

PALLET STACKING DEVICE

TECHNICAL FIELD

The present invention relates to a pallet stacking device which maximizes vertical stacking capability of loaded pallets.

BACKGROUND OF THE INVENTION

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Bottle carrying crates are often stacked in vertical sets on top of pallets. For example, two liter bottle crates may be stacked in sets of three to seven. A pallet loaded with such a stack of bottle crates may be properly handled by a forklift for shipment or storage. Generally, stacking more than four or five crates
10 vertically on a pallet can create stability or handling problems.

Because height in a warehouse is significantly less expensive than floor space, it is desirable to stack fully loaded pallets vertically as high as possible. However, various problems arise in stacking loaded wood pallets on top of other fully loaded pallets. The wood pallet must rest upon the bottle caps of the top crate
15 of the loaded pallet upon which it is to be stacked. Generally, wood pallets only have three spaced apart horizontal slats, therefore weight of the loaded pallet is not properly distributed because only the three slats resting upon a portion of the bottle caps below will support the load. This configuration may be unstable. Also, this
20 configuration may lead to a "flowering" affect wherein the outer row of bottles or cans may tend to lean outwardly.

One prior art attempt to increase the stacking capacity of fully loaded pallets is to place a plywood sheet on top of the highest crate so that the plywood rests on top of the bottle caps or can tops. In this manner, the weight of the pallet or pallets stacked on top of the plywood sheet may be more evenly distributed to all
25 bottle caps. However, the use of plywood sheets is problematic because when the

plywood gets wet it tends to warp, and the plywood may also splinter which can create handling problems, particularly when the plywood does not have handles. Additionally, the plywood will have a significantly limited life span, particularly when the plywood gets wet.

- 5 Accordingly, it is desirable to provide an apparatus for maximizing the stacking capacity of pallets loaded with bottle crates or can crates so that the number of loaded pallets which may be vertically stacked is optimized.

SUMMARY OF INVENTION

- 10 The present invention overcomes the above-referenced shortcomings of the use of plywood in maximizing stacking capacity of pallets loaded with bottle crates or can crates by providing a plastic stacking member having on one side a contoured surface having grooves and ridges formed therein sufficiently to engage and support a variety of arrays of bottle caps or can tops, with fully loaded bottle crates or can crates. This invention promotes load stability through uniform axial
15 loading of each bottle or can. The stacking member is also provided with handles on each peripheral edge, and with through- holes for cleaning, convenience and for drainage of spilled cartons.

- 20 More specifically, the present invention provides a method of vertically stacking crates loaded with liquid containers having container tops. The method includes the steps of: a) loading liquid containers into portable crates with the container tops exposed; b) arranging the loaded crates onto a first pallet in a vertically stacked configuration of crate layers; c) positioning a plastic coupling member on an uppermost crate layer in contact with the exposed container tops, the plastic coupling member having a contoured surface configured with an array of
25 indentations formed therein and properly spaced to mate with each exposed container top of the uppermost crate layer, the array of indentations being sufficiently deep to prevent relative lateral displacement of the coupling member with respect to the exposed container tops of the uppermost layer; and d) stacking a fully loaded second

pallet on the plastic coupling member, the second pallet being fully loaded with multiple crate layers including multiple crates loaded with liquid containers.

5 Another aspect of the invention provides an interface between stacked arrays of containers having container tops. The interface includes a pallet loaded with a stacked array of containers and a layer of exposed container tops. A plastic coupling member is positioned between the layer of exposed container tops and the pallet. The plastic coupling member includes a contoured surface configured with an array of indentations formed therein and properly spaced to mate with each of the layer of exposed container tops. The array of indentations are sufficiently deep to prevent relative lateral displacement of the coupling member with respect to the layer of exposed container tops.

10 Accordingly, an object of the present invention is to provide a method and apparatus for maximizing the stacking capacity of pallets loaded with bottle crates or can crates so that the number of loaded pallets which may be vertically stacked is optimized.

The above object and other objects, features, and advantages of the present invention are readily apparent from the following detailed description of the best mode for carrying out the invention when taken in connection with the accompanying drawings.

20 BRIEF DESCRIPTION OF DRAWINGS

FIGURE 1 shows a bottom perspective view of a stacking member in accordance with the present invention;

FIGURE 2 shows a bottom perspective view of the pallet stacking member of Figure 1;

25 FIGURE 3 shows a top perspective view of the stacking member of Figure 1;

FIGURE 4 shows a top perspective view of the stacking member of Figure 1;

FIGURE 5 shows a perspective view of a stacking member used in a stack of loaded pallets in accordance with the present invention;

5 FIGURE 6 shows a top perspective cut-away sectional view of the stacking member of Figure 1;

FIGURE 7 shows an enlarged cut-away top perspective view of the stacking member of Figure 6;

10 FIGURE 8 shows an enlarged cut-away bottom perspective view of the stacking member of Figure 1;

FIGURE 9 shows a cut-away bottom perspective view of the stacking member of Figure 1;

FIGURE 10 shows an enlarged cut-away bottom perspective view of the stacking member of Figure 9; and

15 FIGURE 11 shows an enlarged cut-away bottom perspective view of the stacking member of Figure 10.

BEST MODE FOR CARRYING OUT THE INVENTION

20 Referring to Figures 1-4, a stacking member 10 is shown in accordance with the present invention for use in maximizing the stacking capacity of pallets which are fully loaded with bottle crates or can crates holding liquid containers, such as bottles or cans. As shown, the stacking member 10 has a bottom

surface 12 and a top surface 14. The bottom surface 12 is configured with an array 16 of indentations including grooves and ridges configured to receive and support bottle caps or can tops from a variety of adjacent crate configurations for properly supporting the bottle tops or can tops. Accordingly, such grooves and ridges of the array 16 are arranged symmetrically about the bottom surface 12 of the stacking member 10.

The stacking member (or coupling member) 10 also includes a plurality of handles 18,20,22,24, and an array of through-holes 26 across the surface of the stacking member 10 for drainage of spilled cartons, and also for minimizing weight of the stacking member 10 to reduce manufacturing costs.

Referring to Figures 3 and 4, the top surface 14 of the stacking member 10 is provided with a vertical rib grid 28 which provides structural integrity to the stacking member 10. The top surface 30 of the grid structure 28 is configured along a common plane for supporting an adjacent pallet.

The stacking configuration is shown in Figure 5. As shown, a fully loaded pallet 36 is loaded with five layers of crates 38,40,42,44,46, which are each loaded with bottles B. A stacking member (or coupling member) 10, as described previously with reference to Figures 1-4, is stacked on top of the bottle caps of the bottles B of the uppermost crate layer 46 so that the array 16 of grooves and ridges, as shown in Figures 1 and 2, cooperate with the bottle caps of the bottles on the crate layer 46 to improve stacking stability. A second pallet 48 is then stacked on top of the stacking member 50. In this manner, the stacking member 50, bottle caps B and pallet 48 form an interface between stacked arrays of containers. This design promotes load stability through uniform axial loading of each bottle or can, which reduces neck failures in bottles, and can failures are reduced as well.

The pallet 48 supports fully loaded layers of crates 50,52,54,56,58, which are each fully loaded with bottles B. The stacking member 10 provides uniform weight distribution of the loaded pallet 48 such that the weight is more evenly distributed through all of the bottle caps of the bottles supported on the crate

layer 46. As shown, another stacking member 60 is provided on top of the bottles B of the crate layer 58 so that another fully loaded pallet may be stacked thereon. As shown, using the stacking member 10 of the present invention, pallets may be loaded with five bottle crates or can crates vertically, and three or more such loaded
5 pallets may be stacked on top of each other with a stacking member 10 provided therebetween.

Figures 6-11 illustrate various cut-away perspective views of the stacking member 10 to properly illustrate the array 16 of indentations including grooves 62 and ridges 64 for properly supporting the loaded crates.

10 Preferably, the stacking member 10 of the present invention will be an injection molded component approximately $\frac{3}{4}$ " to 1" in vertical cross-section. Preferred materials for manufacturing the stacking pallet 10 would be polypropylene or HDPE (high-density polyethylene). However, any suitable material would be sufficient.

15 While one embodiment of the invention has been illustrated and described, it is not intended that this embodiment illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and various changes may be made within the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A method of vertically stacking crates loaded with liquid containers having container tops, the method comprising:

loading liquid containers into portable crates with the container tops
5 exposed;

arranging the loaded crates onto a first pallet in a vertically stacked configuration of crate layers;

positioning a coupling member on an uppermost crate layer in contact with the exposed container tops, said coupling member having a contoured surface
10 configured with an array of indentations formed therein and properly spaced to mate with the exposed container tops of the uppermost crate layer, said array of indentations being sufficiently deep to prevent relative lateral displacement of the coupling member with respect to the exposed container tops of the uppermost layer;
and

15 stacking a fully loaded second pallet on the plastic coupling member, said second pallet being fully loaded with multiple crate layers including multiple crates loaded with liquid containers.

2. The method of claim 1, wherein said step of arranging the loaded crates comprises stacking the crates to form at least five crate layers.

20 3. The method of claim 1, wherein said step of positioning a coupling member comprises positioning a plastic coupling member having handles and through-holes formed therethrough for cleaning and drainage.

4. The method of claim 1, wherein said liquid containers comprise bottles.

25 5. The method of claim 1, wherein said liquid containers comprise cans.

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6. An apparatus for use in stacking loaded pallets, comprising a plastic coupling member adapted for positioning between a layer of exposed container tops and a pallet, said plastic coupling member having a contoured surface configured with an array of indentations formed therein and properly spaced to meet
5 with a plurality of the exposed container tops, said array of indentations being sufficiently deep to prevent relative lateral displacement of the coupling member with respect to said layer of exposed container tops.

7. The apparatus of claim 6, wherein said array of indentations comprises a plurality of arcuate slots configured to receive the rims of aluminum
10 cans, and variably sized openings configured to receive variably sized bottle tops.

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