

A CONTAINER ASSEMBLY

Field of Invention

The present invention relates generally to a container assembly and components for construction thereof.

Background

Pallets and corresponding container structures have been used for many years to provide portable platforms for handling, storing, or moving articles and packages, such as in warehouses or vehicles. Typically, the platform consists of multiple top slats mounted on transverse support elements that elevate the slats from the ground and allow handling of the pallet with forklift equipment. The pallet can be further coupled to or formed with a container for forming container structures. Bottom slats may also be used to reinforce the structure and/or provide a continuous surface for supporting the pallet on a conveyor.

Weight, cost, structural strength, versatility of use, ease of transport, and ability to re-use are all important factors in the evaluation of the ideal pallet for a particular application. Accordingly, the prior art is rich in designs developed for optimal performance for specific uses. It would be desirable to have a pallet of modular construction that provided multiple configurations for different uses and that could be disassembled into basic components. Therefore, there is an apparent need for an improved approach for addressing the foregoing problems.

Summary

In accordance with a first aspect of the invention, there is disclosed a container assembly comprising an interface panel defining a first plane, at least one stringer board coupled to the interface panel with the at least one stringer board defining a duct and comprising at least one webbing extending along the duct, and a plurality of wall panels coupled to and extending from the interface panel away from the at least one stringer board for forming a receptacle with the interface panel for receiving at least one article therewithin.

In accordance with a second aspect of the invention, there is disclosed a container assembly comprising a honeycomb panel and at least one stringer board. The honeycomb panel comprising a honeycomb structure and a face sheet coupled to the honeycomb structure. The at least one stringer board coupled to the honeycomb panel and the at least one stringer board defining a duct and comprising at least one webbing extending along the duct. The honeycomb panel is for supporting articles thereon and the at least one stringer board is for spatially elevating the honeycomb panel from the ground.

In accordance with a third aspect of the invention, there is disclosed a container assembly comprising a honeycomb panel and a plurality of stringer boards. The honeycomb panel comprising a honeycomb structure and a face sheet coupled to the honeycomb structure. The plurality of stringer boards coupled to the honeycomb panel and each of the plurality of stringer board defining a duct and comprising at least one webbing extending along the duct. The honeycomb panel is for supporting articles thereon and the plurality of stringer boards are for spatially elevating the honeycomb panel from the ground.

Brief Description of the Drawings

FIG. 1 shows a perspective view of a container assembly comprising an interface panel and a plurality of stringer boards formed as a plurality of stringer blocks coupled with the honeycomb panel in accordance with an aspect of the invention;

FIG. 2 shows a partial exploded perspective view of the container assembly of FIG. 1;

FIG. 3 shows a partial front sectional elevation of the container assembly of FIG. 1 with the interface panel comprising a corrugated fibreboard panel and a honeycomb panel in a first configuration;

FIG. 4 shows a partial front sectional elevation of the container assembly of FIG. 1 with the interface panel comprising a corrugated fibreboard panel and a honeycomb panel in a second configuration;

FIG. 5 shows an end elevation of the honeycomb panel of FIG. 1;

FIG. 6 shows a perspective view of the stringer board of FIG. 1;

FIG. 7 shows an end elevation of the stringer board of FIG. 6;

FIG. 8 shows an end elevation of the stringer board of FIG. 6 coupled to the interface panel of FIG. 1;

FIGS. 9a to 9e shows end elevations of the stringer board of FIG. 6 with a variety of cross-sectional webbing configurations;

FIG. 10 shows a partial plan view B of Portion A of the container assembly of FIG. 2;

FIG. 11 shows a partial perspective view of the plurality of stringer boards of FIG. 6 being formed as stringer blocks of FIG. 1 and arranged in a four-blocks configuration;

FIG. 12 shows a partial perspective view of the plurality of stringer boards of FIG. 6 being formed as stringer blocks of FIG. 1 and arranged in a six-blocks configuration; and

FIG. 13 shows a partial perspective view of the plurality of stringer boards of FIG. 6 being formed as stringer blocks of FIG. 1 and arranged in a nine-blocks configuration.

Detailed Description

Reference will now be made in detail to an exemplary embodiment of the present invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the embodiment, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of embodiments of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the embodiments of the present invention.

An exemplary embodiment of the invention, a container assembly 20, is described with reference to FIGS 1 to 13. The container assembly 20 is preferably used for containing and supporting articles. Preferably, the container assembly 20 is a transport structure for supporting articles in a stable manner while being transported by a jacking device, for example, by a pallet jack or a forklift. The container assembly constitutes the XPallet™ product line of handling and storage products.

The container assembly 20 comprises an interface panel 500 defining a first plane 502 and at least one stringer board 504 coupled to the interface panel 500. The container assembly 20 further comprises a plurality of wall panels 506 coupled to and extending from the interface panel 500 away from the at least one stringer board 504 for forming a receptacle 508 with the interface panel 500 for receiving at least one article therewithin. Preferably, the interface panel 500 is substantially planar. Although the interface panel 500 can be formed from any one or a combination of panels which in turn can be made from any materials with reasonable strength-to-weight ratio, the interface panel 500 can comprise at least one of a wooden panel, a plastic panel, a corrugated fibreboard panel 510 and a honeycomb panel 22.

It is preferred that the corrugated fibreboard 510 comprises multiple wall layers or flute medium, for example, a triple-walled or triple-A corrugated fibreboard. However, the corrugated fibreboard 510 can include any number of wall layers or flute mediums with various flute profiles extending from A to F flute-profiles or any combination thereof. It is preferred that the plurality of wall panels 506 are formed from corrugated fibreboards or the like cellulosic-type panels, for example, wood, fibreboard and paper formed panels.

The honeycomb panel 22 comprises a honeycomb structure 26 and a face sheet 28 coupled to the honeycomb structure 26. Each of the plurality of stringer boards 504 defines a duct 30 and comprises at least one webbing 32 extending along the duct 30. When the container assembly 20 is in use, the interface panel 500 is preferably for supporting at least one article contained in the receptacle 508 thereon and the plurality of stringer boards 504 is for spatially elevating the honeycomb panel 22 from the ground.

It is presented that a single piece of the stringer board 504 may be used in the container assembly 20 instead of a plurality thereof. However, the single piece of the stringer board needs to be appropriately shaped and dimensioned to enable stable sitting of the container assembly on a surface especially when supporting articles without inhibiting handling and transportation of the container assembly 20.

It is preferred that the honeycomb structure 26 defines a lattice of cells that are one of rectilinearly-shaped, hexagonally-shaped and curvilinearly-shaped cells. It is preferred that the honeycomb panel 22 further comprises a base sheet 34 coupled to the honeycomb structure 26 for sandwiching the honeycomb structure 26 between the face sheet 28 and the base sheet 34. It is preferred that the face sheet 28 extends substantially parallel the first plane 502.

Preferably, each of the face sheet 28 and the base sheet 34 is coupled to the honeycomb structure 26 by one of heat welding and adhesive bonding. Each of the plurality of stringer boards 504 is one of heat welded and adhesive bonded to the interface panel 500. Alternatively, the container assembly 20 comprises fasteners 38 for coupling each of the plurality of stringer boards 504 to the interface panel 500. Each of the fasteners 38 is one of a screw fastener, a stapler fastener and a rivet.

Preferably, each of the plurality of stringer boards 504 is formed from plastic. Alternatively, each of the plurality of stringer boards 504 is made from one of metal and wood. Preferably, the honeycomb panel 22 is formed from plastic, for example, a polymeric material. Alternatively, the honeycomb panel 22 is formed from one of metal and cellulosic-based materials, for example, wood, fibreboard and paper. Further alternatively, the honeycomb structure 26, the face sheet 28 and the base sheet 34 may be made from different materials and subsequently integrated to form the honeycomb panel 22.

Preferably, each of the stringer board 504 comprises a top face 72 and a bottom face 74 outwardly facing the top face 72. The duct 30 of each of the stringer board 504 extends along the length thereof between the top face 72 and the bottom face 74. The stringer board 504 further comprises an upper webbing 78 and a lower webbing 80 extending along the duct 30. The upper webbing 78 is formed proximal the top face 72 while the lower webbing 80 is formed proximal the bottom face 74 of the stringer board 504. Preferably, the top face 72 of the stringer board 504 substantially abuts the base sheet 34 of the honeycomb panel 22.

Preferably, the distance between the bottom face 74 and the lower webbing 80 is similar to the distance between the top face 72 and the upper webbing 78. Alternatively, the distance between the bottom face 74 and the lower webbing 80 is greater than the distance between the top face 72 and the upper webbing 78. Preferably, the distance between the bottom face 74 and the lower webbing 80 is twice the distance between the top face 72 and the upper webbing 78.

Further alternatively, the stringer board 504 further comprises a centre webbing 82 formed between the upper webbing 78 and the lower webbing 80, with the centre webbing 82, upper webbing 78 and the lower webbing 80 being equally spaced within the duct 76 of the stringer board 504.

When coupling the stringer board 504 to the interface panel 500 using the fasteners 38, the fasteners 38 may extend into the stringer board 504 and through the upper webbing 78 towards the lower webbing 80. However, it is presented that the fasteners 38 may further extend through the centre webbing 82 and upper webbing 78. Alternatively, the fasteners 38 may be further elongated to extend through the upper webbing 78, centre webbing 82 and the lower webbing 80. Alternatively, the cross-section of the stringer board 504 can take on a variety of webbing configurations as shown in FIGS. 9a to 9e.

A pair of the stringer board 504 can be inter-coupled to form a stringer beam. In the stringer beam, sidewalls 102 of the pair of the stringer boards 504 inter-abut to enable inter-coupling via the sidewalls 102, preferably using one or more fasteners 104. The stringer beam can then be coupled to the honeycomb panel 22 in the container assembly 20.

Further, the elongated stringer beam 100 can be shortened to form a stringer block 106. When formed as the stringer block 106, multiple pieces of the stringer blocks 106 are preferably utilised and arranged in configurations that enables distributed load-bearing on both the multiple stringer blocks 106 and the interface panel 500 the multiple stringer blocks 106 support. The stringer blocks 106 may take on a four-blocks configuration 110, a six-blocks configuration 112 or a nine-blocks configuration 114. When formed as the stringer blocks 106, the stringer blocks 106 may be supported on support panels to form elongated sub-modules. Each of the elongated sub-module preferably support a row of the stringer blocks 106 and is couplable to the honeycomb panel 22 for disposing the row of stringer blocks 106 between the corresponding support panel and the interface panel 500. A plurality of the elongated sub-modules are then arranged in rows and spaced apart for coupling to the interface panel 500 to form the container assembly 20. Each of the support panels can be formed as a flat planar sheet or an elongated board and can be made from a variety of

materials including plastic and wood. The support panels are coupled to the stringer blocks 106 using fasteners or adhesive means.

Preferably, the container assembly 20 further comprises a plurality of wall panels 506 coupled to the interface panel 500. The plurality of wall panels 506 extends substantially perpendicular the first plane 502 and away from the plurality of stringer board 504 for forming a container structure 212 for defining the receptacle 508. The container structure 212 is for containing at least one article supported by the interface panel 500.

In a first configuration of the interface panel 500, the honeycomb panel 22 interposes the corrugated fibreboard panel 510 and the at least one stringer board 504 with the plurality of wall panels 506 abutting and extending from the honeycomb panel 22. The corrugated fibreboard panel 510 is shaped and dimensioned for the periphery thereof to be bounded by the plurality of wall panels 506 adjacent whereat the plurality of wall panels 506 and the honeycomb panel 22 abut.

In a second configuration of the interface panel 500, the corrugated fibreboard panel 510 interposes the honeycomb panel 22 and the at least one stringer board 504 with the plurality of wall panels 506 abutting and extending from the corrugated fibreboard panel 510. The honeycomb panel 22 is shaped and dimensioned for the periphery thereof to be bounded by the plurality of wall panels 506 adjacent whereat the plurality of wall panels 506 and the corrugated fibreboard panel 510 abut.

The formed container structure 212 defines an opening 520 to the receptacle 508 at an extremity thereof distal the interface panel. The container assembly 20 can further comprise at least one upper cover panel (not shown) coupled to the plurality of wall panels 506 adjacent the opening 520 with the at least one cover panel being positionable, for example by folding, for extending over the opening 520 for substantially impeding access therethrough. Further, the container assembly can further comprise at least one lower cover panel 524 extending from an extremity thereof proximal the interface panel 500.

With the lower cover panel 524 being a constituent of the container assembly 20, the at least one lower cover panel 524 can be positioned to abut the interface panel 500 with the interface panel 500 interposing the lower cover panel 524 and the at least one stringer board 504. Alternatively, the at least one lower cover panel 524 extends between the corrugated fibreboard panel 510 and the honeycomb panel 22. In such an arrangement, the corrugated fibreboard panel 510 will be disposed inside the container structure 212 in the first configuration of the interface panel 500, while the honeycomb panel 22 will be disposed inside the container structure 212 in the second configuration of the interface panel 500.

Similar to the interface panel 500, the formed container structure 212 can also be formed from any one or a combination of panels which in turn can be made from any materials with reasonable strength-to-weight ratio. The formed container structure 212 can comprise and be formed from at least one of wooden panels, plastic panels, corrugated fibreboard panels and honeycomb panels. An example of plastic panels include polypropylene panels and an example of corrugated fibreboard panels include materials and panels used for forming slotted containers and boxes. Hence, the formed container structure 212 can be, for example, a slotted box. Further, the formed container structure 212 includes but is not limited to regular slotted containers, full overlap slotted containers, snap bottom containers with tuck tops, telescopic boxes and container and box structures described in a Fibre Box Association publication entitled "Fibre Box Handbook".

In a foregoing manner, a container assembly is described according to an exemplary embodiment of the invention. Although only one embodiment of the invention is disclosed in this document, it will be apparent to one skilled in the art in view of this disclosure that numerous changes and/or modifications can be made to the disclosed embodiment without departing from the scope and spirit of the invention.

Claims

1. A container assembly comprising:
 - an interface panel defining a first plane;
 - at least one stringer board coupled to the interface panel, the at least one stringer board defining a duct and comprising at least one webbing extending along the duct; and
 - a plurality of wall panels coupled to and extending from the interface panel away from the at least one stringer board for forming a receptacle with the interface panel for receiving at least one article therewithin.
2. The container assembly as in claim 1, the interface panel being substantially planar.
3. The container assembly as in claim 1, the interface panel comprising at least one of a wooden panel, a plastic panel, a corrugated fibreboard panel and a honeycomb panel.
4. The container assembly as in claim 3, the corrugated fibreboard having at a plurality of wall layers.
5. The container assembly as in claim 3, the honeycomb panel comprising a honeycomb structure and a face sheet coupled to the honeycomb structure.
6. The container assembly as in claim 5, the honeycomb panel further comprising a base sheet coupled to the honeycomb structure for sandwiching the honeycomb structure between the face sheet and the base sheet, the base sheet extending along the first plane.
7. The container assembly as in claim 6, the face sheet extending substantially parallel the first plane.
8. The container assembly as in claim 7, each of the base sheet and the face sheet being coupled to the honeycomb structure by one of heat welding and adhesive bonding.

9. The container assembly as in claim 1, the at least one stringer board being one of heat welded and adhesive bonded to the interface panel.
10. The container assembly as in claim 1, further comprising at least one fastener for coupling the at least one stringer board to the interface panel.
11. The container assembly as in claim 10, the at least one fastener being at least one of a screw fastener, a stapler fastener and a rivet.
12. The container assembly as in claim 1, at least one of the stringer board and the honeycomb panel is formed from plastic.
13. The container assembly as in claim 1, the stringer board comprising:
 - a top face; and
 - a bottom face outwardly facing the top face, the at least one webbing comprising:
 - an upper webbing and a lower webbing extending along the length of the duct, the upper webbing being formed proximal the top face and the lower webbing being formed proximal the bottom face,
 - wherein the top face substantially abuts the interface panel when the stringer board is coupled with the thereto.
14. The container assembly as in claim 13, the distance between the bottom face and the lower webbing being greater than the distance between the top face and the upper webbing.
15. The container assembly as in claim 1, the plurality of wall panels being formed from corrugated fibreboards.

16. The container assembly as in claim 1, the plurality of wall panels extending substantially perpendicular the first plane and away from the at least one stringer board for terminating at an opening, the container assembly further comprising at least one cover panels coupled to the plurality of wall panels, the at least one cover panel being positionable for extending over the opening for substantially impeding access therethrough.
17. The container assembly as in claim 1, the interface panel comprising a corrugated fibreboard panel and a honeycomb panel interposing the corrugated fibreboard panel and the at least one stringer board, the plurality of wall panels abutting and extending from the honeycomb panel with the corrugated fibreboard panel being shaped and dimensioned for the periphery thereof to be bounded by the plurality of wall panels adjacent whereat the plurality of wall panels and the honeycomb panel abut.
18. The container assembly as in claim 1, the interface panel comprising a honeycomb panel and a corrugated fibreboard panel interposing the honeycomb panel and the at least one stringer board, the plurality of wall panels abutting and extending from the corrugated fibreboard panel with the honeycomb panel being shaped and dimensioned for the periphery thereof to be bounded by the plurality of wall panels adjacent whereat the plurality of wall panels and the corrugated fibreboard panel abut.