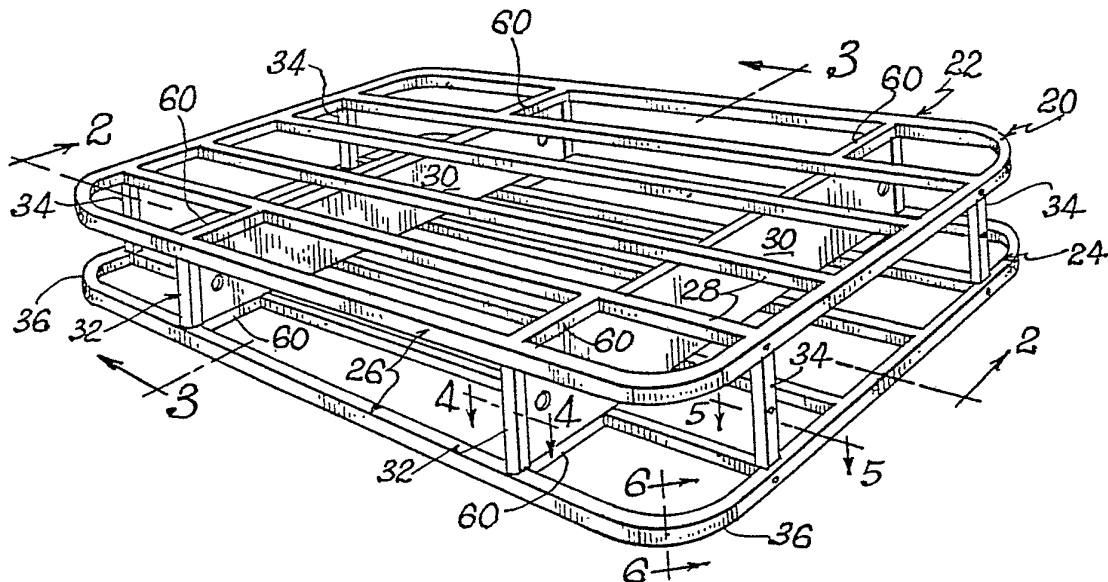


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(54) Title: WAREHOUSE PALLET



(57) Abstract

A warehouse pallet (20) for the handling and storage of goods comprises two spaced, horizontal grids (22, 24) made of steel tubing and separated by a pair of spaced vertical runners (30) and a plurality of peripheral stanchions (34). The runners are judiciously located to provide a convenient guide for the prongs of a fork-lift. The combination tubular runners (30) and stanchions (34) allows the pallet (20) to withstand considerable compressing, bending or twisting forces of such strength that would cause standard wooden pallets or prior metallic pallet designs to break or bend dangerously. Removable lateral extensions can be added in order to increase the load-carrying surface of the pallet. The pallets can also be provided with sockets welded to the four corners which engage four upright posts whose upper ends are stabilized by spacing connectors and which fit into the sockets of an overlapping pallet, enabling the stacking of an indefinite number of pallets to optimize space utilization.

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Description**Warehouse Pallet****Background of the Invention**

Warehouse pallets, or "skids", used for palletizing stored and shipped merchandise and adapted to accommodate the prongs of a fork-lift, are traditionally and almost universally made of sandwiching three spaced longitudinal 2 inches by 4 inches (5cm X 10cm), runners between a number of plane-defining crosswise slats which are nailed to the runners. There have, however, been a number of alternative designs proffered, some of which utilize metallic or metal tubular construction as does the inventor of the instant invention. The following U.S. patents disclose such pallets:

3,981,249	4,112,854
2,544,743	3,701,326
3,748,814	3,227,108
3,851,981	

Pertinent to the instant invention, there also exists pallet stacking frames in the form of tubular steel members which rest on the edges of currently used wooden pallets and define a platform spaced several feet above the pallet to support a second pallet.

One of the drawbacks of existing wooden pallets is their tendency to break in the middle due to the weight of the palletized



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merchandise toward the sides of the pallet from the prongs. Additionally, utilization of wood causes an inherent weakness problem compared to the use of structural steel. Although, as mentioned above, a number of metallic pallets have been designed, they all suffer from design problems and are either too flimsy for the rugged, frequently abusive manner in which they are handled, or they are too complex and intricate to be economically practical.

Summary of the Invention

The pallet of the present invention resolves the above-stated design problems in existing pallets and provides a rugged, relatively lightweight pallet utilizing two runners rather than three. The pallet has been tested by an independent laboratory and shown to be capable of supporting 72,000 pounds (32,725 Kg), and by virtue of the careful positioning of the two support runners and spacer stanchions, weight distribution is such that the problem of the parting of the unit along the longitudinal centerline is all but eliminated.

Other features of the pallet include lateral extensions which hook on either side to expand the support surface area, and sockets mounted to each of the rounded corners of the pallet to engage the posts of a specially designed pallet-stacking frame.

Brief Description of the Drawings

Figure 1 is a perspective view of the pallet;

Figure 2 is a section taken along line 2-2 of Figure 1;

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Figure 3 is a section taken along line 3-3 of Figure 1;
Figure 4 is a section taken along line 4-4 of Figure 1;
Figure 5 is a section taken along line 5-5;
Figure 6 is a section taken along line 6-6 of Figure 1;
Figure 7 is a top elevation view of a modification of the pallet and cooperating corner sockets and lateral extensions;

Figure 8 is a section taken along line 8-8 of Figure 7;
Figure 9 is a top elevation view of a detail of the embodiment of Figure 7;

Figure 10 is a section taken along line 10-10 of Figure 9;
Figure 11 is a top elevation view of a pallet with a stacking frame in place;

Figure 12 is a side elevation view illustrating two stacked pallets with two stacking frames in place;

Figure 13 is a detail of a stacking frame construction;

Figure 14 is a detail of a modification of the stacking frame construction;

Figure 15 is a section taken along line 15-15 of Figure 14; and

Figure 16 is an exploded side elevation view of a pair of disengaged stacking frame components.

Detailed Description of the Preferred Embodiment

The basic form of the pallet is shown at 20 wherein the upper and lower grid platforms are indicated at 22 and 24, respectively.



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These platforms are identical and in fact the top half of the skid is the mirror image of the bottom half. Each of the platforms is made of a continuous peripheral header beam 26 and a number of lateral stringers 28 which span between the longitudinal lengths of the header beams 26. The continuous peripheral beams and the stringers are both made of one inch (2.5cm), tubular steel which is generally square in cross section, and all the individual lengths are welded into place to define an extremely rigid and rugged platform. The stringers 28, shown as four in number, could be provided in any number desired.

The primary support serving to maintain the upper platform spaced from the lower platform, comprises two longitudinally extended runners 30. These runners are also tubular steel, and in the preferred embodiment, comprise rectangular-in-cross section tubing 1 inch (2.5cm) thick, and 3 inches (7.5cm) tall. These runner tubes 30 are welded into position and capped at the ends with V-shaped caps 32 which finish off the ends of the runners and also act as guides for the prongs of a fork-lift, these prongs passing immediately outside of the two runners 30 so that the runners themselves act as guides.

The utilization of tubular runners 30, welded into position between the two platforms, invests the unit with a great deal of strength, particularly against compression, but also against bending



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and twisting forces. To make the unit even stronger, a plurality of upright stanchions 34 are welded between respective portions of the peripheral beams 26. The stanchions define rectangles with the stringers and corresponding portions of the runners 30 and offer high resistance to bending of the edges of the pallet downward under laterally unbalanced loads.

To further enhance the strength of the pallet, the corners of the header beams, indicated at 36, are arcuate in plan form and in cross section are passed between rollers to compress the sidewalls of the tube member defining these segments into a concave configuration shown in Figure 6, with the concomitant bulging of the top and bottom surfaces of the tube into a convex configuration. The concave-convex combination results in the increased strength and ability to resist bending of these rounded corners.

To maximize the utilization of floor space in warehouses having no shelves or racks, it is generally desirable to incorporate a stacking frame on top of each pallet so that two, three, or possibly more pallets can be vertically stacked. To accommodate this need, in one embodiment of the pallet shown in Figure 7, a double-ended socket 38 is welded to each of the corners 36, as best seen in Figures 9 and 10. These sockets have flared lips 40 and are actually made in two halves which are welded to a separator plate 42.



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The frames which are engaged in these sockets are shown in Figures 11-16 at 44 and preferably comprise two identical components 46. Each of these components includes two upright posts 48 having generally V-shaped connectors 50 which have mutually embracing means at the center of the V. The posts themselves are preferably tapered at the bottom and the top by virtue of beveled plugs 52 and this taper, coupled with the approximately 2" diameter of the flares 40 of the sockets, conform to the standard of pallet positioning accuracy by fork-lift which is 2". Note that the upper ends of these posts 48 are free to pass into the bottom of the sockets 38 permitting the full load of the upper pallet to be directly passed down vertically to the underlying support member. This contrasts with present stacking frames in which the connectors 50 are ordinarily used to bear the full weight of the overlying pallets.

The means joining the two components 46 of the stacking frames may be a pair of pins 54 which seat in sockets 56 alongside the pins. Note that with the pin on the left and the sockets immediately to the right, the components can be identically made and still mate properly.

A variant means of embracing the two component parts of the frame is shown in Figures 14 through 16 wherein a strap or hook 58 on each of the V-shaped components engages over the top of the other, so that the two components must be coupled in an angular



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or twisting fashion but are then separable when the posts are engaged in the sockets and cannot be separated until they are removed, providing an added degree of stability and securing to the unit.

Pallets are often transported within warehouses and elsewhere on conveyor belts made of parallel rollers. Transporting the instant pallet on such a roller would cause problems due to the spaced lateral stringers which would repeatedly hang up between rollers. To avoid this problem, longitudinal filler members 60 are then welded flush with the outer surface defined by the platforms between tubing segments at the leading and trailing edge of the pallet.

In the event that it is desired to make the pallets wider, pallet extensions are shown at 62 in Figures 7 and 8. Construction of the extensions is similar to that of the rest of the pallet and comprises oval tubes 64 and stringer extensions 66. A lower longitudinal member 68 lies flush against the lower platform 24 and connects to the oval beam 64 through a pair of stanchions 70 and angular supports 72. Three upper clamps 74 and two lower clamps 76 hold the extensions temporarily but firmly in place on one or both sides of the basic pallet as shown in Figure 7.

The unit as shown in its several modifications and with its several component parts represents an advance in the pallet art, principally in the strength and durability of its construction, its elimination of the midline breaking problem, and the provision of



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runners which are two in number, rather than three, to correspond and act as guides for the prongs of a fork-lift. Additionally, this basic structure accommodates and is complemented by the strong and efficient stacking frames 44 and the lateral extensions 62 to define a simple but amazingly versatile improvement in the pallet art.



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Claims

1. A warehouse pallet comprising:
 - (a) an upper grid platform;
 - (b) a lower grid platform;
 - (c) a pair of spaced longitudinal runners extending generally vertically between said platforms; and
 - (d) a plurality of spaced upright stanchions joining the peripheries of said platforms in spaced relation.

2. The structure according to Claim 1 wherein each of said platforms includes a continuous, generally rectangular, peripheral header beam defining longitudinal and lateral lengths and a plurality of lateral stringers spanning between said longitudinal lengths of said beam.

3. The structure according to Claim 2 wherein said runners are spaced to lie just inwardly of the prongs of a fork-lift and each runner is tapered to define ends generally V-shaped in vertical cross section to facilitate engagement of the pallet by the prongs of a fork-lift.

4. The structure according to Claim 2 wherein the bottom surface of said lower platform is plane-defining and including a plurality of longitudinal members having lower surfaces co-planar with the bottom



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surface of said lower platform to facilitate transport of the pallet on roller conveyors.

5. The structure according to Claim 2 wherein each of said continuous peripheral header beams is generally rectangular having curved corners and made of tubular stock, the tube elements defining said curved corners being deformed in cross section to define concave sides and convex upper and lower surfaces for increased strength.

6. The structure according to Claim 1 wherein said pallet is generally rectangular in plan form and includes an upwardly directed side member mounted at each corner to engage and support four upright posts of a pallet-stacking frame.

7. The structure according to Claim 6 and including a pallet-stacking frame comprising two identical components, each component having a pair of upright posts engageable in a pair of said sockets and having an upper connector extending from said post pair with means for positively embracing the upper connector of the other component.

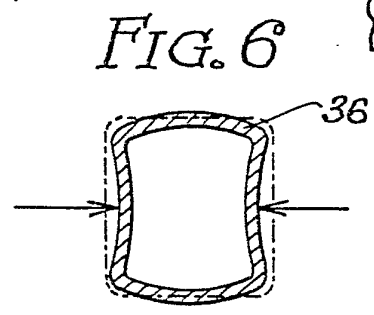
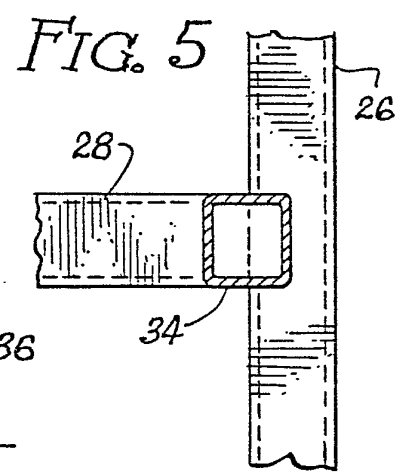
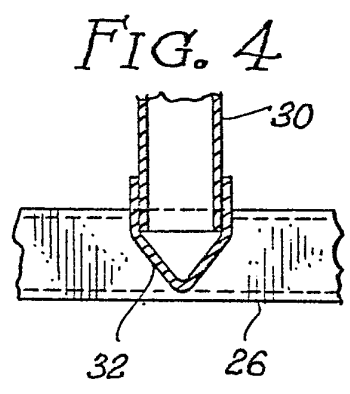
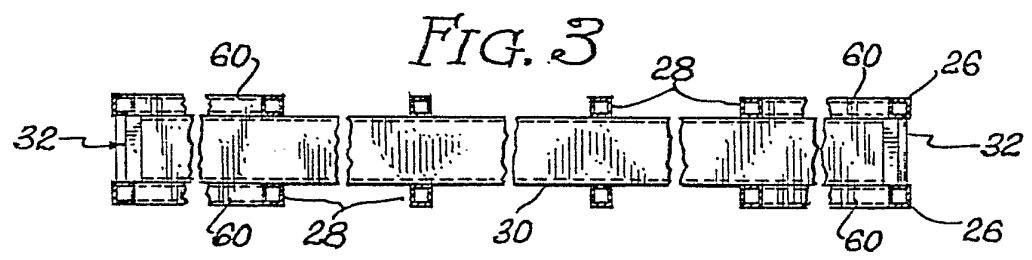
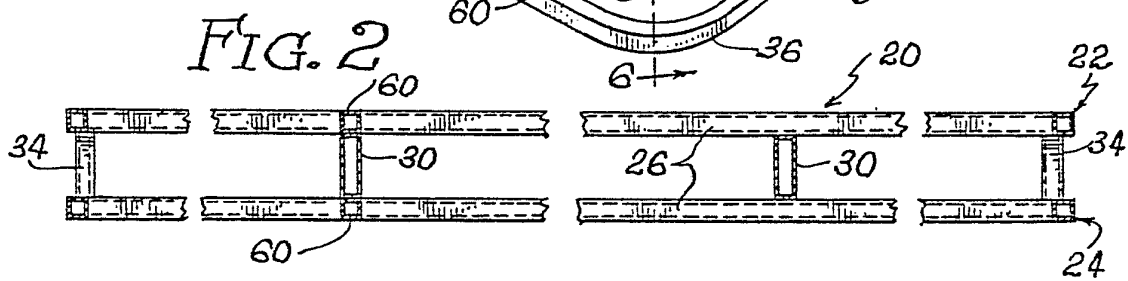
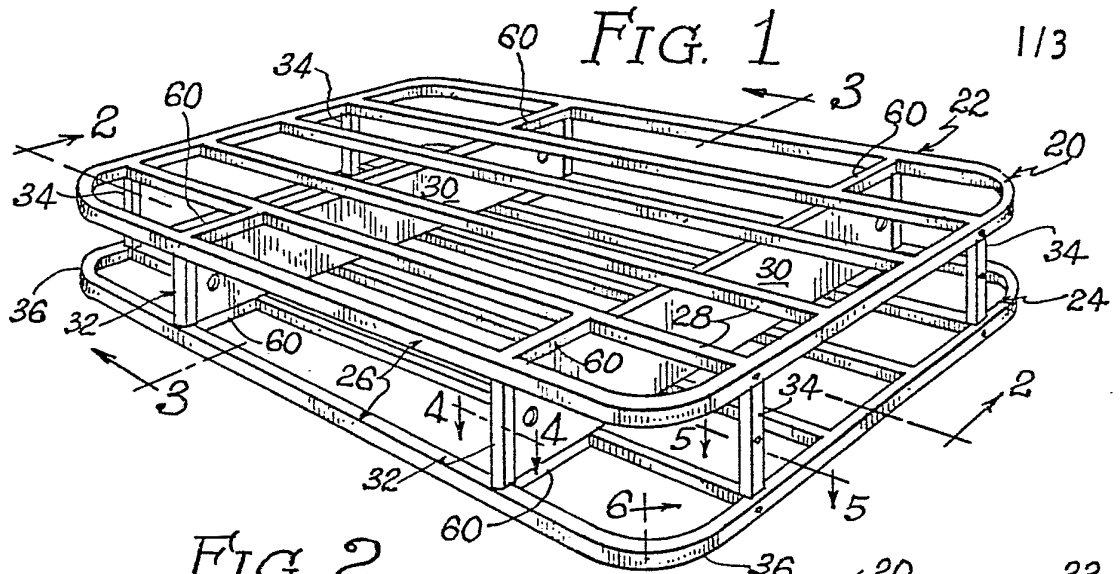
8. The structure according to Claim 7 wherein said sockets are flared and the bottoms of said posts are tapered to facilitate mating post to socket when stacking pallets.

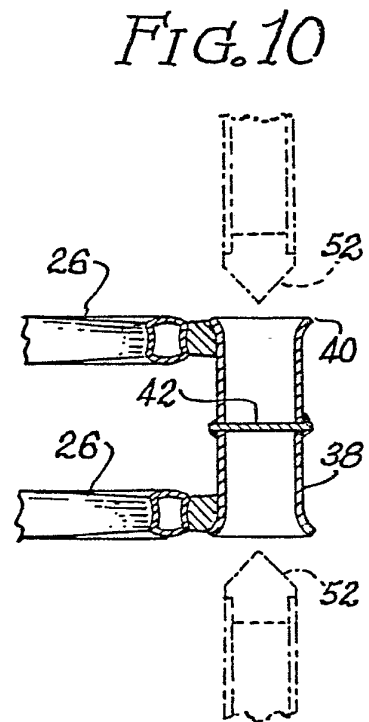
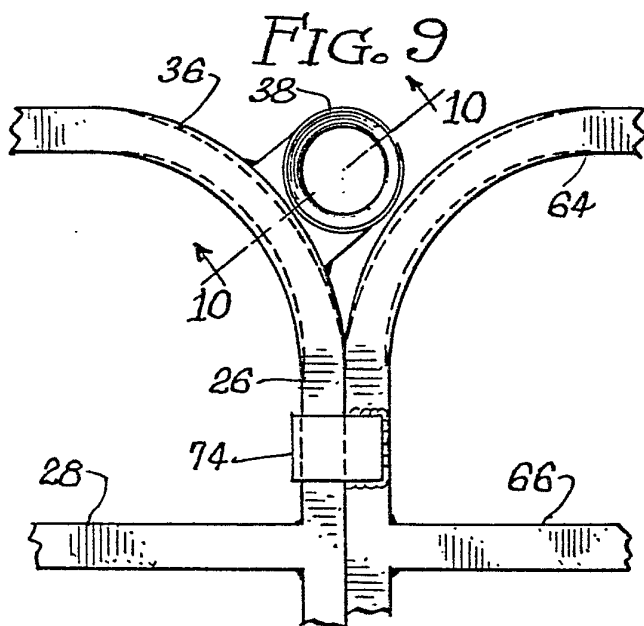
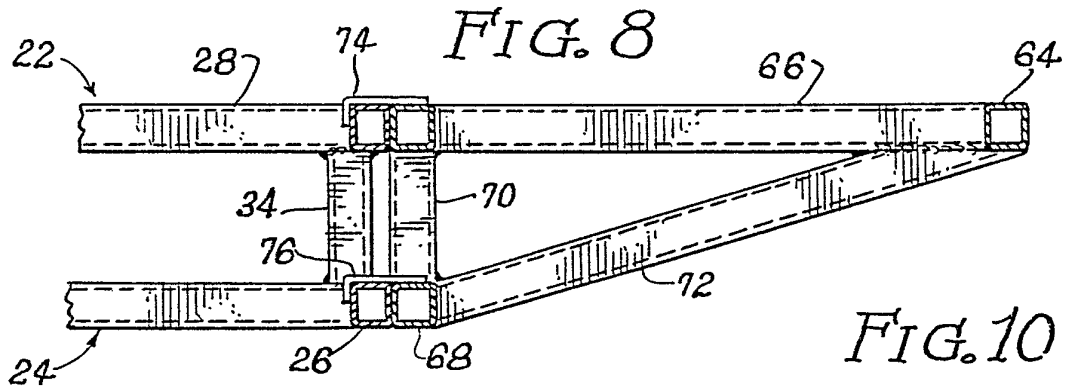
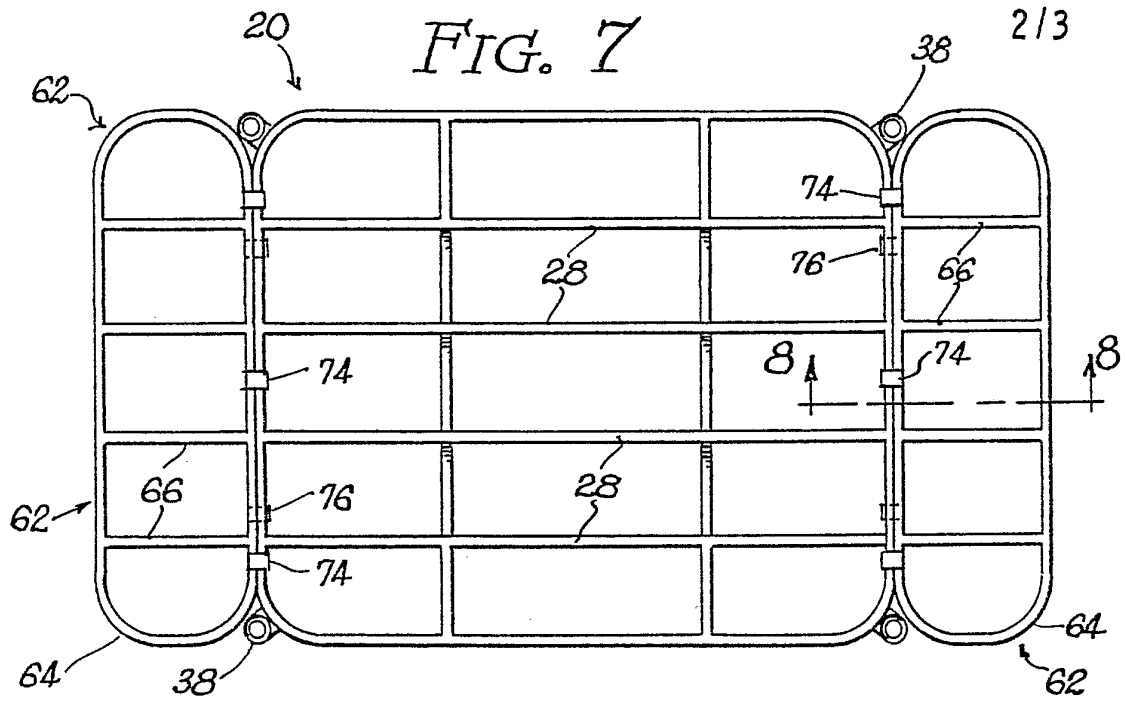


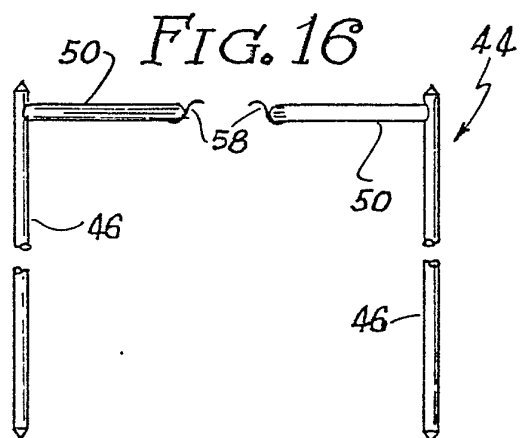
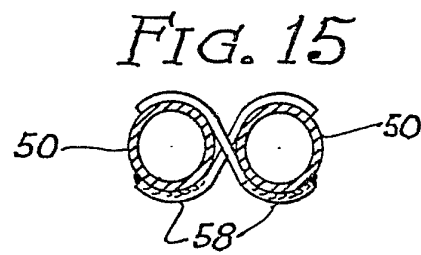
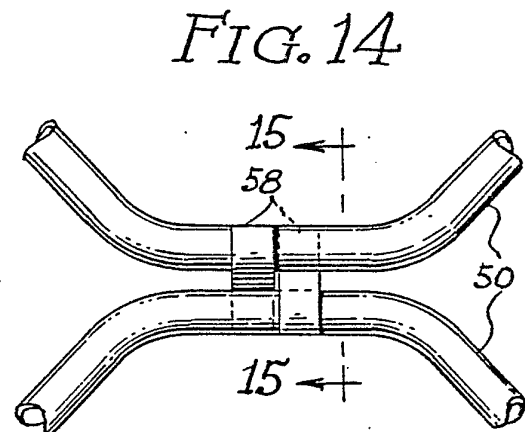
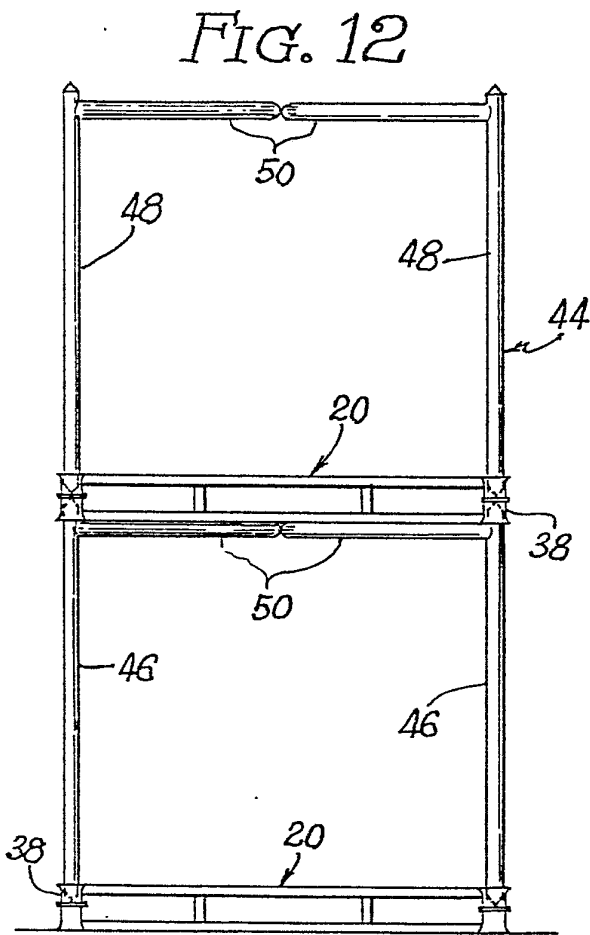
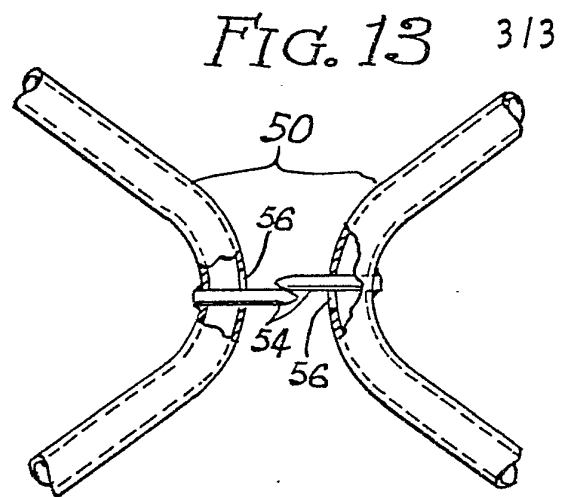
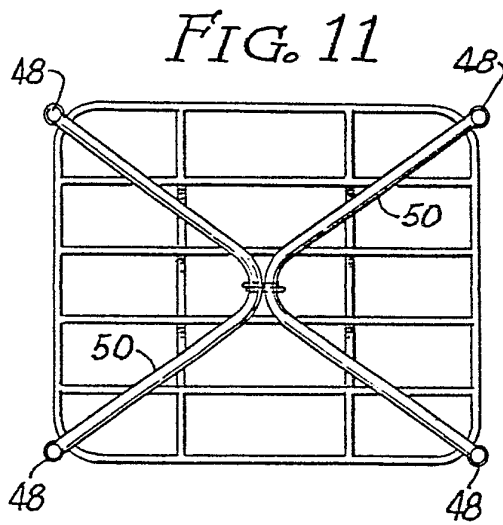
-II-

9. The structure according to Claim 7 wherein each of said socket members defines upwardly and downwardly directed socket elements and said stacking frame posts each defines an upright upper end to engage the downwardly directed socket of an overlying pallet for positive stacking engagement of successive pallets.
10. The structure according to Claim 7 wherein each of said upper connectors comprises a generally V-shaped brace linking the respective posts and an arcuate hook extending from generally centrally of the respective brace to engage over the other said braces.
11. The structure according to Claim 7 wherein said means for positively embracing each upper connector comprises a pin engageable in a socket defined in the embraced connector.
12. The structure according to Claim 11 and including a pallet extension having means to engage said upper and lower platforms to define when engaged a projected continuation of the upper surface of said platform.
13. The structure according to Claim 12 wherein said upper and lower platforms each have a continuous peripheral header beam and said means to engage comprise a pair of beams to lie substantially flush against said header beams and a plurality of hooks to hook over the latter.



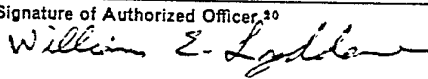






INTERNATIONAL SEARCH REPORT

International Application No PCT/US81/00101

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. 3	B65D	19/28
U.S. Cl.	108/51.1	
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
United States	108/51.1-57.1, 901, 902 248/346; 206/386, 596-600	
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
A	US, A, 2,836,384 Published 27 May, 1958 Haglund	3
A P	US, A, 4,186,667 Published 5 February 1980 Seabrooke	6
A	US, A, 2,673,700 Published 30 March 1954 Eberhardt	8,9
A	US, A 2,868,487 Published 13 January 1959 Robinson	
A	US, A 3,981,249 Published 21 September 1976 Herrmann et al	
A	NL, A 6,414,618 Published 17 June 1965 Bernard et al	1,2,4,5
A	FR,A 1,050,723 Published 11 January 1954 Lindet	1,2,4,5
A	FR,A 1,447,360 Published 20 June 1966 Delvaque et al	1,2,4,5
A		
<p>[*] Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ³	Date of Mailing of this International Search Report ²	
28 April 1981	08 MAY 1981	
International Searching Authority ¹	Signature of Authorized Officer, ²⁰	
ISA/US	 WILLIAM E. LYDDAN PRIMARY EXAMINER ART UNIT 355	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

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GB,A 806,314 Published 23 December 1958
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V. OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹⁰

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. Claim numbers, because they relate to subject matter¹² not required to be searched by this Authority, namely:2. Claim numbers, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out¹³, specifically:VI. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ¹¹

This International Searching Authority found multiple inventions in this international application as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.2. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:3. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

 The additional search fees were accompanied by applicant's protest. No protest accompanied the payment of additional search fees.