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Description

PAPER PALLETS

Technical Field

- [1] The present invention relates generally to paper pallets as goods carrying equipment. Specifically, it relates to pallets made from laminated sheet paper and various designs of their components making up the carrying surface and horizontal runners.

Background Art

- [2] As goods carrying equipment, pallets are traditionally made from wood, plastic or paper. Traditional paper design makes use of honey-comb structure or corrugated paper structure, to give a paper pallet its structural rigidity. There have been numerous attempts to improve the strength and design of paper pallets.
- [3] United States Patent Number 2,559,930 discloses a pallet comprising supports in the form of hollow rectangular paper tubes arranged in spaced parallel relationship, rectangular inserts arranged to fit tightly into the ends of said tubes, and stiff paper sheets secured to either side of said tubes, both the tubes and the inserts being formed of paper wound in layers bonded together, and the axes of the tubes and inserts being arranged at right angles to one another.
- [4] United States Patent Number 2,928,638 discloses a portable pallet and method of fabricating it. The pallet comprises a pair of opposed sheets of paperboard each folded and shaped with provisions of a plurality of alternate upper and lower flat planar sections and intervening vertical wall sections forming channels with the open side of the successive channels being alternately at the top and bottom there being a plurality of such channels at each side, the sheets being arranged adjacent with the facing channels in one sheet at right angles to the facing channels in the other sheet; pedestals mounted in the communicating channel spaces where opposed open channels cross, the pedestals extending to the bottoms of the corresponding opposed channels with the pedestal end engaging the corresponding planar section, and means securing the sheets and pedestals together in fixed relation.
- [5] United States Patent Number 4,714,026 discloses a pallet for material handling. It comprises a deck board and a plurality of legs which are fixed to the under surface of the deck board with specified spacing. The deck board is constituted of laminated corrugated fiberboard, and each of the legs is formed by a square-tubular frame, which is made of a corrugated fiberboard, and in which a pad or pads made of plastic resin is inserted. The deck board of a durable light weight structure has a roughened top surface to prevent slips of a cargo. The legs are so constructed to support heavy load without deforming and collapse, and are designed to prevent absorption of moisture.
- [6] United States Patent Number 5,285,731 discloses a corrugated paperboard pallet. It



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includes a base member having first and second pairs of opposite sides and a plurality of column-shaped support members secured to the bottom side of the base member. The support members have apertures at opposing ends for receiving flaps from the base member and support blocks, so as to secure the support members to the base member and to provide additional strength to the pallet, respectively. This pallet design can be conveniently shipped and stored until ready for use, and can be entirely assembled by the user.

- [7] United States Patent Number 5,329,861 discloses an improved, lightweight, recyclable, nearly completely paper pallet. The pallet is made of a honeycomb paper base and honeycomb paper support runners or blocks. The blocks are protected and significantly strengthened by a rigid paper cap. The base, runners, blocks, and cap may also have a protective liner, such as polyethylene, or be otherwise treated to enhance water and moisture resistance.

Summary of the Invention

- [8] The present invention has therefore, as a primary object to provide pallets made from laminated sheet paper, such that they can be used as a goods carrying equipment.
- [9] Another object of the present invention is that paper pallets must be economical, light weight and structurally strong.
- [10] Yet, another object of the present invention is that designs of paper pallets must be simple and versatile to meet the varying needs of users.
- [11] These and other objects are achieved in that a plurality of horizontal runners being disposed and bonded to the underside of a flat sheet or a plurality of parallel spaced apart elongate elements. The elongate elements can be flat or T-shaped. Each horizontal runner is substantially hollow and rectangular in shape and is constituted from one or more channel members and a plurality of orthogonal core inserts vertically disposed therein. Where an integral U-channel or C-channel member is not available, it can be constituted from two L-shaped elongate members correspondingly disposed and suitably bonded. In the case of T-shaped elongate elements, the top portions of the horizontal runners and orthogonal core inserts are cut at those positions where the T-shaped elongate elements are placed.
- [12] Twelve embodiments of the paper pallets made according to the present invention include two-way pallets and four-way pallets. Three horizontal runners are used to construct a two-way pallet. To construct a four-way pallet, the middle portion of the bottom half of a horizontal runner is left vacant, with two spaced apart short supporter U-channel members disposed towards both ends.

Brief Description of the Drawings

- [13] In order that the present invention may be more readily understood, the following de-

scription is given, by way of examples, of twelve specific embodiments of a paper pallet made in accordance to the present invention. Reference is made to the accompanying drawings, in which:

- [14] Figure 1 is a perspective view of a first embodiment of a paper pallet made in accordance to the present invention.
- [15] Figure 2 is a perspective view of a second embodiment of a paper pallet made in accordance to the present invention.
- [16] Figure 3 is a perspective view of a third embodiment of a paper pallet made in accordance to the present invention.
- [17] Figure 4 is a perspective view of a fourth embodiment of a paper pallet made in accordance to the present invention.
- [18] Figure 5 is a perspective view of a fifth embodiment of a paper pallet made in accordance to the present invention.
- [19] Figure 6 is a perspective view of a sixth embodiment of a paper pallet made in accordance to the present invention.
- [20] Figure 7 is a perspective view of a seventh embodiment of a paper pallet made in accordance to the present invention.
- [21] Figure 8 is a perspective view of an eighth embodiment of a paper pallet made in accordance to the present invention.
- [22] Figure 9 is a perspective view of a ninth embodiment of a paper pallet made in accordance to the present invention.
- [23] Figure 10 is a perspective view of a tenth embodiment of a paper pallet made in accordance to the present invention.
- [24] Figure 11 is a perspective view of an eleventh embodiment of a paper pallet made in accordance to the present invention.
- [25] Figure 12 is a perspective view of a twelfth embodiment of a paper pallet made in accordance to the present invention.
- [26] Figure 13a shows a perspective view of a first design of a horizontal runner made in accordance to the present invention.
- [27] Figure 13b shows a perspective view of the horizontal runner as shown in Figure 13a, with a plurality of cuts on its top portion.
- [28] Figure 14a shows a perspective view of a second design of a horizontal runner made in accordance to the present invention.
- [29] Figure 14b shows a perspective view of the horizontal runner as shown in Figure 14a, with a plurality of cuts on its top portion.
- [30] Figure 15a shows a perspective view of a third design of a horizontal runner made in accordance to the present invention.
- [31] Figure 15b shows a perspective view of the horizontal runner as shown in Figure

15a, with a plurality of cuts on its top portion.

[32] Figure 16a shows a perspective view of a fourth design of a horizontal runner made in accordance to the present invention.

[33] Figure 16b shows a perspective view of the horizontal runner as shown in Figure 16a, with a plurality of cuts on its top portion.

[34] Figure 17a shows a perspective view of a fifth design of a horizontal runner made in accordance to the present invention meant for a four-way pallet.

[35] Figure 17b shows a perspective view of the horizontal runner as shown in Figure 17a, with a plurality of cuts on its top portion.

Disclosure of Invention

Detailed Description of the Invention

[36] According to the teaching of the present invention, layers of laminated sheet paper are suitably bonded together to the required dimensions.

[37] A paper pallet (10) comprises essentially a carrying surface on top of three parallel spaced apart horizontal runners (12). The total number of embodiments of the paper pallet (10) according to the teaching of the present invention depends on the combination use of the designs of the components making up the carrying surface and the horizontal runners (12). In the following description, only twelve embodiments are disclosed.

[38] For ease of description, common component making up the carrying surface is numbered '11' while its different designs are marked 'a', 'b' and 'c' after the numeral '11'. Common component of horizontal runners is numbered as '12'. Alphabets 'a' to 'e' are added after the numeral '12' to indicate different designs of the horizontal runners (12). 'a' to 'e' are added after the numeral '12' to indicate different designs of the horizontal runners (12) with cuts (19) on the top portions of the horizontal runners (12). Alphabets 'a' to 'l' are used to differentiate the twelve embodiments of the paper pallets (10).

[39] There are three designs of the components making up the carrying surface, which is placed essentially across or perpendicularly to the longitudinal axis of the horizontal runners (12). A first design of the components making up the carrying surface comprises a plurality of T-shaped elongate elements (11a), which are parallel spaced apart (see Figures 1, 3, 5, 7 and 9). The T-shaped elongate elements (11a) are perpendicular to the horizontal runners (12). Where T-shaped elongate elements (11a) are employed to fabricate a carrying surface, a plurality of cuts (19) is made to the top portions of the horizontal runners (12) so as to receive the protruding section of the T-shaped elongate elements (11a). A T-shaped elongate element (11a) can be made from two L-shaped elongate elements, suitably bonded together by glue and/or staples. A

second design of the components making up the carrying surface comprises a plurality of flat elongate elements (11b), which are parallel spaced apart (see Figures 2, 4, 6, 8 and 10). The flat elongate elements (11b) are perpendicular to the horizontal runners (12). A third design of the component making up the carrying surface comprises simply a flat sheet (11c) (see Figures 11 and 12). The flat sheet (11c) covers all three horizontal runners (12).

- [40] Essentially, three horizontal runners (12) are used to support components making up the carrying surface of a paper pallet (10). Figures 1-4, 7-10 and 12 each depicts essentially a two-way pallet. Figures 5, 6 and 11 each depicts a four-way pallet, where the middle portion of the bottom half of each horizontal runner (12e) is left vacant and the upper half of each horizontal runner (12e) is supported by two spaced apart short supporter U-channel members (17).
- [41] Five possible designs of the horizontal runners (12a - 12e) are taught according to the teaching of the present invention.
- [42] It is important to note, that the load bearing function of a paper pallet (10) is carried by a plurality of orthogonal core inserts (14) standing vertically therein each horizontal runner (12). The axis of each orthogonal core insert (14) is perpendicular to the longitudinal axis of the horizontal runner (12). At least one channel member (15, 13, 17) allows these orthogonal core inserts (14) to be easily contained, to constitute a rectangular design of the horizontal runner (12). Orthogonal core inserts (14) are used because their four faces allow better contact with other constituent components, for glue and/or stapling method to function more effectively.
- [43] According to the teaching of the present invention, each horizontal runner (12) is substantially hollow and rectangular in shape. The rectangular profile of the horizontal runners (12) is substantially defined by one or more channel members (15, 13, 17) including a U-channel member (13, 17) or a C-channel member (15). Where an integral U-channel member (13, 17) or a C-channel member (15) is not available, the U-profile or C-profile can be constituted from two L-shaped elongate members correspondingly disposed and suitably bonded together.
- [44] As seen in Figure 13a, a first design of the horizontal runner (12a), which is substantially rectangular, is formed from an inverted U-channel member (13) disposed at its top and a bottom U-channel member (13). A plurality of orthogonal core inserts (14) is vertically disposed in between the two U-channel members (13) along the length of the horizontal runner (12a). Two U-channel members (13) facilitate such insertion. The height of the horizontal runner (12a) corresponds substantially to the height of the orthogonal core inserts (14). When the above horizontal runners (12a) are used in conjunction with a plurality of T-shaped elongate elements (11a), a plurality of cuts (19) is made to top portion of each horizontal runner (12a) and top portions of the

orthogonal core inserts (14') (Figure 13b). The number of orthogonal core inserts (14') corresponds to the number of T-shaped elongate elements (11a) used. It is important to note that the orthogonal core inserts (14') are placed at these cut positions (19) to support the T-shaped elongate elements (11a).

[45] As seen in Figure 14a, a second design of the horizontal runner (12b), which is substantially rectangular, is formed from a C-channel member (15) with a plurality of orthogonal core inserts (14) vertically disposed in between its two horizontally facing flanges. The C-channel member (15) comprises two horizontally facing flanges and a vertical flange along the length of the horizontal runner (12b). The height of the C-channel member (15) corresponds substantially to the height of the orthogonal core inserts (14). When the above horizontal runners (12b) are used in conjunction with a plurality of T-shaped elongate elements (11a), a plurality of cuts (19) is made to top flange of each C-channel member (15') and the top portions of the orthogonal core inserts (14') (Figure 14b). The number of orthogonal core inserts (14') corresponds to the number of T-shaped elongate elements (11a) used. It is important to note that the orthogonal core inserts (14') are placed at these cut positions (19) to support the T-shaped elongate elements (11a).

[46] As seen in Figure 15a, a third design of the horizontal runner (12c), which is substantially rectangular, is formed from an inverted U-channel member (13) disposed at its top and a bottom U-channel member (13). A plurality of orthogonal core inserts (14), flanked by two flat panels (16) at its sides along the length of the horizontal runner (12c), is vertically disposed in between the two U-channel members (13). The height of the rectangular horizontal runner (12c) corresponds substantially to the height of the orthogonal core inserts (14). When the above horizontal runners (12c) are used in conjunction with a plurality of T-shaped elongate elements (11a), a plurality of cuts (19) is made to the top portion of each horizontal runner (12c') and the top portions of the orthogonal core inserts (14') as well as the flat panels (16') (Figure 15b). The number of orthogonal core inserts (14') corresponds to the number of T-shaped elongate elements (11a) used. It is important to note that the orthogonal core inserts (14') are placed at these cut positions (19) to support the T-shaped elongate elements (11a).

[47] As seen in Figure 16a, a fourth design of the horizontal runner (12d), which is substantially rectangular, is formed from two embracing C-channel members (15a, 15b) (i.e. one big and one small) with a plurality of orthogonal core inserts (14) vertically disposed inside the small C-channel member (15b). The orthogonal core inserts (14) are flanked by two flat panels (16) at its sides along the length of the horizontal runner (12d). The height of the small C-channel member (15b) corresponds substantially to the height of the orthogonal core inserts (14). When the above horizontal runners (12d)

are used in conjunction with a plurality of T-shaped elongate elements (11a), a plurality of cuts (19) is made to the top portion of each horizontal runner (12d') and the top portions of the orthogonal core inserts (14') as well as the flat panels (16') (Figure 16b). The number of orthogonal core inserts (14') corresponds to the number of T-shaped elongate elements (11a) used. It is important to note that the orthogonal core inserts (14') are placed at these cut positions (19) to support the T-shaped elongate elements (11a).

[48] In all possible runner design involving channel members (13, 15, 17), the orthogonal core inserts (14) vertically disposed therein can be flanked by at least one flat panel (16) along the length of the horizontal runner (12c, 12d). The flat panels (16) further strengthen the rigidity of the runner design. The above disclosed third and fourth designs can be considered as reinforced versions of the runner designs.

[49] As seen in Figure 17a, a fifth design of the horizontal runner (12e), which is substantially rectangular, is formed from a long inverted U-channel member (13) disposed at its top with two spaced apart short supporter U-channel members (17) disposed below towards both ends of the top inverted U-channel member (13). Effectively, the middle portion of the bottom half of the horizontal runner (12e) is left vacant, which is meant to constitute a four-way pallet. The exact length of the middle portion to be left vacant can vary and be tailor-made to meet users' requirements. It is important to note that the middle portion of the top inverted U-channel member (13) that corresponds to the left vacant portion is inserted with a horizontal length of hollow core insert (18). The longitudinal axis of this hollow core insert (18) is parallel to the longitudinal axis of the horizontal runner (12e). This fifth design of the horizontal runner (12e) is suitable for use to construct a four-way pallet. A plurality of orthogonal core inserts (14) is vertically disposed in between the engaging U-channel members (13, 17). The height of the rectangular horizontal runner (12e) corresponds substantially to the height of the orthogonal core inserts (14). When the above horizontal runners (12e) are used in conjunction with a plurality of T-shaped elongate elements (11e), a plurality of cuts (19) is made to the top portion of each horizontal runner (12e') and the top portions of the orthogonal core inserts (14') (Figure 17b). It is important to note that the orthogonal core inserts (14') and the horizontal length of the hollow core insert (18) are placed at these cut positions (19) to support the T-shaped elongate elements (11a).

[50] It is obvious to those skilled in the art that further modification can be anticipated from the teaching of the above disclosure. For an example, the paper pellet (10) can be further strengthened by attaching at least two support elements (20) to the bottom of the horizontal runners (12) as shown in Figures 9 and 10.

Claims

- [1] A paper pallet comprising a plurality of horizontal runners (12) and components making up one carrying surface on top of the horizontal runners (12), is characterized in which
- the horizontal runners (12) and the components making up the carrying surface are made from layers of laminated sheet paper;
- each horizontal runner (12) is substantially hollow and rectangular in shape with its longitudinal axis horizontally disposed;
- each horizontal runner (12) further comprising at least one channel member (15, 13, 17) and a plurality of orthogonal core inserts (14) vertically disposed therein; and
- the components making up the carrying surface include a plurality of parallel spaced apart T-shaped elongate elements (11a) which is disposed perpendicularly on all the horizontal runners (12), and a plurality of cuts (19) is made to top portion of each horizontal runner (12') and top portions of the orthogonal core inserts (14') at appropriate positions where the T-shaped elongate elements (Ha) are placed,
- whereby goods carried on top of the carrying surface are supported by the horizontal runners (12) underneath.
- [2] A paper pallet (10) as in Claim 1 in which the horizontal runner (12a) is formed from an inverted U-channel member (13) disposed at its top and a bottom U-channel member (13), whereas a plurality of orthogonal core inserts (14) is vertically disposed in between the two U-channel members (13) along the length of the horizontal runner (12a), the height of the horizontal runner (12a) corresponds substantially to the height of the orthogonal core inserts (14).
- [3] A paper pallet (10) as in Claim 1 in which the horizontal runner (12d) is formed from one big and one small embracing C-channel members (15a, 15b) with a plurality of orthogonal core inserts (14) vertically disposed inside the small C-channel member (15b), the height of the small C-channel member (15b) corresponds substantially to the height of the orthogonal core inserts (14).
- [4] A paper pallet (10) as in Claim 2 or 3 in which the orthogonal core inserts (14) vertically disposed therein the horizontal runner (12) are flanked by at least one flat panel (16) along the length of the horizontal runner (12).

- [5] A paper pallet (10) as in Claim 1 in which the horizontal runner (12e) is formed from a long inverted U-channel member (13) disposed at its top with two spaced apart short supporter U-channel members (17) disposed below towards both ends of the top inverted U-channel member (13), leaving an empty space in between the two short supporter U-channel members (17), whereas a plurality of orthogonal core inserts (14) is vertically disposed in between the engaging U- channel members (13, 17), the height of the rectangular horizontal runner (12e) corresponds substantially to the height of the orthogonal core inserts (14), such that the horizontal runner (12e) is used to constitute a four-way pallet.
- [6] A paper pallet (10) as in Claim 5 in which the middle portion of the top inverted U-channel member (13) that corresponds to the left vacant portion is inserted with a horizontal length of hollow core insert (18).
- [7] A paper pallet (10) as in Claim 1 in which the T-shaped elongate element (11a) is made from two L-shaped elongate elements correspondingly disposed and suitably bonded together.
- [8] A paper pallet (10) as in Claim 1, 3 or 4 in which the channel member includes a C-channel member (15), which is made from two L-shaped elongate members correspondingly disposed and suitably bonded together.
- [9] A paper pallet (10) as in Claim 1, 2, 4, 5 or 6 in which the channel member includes a U-channel member (13, 17), which is made from two L-shaped elongate members correspondingly disposed and suitably bonded together.