

Aug. 23, 1966

A. LESSHEIM

3,267,884

"OCTOPUS" PALLET

Filed Sept. 7, 1965

2 Sheets-Sheet 1

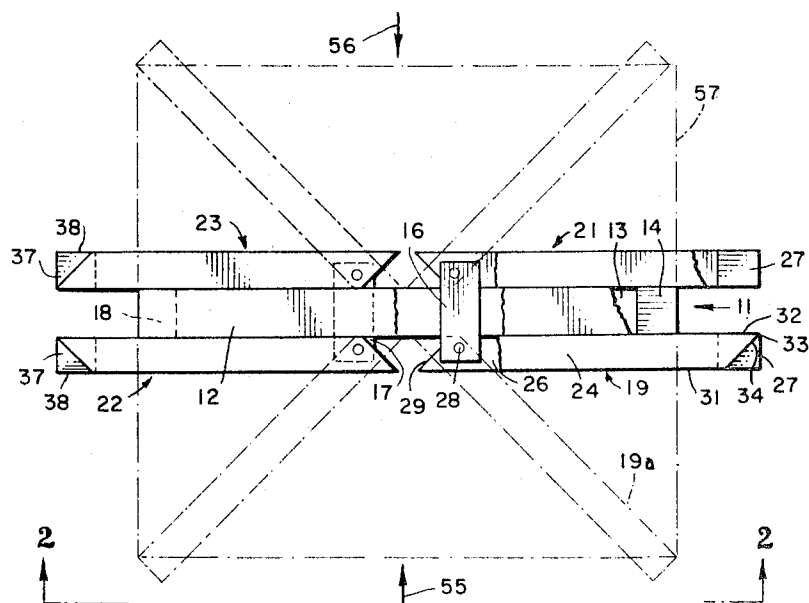


Fig. 1

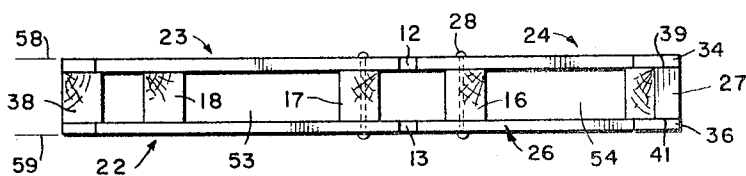


Fig. 2

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2 Sheets-Sheet 2

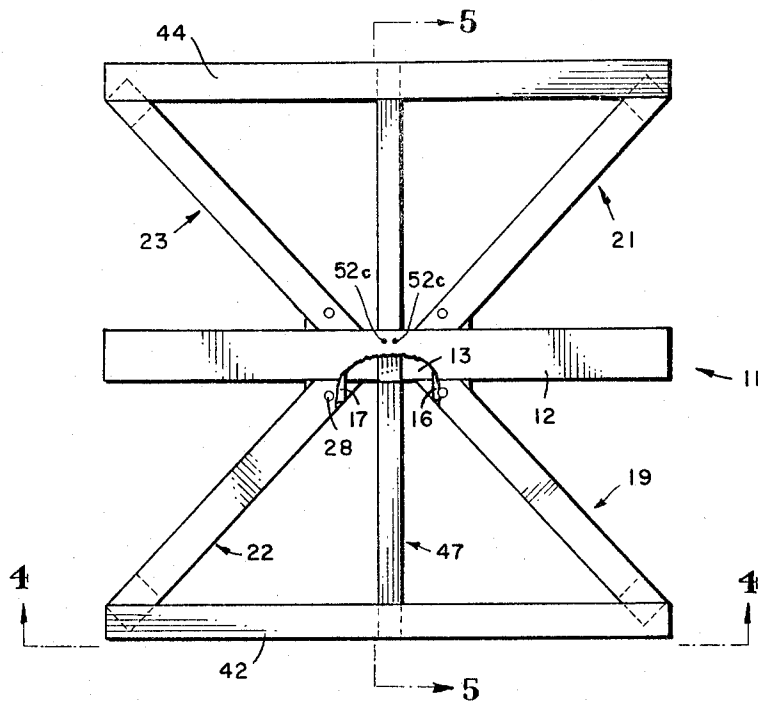


Fig. 3

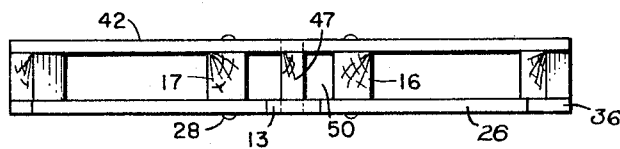


Fig. 4

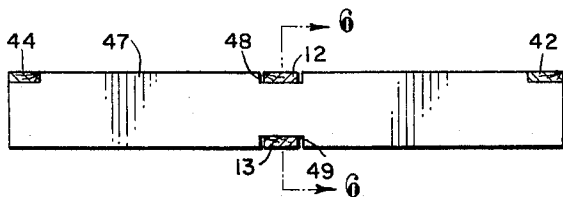


Fig. 5

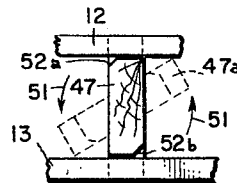


Fig. 6

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"OCTOPUS" PALLET

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13 Claims. (Cl. 108-54)

This invention relates generally to materials storage and handling devices and more particularly to a pallet or skid which is constructed so as to be collapsible when not in use, to occupy a minimum of space, but which can be opened up for use in storage and handling of various types of loads.

Collapsible pallets or skids are known, one of them being that shown in United States Patent Number 2,643,081 issued to Robert E. Spring on June 23, 1953. Many other forms of collapsible pallets are also known. Many of them, and particularly the Spring device, are characterized by certain advantages but also by certain shortcomings. They are frequently expensive, complex, have limited load bearing capacity, are inconvenient to use, are comparatively difficult to manufacture or assemble, require comparatively expensive materials, are of limited versatility, or are otherwise limited or deficient in one or more respects. It is therefore a general object of the present invention to provide a pallet construction overcoming the above noted deficiencies of collapsible pallets heretofore known.

Described briefly, a typical embodiment of the present invention incorporates a primary beam constructed of a pair of elongated flat plates secured in vertically spaced parallel relationship by a plurality of horizontally spaced support blocks therebetween. Two of these support blocks near the center of the beam project beyond the sides of the beam and serve as mounts for four arms, which are of a similar construction and pivotally mounted thereto so as to be foldable to positions alongside of and parallel to the main beam, and extendible to 45 degree angles with respect to the beam. The arms, together with the main beam, then provide a pallet useful for supporting various types of loads, and to the top of which a board can be mounted in the event the loads include many units much smaller than the pallet itself. The arms and primary beam are constructed so as to be conveniently handled by a fork-lift truck regardless of whether the arms are extended or folded, and the unit provides flat top and bottom surfaces in both the folded and unfolded condition.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

FIG. 1 is a top plan view showing in the solid outlines a typical embodiment of the pallet in the folded condition, with portions cut away to show details, and showing in the dotted outlines the pallet in the expanded or unfolded or open condition.

FIG. 2 is a side elevational view showing a pallet as it appears with two legs folded and two legs extended from the primary beam, this view looking at the pallet in the direction of the arrows 2-2 in FIG. 1.

FIG. 3 is a top plan view of the pallet, provided with an additional transverse beam and connector plates, illustrating its adaptability to loads of different characteristics.

FIG. 4 is an elevational view thereof looking in the direction of the arrows 4-4 in FIG. 3.

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FIG. 5 is a section taken along the line 5-5 of FIG. 3 and viewed in the direction of the arrows, illustrating crossmember details.

FIG. 6 is an enlarged section through the crossmember 5 at line 6-6 in FIG. 5 and viewed in the direction of the arrows.

Referring to the drawings in detail, and particularly FIG. 1 thereof, the primary beam 11 incorporates elongated upper and lower plates 12 and 13, respectively, having a plurality of horizontally spaced blocks 14, 16, 17, and 18 affixed thereto and disposed therebetween. These blocks may be secured to the upper and lower plates 12 and 13, respectively, by means of glue, nails, screws, or other fastening means. They thereby support the two plates in parallel vertically spaced relationship to each other.

Blocks 14 and 18 are typically identical and blocks 16 and 17 are typically identical, blocks 16 and 17 projecting outwardly beyond the opposite sides of the main beam as best shown in FIG. 1. They thereby provide mounts for four arms 19, 21, 22, and 23. Because the arms are so much alike each other, the description of one should suffice for all. Referring, therefore particularly to arm 19, it includes an upper plate 24 and a lower plate 26, both of which are elongated and disposed in parallel vertically spaced relationship, with a spacer block affixed thereto and disposed therebetween at the outer ends of these plates. At the inner ends of these plates, they are pivotally connected to the block 16 by means of a pivot pin, which may be a rivet 28 connected to the plates and passing through the block. This enables the swinging of the arm 19 from the closed or folded position shown by the solid outline in FIG. 1 to the open or extended position shown by the dotted outline 19a in FIG. 1 and shown by the solid outline in FIG. 2.

The inner ends of the upper plate 24 and the lower plate 26 are mitered as at 29 to facilitate swinging the arm to the open position and to abuttingly engage the side of the main beam when the arm has been swung outward to a predetermined degree from the closed position. In the illustrated example, this predetermined angle is 45 degrees. Accordingly the miter is nominally established at 45 degrees with respect to a side margin (31, for example) of the arm 19. The shape of the miter and its location with respect to the vertical axis of the pivot pin 28, and the location of the axis of the pivot pin with respect to the side margin 32 can be selected, as desired, to provide different predetermined degrees of maximum opening of the arm.

According to another feature of the present invention, the outer end of each of the upper and lower plates of the arm can also be mitered parallel to the inner end such as shown on arm 23, for example, which is identical to arm 19. But the block 27 is disposed so that it is flush with the outermost points 33 of the upper and lower plates but is not mitered. The result is that when the outer ends of the plates are mitered, a portion of the block projects beyond the ends 34 and 36 of the upper and lower plates 24 and 26, respectively, as does the portion 37 of the block 38 at the outer end of arm 22. The effect then is to provide a sort of a boss extending beyond the end of each of the arm plates and having an upper surface 39 exposed on block 27 and a lower surface 41 exposed on block 27. These bosses may be used as

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shown in FIGS. 3 and 4 wherein an upper connector plate 42 is affixed to the top surfaces of the bosses at the ends of arms 19 and 22. If desired a lower plate may be connected to the bottom surfaces of the bosses at the ends of these arms. Likewise, upper and lower plates 44 and 46 (not shown) may be secured to the outer ends of the arms 21 and 23. Because of the miter at the outer ends of the plates of these arms, these connector plates can easily be secured by nails or screws or glue or removable pins, if desired, to provide side members in the event that it is convenient to do so to provide for certain types of loads. They can also act as a locking device for the arms.

If it is desired to provide additional strength to the pallet, regardless of whether it is the type using the connector plates or the type which does not use them, a transverse center beam 47 may be employed. This beam, as best shown in FIGS. 5 and 6, is a solid beam having a central top notch 48 and central bottom notch 49 receiving, respectively, the upper and lower plates 12 and 13 of the main beam. It also has two notches on top at its ends to receive the top plates 42 and 44 respectively.

To install the center beam, it is tipped sideways as shown by the dotted outline in FIG. 6 and then passed through the opening 50 in the main beam between blocks 16 and 17 and plates 12 and 13. When the central notches are aligned with plates 12 and 13, the bar 47 is turned as indicated by arrows 51 to the upright position shown in FIGS. 3-6.

The top and bottom surfaces of the center notches are rounded or chamfered on opposite corners of a diagonal across the bar as at 52a and 52b and the greatest dimension between the chamfers is just slightly greater ($\frac{1}{32}$ inch for example) than the vertical space between the facing surfaces of plates 12 and 13. The result is that as bar 47 is rotated, it snaps into place. It can then be fixed in place by nails 52c, for example.

In a typical example of the invention, all of the blocks are of the same height and all of the upper plates are of the same thickness and all of the lower plates, but are usually made somewhat thicker in order to better handle the loads when the lifting forks of a fork-lift truck move into the spaces 53 and 54 between the plates, whether in the direction of the arrow 55 in FIG. 1 or the arrow 56 in FIG. 1 for lifting the pallet with the load thereon. This is the preferred direction of approach to the pallet because it makes use of the great strength of the integral primary beam 11. It is possible, however, to enter or approach the open pallet in either horizontal direction transverse to the direction of the arrows 2 and 56 in FIG. 1, to lift the pallet.

It was mentioned above that the inner ends and pivot locations of the arms are usually selected so that, when extended, the arms are located at 45 degrees with respect to their folded position, which is 45 degrees with respect to the primary beam. When so arranged, the outermost points of the arms define the corners of a rectangle 57 and the length of the main beam is selected so that its ends are flush with opposite sides of the rectangle as shown in FIG. 1. In this way, essentially a square pallet can be formed when the arms are extended. By having the pivot points spaced farther apart lengthwise of the main beam, and by changing arm lengths, rectangular pallets of various proportions can be obtained. Other configurations may also be provided. Of course the miters at the ends of the upper and lower arm plates can be arranged at different angles, as can the pivot points be located differently to provide different degrees of maximum opening from the folded locations.

It will be appreciated that the described pallet can be readily made from a variety of materials and in a variety of sizes. By way of example, however, where a pallet is made of wood for a particular application, the length of the primary beam may be 43 inches, the width of the plates of the main beam may be 3 inches, the

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thickness of the upper plates of the main beam and arms may be $\frac{3}{4}$ inch, the thickness of the lower plates of the main beam and arms may be $\frac{1}{2}$ inch, the thickness of the blocks may be $2\frac{3}{8}$ inches, the width of the arm plates may be 2 inches, and the arm mounting blocks may extend $1\frac{1}{2}$ inches beyond the sides of the main beam.

In addition to providing a very useful pallet, the present invention provides a rather inexpensive pallet, because the upper and lower arm plates may all be identical, their orientation being merely inverted for two of the arms from what it is for the other two of the arms. Standard thicknesses of raw material and standard widths can be employed, the mitered cuts can be achieved simultaneously and the number of spacing of blocks can be selected as desired to provide the strengths needed for the particular applications. The upper and lower surfaces of all of the plates are disposed in upper and lower parallel horizontal planes 58 and 59, respectively. Accordingly, the entire substantial surface area of the plates is useful for supporting the loads on top thereof and for transmitting loads from the pallet to whatever it is supported on. The advantage of this in stacking pallets upon other pallets loaded with merchandise, can readily be appreciated.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art and within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A pallet comprising:

a primary beam including an elongated upper plate and an elongated lower plate and a plurality of horizontally spaced blocks affixed to said plates and disposed therebetween and thereby supporting said plates in vertically spaced parallel relationship, two of said blocks being located at opposite ends of said primary beam and two of said blocks being spaced apart near the mid-point between opposite ends of said beam, said two blocks near the mid-point being arranged to project outwardly from opposite sides of said beam to provide mounts for pallet arms;

a pallet arm having an elongated upper plate identical in thickness to the upper plate of said primary beam and having an elongated lower plate identical in thickness to the lower plate of said primary beam, and said arm having a spacer block affixed to the upper and lower plate of the arm at one end thereof, the upper and lower plates of the arm being pivotally connected at the other end of the arm to one of said mounts at one side of said primary beam, the arm being thereby swingable between a folded position alongside said primary beam and an open position projecting outwardly from said one side of said primary beam, the inner ends of the upper and lower plates of the arm adjacent the pivotal connection being mitered at 45 degrees with respect to the sides of said plates which abut the side of said primary beam when the arm is folded, and the pivotal axis being located to cause abutting engagement of the mitered inner end of the upper and lower arm plates with sides of the upper and lower primary beam plates when the arm is swung outwardly from the primary beam to a 45 degree angle therewith, the outer ends of said upper and lower arm plates being mitered parallel to the inner ends thereof, the block affixed to the outer ends being flush with the outermost points on the outer ends of the upper and lower arm plates and projecting therefrom at 45 degrees with respect to the outer ends of the upper and lower arm plates to provide a mounting ledge;

therebeing four arms similar to said arm, two of said arms being identical and the other two of said arms

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being identical, each different one of said arms being mounted to a different one of said mounts and the lengths of said arms being such that when all of said arms are opened and disposed at 45 degrees with respect to said primary beam, the ends of said arms define the four corners of a rectangle with the ends of the primary beam being disposed on opposite sides of the rectangle, the upper faces of all of said upper plates lying in a first common plane and the lower faces of all of said lower plates lying in a second common plane vertically spaced below and parallel to said first plane;

all of said plates being parallelograms, and the plates for said primary beam being rectangular parallelograms.

2. The pallet as set forth in claim 1 and further comprising:

a connector plate extending parallel to the upper plate of said primary beam and having a thickness equal to the thickness of the upper plate of said primary beam and being disposed on upper faces of the mounting ledges of the arms extending from one side of said primary beam and connected thereto to secure the arms extending from said one side in the extended position with the upper face of said connector plate lying in said first common plane;

and a second connector plate parallel to the lower plate of said primary beam and mounted on lower faces of the mounting ledges of said arms extending to said one side of said primary beam and connected thereto and having a lower face lying in said second common plane.

3. A pallet as set forth in claim 2 and further comprising:

third and fourth connector plates mounted to the ledges of the arms extending from the opposite side of said primary beam and connected thereto and holding these said arms in the extended position with the upper and lower faces of said third and fourth connector plates lying respectively in said first and second common planes.

4. A pallet comprising:

a primary beam including an elongated upper plate and an elongated lower plate and a plurality of horizontally spaced blocks affixed to said plates and disposed therebetween and thereby supporting said plates in vertically spaced relationship, two of said blocks being arranged to project outwardly from both sides of said primary beam to provide mounts for pallet arms;

a plurality of pallet arms, each arm having an elongated upper plate identical in thickness to the upper plate of said primary beam and each arm having a lower plate identical in thickness to the lower plate of said primary beam, and each arm having a spacer block affixed to the upper and lower plate of the arm at one end thereof with the upper and lower plates of the arm being pivotally connected at the other end of the arm to one of said mounts at a side of said primary beam, each arm being thereby swingable between a folded position alongside said primary beam and an open position, the end portions of the upper and lower plates of each arm adjacent the pivotal connection being vertically spaced by the mount received therebetween and to which they are pivotally connected, and the inner ends of said upper and lower plates of each arm being so formed and the pivot points thereof being so located as to cause abutting engagement of the inner ends of the upper and lower arm plates with sides of the upper and lower primary beam plates when the arm is swung outwardly from the primary beam to a predetermined angle therewith, and the said spacer block affixed to the outer ends of the upper and lower plates of each arm being arranged to project from

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between the plates to provide connector mounting bosses;

the upper faces of said upper plates of said primary beam and said arms lying in a first common plane defining the upper margin of the pallet and the lower faces of said lower plates of said primary beam and said arms lying in a second common plane vertically spaced below and parallel to said first plane and defining the lower margin of the pallet.

5. The pallet as set forth in claim 4 and further comprising:

a connector plate extending parallel to said primary beam and having a thickness equal to the thickness of one plate of said primary beam and being connected to said bosses of the arms extending from one side of said primary beam to secure the arms extending from said one side in the extended position with the outer face of said connector plate lying in one of said common planes.

6. A pallet as set forth in claim 5 and further comprising another connector plate connected to the bosses of the arms extending from the opposite side of said primary beam and holding said arms in the extended position with the outer face of said another connector plate lying in said one common plane whereby a substantial plate surface area is provided in said one common plane, and each of said arms is locked outwardly at said predetermined angle.

7. A pallet comprising:

a primary beam including an elongated upper plate and an elongated lower plate and horizontally spaced blocks affixed to said plates and disposed therebetween and thereby supporting said plates in vertically spaced relationship, one of said blocks being arranged to project outwardly from both sides of said primary beam to provide mounts for pallet arms;

a pair of pallet arms, each arm having an upper plate and a lower plate, the upper and lower plates of each arm being pivotally connected at inner ends thereof to one of said mounts, one of said arms being thereby swingably mounted to said primary beam at one side thereof and the other arm being thereby swingably mounted to said primary beam at the other side thereof, each arm being swingable between a folded position alongside and parallel to said primary beam and an open position, projecting outwardly from said primary beam at an angle of less than 90 degrees from the folded position of the arm, the upper faces of said upper plates lying in a first common plane defining the upper margin of the pallet.

8. The pallet as set forth in claim 7 wherein:

the inner ends of said arms are so formed and the pivotal axes are so located that said ends move into abutting engagement with the side of said primary beam during swinging of said arms out from closed position to thereupon prevent further outward swinging of said arms.

9. The pallet as set forth in claim 7 wherein:

the upper and lower plate of each arm is received above and below, respectively, the mount to which it is pivotally connected whereby the mount serves as a spacer therebetween,

and each arm has a spacer block secured between the upper and lower plate thereof near the outer end.

10. The pallet as set forth in claim 7 and further comprising:

a connector plate extending parallel to said primary beam and connected to arms extending from one side of said primary beam and connected thereto to secure the arms extending from said one side in an extended position.

11. The pallet as set forth in claim 7 wherein:

the lower faces of said lower plates lie in a second common plane defining the lower margin of said pallet.

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12. The pallet as set forth in claim 7 and further comprising:

a crossmember extending transverse to said primary beam and having upper and lower notches in upper and lower faces, said notches receiving said upper and lower plates respectively, the distance between said notches being sufficient to retain said crossmember in position wherein said plates are received in said notches.

13. The pallet of claim 12 wherein:

the upper face of said crossmember lies in said first common plane and the lower face of said crossmember lies in a second common plane with lower faces of said lower plates.

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