Aug. 1, 1961 C. N. FRASER ET AL 2,994,500

SUPERSTRUCTURE FOR PALLETS

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Fig. 1.

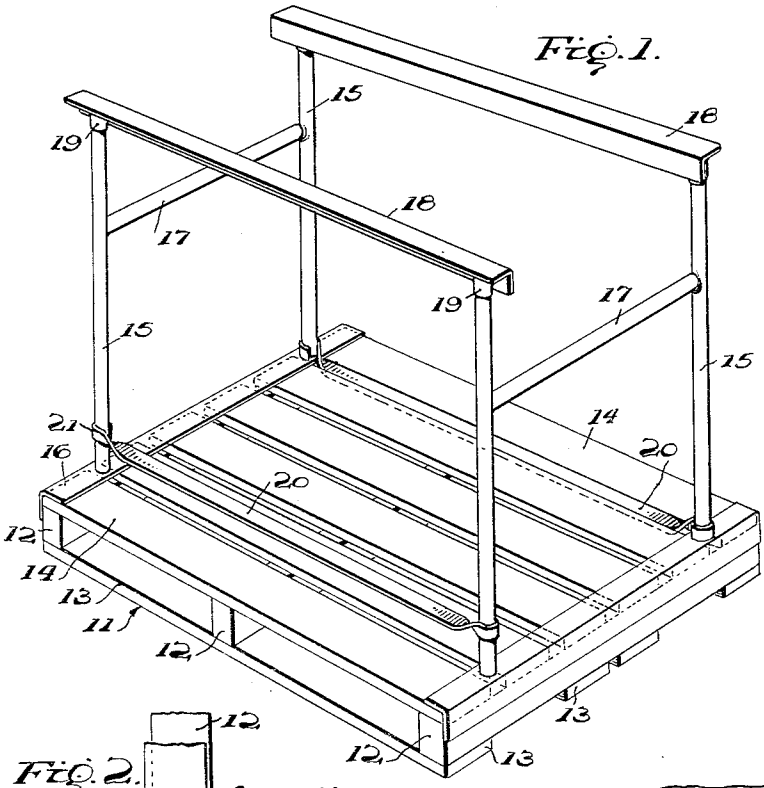


Fig. 4.

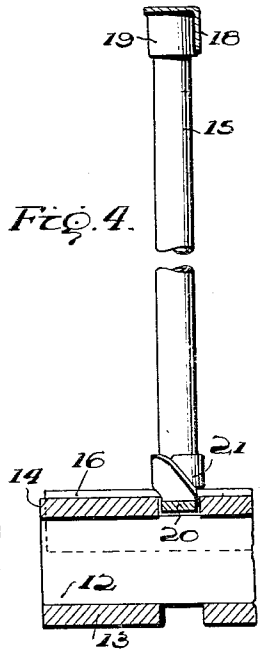
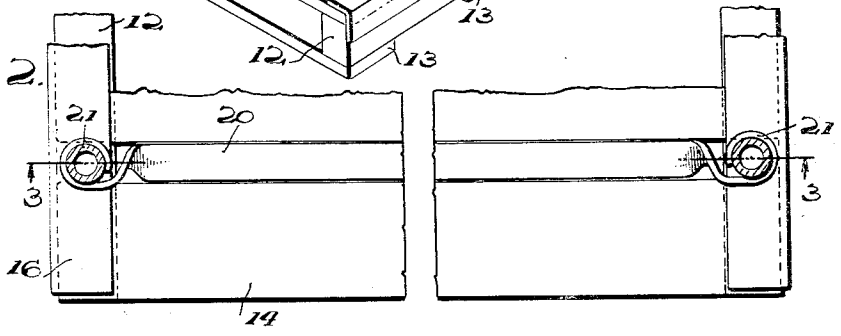


Fig. 2.



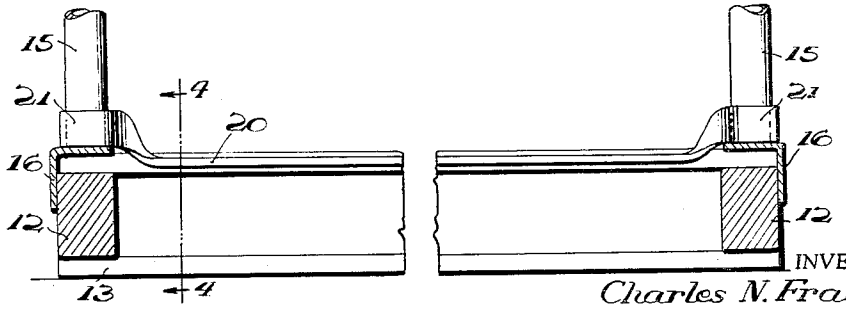


Fig. 3.

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SUPERSTRUCTURE FOR PALLETS

Filed June 18, 1959 2 Sheets-Sheet 2

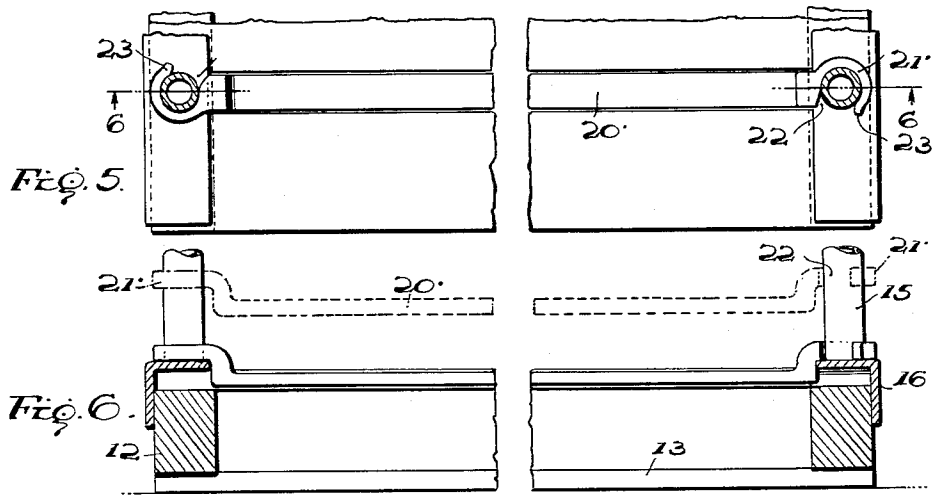


Fig. 5.

Fig. 6.

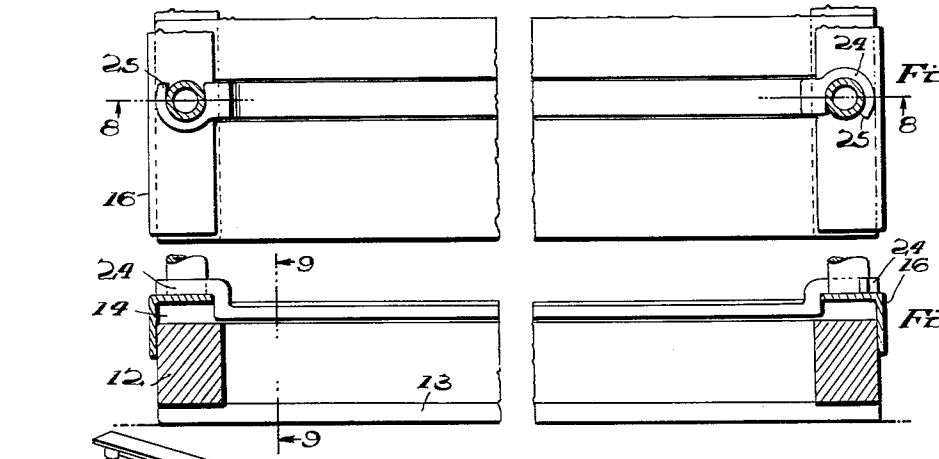


Fig. 7.

Fig. 8.

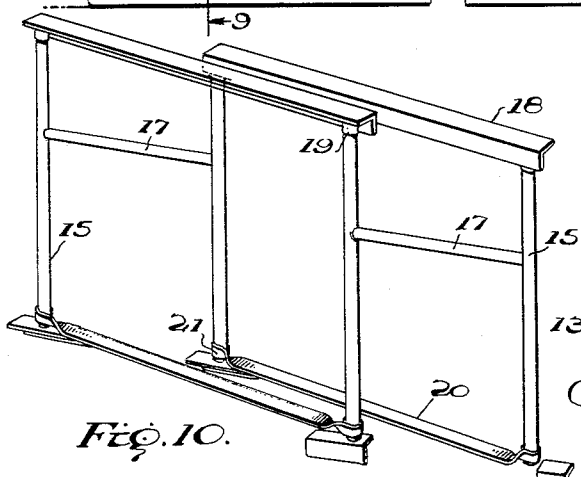


Fig. 10.

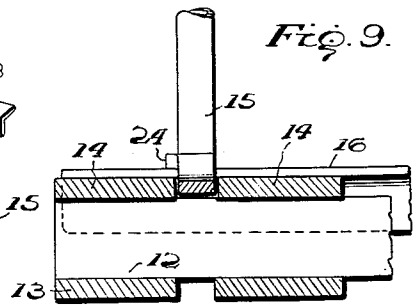


Fig. 9.

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SUPERSTRUCTURE FOR PALLETS

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13 Claims. (Cl. 248—120)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

The present invention relates to improvements in material supports of the type known as pallets, and more particularly to a superstructure for use with such pallets.

In the use of materials handling pallets, the efficient utilization of space often requires the stacking of loaded pallets one above the other in vertical tiers, and frequently the material upon the pallet cannot support the weight of the loaded pallets above it. In order to keep the weight of the upper loaded pallets from crushing the material on the lower pallets, it is desirable to provide the pallets with a superstructure to support the upper pallets, without transmitting the weight of such upper pallets to the material supported on the lower pallets.

An important object of the present invention is to provide a superstructure of the above-mentioned type which will safely support the weight of a plurality of loaded pallets above it in a vertical tier.

Another object of the invention is the provision of a pallet superstructure which is readily removable from the pallet, which may be folded or knocked down for shipment or storage, which can be easily mounted on the pallet, and which is strong and stable in use.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings which form a part of this specification, and wherein like numerals designate like parts throughout,

FIGURE 1 is a perspective view of a pallet having a superstructure embodying one form of the present invention mounted thereon, one of the connecting straps being shown in a raised position for convenience of illustration;

FIGURE 2 is a fragmentary horizontal sectional view looking down on the top of one of the connecting straps in its operative position;

FIGURE 3 is a vertical sectional view taken on the line 3—3 of FIGURE 2, parts being broken away;

FIGURE 4 is a fragmentary vertical section at right angles to FIGURE 3 and taken on the line 4—4 of FIGURE 3, parts being shown as broken away;

FIGURE 5 is a view similar to FIGURE 2 but illustrating a modified form of the connecting strap;

FIGURE 6 is a vertical sectional view taken on the line 6—6 of FIGURE 5, the strap being illustrated in raised position in dotted lines and in lowered operative position in full lines, parts being broken away;

FIGURE 7 is a view similar to FIGURE 5, illustrating a further modification of the connecting strap;

FIGURE 8 is a vertical sectional view on the line 8—8 of FIGURE 7, parts being broken away;

FIGURE 9 is a fragmentary vertical sectional view on the line 9—9 of FIGURE 8; and

FIGURE 10 is a perspective view of the superstructure in its folded position ready for storage or shipment without dismantling, the angle iron base members of the end frames being partially removed to better show the position of the connecting straps.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the present invention, the numeral 11 denotes a pallet which is illustrated as of the conventional form of wooden pallet which has parallel stringers 12, usually three in number, base boards 13 and spaced deck boards 14. Although the deck boards may vary widely in widths, the outer ones customarily are of the same width so that the first gap or space between the deck boards at each side of the pallet will occur in the same relative position in the great majority of pallets of the same size. Articles, packages, and materials of various kinds are piled upon the deck boards 14, and when it is desired to move the loaded pallet, the forks of a lift truck are placed between the stringers and between the base and deck boards so that the loaded pallet can be lifted, moved and placed in the desired position without interfering with the material resting upon the pallet.

The pallet superstructure comprises a pair of end frames removably connected at their upper ends by suitable top rails. The end frames each comprise a pair of spaced tubular uprights 15 welded to a base runner 16 which is preferably in the form of an angle iron adapted to rest upon the top ends of the deck boards and extend down the ends of the pallet in engagement or close proximity to the end stringers 12. The uprights 15 of each frame are connected by a horizontal cross bar 17 welded to the sides of the uprights. Two top rails 18 are usually formed from angle iron and provided adjacent each end with depending sleeves 19 open at their lower ends so as to telescopically, rotatably and removably receive the upper ends of the tubular uprights 15. The top rails 18 serve to space and brace the upper ends of the side frames and also form a supporting surface upon which the next pallet in the tier may rest. The construction thus far described is usual, but variations occur in the manner in which the superstructure is secured to the pallet in the position illustrated in FIGURE 1.

Because of the weight of loaded pallets supported by the superstructure and of the height to which the pallets are often tiered, it is essential that the superstructure be very stable when mounted upon the pallet. Other desirable features are that the superstructure be removably associated with the pallet, that it be readily mountable on and removable from the pallet, preferably by one man, and that it can be knocked down or folded for transportation or storage. For the purpose of this invention, it is highly desirable, although not essential, that the spacing of the tubular uprights 15 of each of the end frames coincide with the spacing of the slots or gaps adjacent the outermost deck boards as shown in FIGURE 1, so that the end frames can be placed on the pallet with such uprights arranged in alignment with the outermost deck slots. In order to permit adjustable placement of the end frames on the pallet to align the uprights 15 with the deck slots, the base angle irons 16 may be of a length somewhat less than the length of

the stringers **12** which determine the width of the pallet so that some adjustment is permitted without the necessity of the angle irons **16** projecting beyond the ends of the stringers.

In order to maintain the end frames firmly in position on the pallet without spreading of the lower portions of the end frames under load, it is proposed to connect the end frames by a suitable tie-rod or strap extending lengthwise of the pallet and so arranged as not to interfere with packages or material carried by the pallet. One method of connecting the end frames is by securing the tie-rod or strap to one of the tubular uprights **15** of each end frame. Although one tie-rod is sufficient to hold the end frames in position on the pallet without spreading of the frames to an extent that would permit dislodgment of the superstructure, two tie-rods are desirable when they are attached to the tubular uprights, because of the fact that the tubular uprights are positioned near the ends of the end frames.

The tie-rods may take various forms, but in FIGURES 1 to 4 and 10 each tie-rod is shown as a strap **20** of metal or other suitable material which is of a width somewhat less than the width of the slots or gaps between adjacent deck boards so that the strap may be freely positioned in such slots. In order for the strap **20** to engage the tubular uprights **15**, it is twisted adjacent each end through an angle of 90° so that when the main portion of the strap is in a horizontal position, its twisted ends will be disposed in an edgewise position in a vertical plane with respect to the central portion of the strap. In addition, the twisted ends of the strap **20** are offset upwardly with respect to the central portion of the strap as best shown in FIGURES 3 and 4, and the twisted offset ends are bent into vertical end loops or collars **21** adapted to fit about the uprights **15**. The collars **21** are of a size to permit sliding movement axially of the upright **15** and rotational movement thereabout.

It will be seen by reference to FIGURES 1 and 10 that the two end frames connected by the two rails **18** and the two tie-rods **20** form a parallelogram which may be collapsed or folded as shown in FIGURE 10 by reason of rotational movement of the uprights **15** with respect to the rail sleeves **19** and the rod collars **21**. If it is desired to separate the side frames from the top rails and tie-rods, the collars **21** may be easily opened by inserting a suitable tool such as a strong screw-driver between the uprights and the extreme ends of the tie-rods to pry open the collars **21**. The top rails are merely lifted off the ends of the uprights. When installing the tie-rods, the open collars **21** are placed about the uprights and tapped closed by means of a hammer or the like.

When mounting the superstructure on a pallet, the angle irons **16** are placed on top of the deck boards at each end of the pallet so that they extend down the outer surface of the end stringers **12**. If the top rails and tie-rods are in place on the side frames, it is only necessary to adjust the side frames to bring the uprights into alignment with the outer slots between the deck boards, at which time the tie-rods can be dropped into the slots, as shown at the right of FIGURE 1 and in FIGURES 3 and 4. When either of the tie-rods is positioned in one of the deck slots, it serves to hold the two end frames against movement laterally with respect to the deck boards and slots. When in their operative position within the deck board slots, the major portions of the tie-rods are below the top surface of the deck boards and will not interfere with material or packages carried by the pallet. The twisted portions connecting the main portions of the rods to collars **21** are disposed at the ends of the pallet where they will not be in the way. The tie-rods not only prevent movement of the side frames along the ends of the pallet but also prevent spreading of the side frames under load, and consequently hold the side frames in place on the pallet.

When for any reason, the two outer deck slots are not properly spaced so as to be capable of alignment with the two uprights **15** of each end frame, the superstructure can be positioned so that one of the tie-rods is aligned with a slot so as to fit therein, in which case the other tie-rod which cannot be aligned with a slot can be dropped on top of the nearest deck board where articles can be rested upon it, as the thickness of the flat tie-rod is not sufficient to form an obstacle. When the collars **21** are closed, they do not fit the upright so tightly as to prevent relative movement between upright and collar so that the tie-rods can be slid vertically up and down the uprights in mounting the superstructure on the pallet. In FIGURE 1, the left-hand tie-rod is shown in raised position prior to being lowered into its slot, while the right-hand tie-rod is in lowered position within its slot.

The use of tie-rods formed from strap iron is suggested because of their cheapness and the ease with which they can be formed. However, the tie-rods can take a variey of forms. In FIGURES 5 and 6, in place of strap iron, the tie-rod is formed from a metal bar **20'** having upwardly offset open end collars **21'** which may be forged, molded or otherwise formed, and which may be integral or made separately and welded or otherwise attached to the end portions of the bar **20'**. A feature of the offset collars **21'** is the provision of an opening **22** in each collar large enough to admit one of the uprights **15**. Each opening **22** is shown in FIGURE 5 as facing slightly inwardly towards the center of the pallet so that the base angle irons **16** must be moved towards each other to permit separation of the collars **21'** from the upright **15**. The openings **22** also preferably face in opposite directions. With this arrangement, the collars **21'** must be engaged with the uprights of the end frames before the superstructure is lowered into position on the pallet. Due to the inclination of the collar openings **22**, the tie-rods cannot be separated inadvertently from the end frames so long as the superstructure is in position on the pallet, because the ends of the pallet prevent inward movement of the base angle irons **16** sufficiently to permit such separation. The collars **21'** are movable vertically on the uprights **15** and are rotatable thereon so that the superstructure can be folded into the position shown in FIGURE 10. If it is desired to prevent inadvertent removal of the tie-rods from the frames, the tip ends **23** of the collars **21'** may be tapped inwardly against the upright **15** to so narrow the openings **22** as to prevent passage of the upright, and may be pried open for separation of the parts when desired.

In FIGURES 7, 8 and 9, the collars 24 are shown as open on opposite sides with no inclination of the openings, and the tip end **25** of the right-hand collar of FIGURE 7 is shown as tapped inwardly against the upright **15** to prevent inadvertent removal of the tie-rod from the upright, although it may be pried loose when desired. The left-hand collar is shown as open so that it can be swung into engagement with the upright about the axis of its closed collar **24** before being dropped into position in its deck slot. When in its operative position, the deck boards prevent movement of the tie-rod in a direction to disengage the open collar from the upright. Obviously, many other variations in the form of the tie-rods may be made, so long as the tie-rods serve the dual purpose of preventing movement of the superstructure longitudinally of the pallet stringers and of preventing spreading of the base angle irons under load sufficiently to permit dislodgment of the superstructure from the pallet.

While the preferred embodiment of the invention has been shown and described, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

We claim:

1. The combination with a pallet having means to sup-

port spaced deck boards, of a pallet tiering superstructure comprising a pair of end frames each comprising a base adapted to rest on the end portions of the deck boards, and uprights carried by the base, said base having a depending side portion adapted to extend below the deck boards at the end of the pallet, a rail connecting the upper portions of the two end frames, and a tie-rod connecting the lower portions of the end frame in proximity to the pallet deck boards and holding the end frames against relative spreading movement, the major portion of said tie-rod being disposed within the space between two adjacent deck boards to hold the superstructure against movement laterally of the deck boards.

2. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a removable pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner adapted to rest upon the end portions of the deck boards, and a pair of spaced uprights carried by the base runner, said base runner having a depending side portion adapted to extend below the deck boards at the end of the pallet, top rails connecting the uprights of opposite end frames, and a tie-rod connecting the lower portions of the end frames to prevent spreading of the frames under load, the major portion of the tie-rod being disposed within the space between two adjacent deck boards and below the upper surface of such deck boards, and said tie-rod having upwardly offset end portions engaging the end frames.

3. The superstructure of claim 2 in which the top rails and tie-rod pivotally engage the end frames to permit folding of the superstructure when it is removed from the pallet.

4. The superstructure of claim 2 in which the top rails and tie-rod pivotally and removably engage the end frames to permit folding of the superstructure or separation into its component parts.

5. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner adapted to rest upon the end portions of the deck boads, and uprights carried by the base runner, said base runner having a depending side portion to extend below the deck boards at the end of the pallet, upper frame connecting means pivotally engaging the upper portion of each frame, and a lower frame connecting member pivotally connecting the lower portion of each frame in proximity to the pallet deck boards and bracing the lower portions of the end frames against relative spreading movement under load applied to the top of the end frame, whereby the superstructure may be removed as a unit from the pallet and collapsed by pivotal movement of the end frames at their connection with the upper connecting means and with the lower connecting member while maintaining the connection between the various elements of the superstructure, the major portion of the lower frame connecting member being disposed within the space between two adjacent deck boards to hold the superstructure against movement laterally of the deck boards.

6. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a removable pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner adapted to rest upon the end portions of the deck boards, and a pair of spaced tubular uprights mounted upon the base runner in spaced relation to the ends thereof, top rails connecting the uprights of opposite end frames, a tie-rod engaging the pallet at a point spaced a substantial distance from the side edges of the pallet and connecting the lower portions of the end frames to prevent spreading of the frames under load, and upwardly offset collars carried by the ends of the tie-rod and embracing one upright of each end frame, said collars being slidable vertically on the uprights, and the major portion of the tie-rod being of a width substantially less than the spacing between adjacent pallet deck boards and disposed in the space between two adjacent deck boards to hold the superstructure against sliding movement laterally with respect to the pallet deck boards.

7. The superstructure of claim 6 in which the tie-rod is formed from strap metal the ends of which are twisted into a plane at a right angle to the plane of the major portion of the strap and bent upon itself to form integral collars to receive the uprights of the end frames.

8. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a removable pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner adapted to rest upon the end portions of the deck boards, and a pair of spaced tubular uprights mounted upon the base runner in spaced relation to the ends thereof, top rails connecting the uprights of opposite end frames, a tie-rod engaging the pallet at a point spaced a substantial distance from the side edges of the pallet and connecting the lower portions of the end frames to prevent spreading of the frames under load, upwardly offset collars carried by the ends of the tie-rod and embracing one upright of each end frame, said collars being slidable vertically on the uprights, and a second similarly formed tie-rod having its end collars embracing the other uprights of the end frames, the major portion of the length of each tie-rod being of a width substantially less than the spacing betwen adjacent pallet deck boards, and at least one of the tie-rods being disposed in a space betwen adjacent deck boards to hold the superstructure against sliding movement laterally with respect to the pallet deck boards.

9. The superstructure of claim 8 in which the top rails and tie-rods are pivotally connected to the uprights of the end frames to permit folding of the superstructure when it is removed from the pallet.

10. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner resting upon the end portions of the deck boards, and uprights carried by the base runner, said base runner having a depending side portion extending below the deck boards at the end of the pallet, upper frame connecting means pivotally engaging the upper portion of each frame, and a lower frame connecting member pivotally connecting the lower portions of the end frames to hold the end frames against relative spreading movement, said lower frame connecting member extending along the top portion of the pallet in spaced relation with the sides of the pallet and in substantial engagement with the pallet so that materials placed upon the pallet between the end frames will overlie the lower frame connecting member which will be maintained in position upon the pallet by the weight of such overlying materials, and whereby the superstructure may be removed as a unit from the pallet and collapsed by pivotal movement of the end frames at their connection with the upper connecting means and with the lower connecting member while maintaining the connection between the various elements of the superstructure.

11. The pallet superstructure of claim 10 in which the upper frame connecting means and the lower frame connecting member are removably connected to the end frames.

12. The combination with a pallet having a base and spaced deck boards supported above the pallet base, of a removable pallet tiering superstructure comprising a pair of end frames each of which comprises a base runner resting upon the end portions of the deck boards, and a pair of spaced tubular uprights mounted upon the base runner in spaced relation to the ends thereof, top rails connecting the uprights of opposite end frames, a tie-rod connecting the lower portions of the end frames between their ends to prevent spreading of the frames under load,

said tie-rod extending along the top portion of the pallet in substantial engagement therewith so that material placed upon the pallet betwen the end frames will overlie the tie-rod which will be maintained in position upon the pallet by the weight of such overlying material, and upwardly offset collars carried by the end of the tie-rod and embracing one upright of each frame, said collars being slidable vertically on the uprights.

13. The superstructure of claim 12 in which the tie-rod is formed from strap metal the ends of which are twisted into a plane at a right angle to the plane of the main portion of the strap and bent upon itself to form integral collars to receive the uprights of the end frames.

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