

Sept. 29, 1959

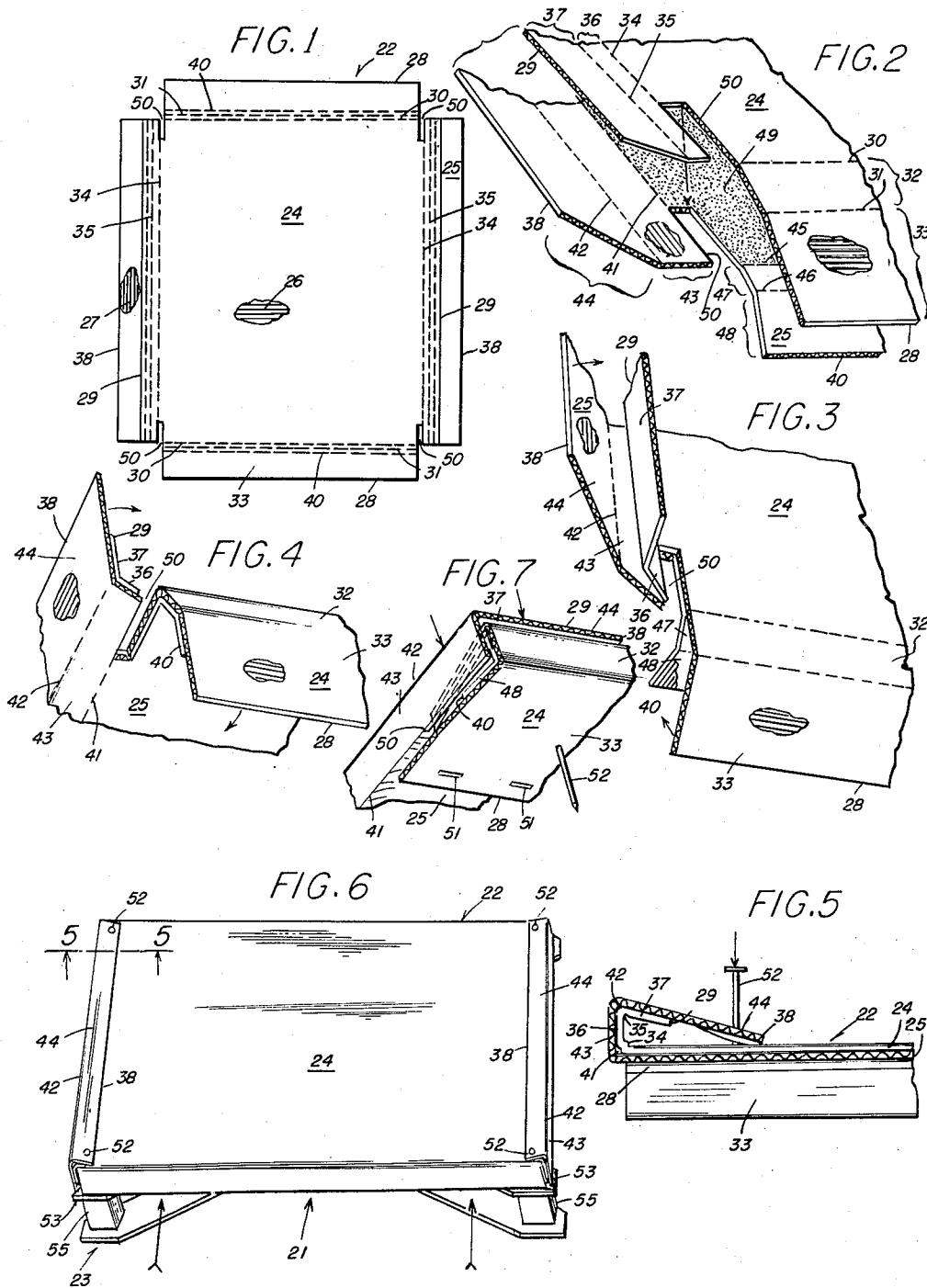
B. O'C. PARKER

2,906,481

MATERIALS HANDLING PALLET

Filed July 10, 1958

3 Sheets-Sheet 1



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B. O'C. PARKER

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MATERIALS HANDLING PALLET

Filed July 10, 1958

3 Sheets-Sheet 2

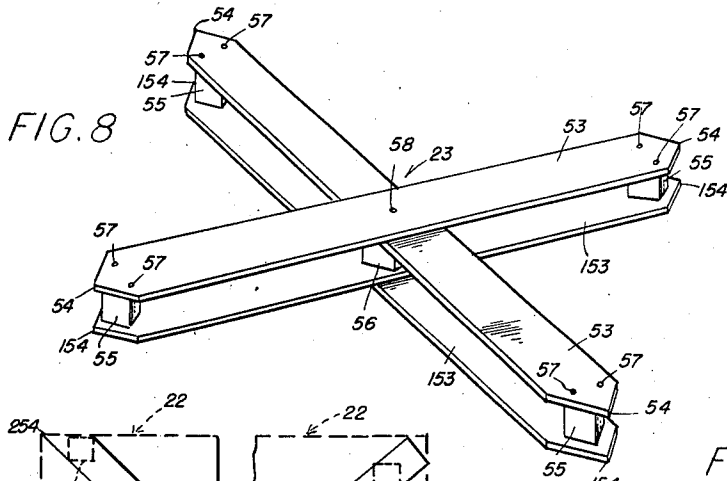


FIG. 8

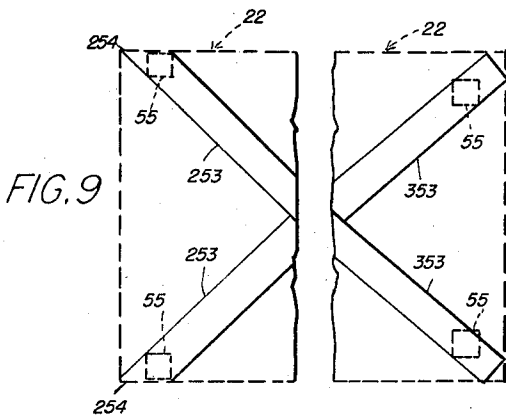


FIG. 9

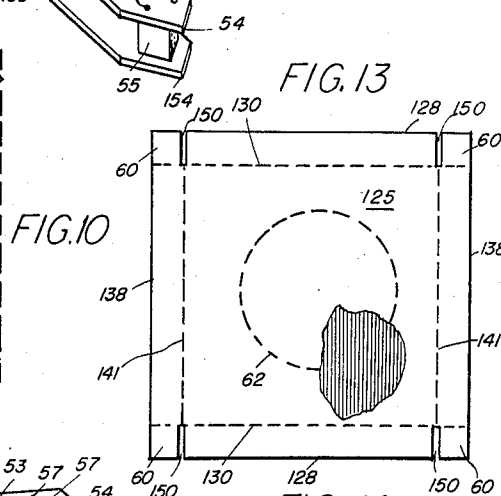


FIG. 10

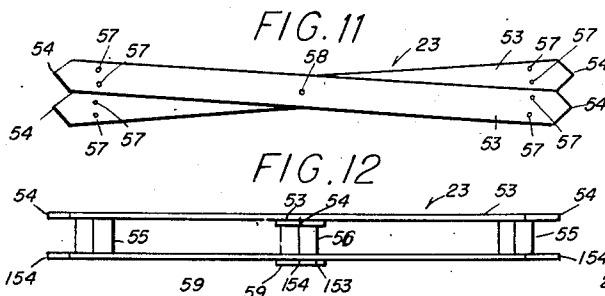


FIG. 11

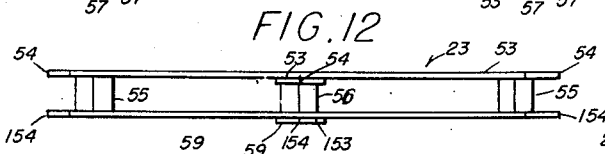


FIG. 12

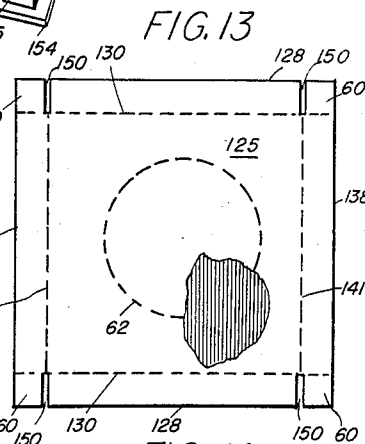


FIG. 13

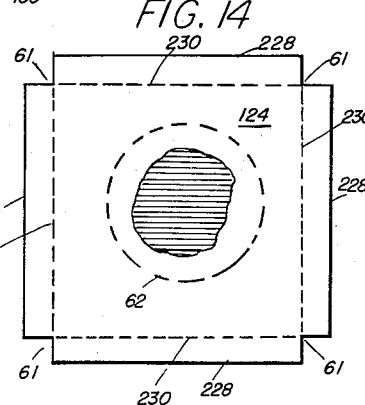


FIG. 14

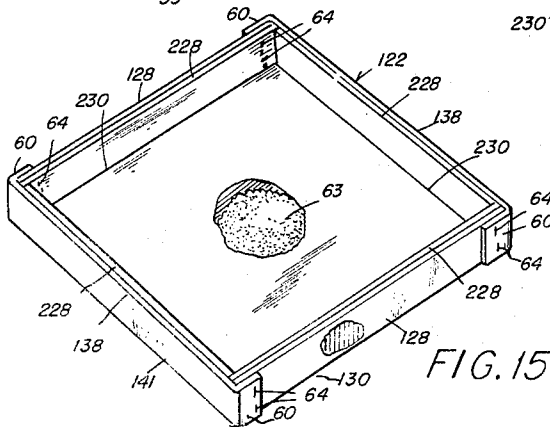


FIG. 15

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MATERIALS HANDLING PALLET

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3 Sheets-Sheet 3

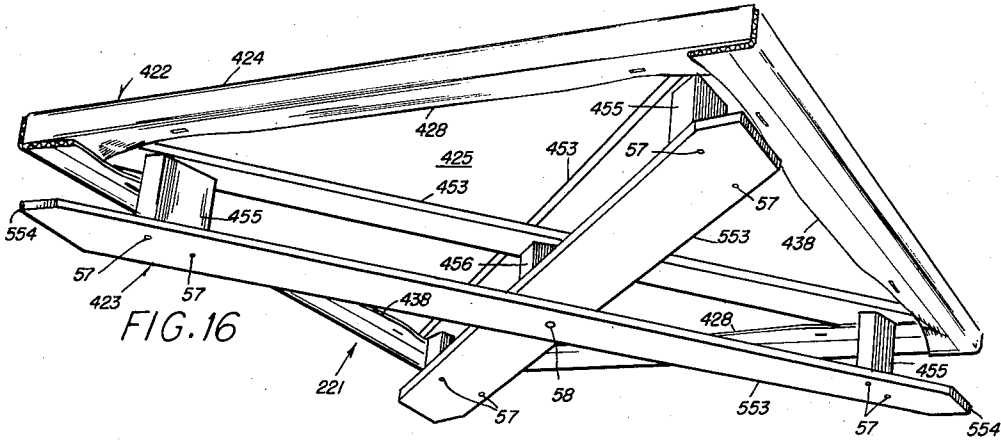


FIG. 16

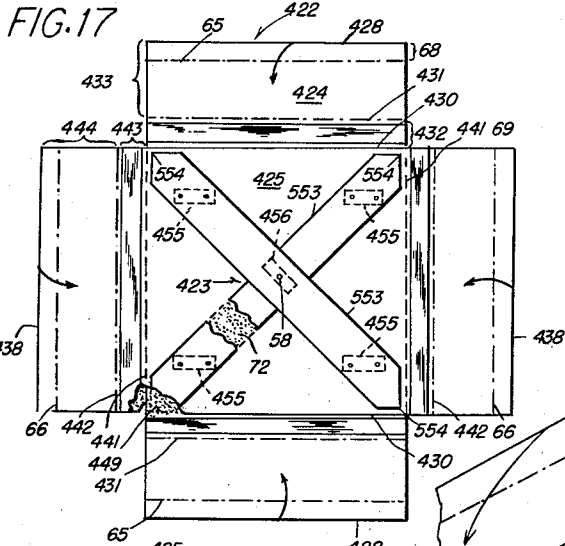


FIG. 17

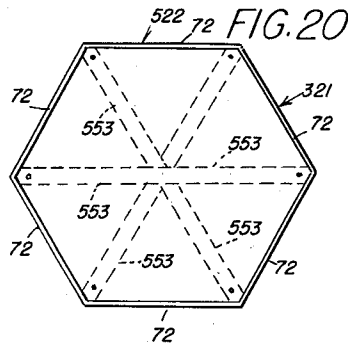


FIG. 20

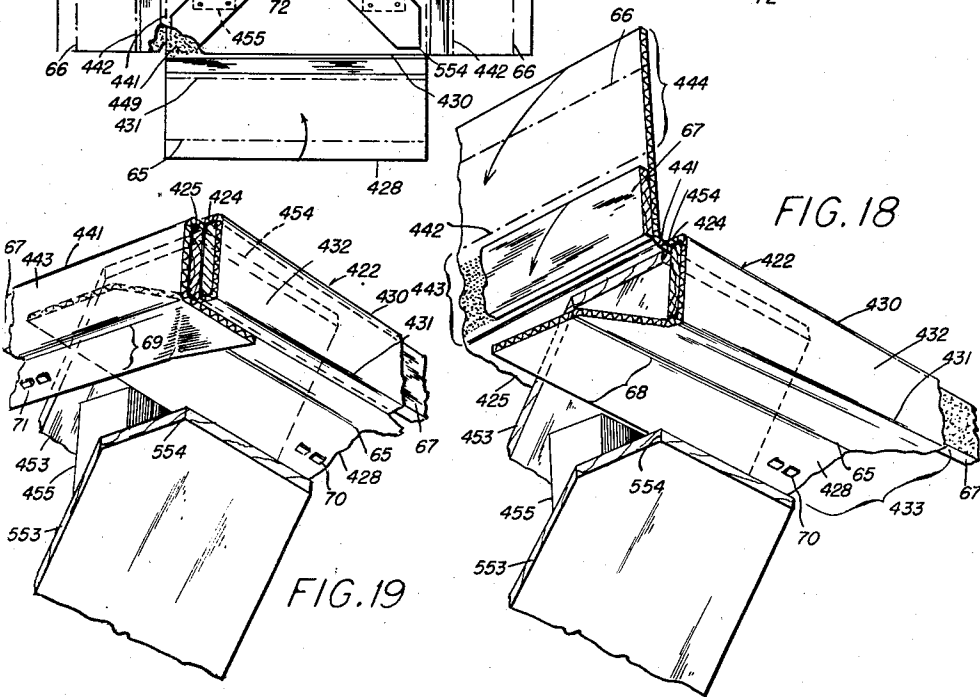


FIG. 18

FIG. 19

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2,906,481

MATERIALS HANDLING PALLET

Brooks O'C. Parker, New York, N.Y.

Application July 10, 1958, Serial No. 747,781

10 Claims. (Cl. 248—120)

The present invention relates to portable materials handling pallets which may be transported with loads of single or plural units thereon, and designed to facilitate handling of such loads by fork lift and hand lift trucks.

A general object of the present invention is to provide such a materials handling pallet which is of such economical construction as to be expendable or discardable after a single use, or easily knocked down and compactly packed for reshipment and reuse, the deck being constructed from suitable sheet material which is supported in a unique manner by base structure that cooperates with deck beam means efficiently to distribute and carry imposed loads. The parts of this pallet construction in its various embodiments are extremely easy to fabricate in mass production by currently known industrial techniques at very low cost, and these pallets are economically and easily shipped in knocked down and collapsed condition while being readily set up and assembled by the commodity shipper in very simple manner.

Many commercial products are packed in paperboard shipping containers of such limited strength as to be incapable of supporting without damage appreciable loads stacked thereon unless intervened by pallet construction in which the area of the bottom bearing surface thereof is such as to reduce substantially the unit stress on such containers therebelow. Warehousing requirements frequently dictate that acceptable pallets provide a lateral deck structure having a plane load-supporting area on which goods are to be loaded and an underneath supporting bearing surface to seat upon loads of pallets therebelow. Thus many shipping and warehousing situations make unsuitable pallet constructions in which the base structures are in the form of isolated and widely spaced small leg posts or feet or laterally-spaced parallel narrow stringers or beams. Another object is to provide embodiments of the present invention which efficiently solve this problem in providing bottom stringers having relatively wide bearing surfaces uniquely arranged that effectively distribute widely superimposed loads.

A further object of the present invention is to provide embodiments thereof which advantageously combine the economy and cleanliness of paperboard deck structure with strength of a base structure that uniquely provides diagonal stringer means extending across beneath the deck structure from the vicinities of corners thereof efficiently to cooperate with marginal beam means of the deck structure for effective distribution and support of loads, the base structure being of such design as to be readily and economically made from wood or other suitable material to assure incorporation of the strength of such base construction.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

5 Fig. 1 is a plan view to reduced scale, with parts broken away, of a blank in the form of a sandwich or stack of two sheets of suitable sheet material, such as corrugated paperboard, to be folded together marginally to form the deck structure of one embodiment of the present invention;

10 Fig. 2 is an exploded perspective view to larger scale, with parts broken away, of one corner of the deck structure blank shown in Fig. 1, indicating a step in the forming of the deck sandwich;

Fig. 3 is a perspective view, with parts broken away, of the same corner portion shown in Fig. 2, illustrating steps of folding of the marginal edges thereof;

20 Fig. 4 is another perspective view of the corner portion shown in Fig. 3, with parts broken away, illustrating further folding steps;

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 6, showing the relative positions of parts of the corner portion shown in Fig. 4 after completion of the folding operation illustrated therein, and depicting the fastening thereof by nails, for example, to suitable base structure omitted therefrom;

Fig. 6 is a perspective view of a completed embodiment of the pallet employing the deck structure of Figs. 1 to 5 inclusive;

30 Fig. 7 is a perspective view, with parts broken away, of the deck corner portion shown in Fig. 4 after nailing of the deck structure upon the base structure illustrated in Fig. 6 and omitted herefrom, showing relative movement of parts under imposed load;

Fig. 8 is a perspective view of the unfolded base structure shown in Fig. 6;

Figs. 9 and 10 are plan views, with parts broken away, of modified forms of the base structure shown in Fig. 8;

40 Fig. 11 is a plan view to reduced scale of the base structure illustrated in Fig. 8, showing the collapsed or folded condition thereof in which it may be shipped;

Fig. 12 is an elevational view of the base structure shown in Fig. 11 when unfolded with the crossed stringer structures thereof arranged substantially normal to each other for support of a substantially square deck structure;

Fig. 13 is a plan view, with parts broken away, of one of a pair of corrugated paperboard sheets to be assembled to form another sandwich embodiment of the deck structure;

50 Fig. 14 is a plan view similar to Fig. 13 showing the other deck sheet of this embodiment;

Fig. 15 is a perspective view, with parts broken away, of the deck structure completed with the use of the sheets shown in Figs. 13 and 14;

55 Fig. 16 is a bottom perspective view of still another pallet embodiment of the present invention, showing a third form of deck structure mounted on a slightly modified form of the base structure shown in Figs. 8, 11 and 12;

60 Fig. 17 is a bottom plan view to reduced scale, with parts broken away, of the pallet construction shown in Fig. 16, illustrating the folding of marginal edges of the deck structure blank thereof;

65 Fig. 18 is an enlarged perspective view, with parts broken away, of a corner portion of the pallet shown in Figs. 16 and 17, illustrating steps in folding and anchoring edge flaps of the deck structure;

Fig. 19 is a perspective view similar to Fig. 18, showing the parts in their relative positions after completion of the folding and anchoring of the deck structure flaps; and

70 Fig. 20 is a top plan view to reduced scale of a further embodiment of the pallet of the present invention.

Referring to the drawings, in which like numerals identify similar parts throughout, it will be seen from Figs. 1 to 12 incl. that an embodiment of the present invention 21 may comprise a deck structure 22 and a base structure 23.

In all of the illustrated embodiments, the deck structure 22 is shown to be formed of corrugated paperboard sheets, a plurality thereof being desirably stacked together with areas of opposed faces preferably being cemented or glued together to hold the sheets in proper alignment and to form a sandwich which may act a homogeneous panel, although other suitable sheet material may be used for this purpose. The sheet material may be one of a variety of types of paperboard, such as one of common or conventional materials intended for use in the construction of pallets, particularly of the expendable type, and of standard thickness. It is intended that the term "paperboard," as used herein, be understood to have been employed in the sense of identification of various types of composition sheet material which is light in weight and capable of being folded along break lines and in the manner to be described. It may comprise one of various kinds of cellulose materials impregnated, if desired, with plastic materials, or it may comprise an appropriate plastic sheet material and include, if desired, reinforcement. Corrugated paperboard is particularly advantageous for the purpose since it provides high strength and rigidity relative to weight and cost, is cheap enough to permit such economy as to allow discard of a pallet deck structure constructed therefrom after a single use and is readily adapted to the manipulative steps of assembly of parts. When corrugated paperboard is employed for the deck sheets, it is preferable that the sheets be so oriented relative to each other that the flutes thereof run across the deck structure in different directions and thus when the deck structure of an embodiment of the pallet of the present invention is formed of a pair of sheets of corrugated paperboard, the flutes of one preferably will extend substantially normal to the flutes of the other.

Although the composition of the parts of the base structure 23 may be selected from a wide variety of materials, preferably these parts are made from wood for the sake of economy. As will appear hereinafter, the base structure of all of the illustrated embodiments comprises a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from the deck structure with the stringer means extending diagonally across beneath the deck structure, and a plurality of leg means mounted to these stringer means therebeneath in the vicinities of the ends thereof and generally centrally where they are pivotally connected together so as suitably to space them appreciably above a supporting surface for insertion of fork tines therebeneath. In pallet constructions of the present invention where it is intended that loaded pallets be stacked for storage and shipping and their loads consist of products boxed in containers of insufficient strength to support in relatively small isolated areas appreciable loads thereabove without damage, the base structures preferably embody the elongated stringer means in the form of paired, vertically-spaced, laterally-extending, elongated top and bottom members between which the leg means are interposed as spacer units or blocks, and in such structures the stringer members preferably will be in the form of relatively wide, flat wooden boards so as to insure relatively wide distribution of superimposed loads for protection of the loads therebeneath.

As is illustrated in Figs. 1 to 7 inclusive, the deck structure of one embodiment of the pallet of the present invention may be formed of a pair of stacked corrugated paperboard blanks 24 and 25 respectively constituting the top and bottom sheets. It will be noted from Fig. 1 that the flutes of the top sheet 24 run transversely, as will be seen at 26, and that those of the bottom sheet 25 run in a direction substantially normal thereto, as will be seen

at 27. Top sheet 24 is provided along opposite sides with a pair of elongated flaps 28, 28 with the other opposite sides being equipped with relatively short flaps 29, 29. Each elongated flap 28 of top sheet 24 is defined from the main load-supporting area thereof by a transverse scored or break line 30, along which it is to be folded or bent, and another scored or break line 31 defines therewith an intervening panel 32, with the remainder of the flap constituting a terminal portion 33, as will be best understood from Fig. 2. Each short flap 29 of top sheet 24 also is defined from the main load-supporting area by a scored or break line 34 and has a scored or break line 35 extending substantially parallel thereto to define therewith panel 36, with the remainder constituting a terminal portion 37, also as best seen in Fig. 2.

Bottom sheet 25 is provided with similar flap structures with, however, the opposite elongated flaps 38, 38 thereof arranged along the marginal edges of the main load-supporting area in the vicinity of the relatively short flaps 29, 29 of the top sheet 24 and with its relatively short flaps 40, 40 arranged in the vicinity of the elongated flaps 28, 28 of the top sheet. Thus, the elongated flaps 28, 28 of the top sheet 24 lap over and extend beyond the relatively short flaps 40, 40 of the bottom sheet 25, and the elongated flaps 38, 38 of the latter lap over and extend beyond the relatively short flaps 29, 29 of the top sheet. Each elongated flap 38 of bottom sheet 25 is defined from the main body thereof by a scored or break line 41 and has a parallel scored or break line 42 defining therewith a side panel 43, with the remainder constituting a terminal portion 44. A transverse scored or break line 45 defines each relatively short flap 40 from the main body of bottom sheet 25 and a parallel transverse scored or break line 46 defines therewith a side panel 47, with the remainder of flap 40 constituting a terminal portion 48. These structural features will be best understood from Fig. 2.

Opposed faces of the top sheet 24 and bottom sheet 25 in the main deck areas thereof, inward of their marginal edge flaps, are provided with suitable cement or glue, as is indicated at 49 in Fig. 2, so as to secure them together to form a sandwich that may act as a homogeneous panel.

Aligned, relatively short slots 50—50 are formed at the corners of the main load-supporting areas of the top and bottom sheets 24 and 25. Each slot 50 in top sheet 24 has one side thereof arranged along break or fold line 34 with the companion slot 50 in bottom sheet 25 arranged along break or fold line 41. The other inboard side of each slot 50 is arranged substantially parallel to the mentioned side and spaced a short distance therefrom and the side edges of top sheet flaps 28, 28 and bottom sheet flaps 40, 40 are aligned with these inboard slot edges, as will best be seen from Fig. 2. The purpose of slots 50—50 will be explained later in describing the action of the deck structure parts under load.

Let it be assumed that top sheet 24 is moved to face contact with bottom sheet 25 in the direction of the arrow shown in Fig. 2 to cement their opposed faces together in the main load-supporting areas thereof, so as to form the sandwich shown in Fig. 3. The relatively short flaps 40, 40 of the bottom sheets will then be turned inward and underneath with the elongated flaps 28, 28 of the top sheet 24 as indicated in Figs. 3 and 4, so that the latter house the former to provide a pair of depending marginal edge panels comprising stacked or overlaid side panels 32 and 47 of the top and bottom sheets. The terminal portion 33 of each top sheet flap 28 will then be suitably anchored, such as by means of a plurality of staples 51—51 which may extend through both sheets 24 and 25 in the main load-supporting areas thereof. As a result, a pair of depending side beams is formed along opposite marginal edges of the stacked sheets. Reversely, the relatively short marginal edge flaps 29, 29 and the elongated marginal edge flaps 38, 38 of the top and bottom sheets will be folded upwardly as is indicated in Figs. 3 and 4,

so that the latter house the former, as will be seen from Fig. 5. As a result, opposite sides of the deck structure will be provided with upstanding edge beam structures each comprising lapped side panels 36 and 43.

The resulting deck structure 22 is then to be suitably fastened upon base structure 23 and, for this purpose, one may employ a plurality of nails 52—52 indicated in Figs. 5, 6 and 7. Preferably each of these nails 52 extends down through terminal portion 44 of elongated bottom sheet flap 38, the top sheet 24 and the bottom sheet 25 into the base structure 23 but, of course, any other suitable fastening means may be employed for this purpose.

As will be seen from Figs. 6, 8, 11 and 12, base structure 23 may consist of a plurality of stringer means pivotally connected together generally centrally thereof. Each stringer means comprises at least one elongated top stringer member 53 and each may be in the form of a relatively wide, flat wooden board. These stringer members 53—53 are intended to extend diagonally across beneath deck structure 22 from the vicinities of the corners thereof, i.e. along diagonal axes of the deck structure, and thus their ends 54—54 are shaped or mitered, as shown, to conform to the shape of the corners of the rectangular deck structure. Elongated stringer members 53, 53 are suitably mounted upon elevating leg means, which may be in the form of a plurality of end blocks or spacers 55—55 and a central block or spacer 56 that are of lengths sufficient to space the stringer members appreciably above a support surface for insertion therebeneath of fork tines. Each of end leg blocks 55—55 preferably is secured to an end of one of the stringer members 53, 53 by a pair of nails 57, 57, with these blocks being located inward from the tip ends of the stringer members a short distance to cantilever them at points which will produce minimum deflection of the stringer members under load. The central leg block 56 will be fastened to central portions of stringer members 53, 53 by means of a single pivoting member, such as a nail 58 which extends down through both members in lapped relation into this central leg block. Of course, the central leg block 56 will be shorter than the end leg blocks 55—55 to compensate for the lapped thicknesses of the stringer members 53, 53 in their central portions, so as to form a generally level platform. Consequently, stringer members 53, 53 may be scissored together about the pivot means 58 to the relative compact folded positions illustrated in Fig. 11, so that such base structure will occupy minimum space in shipping and storage. These stringer members 53, 53, of course, will be scissored out at time of use to their relative unfolded positions of Figs. 8 or 12, so that the ends thereof extend from each other at relatively large oblique angles for support thereon of rectangular deck structure along diagonal axes thereof, or even at about 90°, as indicated in Fig. 12, for support of a square deck structure.

In preferred forms of base structure 23, such as that illustrated in Figs. 6, 8, 11 and 12, each stringer means, which may comprise a single stringer member 53, preferably is provided in the form of a pair of vertically-spaced, laterally-extending, elongated top and bottom members. For example, with each top stringer member 53 is paired a similar bottom stringer member 153 and, in this case, the end leg blocks 55—55 are interposed as spacers between these pairs of stringer members and fastened to the bottom ones by similar means, such as additional pairs of nails. Central block 56 will then intervene lapped central portions of the top stringer members 53, 53 and lapped central portions of bottom stringer members 153, 153 and will be pivotally connected to the latter in the manner of the pivotal connection to the former, as will be understood from Figs. 8 and 12. The ends 154—154 of the bottom stringer members 153, 153 will also be shaped or mitered in a manner similar to the shaping of the ends 54—54 of the top stringer members 53, 53 for a similar reason. The bottom stringer members 153, 153 will thus

provide the base structure 23 with relatively wide bearing surfaces 59, 59 for distributing effectively the load of such a pallet when it is superimposed over the load of another pallet located therebelow.

The stringer members 53, 53 and 153—153 may have their ends shaped or mitered differently than as is proposed in Figs. 6, 8, 11 and 12, perhaps to obtain an economy in fabrication. For example, as is indicated in Fig. 9, stringer members 253, 253 may have their tip ends 254, 254 mitered off on one side with the other sides extending to the corners of the deck structure 22 (indicated in dotted lines) and with the mitered edges conforming in shape to opposite sides of this deck structure, as shown. By foreshortening the ends of the stringer members, no mitering may be necessary as is indicated in Fig. 10 with respect to stringer members 353, 353.

In use of the embodiment of the pallet of the present invention which is illustrated by way of example in Figs. 1 to 12 inclusive, a plurality of deck structure blanks, such as the sandwich 22 shown in Fig. 1, may be stacked and shipped to the user. There will be shipped therewith a similar number of the compactly folded or scissored base structures 23, such as that illustrated in Fig. 11. It is then a simple matter for the shipper of the goods to set up the pallet by folding marginal edge flaps of each deck sandwich in the manner proposed in Figs. 3 and 4 and, after expanding one of the base structures, to mount one of the so-folded deck structures thereon, such as in the manner proposed in Fig. 5 by nailing the corners thereof to the corners of the base structure, thereby setting up the pallet construction of Fig. 6. The corner's nails 52—52 preferably are so located as to extend down through the top stringer members 53, 53 into the corner blocks 55—55.

It will be understood that in the resulting pallet structure the upstanding edge beams, which include lapped side panels 43 and 36 of flaps 38 and 29, will be located above the depending edge beams, which include the lapped side panels 32 and 47 of the flaps 28 and 40. However, when this deck structure 22 of such pallet construction 21 is loaded, the corner slots 50—50 permit the upstanding edge beams to be crushed down under load so as to be in substantial alignment with the depending edge beams, as is indicated in Fig. 7. As a result, a neater structure is formed with reduction in the overall thickness of the deck structure at the corners. The edge beams are incorporated in the deck structure 22 with each extending from one corner thereof to the next successive corner of the four deck corners and these materially help to support the loads on the pallet between and in supplement to the wooden base stringers which extend along the diagonal axes of the rectangular deck structure. Such diagonal arrangement of stringer members which have relatively wide bearing faces will so distribute the imposed load upon the boxes of the load of a pallet therebeneath, when loaded pallets are stacked, as to minimize damage to the tops of the boxes of the underlying load, and this diagonal arrangement of the stringer members permits them to be incorporated in a base structure which may be scissored to compact form, as indicated in Fig. 11, to assure economy in storage and shipping space. Further, such a pallet construction permits ready disassembly of parts, such as by removal of the four fastening nails 52—52, so that it may be knocked down for economical reshipment, although it is of such construction as to be cheap enough to be discarded after a single use, if desired.

In order merely to permit one to understand more thoroughly a practical embodiment of pallet construction of the present invention, such as that shown by way of example in Figs. 1 to 12 inclusive, the relative proportions of the dimensions of the parts may be of the following order. Let it be assumed that the rectangular deck structure is to be of conventional dimensions of forty inches (40") by forty-eight inches (48"). The stringer members may be flat boards of a width between about

five and one-half to six inches (5½"-6") and in thickness from one quarter to three-eighths of an inch (¼"-⅜"). As a result, the unsupported spans along the edges of the deck structure will be about thirty-six inches (36") and forty-two inches (42"). It has been found that for unsupported spans of about thirty-six inches (36") an edge beam may extend substantially normal to the load-bearing surface about one inch (1") and for the longer unsupported span of about forty-two inches (42"), the depth of the edge beams may be about one and one quarter inches (1¼"). The leg blocks which are located beneath the top stringer members, or span between them and the bottom stringer members as spacers, may, in such a practical embodiment, be of a length of between about two and one-half inches and four inches (2½"-4") and, of course, the center block will be sufficiently shorter to compensate for the thickness of an interposed stringer member where lapped at the center. The stringer members will have sufficient flexibility so as to permit under load adjustment to a substantially flat plane or level surface, except for a small area at the nexus of the stringer members.

Although the upstanding edge beams located along two of the opposite sides of such rectangular deck structure 22 will tend to hold boxes of a load thereon, particularly if edges of the boxes are not rested thereon, it may be desired to provide the deck structure in the form of a tray with all four edge beams upstanding, as is proposed in Figs. 13, 14 and 15. Bottom sheet 125 shown in Fig. 13 is provided with a pair of opposite edge flaps 128, 128 and another pair of edge flaps 138, 138 respectively by means of scored or break lines 130, 130 and 141, 141. Corner notches 150—150 will define with extensions of scored or break lines 130, 130 corner tabs 60—60. The top sheet 124 of the Fig. 15 tray structure has marginal side flaps 228—228 defined from the main deck area thereof by scored or break lines 230—230, and the corners of this blank are notched out at 61—61, as shown in Fig. 14.

Top sheet 124 may be secured to bottom sheet 125 to form a sandwich by gluing together opposed faces, as in a central area thereof, such area being indicated in dotted lines at 62 in Figs. 13 and 14, the application of suitable cement or glue in such area being indicated in the broken away portion at 63 in Fig. 15. Such deck tray sandwich may then be folded up to provide a continuous edge beam around the load-supporting main deck area in the manner proposed in Fig. 15, with lapped flaps 138, 228; 138, 228; 128, 228; and 128, 228 providing upstanding edge beams along all four sides. The tabs 60—60 of flaps 138, 138 will be bent about the corners so as to lap ends of the flaps 128, 128 and may be fastened in position in any suitable manner, such as by through staples 64—64. Such deck tray 122 may then be suitably fastened upon a base structure or platform of the type illustrated in Figs. 6, 8, 11 and 12 in any desired manner, such as by corner nails of the type illustrated at 52 in Figs. 5, 6 and 7.

Another embodiment of the pallet construction of the present invention is illustrated in Figs. 16 to 19 incl. It will there be seen that the base structure 423 of pallet construction 221 is similar in many respects to that illustrated at 23 in Figs. 6, 8, 11 and 12. Crossed and lapped top stringer members 453, 453 and crossed and lapped bottom stringer members 553, 553 are connected together in spaced apart relation by end leg blocks 455—455 and central leg block 455 with nails 57—57 anchoring the end blocks to the stringer members and with the central block being connected thereto by pivot means, such as a pair of opposed nails 58 extending through the lapped stringer members from opposite sides. The shapes of the mitered ends 554—554 of the bottom stringer members 553, 553 are seen in Figs. 17, 18 and 19 and the ends 454—454 of the top stringer members 453, 453 are of similar shape, as will be understood from Figs. 18 and 19. Consequently, the base structure 423 when

free from the deck structure 422 may be scissored into compact folded condition in the manner illustrated in Fig. 11 with respect to base structure 23.

Deck structure 422 is also preferably in the form of a sandwich of plies or stack of sheets of corrugated paper-board, such as a top sheet 424 and a bottom sheet 425. Both of the top and bottom sheets 424 and 425 have main load-bearing areas substantially rectangular or, if desired, square in outline.

Top sheet 424 has defined along opposite edges thereof elongated edge flaps 428, 428 and bottom sheet 425 is also provided with a pair of opposite elongated edge flaps 438, 438 arranged to extend normal to the former, as will be understood particularly from Fig. 17. The top sheet edge flaps are defined from the main load-supporting area of the top sheet 424 by scored or break lines 430, 430 and the bottom sheet edge flaps 438, 438 are defined from the main load-supporting area of the bottom sheet 425 by scored or break lines 441, 441.

The top sheet edge flaps 428, 428 are each provided with a transversely-extending scored or break line 431 to define between the latter and its base scored line 430 a side panel 432 and therebeyond a terminal portion 433. The terminal portion 433 of each edge flap 428 is also preferably provided with a transverse scored or break line 65 to facilitate some deflection thereof in its anchorage by any suitable means located in its marginal zone 68. Similarly, each of the bottom sheet edge flaps 438, 438 is provided with a transversely-extending scored or break line 442 to define between the latter and its base scored line 441 a similar side panel 443 and therebeyond a terminal portion 444. Also each of the bottom sheet edge flaps 438, 438 preferably is provided with an additional transverse scored or break line 66 in its terminal portion 444 for a like reason of facilitating flexure and to define marginal zone 69 thereof. In order that the top and bottom sheets 424 and 425 may be sandwiched together to act as a homogeneous panel, they may have juxtaposed faces thereof cemented or glued together, such as is indicated at 449 in Fig. 17.

Since the side panels 432, 432 and 443, 443 are to serve as edge beams, they may, if desired, be strengthened in a suitable manner, such as by gluing to the bottom faces thereof strips of any stiff material, for example wooden slats 67—67.

In use of the embodiment of the invention illustrated in Figs. 16 to 19 incl., the pallet constructions will also be shipped to the distributor of the goods in knocked-down condition, a stack of the deck structures 422 being shipped along with a group of the folded base structures 423. In order to set up one of these pallet constructions, one of the deck structures 422 is laid flat in inverted position and one of the base structures 423 is scissored open and laid thereover, as is indicated in Fig. 17. Then each of the top sheet edge flaps 428, 428 may be bent up and lapped back, in the manner indicated in Fig. 18, so that its reinforced side panel 432 extends as a depending beam substantially normal to the main load-supporting area of the top sheet 424, the terminal portion of this flap 433 being folded in over the ends of the top stringer members with transverse flexure of these flap terminal portions along the transverse score lines 65, 65, also as will be seen from Fig. 18. The marginal zone 68 of each flap terminal 433 may then be secured in position in any suitable manner to anchor the ends of the top stringer members 453, 453 to the bottom of the deck structure, such as by means of a plurality of through staples, one of which is illustrated at 70 in Fig. 18, preferably pierced through the deck sandwich from the top side thereof. The bottom sheet edge flaps 438, 438 may then be bent and lapped in a similar fashion to dispose their reinforced side panels 443, 443 substantially normal to the load-supporting main deck area, the terminal flap portions 444, 444 being lapped back over both the adjacent ends of the top stringer members 453, 453 and end areas of the ter-

terminal portions 433, 433 of edge flaps 428, 428 in the directions of the arrows shown in Fig. 18 to the folded positions shown in Fig. 19. The marginal zone 69 of each of the flap terminal portions 444, 444 will then be suitably anchored in position, such as for example, by through stapling indicated at 71 in Fig. 19 which is similar to the stapling at 70. No other means to fasten the deck structure 422 upon the base structure 423 is necessary, but, if desired, top surfaces of the top stringer members 453, 453 may be cemented or glued to the under-surface of the bottom sheet 425, as is suggested at 72 in Fig. 17, or alternately nailing may be employed, but such supplemental fastening means have been found to be unnecessary.

It will be understood from Figs. 16 to 19 incl. that in this embodiment of the pallet construction 221, since all of the edge beams are depending and substantially aligned the top load-supporting deck surface is substantially flat and smooth and there is no requirement that upstanding edge beams be crushed down by the load to attain a load-supporting plane deck surface. The blanks for the top and bottom deck sheets 424 and 425 are alike and of simple configuration so that both of them may be simply cut with the use of a single die. Also, if reshipment in knocked-down condition of this pallet construction is desired, disassembly of parts may be easier, particularly when no fastening means supplemental to the stapling at 70 and 71 is employed.

It is to be understood that practice of the present invention is not limited to pallet constructions wherein the deck structure is rectangular in shape. For example, as illustrated in Fig. 20, the deck structure 522 of pallet construction 321 may be polygonal in outline with each of the side edge beams 72—72 extending from one of the plurality of corners to the next succeeding corner. Of course, in such a case, a greater number of stringer members will be employed so as to extend along all of the diagonal axes of the deck structure. Such diagonally-arranged stringer members 553—553 are illustrated in dotted lines in Fig. 20 and in all other respects the base structure of this embodiment may be similar to that illustrated in Figs. 8 and 11 with pivotal connection of the stringer members in the general central portions thereof to permit the scissored compact folding of the stringer members. Such pallet construction, of course, is well adapted to the support of loads wherein unit containers are of similar cross-sectional shape so as to fit together side-by-side in a compact bundle with the end area thereof shaped similarly to the load-supporting area of the deck structure.

It will be seen that in all of the illustrated embodiments each of the top stringer members is in the form of a three-point supported, continuously loaded beam with the ends thereof cantilevered out over the end supports. This permits optimum spacing of the supporting legs or blocks beneath the diagonal top stringer members so that the positive and negative bending moments on such a beam will be substantially equal. Since deflection for any given section of such a continuously loaded beam structure is a function of the moment if the maximum negative and positive moments are made substantially equal resultant deflection will be minimized.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of sheet material having a relatively flat top surface area polygonal in shape to provide a plurality of corners and substantially straight side edges intervening said corners, and a plurality of edge beam means each connected to and arranged generally normal to said top surface along one of said side edges to extend from the vicinity of one corner to the next; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, and a plurality of leg means mounted to said stringer means therebeneath in the vicinities of the ends thereof and said corners and generally centrally where said stringer means are pivotally connected together suitably spacing the latter appreciably above a supporting surface for insertion of fork tines therebeneath; and means fastening said deck structure on said stringer means.

2. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of paperboard having a relatively flat top surface area polygonal in shape to provide a plurality of corners and substantially straight side edges intervening said corners, and a plurality of edge beam means each connected to and arranged generally normal to said top surface along one of said side edges to extend from the vicinity of one corner to the next; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, each of said stringer means comprising a pair of vertically-spaced laterally-extending elongated top and bottom members, a plurality of spacers mounted between said pairs of top and bottom stringer members in the vicinities of the ends thereof suitably spacing said members for insertion of fork tines therebetween, and an additional vertical spacer interposed between the top stringer members and the bottom stringer members in the vicinity of the pivotal connection of said stringer means; and means fastening said deck structure on the top members of said stringer means.

3. The pallet as defined in claim 2 characterized by said paperboard deck structure as comprising a plurality of stacked sheets of corrugated paper with the flutes thereof running across said deck structure in different directions.

4. The pallet as defined in claim 3 characterized by said deck structure being rectangular in shape and formed of a pair of the sheets of corrugated paper with the flutes of one extending substantially normal to the flutes of the other.

5. The pallet as defined in claim 2 characterized by said stringer members being in the form of relatively wide flat wooden boards and said spacers being in the form of wooden blocks.

6. The pallet as defined in claim 5 characterized by said paperboard deck structure being rectangular in shape and formed of a stacked pair of corrugated paper sheets with the flutes of one extending across said deck structure normal to the flutes of the other.

7. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of a stacked pair of corrugated paper sheets secured together with the flutes of one extending across said deck structure substantially normal to the flutes of the other and with its top deck area being substantially rectangular, a plurality of substantially vertical edge beams each ex-

tending along one side edge of the deck area from one to the next of the four corners, each of said beams being formed by paired lapped edge flaps of both of said sheets bent together to provide a side panel extending substantially normal to the top deck area and at least one outer terminal flap portion extending laterally from the outside sheet portion of said side panel toward the center of the deck area to enclose the flap of the other sheet with said terminal flap portion fastened to the latter sheet, the side edge beams of one of a pair thereof located along opposite sides of the deck area being upstanding with those of the other pair thereof located along the remaining opposite sides of the deck area being depending, the stacked sheets having aligned pairs of relatively short slots in the deck area at each of the four corners with each aligned pair extending alongside of one of said beams to permit said upstanding and depending beams to be brought to substantial transverse alignment by flexure of said stacked sheets in the deck area under load; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, and a plurality of leg means mounted to said stringer means therebeneath in the vicinities of the ends thereof and said corners and generally centrally where said stringer means are pivotally connected together suitably spacing the latter appreciably above a supporting surface for insertion of fork tines therebeneath; and means fastening said deck structure on said stringer means.

8. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of a stacked pair of corrugated paper sheets secured together with the flutes of one extending across said deck structure substantially normal to the flutes of the other and with its top deck area being substantially rectangular, a plurality of substantially vertical edge beams each extending along one side edge of the deck area from one to the next of the four corners, each of said beams being formed by paired lapped edge flaps of both of said sheets bent together to provide a side panel extending substantially normal to the top deck area and at least one outer terminal flap portion extending laterally from the outside sheet portion of said side panel toward the center of the deck area to enclose the flap of the other sheet with said terminal flap portion fastened to the latter sheet, the side edge beams of one of a pair thereof located along opposite sides of the deck area being upstanding with those of the other pair thereof located along the remaining opposite sides of the deck area being depending, the stacked sheets having aligned pairs of relatively short slots in the deck area at each of the four corners extending alongside of one of said beams to permit said upstanding and depending beams to be brought to substantial transverse alignment by flexure of said stacked sheets in the deck area under load; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, each of said stringer means comprising a pair of vertically-spaced laterally-extending elongated top and bottom members, a plurality of spacers mounted between said pairs of top and bottom stringer members in the vicinities of the ends thereof suitably spacing said members for insertion of fork tines therebetween; and an additional vertical spacer interposed between the top stringer members and the bottom stringer members in the vicinity of the pivotal connection of

said stringer means; and means fastening said deck structure on the top members of said stringer means.

9. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of a stacked pair of corrugated paper sheets secured together with the flutes of one extending across said deck structure substantially normal to the flutes of the other and with its top deck area being substantially rectangular, a plurality of substantially vertical edge beams each extending along one side edge of the deck area from one to the next of the four corners, each of said edge beams being formed as a depending structure consisting of an edge flap of the top deck sheet bent downward and then laterally back underneath said stacked deck sheets to define a depending side panel and an underturned terminal flap portion, each of said beams including a substantially rigid reinforcing strip secured to the inner face of the side panel thereof; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, and a plurality of leg means mounted to said stringer means therebeneath in the vicinities of the ends thereof and said corners and generally centrally where said stringer means are pivotally connected together suitably spacing the latter appreciably above a supporting surface for insertion of fork tines therebeneath; and means fastening the underturned terminal flap portions to the stacked deck sheets in the top deck area with ends of said stringer means interposed therebetween.

10. A materials handling pallet comprising, in combination; a load-supporting deck structure formed of a stacked pair of corrugated paper sheets secured together with the flutes of one extending across said deck structure substantially normal to the flutes of the other and with its top deck area being substantially rectangular, a plurality of substantially vertical edge beams each extending along one side edge of the deck area from one to the next of the four corners, each of said edge beams being formed as a depending structure consisting of an edge flap of the top deck sheet bent downward and then laterally back underneath said stacked deck sheets to define a depending side panel and an underturned terminal flap portion, each of said beams including a substantially rigid reinforcing strip secured to the inner face of the side panel thereof; a base structure comprising a plurality of elongated stringer means pivotally connected together generally centrally thereof for scissored compact folding together when disconnected from said deck structure with each stringer means extending from one of said corners diagonally across beneath said deck structure to another of said corners, each of said stringer means comprising a pair of vertically-spaced laterally-extending elongated top and bottom members, a plurality of spacers mounted between said pairs of top and bottom stringer members in the vicinities of the ends thereof suitably spacing said members for insertion of fork tines therebetween, and an additional vertical spacer interposed between the top stringer members and the bottom stringer members in the vicinity of the pivotal connection of said stringer means; and means fastening the underturned terminal flap portions to the stacked deck sheets in the top deck area with ends of said top stringer members interposed therebetween.

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