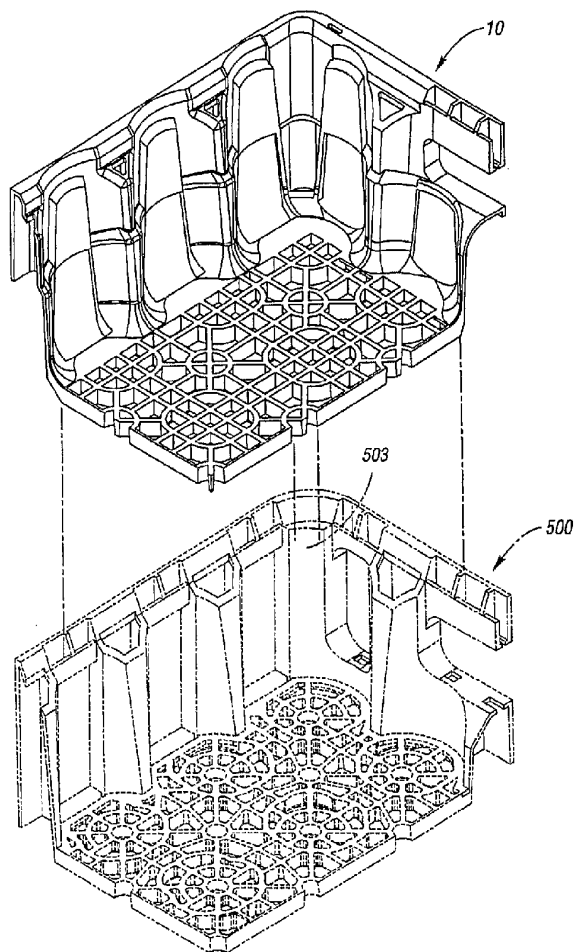
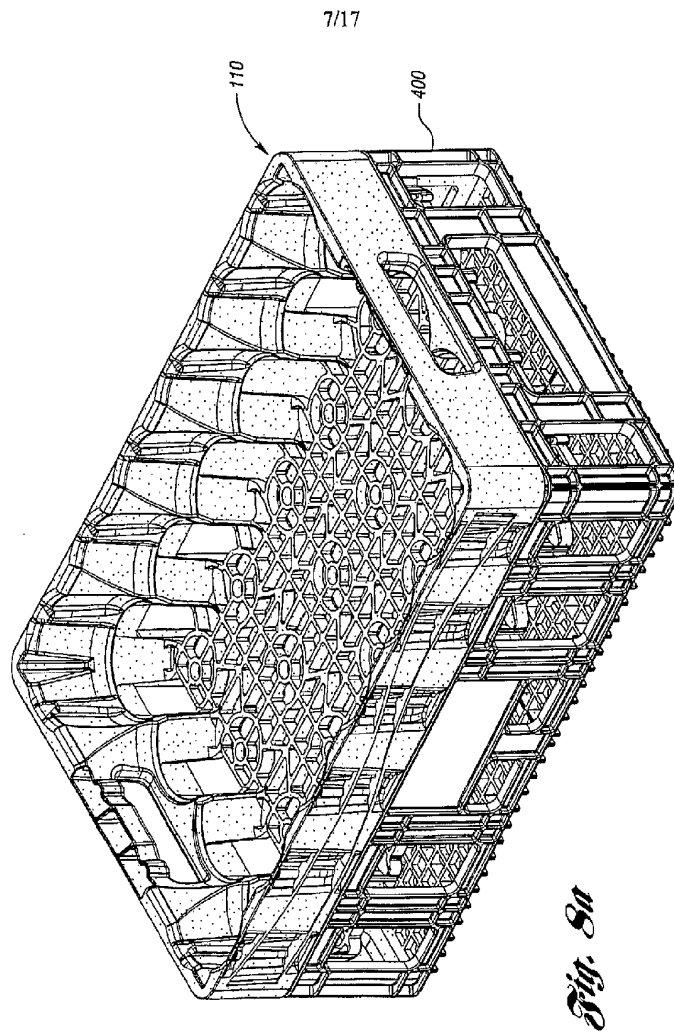


Fig. 7



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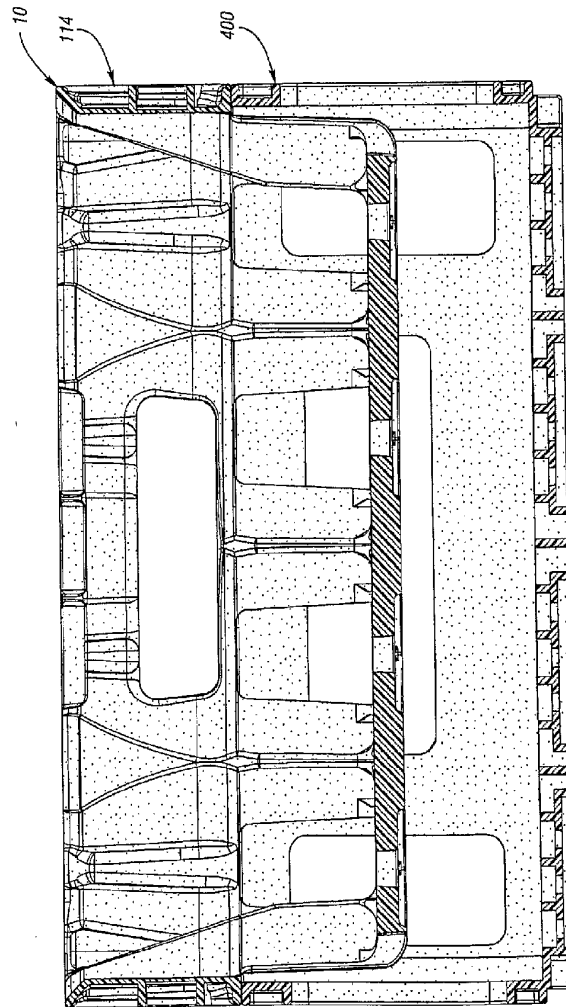


Fig. 8b

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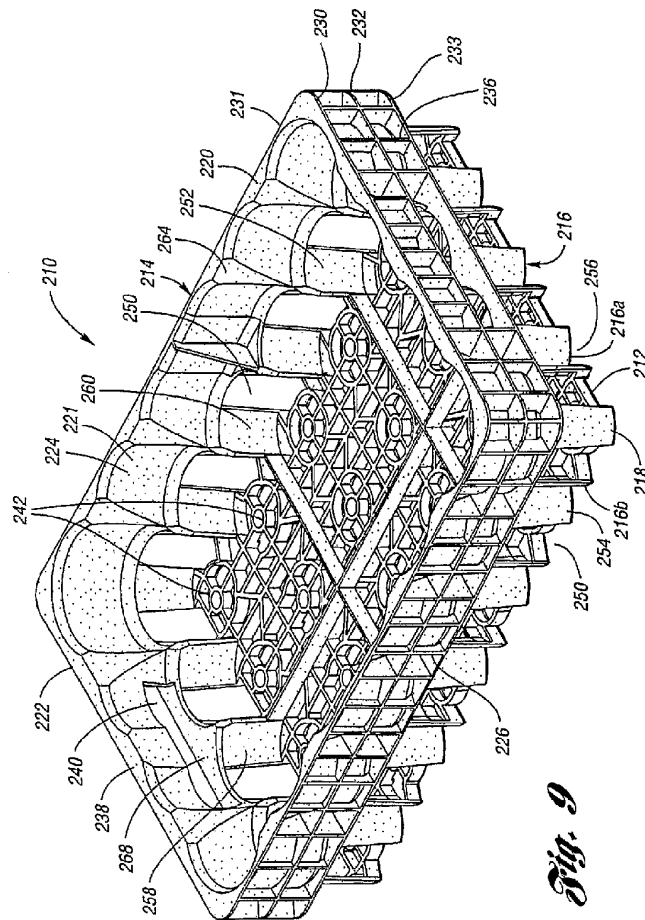
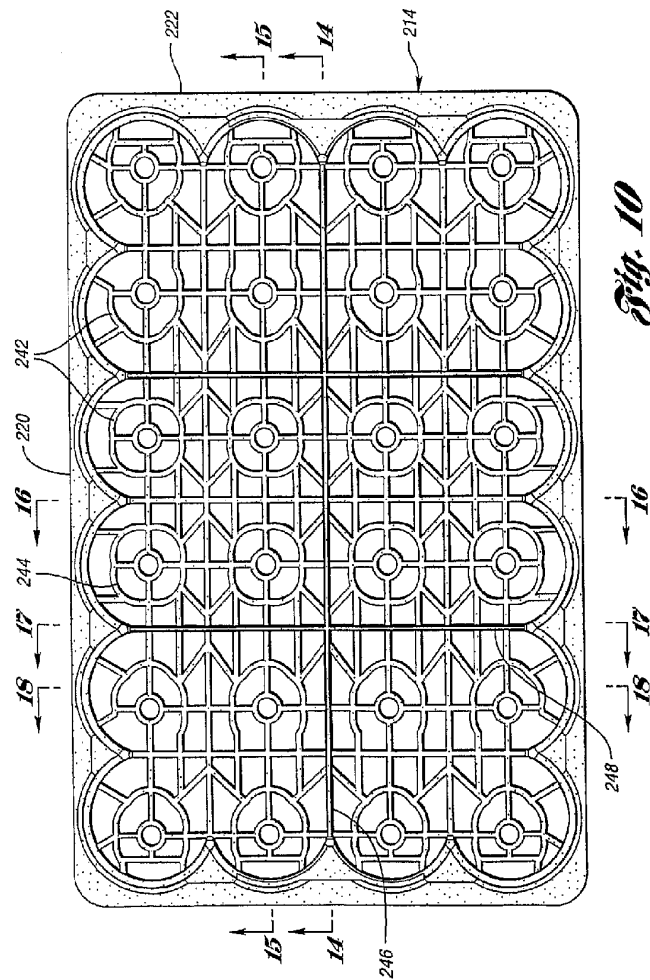
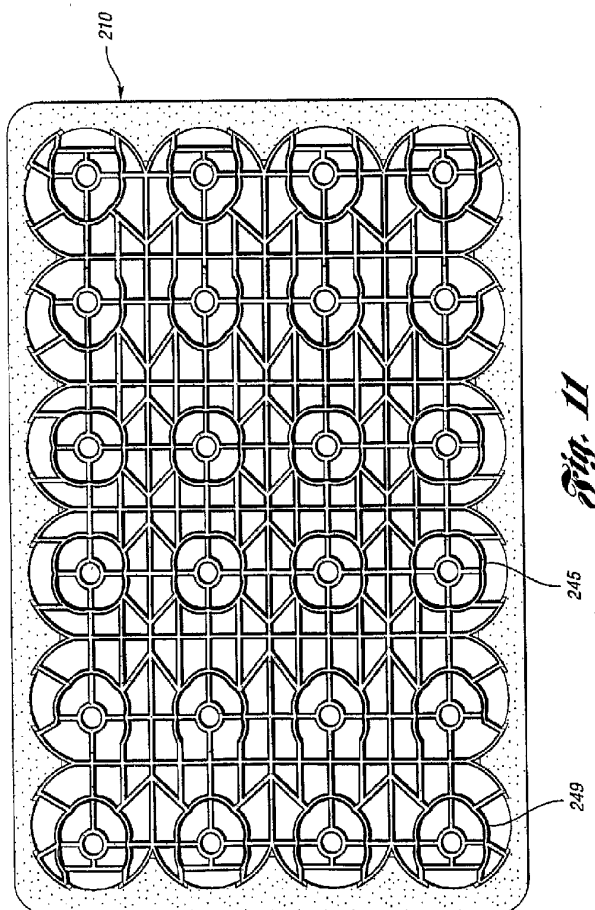


Fig. 9

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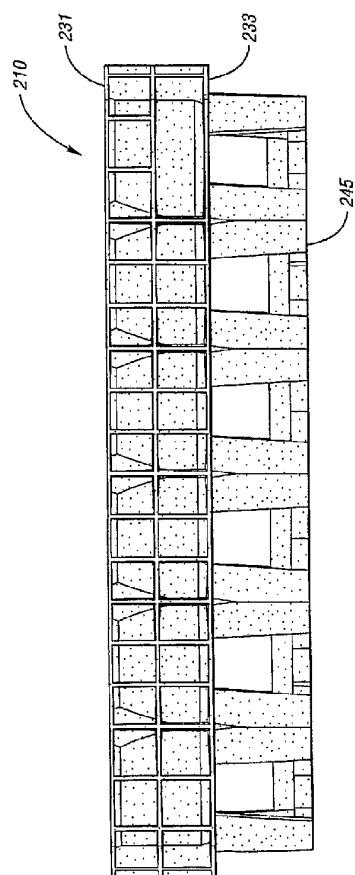


Fig. 12

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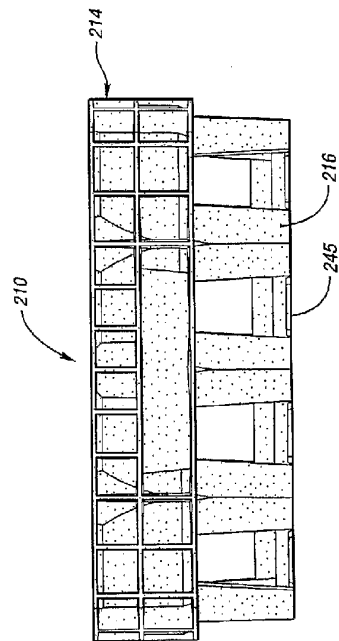


Fig. 13

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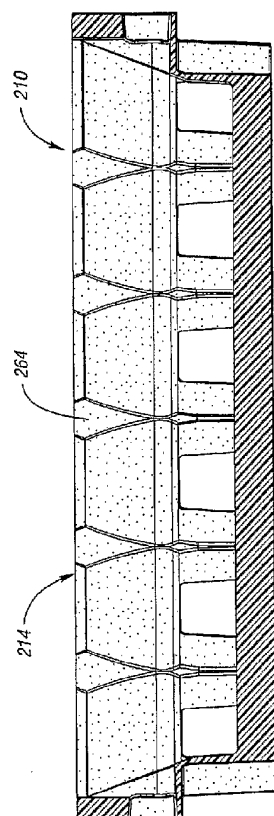


Fig. 14

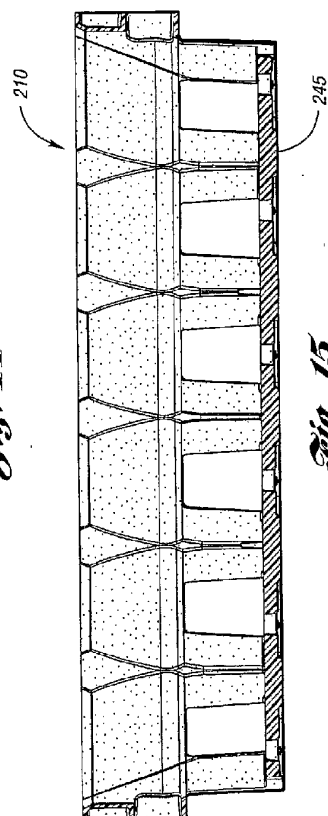


Fig. 15

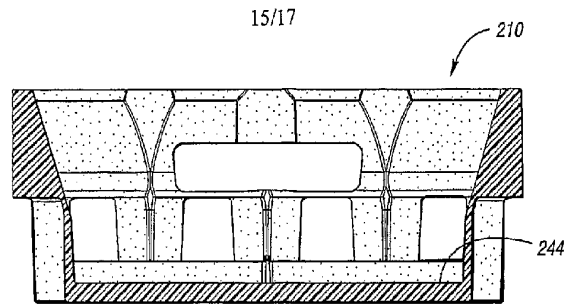


Fig. 16

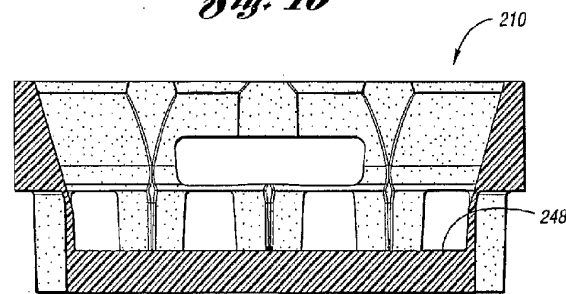


Fig. 17

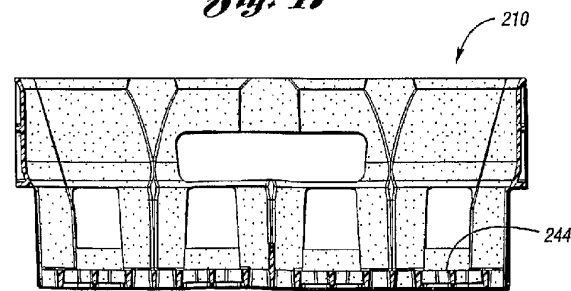


Fig. 18

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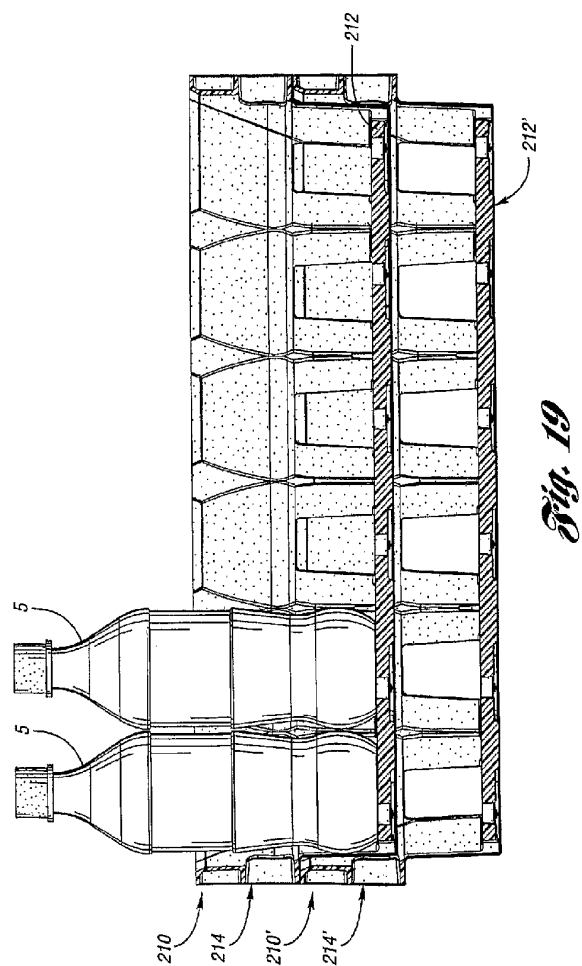


Fig. 19

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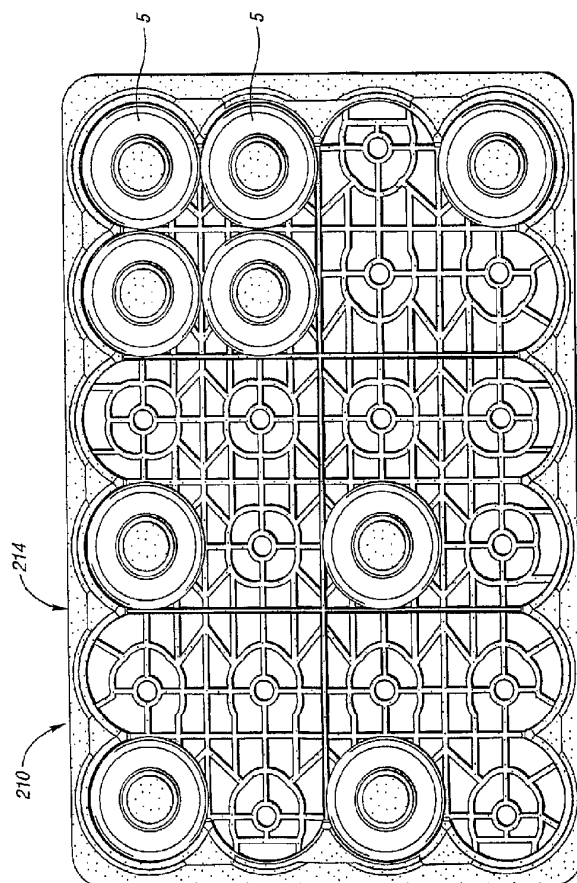


Fig. 20