Dec. 24, 1963 H. C. ALLEN 3,115,105

PALLET AND SUPPORT STATION USEFUL IN PALLETS AND THE LIKE

Filed Jan. 2, 1962 2 Sheets-Sheet 1

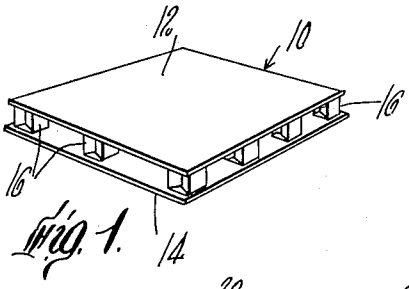


Fig. 1.

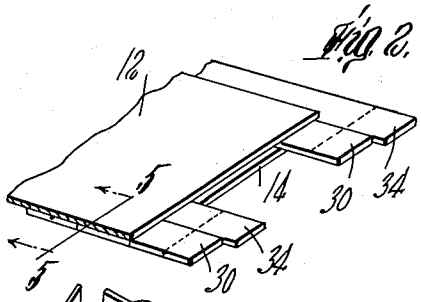


Fig. 2.

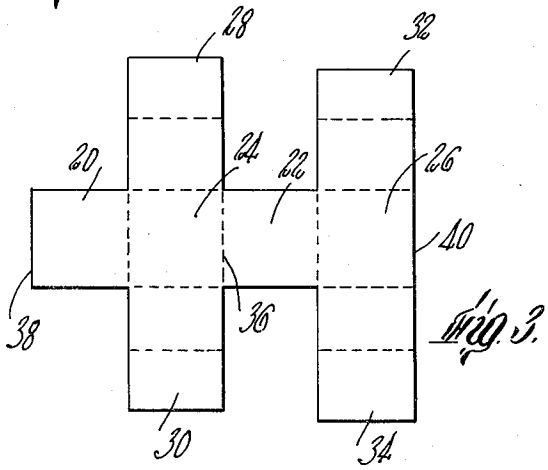


Fig. 3.

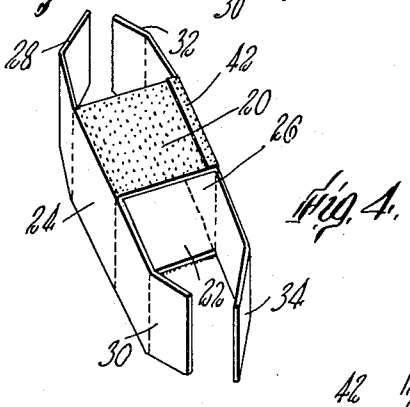


Fig. 4.

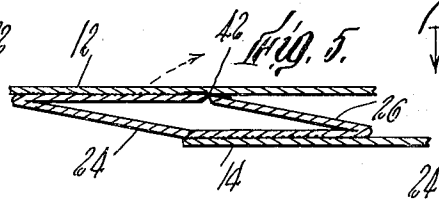


Fig. 5.

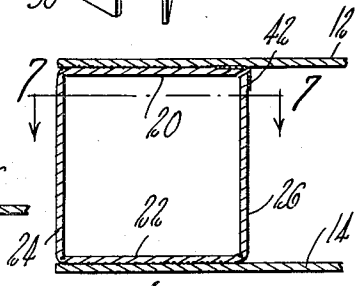


Fig. 6.

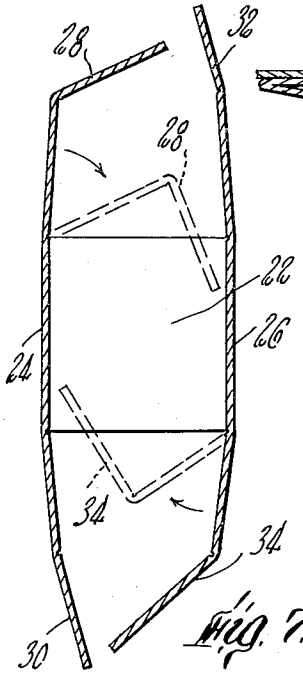


Fig. 7.

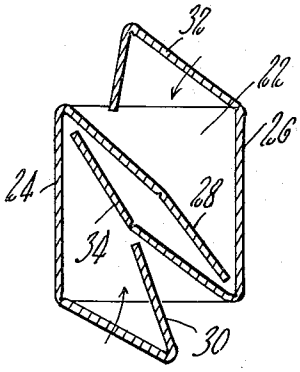


Fig. 8.

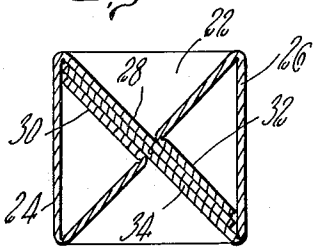


Fig. 9.

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PALLET AND SUPPORT STATION USEFUL IN PALLETS AND THE LIKE

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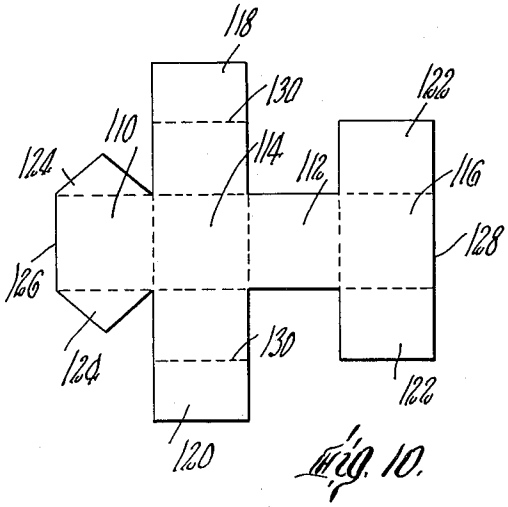


Fig. 10.

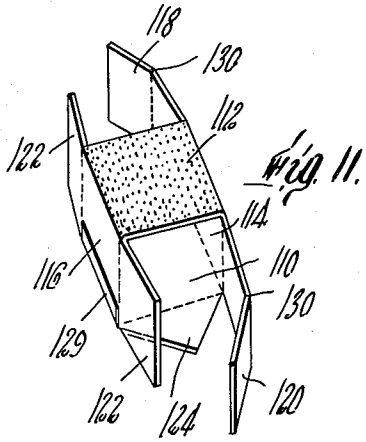


Fig. 11.

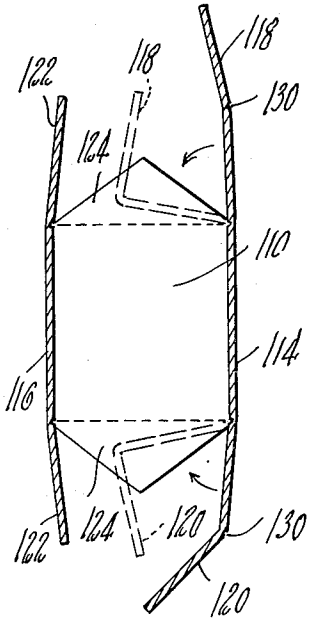


Fig. 12.

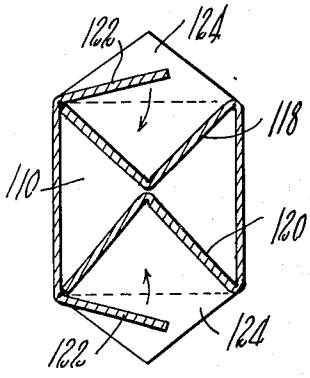


Fig. 13.

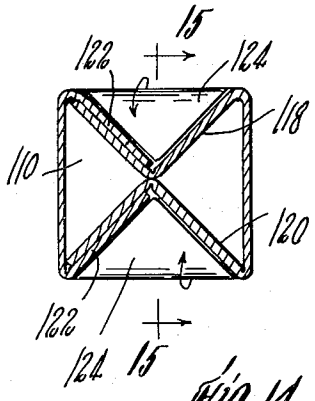


Fig. 14.

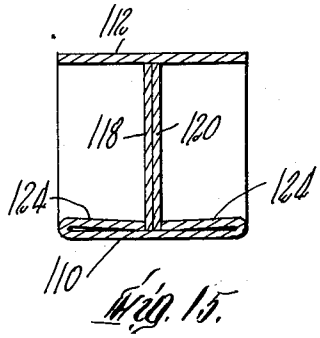


Fig. 15.

United States Patent Office 3,115,105 Patented Dec. 24, 1963

3,115,105
PALLET AND SUPPORT STATION USEFUL IN PALLETS AND THE LIKE

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7 Claims. (Cl. 108—56)

This invention relates to pallets and support stations useful therein.

It is a primary object of the invention to provide an improved construction for pallets and support stations which simultaneously provides a very large number of important advantages. Of particular importance is the fact that the construction makes possible shipping the pallet in space-saving flat condition, quickly erecting it into operative position when ready for use without requiring use of separate inserts, and easy knocking down into reusable flat condition for re-shipping if desired. A further important advantage from both inventory and handling standpoints is avoidance of the necessity of having available at the point of use separate solid, folded, or other inserts for insertion into the support stations of the pallet. Further important advantages are that the novel pallet and novel support stations therefor may be formed from inexpensive sheet material, lend themselves to economical cutting thereof, and provide pallets when erected of considerable strength.

An important feature of the invention is that each pallet support station is provided with horizontal upper and lower support portions, two parallel edges of which are foldably secured to parallel wall portions, and further vertical wall support is provided by material foldably secured to a parallel wall portion, which is folded and locked into a vertical position between the upper and lower support portions and supporting the former when the pallet is erected. In preferred embodiments of the invention two intermediately foldable wall portions of width greater than the horizontal portions and foldable, along an intermediate fold line, into opposite open ends of the zone defined by the horizontal portions and the parallel wall portions into V-shaped configuration, with parallel edges engaging the inner surfaces of the horizontal support portions, are foldably secured to two parallel wall portion edges.

Other objects, features, and advantages will appear from the following description of the preferred and a modified embodiment of the invention, taken together with the attached drawings thereof, in which:

FIG. 1 is an isometric view of the preferred embodiment of the invention;

FIG. 2 is an enlarged isometric view, broken away, of said embodiment in collapsed condition, showing two support stations;

FIG. 3 is a plan view of the blank from which the support stations of said embodiment are folded, fold lines being indicated by dotted lines;

FIG. 4 is an isometric view of one of the support stations of the preferred embodiment opened up so that the parallel wall surfaces thereof are in a vertical position;

FIG. 5 is a sectional view taken at 5—5 of FIG. 2 showing the pallet in partially collapsed condition;

FIG. 6 is a vertical section centrally through FIG. 4, showing also portions of an upper and lower sheet secured to the horizontal surfaces;

FIG. 7 is a sectional view taken at 7—7 of FIG. 6, showing in solid lines two of the intermediately foldable wall portions after partial folding toward operative position and showing in dotted lines said intermediately foldable wall portions at a further stage of folding;

FIG. 8 is a view corresponding to FIG. 7, showing the first-mentioned two intermediately foldable wall portions in a still further advanced stage of folding and showing also the remaining two intermediately foldable wall portions in a further advanced stage of folding;

FIG. 9 is a cross-sectional view corresponding to FIGS. 7 and 8 and showing the intermediately foldable wall portions of this embodiment fully folded into operative position;

FIG. 10 is a plan view of a blank for a modified embodiment of support station according to the invention;

FIG. 11 is an isometric view of said blank after the same is folded to bring the horizontal support portions into fully-spaced position and the parallel wall portions into perpendicular position, and after foldably joining the free vertical wall portion edge with the abutting free horizontal wall portion edge;

FIG. 12 is a sectional view taken on a plane cutting horizontally through FIG. 11, showing in dotted lines the intermediately foldable wall portions in an advanced stage of folding;

FIG. 13 is a view corresponding to FIG. 12, showing the intermediately foldable wall portions folded into operative position and showing the rectangular auxiliary support portions partially folded into operative position;

FIG. 14 is a view corresponding to FIGS. 12 and 13 and showing both the rectangular auxiliary support portions and the triangular locking portions folded into operative positions; and

FIG. 15 is a sectional view taken at 15—15 of FIG. 14.

Referring now more particularly to the drawings, there is shown a pallet indicated generally at 10, which is provided with an upper sheet 12, a lower sheet 14, and three rows each including four support stations indicated generally at 16.

Each support station is foldable from a blank as shown in FIG. 3, which includes two horizontal support portion areas 20 and 22 and two vertical support portion areas 24 and 26. Adjoining the latter are four intermediately foldable wall portion areas 28, 30, 32, and 34.

The blank may be bent on the fold line 36 to bring the free edge 38 of the horizontal support portion area 20 alongside the corresponding length of the free edge 40 of the parallel wall portion area 26, and the adjacent edges then foldably secured together by means of tape 42.

The horizontal support area portions 20 and 22 are then adhered or otherwise secured to the upper support sheet 12 and lower support sheet 14, to produce a collapsed pallet as shown in FIG. 2.

To bring the pallet into operative condition, the top sheet 12 is moved upwardly and sidewise relative to the bottom sheet 14, as indicated in FIG. 5, to raise the parallel wall portions 24 and 26 into vertical position as shown in FIG. 6. For each support station then, the intermediately foldable wall portions 28, 30, 32, and 34 are folded as shown in successive stages in FIGS. 7 and 8 to the operative condition shown in FIG. 9. The diagonally opposed intermediately foldable wall portions 28 and 34 are of greater length than the width of the horizontal portions 20 and 22, and are introduced into opposite ends of the open zone defined by the horizontal support portions 20 and 22 and the vertical wall portions 24 and 26 by transiently flexing the same along their intermediate fold lines. Thereafter the wall portions 28 and 34 are straightened out to provide vertical sheet members extending diagonally from one end of one parallel wall portion 24 to the other end of the other parallel wall portion 26. The other two intermediately foldable wall portions 30 and 32 are folded on themselves, the outer portions being relatively inwardly folded, and inserted into the zone defined by the horizontal support portions and the parallel wall portions so that said outer

portions lie along the intermediately foldable support walls 28 and 34, to provide V-shape (in horizontal cross-section) supporting walls with the apices of the V's pointing toward each other and separated from each other by the diagonal wall portions 28 and 34.

A modified support station according to the invention is shown in FIGS. 10 through 15. The support stations of this embodiment may of course be attached to upper and lower sheets in the same manner as the support stations above discussed. The blank shown in FIG. 10 includes a lower support portion area **110**, an upper support portion area **112**, and parallel wall portion areas **114** and **116**. It includes two intermediately foldable wall portion areas **118** and **120**, two rectangular auxiliary support portion areas **122** foldably adjoining opposite edges of area **116**, and two triangular locking portion areas **124** foldably adjoining opposite edges of area **116**. This blank may be folded, the free edges **126** and **128** foldably connected by tape **129**, and adhered to upper and lower sheets as in the embodiment previously described. (While in the embodiment shown the two intermediately foldable wall portion areas are attached to one parallel wall portion area and the two rectangular auxiliary support portion areas to the other, it will be apparent that each parallel wall portion area might suitably be attached to one intermediately foldable wall portion area and one rectangular auxiliary support portion area, the latter being located to be diagonally across the support station from each other.)

In either embodiment the bottom sheet may be omitted if preferred, so that in use each support station will rest directly on the floor.

In this embodiment the intermediately foldable wall portions **118** and **120** are foldably joined to, along opposite edges of, the same parallel wall portion area **114**, which is vertical when the support stations are in operative position. To insert the intermediately foldable wall portions **118** and **120** into the zone defined by the parallel wall portions and the horizontal support portions, they are bent upon themselves along the intermediate fold lines **130** thereof, with the outer portions thereof moving relatively outwardly so that the wall portions **118** and **120** each assumes a V-shape, pointing toward each other and with the apices of the V's adjacent each other centrally of the support station. The rectangular auxiliary support flaps **122** are then folded into position, after which the triangular locking flaps **124** are folded inwardly into position with their edges engaging portions of the outer surfaces of the now V-shaped intermediately foldable wall members **118** and **120** and the surfaces of the rectangular auxiliary support flaps **122**. The edges of the intermediately foldable wall portions alongside the horizontal support portions in this embodiment as in the preferred embodiment above described frictionally engage the horizontal portions for stability. In the present embodiment the rectangular auxiliary support portions **122** likewise frictionally engage the horizontal support portions, and the triangular locking flaps frictionally engage the outer portion of the rectangular auxiliary support flaps as well as half the outer portion of the intermediately foldable wall portions **118** and **120**.

The present invention thus provides a sturdy, easily shipped, easily set up or knocked down for subsequent re-use, inexpensive, collapsible pallet. It may be made of sheet material of various forms, for example, corrugated paperboard, with which it is preferable for added strength that the corrugations extend vertically in the parallel and other wall portions when the latter are in operative position. While in the pallet shown, twelve support stations are used, this number may be varied as desired, while at the same time easily providing for four-way entry of lift truck forks. If two-way entry only is desired, the horizontal support members and parallel wall members may be extended to span the entire pallet, the intermediately foldable wall portions then providing support only toward the opposed extremities of each elongated support station. The support stations may usefully be employed in non-pallet contexts; as, for example, a multiplicity thereof may be attached to the bottom of a packing crate to facilitate fork lift handling thereof; or secured to the bottom of fiberboard file cabinets; or secured to the flat bottom of a mattress support to provide a collapsible bed, for example for emergency hospital use.

Other embodiments within the invention and within the scope of the appended claims will occur to those skilled in the art.

I claim:

1. A foldable pallet comprising a sheet and a multiplicity of support stations, each said support station comprising an upper horizontal support portion secured to the lower surface of said sheet and a lower horizontal support portion parallel thereto, two parallel wall portions each foldably joined along one edge with said upper support portion and along the opposed edge with said lower support portion, and at least two intermediately foldable wall portions, each of which is of greater length than the width of said parallel wall portions, each said intermediately foldable wall portion being foldably joined for introduction into opposed open ends defined by said horizontal portions and said parallel wall portions along a secured edge thereof to one of said parallel wall portions and including within itself an intermediate fold line parallel to said secured edge and being foldable thereon into V-shape, and two edges of each said foldable wall portion perpendicular to its said secured edge being spaced apart a distance corresponding to the distance along the inner faces of said parallel wall portions between said support portions, whereby when said intermediately foldable wall portions are folded into V-shape the latter are held in supporting position between said support portions.

2. The pallet of claim 1 in which a second sheet parallel to the aforementioned sheet is secured to said lower support portions of said support stations.

3. The pallet of claim 1 which includes four intermediately foldable wall portions, each foldably joined along its said secured edge to an edge of one of said parallel wall portions, a pair of said intermediately foldable wall portions with diagonally opposed secured edges being foldable through transient flexing on the intermediate fold lines thereof into the zone defined by said support portions and parallel wall portions to define diagonal unbent support portions, and the other two of said intermediately foldable wall portions being foldable into V-shapes with the apex of each V pointing away from the parallel wall portion to which the respective intermediately foldable wall portion is foldably joined, with a face of each V-shaped intermediately foldable wall portion against a face of a diagonally disposed intermediately foldable wall portion.

4. The pallet of claim 1 in which each said support station contains two said intermediately foldable wall portions foldable into inwardly-directed V-shaped conformation with the apices of the V's generally abutting, said support stations including also a pair of triangular locking portions foldably joined to edges of said horizontal support portions and foldable to secure said V-shaped conformation.

5. The pallet of claim 4 which includes also a pair of rectangular auxiliary support portions foldably joined to edges of at least one of said parallel wall portions, the two edges thereof perpendicular to the joined edge just mentioned being spaced apart the same distance as corresponding edges of said intermediately foldable wall portions, each said rectangular auxiliary support portion being held against a said intermediately foldable wall portion by a said triangular locking portion.

6. The pallet of claim 1 in which the secured edges of the two said intermediately foldable wall portions are along opposite edges of the same said parallel wall por-

tion and said intermediately foldable wall portions are foldable into inwardly-directed V-shaped conformation with the apices of the V's generally abutting, said support stations including also a pair of rectangular auxiliary support portions foldably joined to the opposed edges of the other said parallel wall portion, the two edges thereof perpendicular to the joined edge just mentioned being spaced apart the same distance as corresponding edges of said intermediately foldable wall portions, and a pair of triangular locking portions foldably joined to edges of said horizontal support portions and foldable to engage with the edges thereof outer surfaces of the V-shape folded intermediately foldable wall portions and the rectangular locking portions.

7. A support station which comprises a horizontal upper support portion, a lower horizontal support portion parallel thereto, two parallel wall portions each foldably joined along one edge with said upper support portion and along the opposed edge with said lower support portion, and at least two intermediately foldable wall portions, each of which is of greater length than the width of said parallel wall portions, each said intermediately foldable wall portion being foldably joined for introduction into opposed open ends of the zone defined by said horizontal portions and said parallel wall portions along a secured edge thereof to one of said parallel wall portions and including within itself an intermediate fold line parallel to said secured edge and being foldable thereon into V-shape, two edges of each said foldable wall portion perpendicular to its said secured edge being spaced apart a distance corresponding to the distance along the inner faces of said parallel wall portions between said support portions, the secured edges of the two said intermediately foldable wall portions being along opposite edges of the same said parallel wall portion and said intermediately foldable wall portions being foldable into inwardly-directed V-shaped conformation with the apices of the V's generally abutting, said support station including also a pair of rectangular locking portions foldably joined to opposite edges of the other said parallel wall portion, the two edges of each rectangular locking portion perpendicular to the joined edge just mentioned being spaced apart the same distance as corresponding edges of said intermediately foldable wall portions, and a pair of triangular locking portions foldably joined to edges of said horizontal support portions and foldable to engage with the edges thereof outer surfaces of the V-shape folded intermediately foldable wall portions and the rectangular locking portions, whereby when said intermediately foldable wall portions are folded into V-shape the latter are held in supporting position between said support portions.

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