United States Patent

Roberts et al.

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[45] **Aug. 15, 1972**

[54] **DISPOSABLE PALLET**

[72] Inventors: **Joe R. Roberts,** 32 West Ogden, Hinsdale, Ill. 60521; **James L. Torrence,** 806 Forest Rd., La Grange Park, Ill. 60525

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[52] **U.S. Cl.** **108/56**

[51] **Int. Cl.** **B65d 19/12**

[58] **Field of Search** 108/51–58; 229/22; 161/99–107, 120, 122, 139

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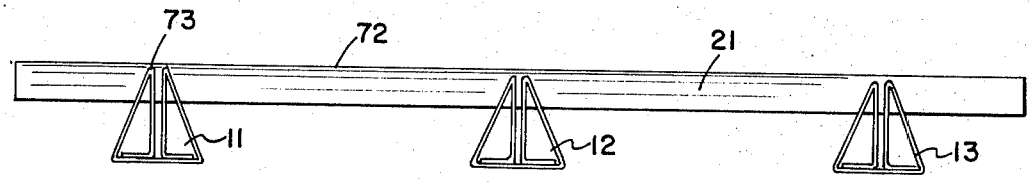
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Primary Examiner—Bobby R. Gay
Assistant Examiner—Peter A. Aschenbrenner
Attorney—Greist, Lockwood, Greenawalt & Dewey

[57] **ABSTRACT**

The pallet includes a plurality e.g., 2 or more, commonly 3) of parallel spaced, elongated base members interconnected by a plurality e.g., 2 or more, commonly 6) of parallel spaced, elongated tie members. The base members and the tie members are preferably formed from blanks of double faced corrugated paperboard material which are scored and folded to form each member with a triangular cross section and a hollow interior. Each one of the base members has triangular notches or openings formed therein which are equal in number to the tie members and which extend transversely through the base member at predetermined locations along the base member; and a portion of each one of the tie members is removably and frictionally received in one of the triangular notches in each one of the base members.

3 Claims, 12 Drawing Figures

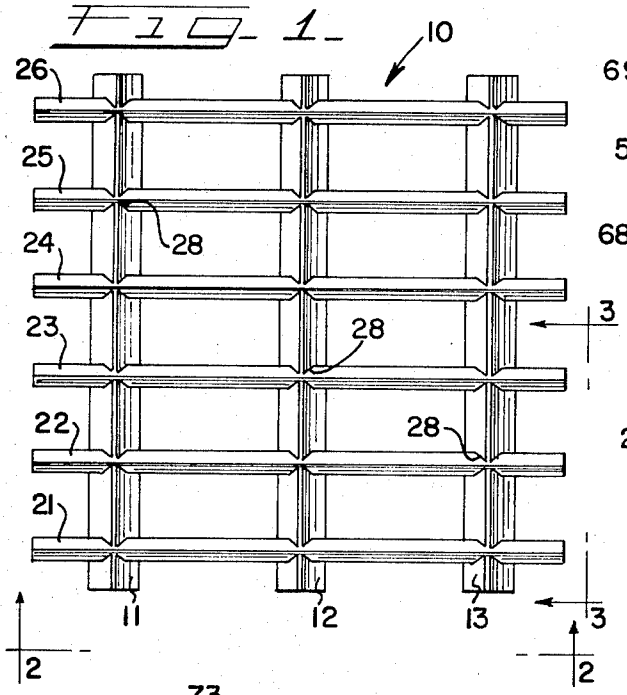


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SHEET 1 OF 2

FIG. 1



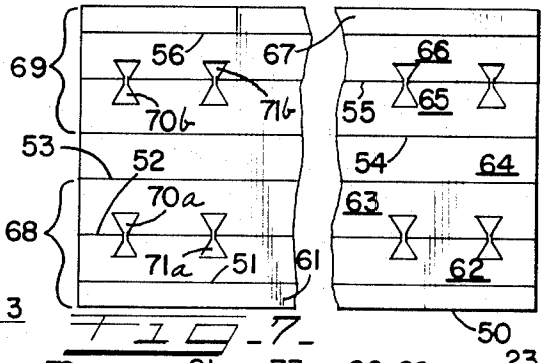


FIG. 7

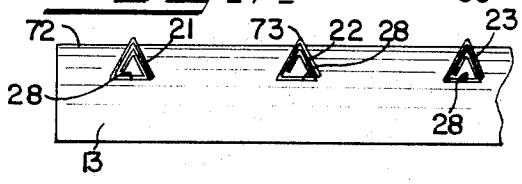


FIG. 3

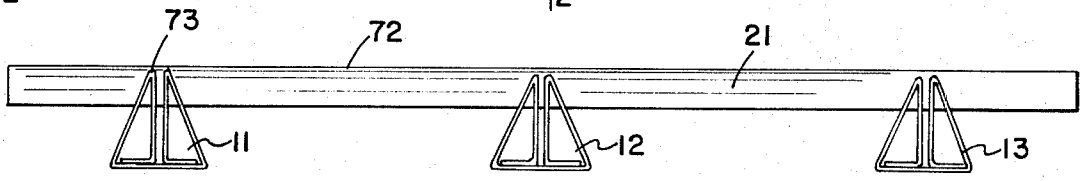


FIG. 2

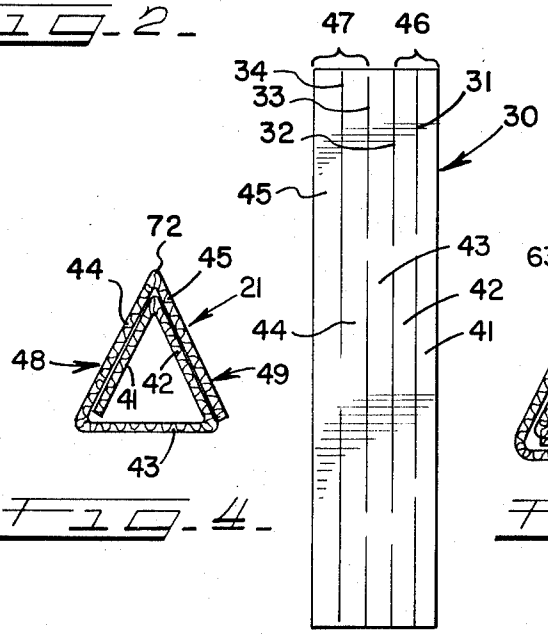


FIG. 4

FIG. 5

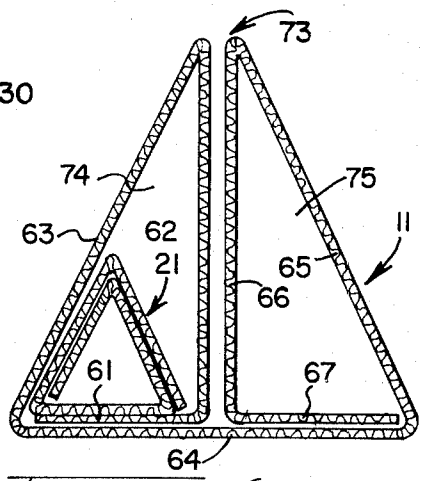


FIG. 6

INVENTORS
JOE R. ROBERTS
JAMES L. TORRENCE
BY Gust, Lockwood, Brunswick & Dewey
ATT'YS.

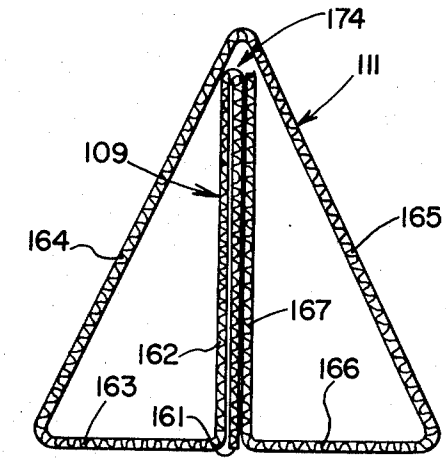


FIG. 10

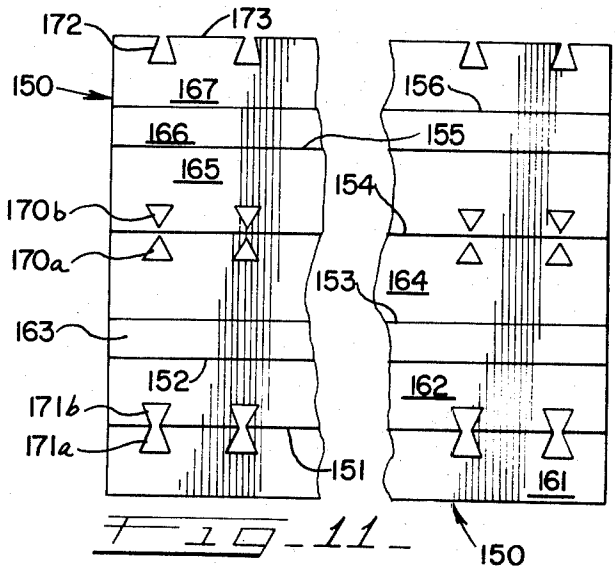


FIG. 11

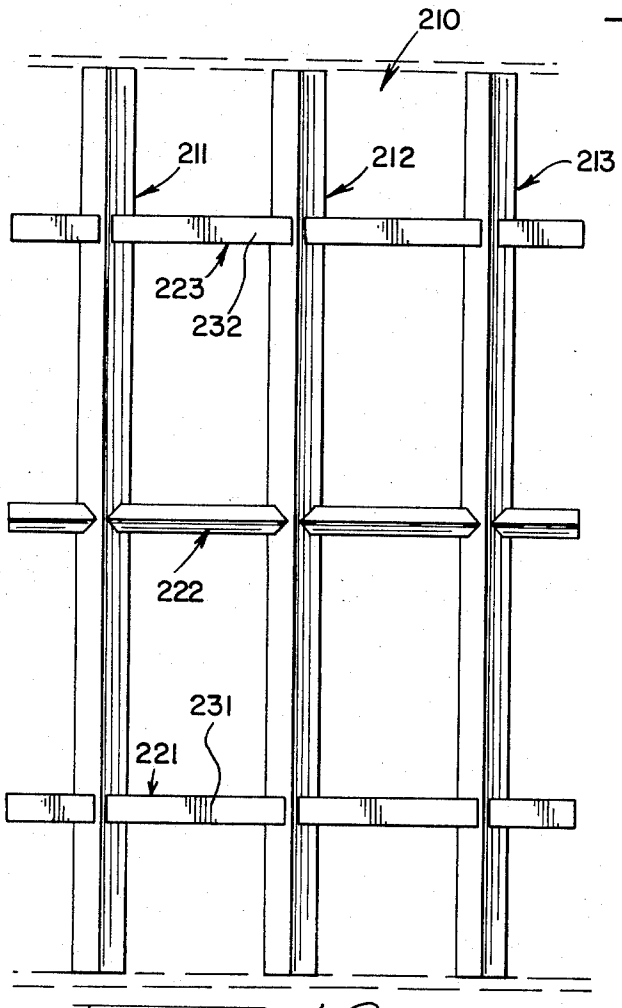


FIG. 12

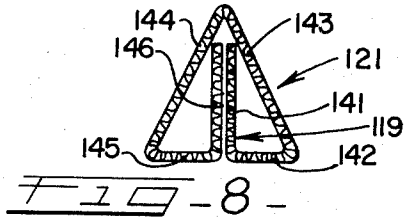


FIG. 8

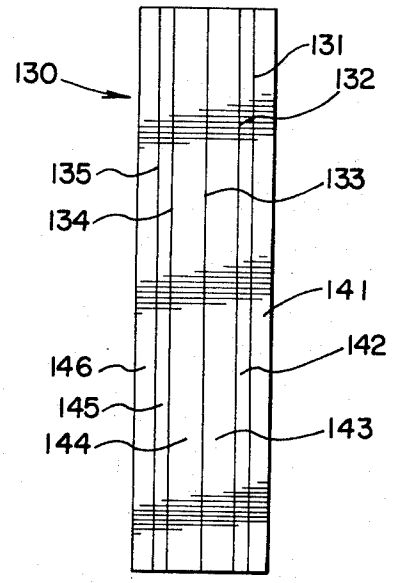


FIG. 9

INVENTORS
JOE R. ROBERTS
JAMES L. TORRENCE
BY Treist, Lodwood, Greenawalt & Dewey
ATT'YS.

DISPOSABLE PALLET

The present invention relates to a pallet which is lightweight and disposable. More specifically, the present invention relates to a corrugated paperboard pallet having at least two triangularly shaped base members which are adapted to rest on a floor surface, and a plurality of triangularly shaped cross or tie members which extend between and interconnect the base members.

Pallets are widely used in transportation and storage or goods (typically packaged in boxes or bags) which are stacked on a pallet for shipment therewith as an integral unit. Heretofore such pallets have been made primarily of wood and have in general not been inexpensive and disposable.

It is desireable, in many instances, that the pallets be inexpensive so that after the goods have been removed from the pallets they can be discarded to avoid the cost of returning the empty pallets to their point of origin.

In other instances, where it is desirable to reuse the pallets, it is desirable that the pallets be of a simple construction so that they can be easily disassembled by unskilled labor and packed in a small space for return shipment. Additionally, it is desirable that the pallet be constructed of easily assembled, inexpensive members which can be assembled by unskilled labor at the point of use without the use of tools or fasteners.

Another object of the present invention is the provision of a pallet defined by a lattice of elongated supporting members each of which has a triangular cross section.

Another object of the present invention is the provision of a pallet in which supporting members of the pallet are formed from blanks of sheet material which are scored and folded to form each member with a generally triangular cross section and a hollow interior.

Still another object of the present invention is the provision of a kit for constructing a pallet, the kit including a plurality of first and second elongated blanks formed from a sheet material and each of the blanks having at least two score lines dividing the blank into at least three panels so that each blank can be folded to form a supporting member with a triangular cross section and a hollow interior. Each of the second blanks has at least two pairs of holes with each pair including a first hole in one panel and and a second hole in another panel, the first and second hole being laterally aligned so that when the second blank is folded to form a supporting base member the laterally aligned holes will form a triangular opening extending transversely through the base member for receiving a portion of a tie member formed from one of the first blanks.

These and other objects and advantages of the present invention, and the manner of their attainment, will become more apparent from the following detailed description of a preferred embodiment of the present invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of the pallet of the present invention;

FIG. 2 is an end elevational view of the pallet taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary side elevational view of the pallet lattice along line 3—3 of FIG. 1;

FIG. 4 is an enlarged end view of a tie member of the pallet shown in FIG. 1;

FIG. 5 is a plan view of a blank of sheet material from which the tie member shown in FIG. 4 is formed;

FIG. 6 is an enlarged end view of a base member of the pallet shown in FIG. 1;

FIG. 7 is a plan view with portions broken away of a blank of sheet material from which the base member shown in FIG. 6 is formed.

FIG. 8 is an enlarged end view of a modified form of base member similar to the base member shown in FIG. 6;

FIG. 9 is a plan view with portions broken away of a blank of sheet material from which the base member shown in FIG. 8 is formed;

FIG. 10 is an enlarged end view of a modified form of tie member similar to the tie member shown in FIG. 4;

FIG. 11 is a plan view of a blank of sheet material from which the tie member shown in FIG. 10 is formed; and,

FIG. 12 is an elevational plan view of a lattice structure formed with members similar to the tie members and base members shown in the previous figures and which is adapted for use in building construction.

Referring now the drawings in greater detail, one embodiment of the pallet of the present invention is generally indicated at **10** in FIG. 1. As shown, the pallet **10** includes three parallel spaced base members **11**, **12**, and **13** and six parallel spaced tie members **21–26** which interconnect the base member **11–13** to form a supporting lattice structure which defines the pallet **10**.

As shown in FIG. 2, each of the base members **11–13** is generally triangular in shape. Likewise, as shown in FIG. 3, each of the tie members **21–26** is generally triangular in shape. In the illustrated embodiment, each one of the base members **11–13** has six transverse notches or openings **28**, each of which receives and frictionally holds a portion of one of the tie members **21–26**, as shown in FIGS. 1–3. Preferably, the openings **28** are triangularly shaped to provide a close fit between the sides of the opening **28** and the portion of a triangularly shaped tie member received in the opening **28**. However, a trapezoidally shaped opening **28** will also provide a close fit.

The size of the triangular openings **28** and the triangularly shaped tie members **21–26** is less than the size of the triangularly shaped base members **11–13**. In this way, and as best shown in FIG. 2, a space is provided below the bases of the interconnecting tie members **21–26** between the base members **11** and **12** and between the base members **11** and **13**. These spaces permit the insertion of forks of a fork lift mechanism underneath the pallet **10** for raising, lowering and carrying the pallet **10** with or without a load thereon.

In the pallet construction shown in FIGS. 2 and 3, the apex of each of the triangular openings **28** intersects the apex of the triangularly shaped base member **11**, **12** or **13**. However, it is preferred that the openings **28** do not intersect the apex of the base members **11–13** to keep the base members **11–13** as strong as possible.

Since all of the tie members **21–26** are formed in the same manner, only the tie member **21** will be described in detail with reference to FIGS. 4 and 5. As best shown in FIG. 4, the tie member **21** is preferably formed from a double faced corrugated paperboard material, and initially, the tie member **21** is in the form of an elongated paperboard blank **30** as shown in FIG. 5. The blank **30** is divided by four score lines **31–34** into five panels

41–45. The center panel 43 forms the base of the tie member 21 after the side portions 46 and 47 on either side thereof are folded over to form the tie member with the cross section shown in FIG. 4. This is accomplished by first folding the side portion 46 twice along the score lines 32 and 31 so that the panels 42 and 41 are formed in an inverted V over the center panel 43. Then the other side portion 47 is folded twice along the score lines 33 and 34 to super-impose the panels 44 and 45 over the panels 41 and 42, with the panels 44 and 45 also forming an inverted V over the base 43. In this way, the tie member 21 is formed with two double strength side wall portions 48 and 49 defined by the overlapping panels 44, 45 and 41, 42, and with a base portion formed by the center panel 43. Preferably, the panels 42 and 45 are secured together by a suitable fastening means, such as by an adhesive or by several staples (not shown).

Since each of the base members 11–13 are formed in a similar manner, only the base member 11 will be described in detail with reference to FIGS. 6 and 7. As shown in FIG. 6, the base member 11 is also preferably formed from a double faced corrugated paperboard material and, initially, is in the form of an elongated paperboard blank 50. The blank 50 has six score lines 51–56 for dividing the blank 50 into seven panels 61–67. The side portions 68 and 69 of the blank 50 on either side of the center panel 64 are mirror images of each other and are folded in a similar manner to form the base member 11 with the cross section shown in FIG. 6. To accomplish this, the side portion 68 is folded three times: along the score line 53 to form the first adjacent panel 63 on one side of the center panel 64 as an upwardly inclined wall portion of the base member 11; along the score line 52 so that the panel 62 extends downwardly to form an interior vertical wall portion; and, along the score line 51 so that the outermost panel 61 extends from the lower end of the panel 62 to the fold along the score line 53 separating the center panel 64 from the first adjacent panel 63 to define a structural reinforcing part of the base member 11.

In like manner, the other side portion 69 is folded along the score lines 54, 55 and 56 so that the first adjacent panel 65 forms an upwardly inclined side wall portion, the next adjacent side wall 66 forms an interior wall portion, and the outermost panel 67 forms a structural reinforcing part of the base member 11.

As shown in FIG. 7, the first adjacent panel 63 on one side of the center panel 64 is provided with a first group of spaced apart, triangularly shaped, or trapezoidally shaped holes 70*a* which are situated adjacent the second score line 52; and a second group of spaced apart, triangularly shaped holes 70*b* is provided in the first adjacent panel 65 on the other side of the center panel 64 and adjacent the fifth score line 55. The first and second groups of holes 70*a* and 70*b* are laterally aligned with each other so that when the blank 50 is folded along the score lines 51–56, to form the base member 11, the holes 70*a* and 70*b* will form part of the openings 28 which extend transversely through the base members 11–13. The openings 28 are also defined by a third and a fourth group of holes 71*a* and 71*b* which are formed respectively in the next adjacent panels 62 and 66 on either side of the center panel 64. In this respect, the third group of holes 71*a* is aligned with the first group of holes 70*a* and each hole 71*a* is situated in the panel 62 adjacent the second score line 52. As shown in FIG. 7, each one of the holes 71*a* communicates with one of the holes 70*a* so that the ridge or crest 72 of each tie member 21–26 will lie in essentially the same plane as the ridge or crest 73 of each base member 11–13 as shown in FIGS. 2 and 3. In this way, a load on the pallet 10 will be supported on the crests 72 of the tie members 21–26 and on the crests 73 of the base members 11–13.

In like manner, the fourth group of holes 71*b* is aligned with the second group of holes 70*b*. Also, each one of the holes 71*b* is situated in the panel 66 adjacent the fifth score line 55 and communicates with one of the holes 70*b*.

When the blank 50 is folded along the score lines 51–56 to form the base member 11, each of the holes 71*a* and 71*b* defines the part of one of the openings 28 which extends through the interior vertical wall portions formed by the panels 62 and 66.

It will be understood that the holes 70*a*, 70*b*, 71*a* and 71*b*, and the openings 28 formed thereby, can be either triangular or trapezoidal fro receiving the tie members 21–26. When the crests 72 of the tie members 21–26 extend slightly above the crests 73 of each of the base members 11–13, the openings 70*a*—71*b* will be trapezoidal in form. Moreover, it will be understood that the openings 71a and 71b in the panels 62 and 66 forming the interior vertical walls are slightly smaller than the openings 70*a* and 70*b* in the panels 63 and 65 which are inclined when the blank 50 is folded to form the base member 11. Additionally, and as previously explained, it is preferred that neither the holes 70*a* and 71*a* nor the holes 70*b* and 71*b* communicate with each other to minimize the loss in strength in the base members 11-13 resulting from the holes 70*a*-71*b*.

With the base members 11–13 constructed in the manner described above, each of the base members 11–13 has two vertical load supporting wall portions and two inclined load supporting wall portions, such that, the portion of each tie member 21–26 which is received through one of the openings 28 in the base member 11 is supported by four wall portions 62, 63, 65 and 66 of the base member 11. In this way, the load bearing strength of the base members 11–13 is significantly enhanced.

Alternatively, the base members 11–13 can be formed in the same manner as the tie members 21–26 with overlapping side wall portions. With such an alternative construction of the base members 11–13, the portion of each tie member 21–26 supported by each base member 11–13 will also be supported by four wall portions, all of which are inclined.

When the blank 50 is folded to form the base member 11, the side portions 68 and 69 are folded to form triangles defining interior spaces 74 and 75 within the base member 11, as shown in FIG. 6. Preferably, the base members 11–13 and the tie members 21–26 are sized so that one of the base members 21–26 can be received in one of the spaces 74 or 75 in each of the base members 11–13. The tie member 21 is shown in FIG. 6 positioned in the space 74 of the base member 11. This sizing of the base members 11–13 and the tie members 21–26 are desired so that the disassembled base members 11–13 and tie members 21–26 can be packed in a small space for return shipment.

Moreover, after disassembling the pallet **10**, the tie members **21–26** and the base members **11–13** can be unfolded and flattened into their initial form as blanks **30** and **50** if the panels thereof were not initially secured to each other, such as with an adhesive.

The formation of the base members **11–13** and tie members **21–26** of the pallet **10** from blanks of sheet material as disclosed in FIGS. **4–7** will provide a pallet construction having a sufficient load bearing capacity for handling many types of loads. However, it has been learned empirically that a greater load bearing capacity can be obtained by modifying the construction of the base members and tie members to include interior, vertically extending, structurally reinforcing wall portions, such as the wall portion **109** of a modified base member **111** shown in FIG. **10**, and the wall portion **119** of a modified tie member **121** shown in FIG. **8**. It will be apparent that the construction of the tie members **121** is very similar to the construction of the base member **111**. Accordingly, the construction of the base member **111** can be utilized in the construction of tie members **121**. Likewise, the construction of the tie member **121** can be utilized in the construction of the base members **111**.

As best shown in FIGS. **8** and **9**, the tie member **121** is formed from an elongated blank **130** (FIG. **9**) of sheet material. The blank **130** is divided by five score lines **131–134** into six panels **141–146**. To form the tie member **121**, the blank **130** is first folded along the score lines **133** to form the panels **143** and **144** to inclined side wall portions of the tie member **121**. Next, the partially folded blank **130** is folded along the score lines **132** and **134** to properly position the panels **142** and **145** for forming the base of the tie member **121**. At approximately the same time, the blank **130** is folded along the score lines **131** and **135** for positioning the panels **141** and **146** within the hollow interior **148** of the tie member **121** to form the interior wall portion **119** of the tie member **121**. It will be noted that the wall portion **119** is double strength, being formed of two panels **141** and **146**. It will be understood that the tie members **121** can be utilized in place of the tie members **21–26** to form the pallet **10** or a similar pallet.

Referring now to FIGS. **10** and **11**, the base member **111** shown in FIG. **10** is formed from an elongated blank **150** (FIG. **11**) of sheet material. The elongated blank **150** is divided by six score lines **151–156** into seven panels **161–167**. To form the base member **111**, the blank **150** is first folded along the score line **154** to form the panels **164** and **165** into inclined side wall portions of the base member **111**. Next, the partially folded blank **150** is folded along the score lines **153** and **155** to position the panels **163** and **166** to proper position for forming the base of the base member **111**. At approximately the same time, the partially folded blank **150** is also folded along the score lines **151**, **152** and **156** so that the panels **161**, **162** and **167** can be folded inwardly into the interior **168** of the base member **111** to form the interior wall portion **109**, which as shown, is formed from three panels **161**, **162** and **167**. It will be appreciated that the base member **111** is formed in essentially the same manner as the tie member **121** with the exception of the extra panel **161** which is folded over to provide the triple strength interior wall portion **109**. This construction of the base member **111** is somewhat stronger than the construction of the tie member **121**, if desired, the tie member **121** can be formed in the same manner as the base member **111** and vice versa.

The base member **111** is also formed with a plurality of transversely extending openings, which are similar to the openings **28** in the base members **11–13**. Each opening is adapted to receive and hold a portion of one of the tie members **121**. The openings are defined by aligned holes formed in several of the panels **161–167** and spaced along the length of the blank **150**. In this respect, the panels **164** and **165** which form the inclined side wall portions of the base member **111** are provided with groups of aligned holes **170*a*** and **170*b***. These holes **170*a*** and **170*b*** are located in the respective panels **164** and **165** adjacent to, but spaced from, the score line **154** as shown in FIG. **11** and define the portion of the openings (in the base member **111**) which extend through the side wall portions of the base member **111**. The three panels **161**, **162** and **167**, which form the vertical interior wall portion **109** of the base member **111** also have holes or notches **171a**, **171b** and **172** formed therein which are aligned with respective holes of the groups of holes **170*a*** and **170*b*** to form the portion of the openings (in the base member **111**) which extend through the interior vertical wall portion **109** of the base member **111**. In this respect, the holes **171*a*** and **171*b*** are formed in the panels **161**, **162** adjacent the score line **151** whereas the notches **172** are formed along the outer margin of the panel **167** and open onto the edge **173** of the panel **167**. As shown, the holes **171a** and **171b** communicate with each other at the score line **151**. Of course, it is to be understood that, to enhance the strength of the base member **111**, the portion of each of the transverse openings through the interior wall portion **109** of the base member **111**, can be spaced from the upper edge **174** of the interior wall portion **109** so that the opening **171a** and **171b** will not communicate with each other. In other words, the holes **171*a*** and **171*b*** can be formed in a manner similar to the formation of the holes **170*a*** and **170*b*** in panels **164** and **165** as shown in FIG. **11**.

Likewise, the notches or holes **172** in the panel **167** adjacent the side edge **173** thereof can be formed so that each notch **172** does not open onto the side edge **173**.

Preferably, the panels forming the interior wall section in both the base member **111** and the tie member **121** are secured to each other by a suitable adhesive or other fastening means, i.e., the panels **141** and **146** of the tie member **121** are secured to each other by an adhesive and the panels **161**, **162** and **167** are secured to each other by an adhesive. In this way, a rigid internal wall structure **109** or **119** is provided in the construction of each base member **111** and each tie member **121**.

Referring now to FIG. **12**, it will be understood that the lattice structure and the base and tie member construction defining the pallet **10** of the present invention can also be utilized in other applications. For example, the lattice structure can be used as a replacement for studs in a wall framework. In this application, a lattice structure, such as the structure **210**, is substituted for wall studs to provide lateral support to wall boards secured to either side thereof. The lattice structure **210** typically has an overall length of approximately **8** feet

and an overall width of approximately 4 feet to correspond to the size of conventional 8 inch × 4 inch wall boards.

In FIG. 12, the lattice structure 210 is shown as comprising three base members 211–213 and three tie members 221–223. To facilitate securement of a wall board to each side of the lattice structure 210, some of the tie members 221–223 are inverted so that the bases thereof lie in the same plane to define surface portions to which the wall board can be attached. Thus, the tie members 221 and 223 are positioned so that the inverted base surfaces 231 and 232 thereof are arranged to lie in a plane as close as possible to a plane passing through the apex 234 of each one of the base members 211–213. Also, although the lattice structure 210 is shown as comprising only three tie members, it will be understood that the lattice structure 210 can be formed with more than three tie members.

In addition to the pallet 10, the present invention also includes a kit for construction the pallet 10 as shown in FIGS. 1 to 3. Such a kit includes a plurality of the blanks 30 and 50 (or 130 and 150). For example, a kit for constructing the pallet 10 as sown in FIG. 1 will consist of six of the blanks 30 and three of the blanks 50 preformed with score lines and holes in the manner described above.

Although the present invention contemplates the use of a sheet material which is a double faced corrugated paperboard material, it is to be understood that other sheet materials can be utilized, such as a semi-rigid plastic sheet material.

As another alternative, the pallet of the present invention can be constructed from triangular tubes made from a semi-rigid material, such as a plastic material. Such a modified form of the pallet 10 will include at least two tubular base members each having a triangular cross section, a hollow interior, and a plurality of spaced apart openings formed transversely of and through each base member, together with a plurality of tubular tie members equal in number to the openings in each base member with each tie member having a triangular cross section and a hollow interior.

With the pallet 10 of the present invention constructed in the manner described, a lightweight, inexpensive and disposable pallet is provided. Moreover, a kit for constructing the pallet 10 can be easily assembled and disassembled by unskilled labor without the use of tools or fasteners.

I claim:

1. A disposable and reusable pallet comprising at least two parallel spaced, elongated base members interconnected by at least two parallel spaced elongated tie members to form a lattice structure for supporting a load, each of said base members and each of said tie members having a triangular cross section and being formed from a sheet material, and each of said base members having a plurality of triangular or trapezoidal openings formed therein which extend transversely through said base member and which are at least equal in number to the number of tie members, said openings being located at predetermined intervals along said base member and a portion of each one of said tie members being removably and frictionally received in one of said openings in each of said base members, each of said base members being formed from a blank of sheet material having a central panel and first and second side portions, each of said side portions being folded three times to form three panels, the first panel extending angularly upwardly from said central panel to define an upwardly inclined side wall portion of said base member, the second panel extending vertically downwardly from said first panel to form an interior vertical wall portion and said third panel extending horizontally from the lower end of said second panel to the fold separating said central panel from said first panel and defining a reinforcing structural part of said base member.

2. A kit for constructing a disposable and reusable pallet, said kit including a plurality of first and second elongated blanks formed from a sheet material: said first blank having at least two longitudinally extending score lines dividing said first blank into at least three panels whereby said first blank can be folded along said score lines to form a tie member having a triangular cross section and a hollow interior; said second blank having six longitudinally extending score lines dividing said second blank into seven panels, the center panel defining a base portion of said base member, the first adjacent panel on either side of said center panel defining an upwardly inclined side wall portion of said base member, the next adjacent panel on either side of said center panel defining a vertical interior wall portion of said base member and each one of the outermost panels on either side of said center panel forms a horizontal structural reinforcing part of said base member and overlies one half of said center panel when said second blank is folded along said score lines to form said base member; said second blank also having a first group of triangular or trapezoidal shaped holes in one of said panels and a second group of triangular or trapezoidal shaped holes in another one of said panels, each of said holes of said first group being laterally aligned with one of said holes of said second group so that when said second blank is folded to form said base member, each pair of said aligned holes will form a triangular or trapezoidal opening extending transversely through said base member for receiving a portion of one of said tie members formed from one of said first blanks.

3. The kit as defined in claim 2 wherein said first group of holes is formed in the first adjacent panel adjacent the second score line which divides said first adjacent panel from said next adjacent panel on one side of said center panel, and said second group of holes is formed in the first adjacent panel adjacent the fifth score line which divides said first adjacent panel from said next adjacent panel on the other side of said center panel, and wherein said second blank has a third group of holes in said next adjacent panel on said one side of said center panel adjacent said second score line, each of said holes in said third group being laterally aligned with one of said holes of said first group, and a fourth group of holes in said next adjacent panel on said other side of said center panel adjacent said fifth score line, each of said holes of said fourth group being laterally aligned with one of said holes of said second group.

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