

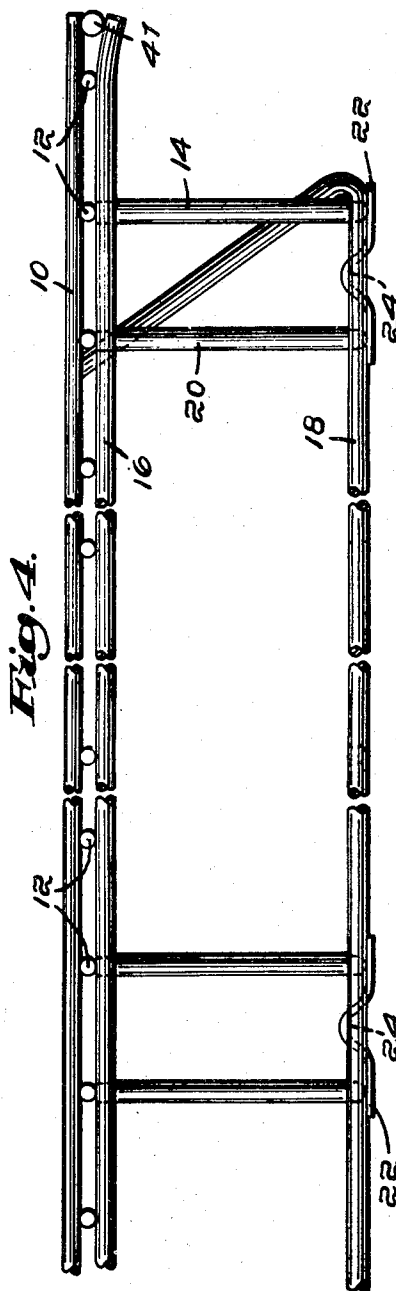
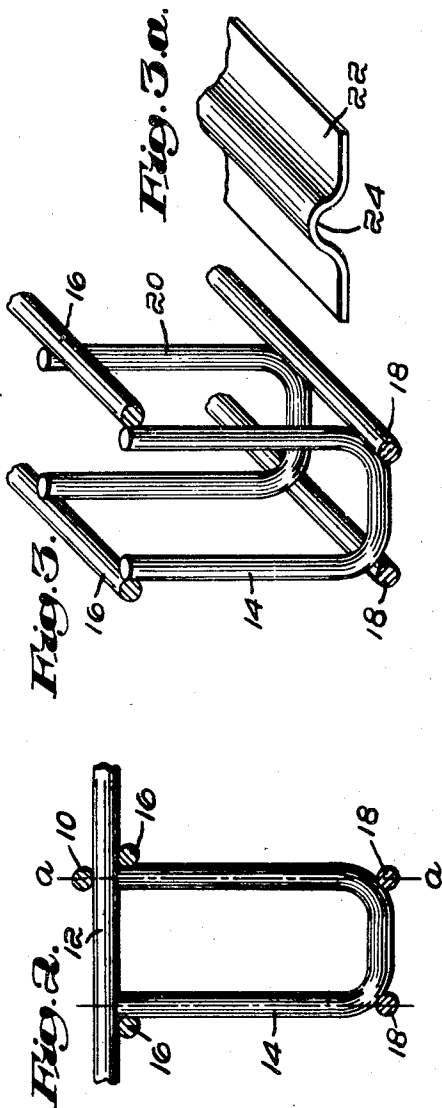
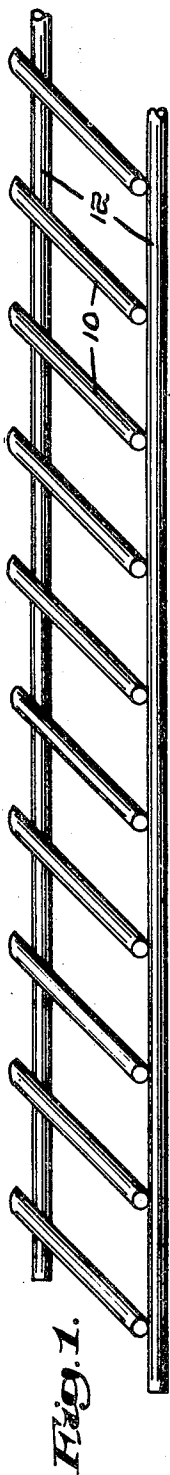
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FABRICATED PALLET

2,461,887

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4 Sheets-Sheet 1



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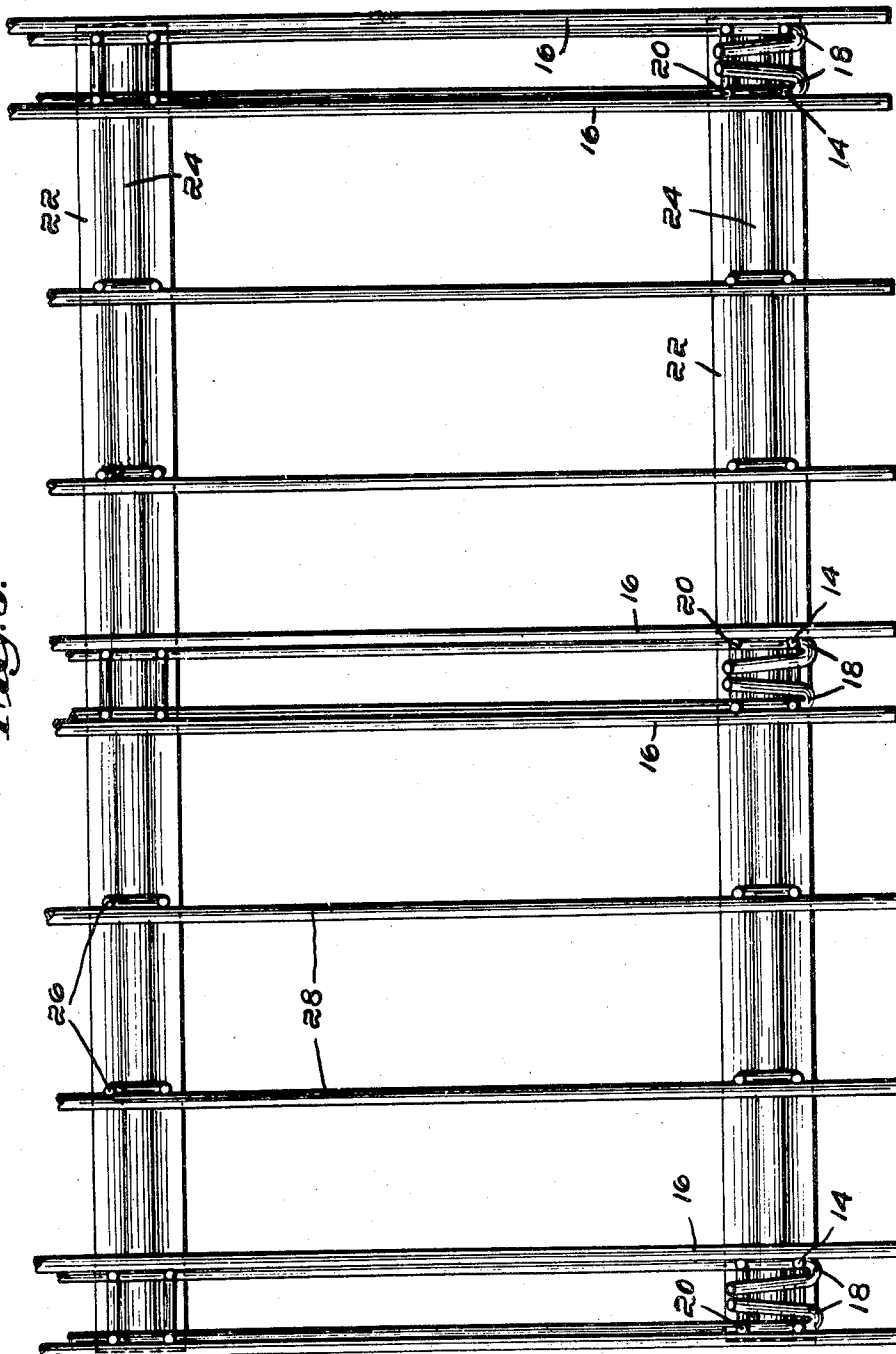
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FABRICATED PALLET

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Fig. 5.



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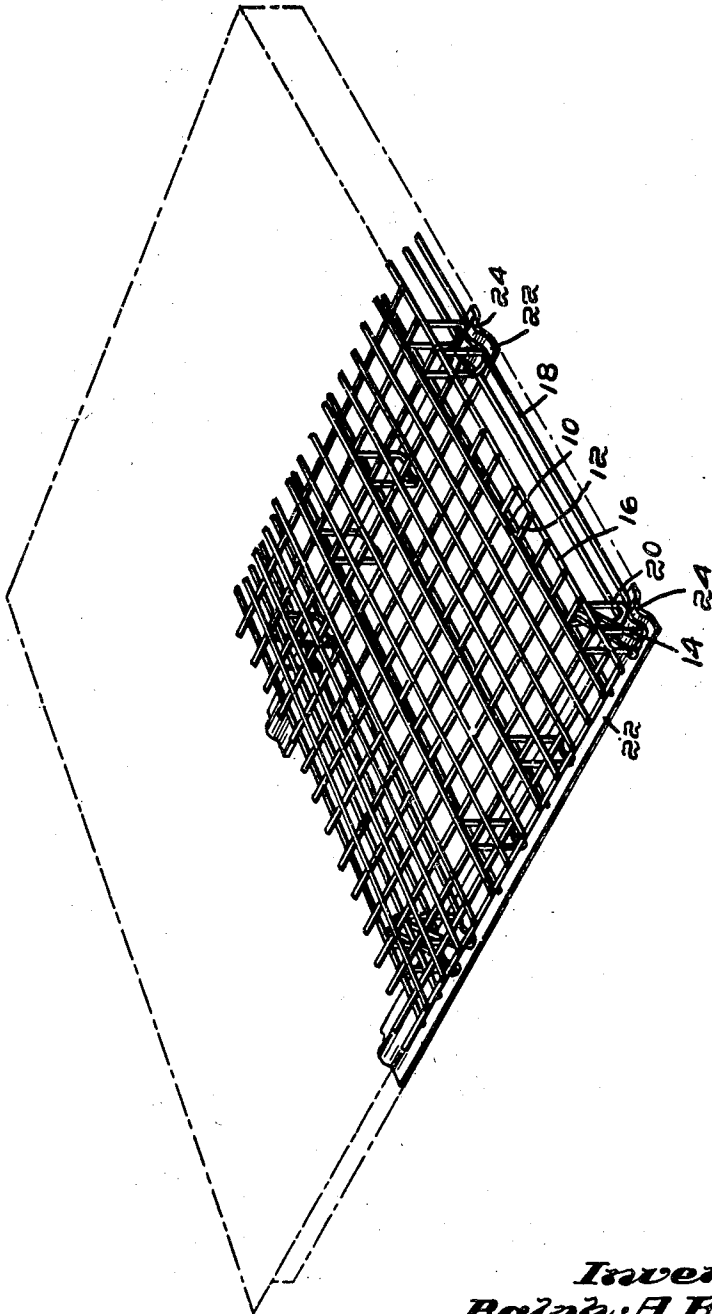
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Fig. 6.



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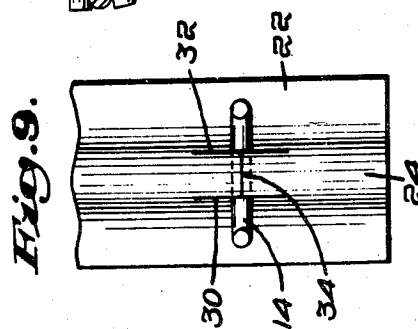
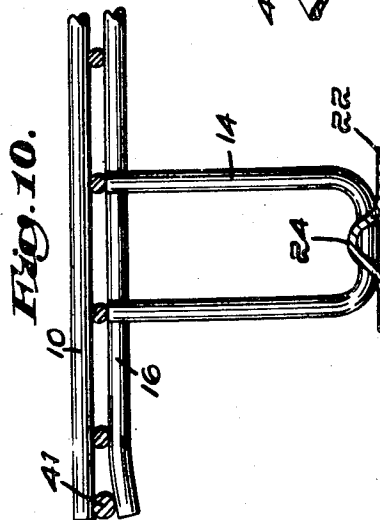
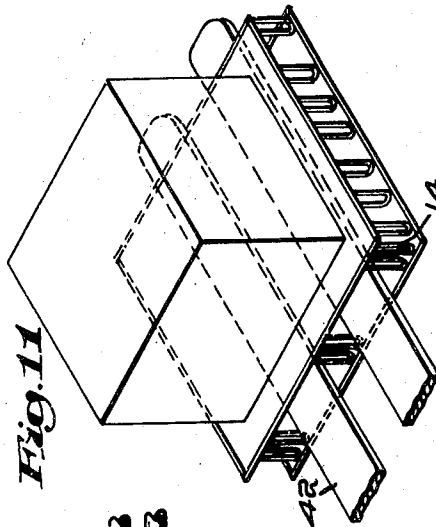
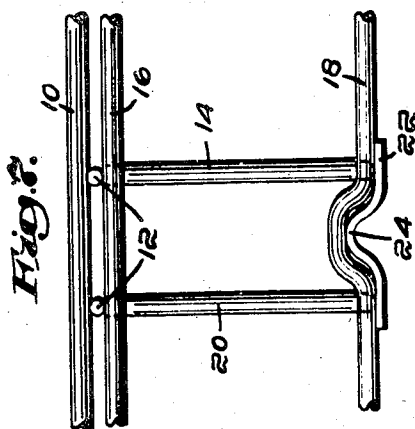
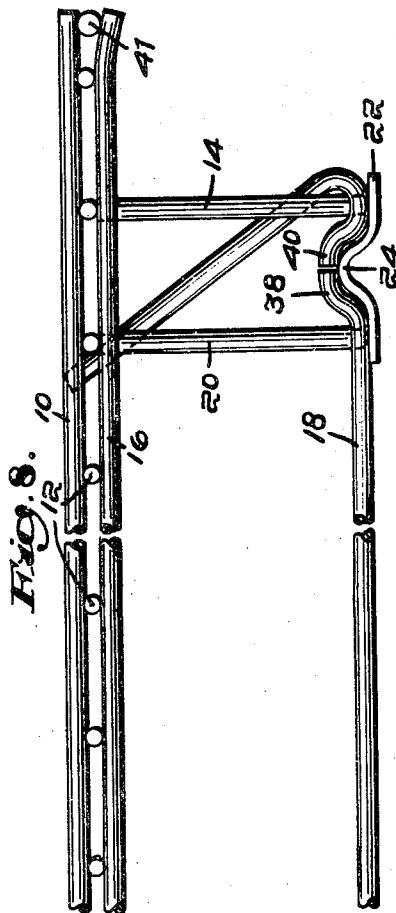
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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FABRICATED PALLET

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10 Claims. (Cl. 248—120)

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This invention relates to transporting material and to improvements in pallets for use in supporting goods which are required to be moved about and stacked in transit.

The usual pallet construction includes a platform or deck; beams or blocks for supporting the deck in a raised position; and base means on which the beams or blocks are mounted.

These pallets have been customarily built of wood in order to maintain the cost of such devices at a minimum and yet afford a proper degree of strength and durability. When using wood, it is necessary, in order to secure desired strength, to employ relatively thick planking and relatively large blocks. This tends to result in a cumbersome body, occupying an undesirably large amount of space and adding considerably to the weight of a palletized unit. These objectionable aspects of conventional pallets become even more undesirable owing to the development of a custom of shipping palletized units. Here the pallet may be used only a few times, or possibly only once, and its cost must be absorbed by the party sending the goods. Manufacture of relatively lightweight pallets at the lowest possible cost is thus of paramount importance.

An object of the invention therefore is to improve pallet structures and to provide a low-cost pallet which furnishes an adequate amount of strength and durability. Another object is to provide a pallet of outstanding light-weight character and compact construction. Other objects will appear from the following description of the invention.

With the foregoing situation in mind, I have designed a fabricated metal pallet structure having much less bulk and weight than the conventional pallets described. As a substitute for the common wooden pallet platform or deck, there is provided a reinforced reticulated deck requiring for its construction substantially less material. Combined with the reticulated deck are specially designed supporting means consisting of a plurality of upright members so fashioned and so arranged as to produce an exceedingly high strength to weight ratio.

An important feature of the invention, therefore, is a mesh deck type pallet combined with novel deck-supporting means which provide an exceedingly high degree of rigidity and strength

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while being of very light weight and small bulk. Still another important aspect of the invention resides in unique methods of joining the supporting means and furnishing them with pedestal or base portions.

These features as well as others are further illustrated in the accompanying drawings, in which

Fig. 1 is a fragmentary perspective view of a mesh material employed in making the pallet of the invention;

Figs. 2 and 3 are perspective views of supporting means;

Fig. 4 is a side elevational view illustrating partial assembly of the various elements noted in Figs. 1, 2, and 3;

Fig. 5 is a plan view illustrating a further step in making the pallet of the invention;

Fig. 6 is a fragmentary perspective view of a finished pallet;

Figs. 7 to 10 inclusive illustrate various methods of securing the supporting means to the pallet base plates; and

Fig. 11 is a diagrammatic view further illustrating the pallet member in use.

The structures illustrated in the drawings represent preferred forms of the invention and include a mesh deck and upright members made up of a plurality of rigid metal elements. The invention will be described with reference to a mesh deck and supporting members formed of steel wire or wire-like elements. It should be understood, however, that the invention is not limited to the particular structures shown, and that decks fabricated from other metals, plastic materials and the like may be utilized either in the shape of rods, strips, sheets or other forms.

Fig. 1 of the drawings illustrates a fragment of a mesh type deck composed of a plurality of upper deck elements 10, extending in parallel spaced-apart relation to form a top deck section; and lower deck elements 12, also extending in parallel spaced-apart relation and at an angle to the upper deck elements 10, thereby forming a lower deck section. The elements 10 and 12, cut into suitable lengths, may be secured together at points of contact by some convenient means such as spot welding, thus providing a continuous network of appreciable rigidity.

I have found that excellent supporting means

for a pallet deck of the mesh type may be provided by utilizing a plurality of upright members of relatively small cross section; by arranging these upright members so that they are caused to bear directly under the lowermost section of the mesh deck; and also by bracing the uprights in the position noted with laterally extending tie rods secured at the tops and bottoms of the upright. Moreover, I have also found that these supporting elements, when so arranged and braced, are especially adapted to being provided with pedestal means which may either be an integral part of the upright members or may be separately attached in the form of strips or plates.

Considering these features in greater detail, numeral 14 denotes one form of upright member consisting of a length of steel wire bent upon itself to form a U-shaped element. The wire stock may be used in a diameter of $\frac{1}{8}$ of an inch for example, or even smaller with good results. The legs of the U-shaped element 14 extend upwardly and are arranged to terminate at points directly under the elements 12 in the lower deck section, preferably below a point of intersection of an overlying deck element 10 as illustrated in Fig. 2.

A number of the U-shaped elements are preferably utilized and to them are secured laterally extending tie rods 16 which are secured by welding along the upper ends of the legs of the U-shaped elements as noted in Fig. 2. There are also provided tie rods 18 secured along the bottoms of the U-shaped elements preferably in an abutting position such that the centers of rods 18 fall on lines intersecting the vertical center lines through the legs, as for example center line A—A of Fig. 2. By this arrangement, it is found that a load on the deck is more efficiently distributed through the legs of the U's to the bottom tie wires with less possibility of the legs of the U's being caused to buckle by a heavy load.

It is pointed out that this combination of upright elements and laterally extending tie rods is especially designed to take a load from a mesh type deck since the ends of the legs at the points of contact with deck elements 12 assume a part of the stress, which is then transmitted in part throughout the whole length of each bottom tie wire 18. At the same time, the upper tie wires 16 assume a part of the load as distributed all along the upper deck elements 12 from the top deck elements 10. Thus at the upper extremity of each leg there is a three-point contact between the upright member, its adjacent tie rod, and a deck element. When these members are secured by welding, a multiple union is achieved which braces the deck in three dimensions and lends an exceedingly high degree of rigidity and strength even with small gauge wire supporting members used in the deck as well as the legs.

A further desirable feature of my pallet construction resides in the fact that the bottoms of the U-shaped elements constitute in effect pedestal portions of appreciable area for furnishing a bearing or base surface. By combining the lower tie rods 18 in the position noted, it will be seen that the lowermost surface of any one of the lower tie rods 18 lies in the same plane as that occupied by the lower peripheral surface of the U-shaped member. Consequently, the tie rods 18 cooperate with the bottom of the U's in furnishing a relatively large pedestal or bearing surface and thus perform a double function of buttressing the legs of the U's and increasing the total bearing area.

It will be apparent that the novel supporting

effects thus achieved may be augmented by using groups of U-shaped members. For example, by securing a second U-shaped element 20 in close proximity to element 18, as is illustrated in Fig. 3, there is obtained a skeletonized column unit, especially suitable for constituting corner supports for a pallet. It is pointed out that the corners of pallets may suddenly be called upon to receive a disproportionate amount of stress when a heavy package is tipped over onto one corner or edge of the pallet. The strength feature above noted is especially applicable to such a situation.

I may therefore provide a simple pallet structure composed of a mesh deck and corner supporting columns made up of groups of U-shaped elements secured together by tie rods running between two opposite sides only of the deck. Here the bottom of the U-shaped members and the lower tie rods 18 afford a sufficient pedestal area to support many types of containers. For greater weights, additional strength may be secured by inserting more of the columns or of single U-shaped elements at other points, as for example midway between the corners. Fig. 11 illustrates the extremities 42 of a fork lift truck as commonly used with pallets, engaged between the uprights of the invention.

A further aspect of the invention relates to the use of additional elements attached to the bottoms of the U-shaped elements and their tie rods. These consist of base plates which provide a strip type of pedestal or bearing surface. For some uses of pallets, it has been found desirable to employ a plate type of pedestal and such an arrangement has been included in Fig. 4 and further illustrated in Fig. 5. Numeral 22 indicates one of these plates formed with a corrugated mid-section 24 (Fig. 3). In this form of the invention it has been found desirable to employ two plates for example, below two opposite sides of the pallet and a third plate extending centrally between the first two and parallel with them. The U-shaped elements are secured along the upper sides of these plates 22, as may be observed in Fig. 4, with the lower tie rods for the U-shaped elements extending transversely over or through the corrugated mid-sections of the plates. Intermediate U-shaped elements 26, supported by tie rods 28, may be mounted along the plate members. The elements 26 may be turned at right angles to the position assumed by the U-shaped elements occurring at the corners of the pallet, as noted in Figs. 6 and 7. When turned in this manner, the intermediate elements 26 provide a wider area of support along the edges of the pallet at points intermediate the corners.

In securing U-shaped elements on the rods which extend transversely of the corrugations, I have found that I may with good results cut slots or openings through the corrugations of the plates and allow the elements noted to extend through these openings. This construction is indicated in Fig. 10. Another desirable method of securing these elements is to cut the corrugations of a plate in the manner noted in Fig. 9, along intersecting lines 30, 32 and 34. There are thus formed partly severed tabs which may be lifted up to leave an opening into which the element may be inserted. Thereafter the tabs are forced back into place and if desired welded to the element to lock it firmly in place.

In the case of a bottom tie rod which extends transversely of the plates, a very desirable arrangement has been found to be one such as that illustrated in Figs. 7 and 8. This construction

involves bending or upsetting the tie rod so that it passes over the corrugation 24, contacting it at one point which offers a convenient junction for welding. A stronger welding union can be obtained by cutting through the tie rod to form ends 38 and 40 (Fig. 8). Both of these ends are spot welded to the corrugation. I have also found it desirable to fold the ends of the bottom tie rods 18 inwardly as shown in Fig. 4 for example. This affords an additional bracing effect and presents rounded ends which afford a more finished edge along the pallet. Another means of finishing the edges of the pallet is to employ frame wires 41 (Fig. 4) which are inserted as shown and may be interwoven to form protected edges.

It is to be noted that the pallet described may be subject to modification, especially with respect to the supporting members. The upright elements may take other forms than the specific U-shape described, for example they may consist of separated legs or columns and be provided with pedestal means consisting of bent or coiled bottom extremities, or may carry discs or balls for constituting more easily operated bearing surfaces. In addition to the laterally extending tie rods I may desire to utilize angle irons and cross braces extending between adjacent upright elements, either at their tops, bottoms or intermediate points. Various other changes are also contemplated within the scope of the invention.

The advantages offered by the pallet of the invention may be more readily understood from a consideration of pallet specifications now common in the palletizing art. Load carrying capacity ranges all the way from one or two tons, or less, all the way up to eight and ten tons. The supporting surface area of pallets commonly occurs in square formation and may be as large as 48" x 48" or even larger.

It will be apparent that different sizes of pallets may be required and in this connection the deck elements and supporting members may vary in gauge. An outstanding advantage is the substantial reduction in the gauge of wire or other stock which may be required for carrying a given range of loads. Reducing the gauge of the wire or other material has several desirable advantages, principal ones being a great reduction in cost of the pallet and a lowering of weight and bulk.

I claim:

1. An improved pallet construction comprising a deck, means for supporting the deck in elevated position, said supporting means including skeletonized column members, each of said column members consisting of a pair of spaced-apart U-shaped elements secured together by laterally extending tie rods.

2. An improved pallet comprising a deck, means for supporting the deck in elevated position, said supporting means including upright members having pedestal portions, laterally extending tie rods secured in abutting relation with respect to the upright members in a position so chosen that a vertically extending line passing through the center of one of the upright members is intersected by a horizontally extending line passing through the center of any one of the tie rods.

3. An improved pallet construction comprising a mesh deck, means for supporting the deck in an elevated position, said supporting means including a plurality of upright legs having pedestal portions formed thereon, said upright legs being

secured in spaced-apart relation by laterally extending tie rods fastened along the tops of adjacent legs and other laterally extending tie rods lying in abutting relation to the pedestal portions.

4. An improved pallet construction comprising a mesh deck, means for supporting the deck in an elevated position, said supporting means including upright legs having pedestal portions formed thereon, said upright legs being secured in spaced-apart relation by vertically extending tie rods fastened along the tops of adjacent legs, and other laterally extending tie rods lying in abutting relation to the pedestal portions, said deck consisting of cross-laid elements, the tops of said upright legs being secured to elements of the said cross-laid deck.

5. An improved pallet construction comprising a deck, means for supporting the deck in an elevated position, said supporting means including a plurality of rows of upright legs having pedestal portions formed thereon, said upright legs being secured in spaced-apart relation by vertically extending tie rods fastened along the tops of adjacent legs, other laterally extending tie rods lying in abutting relation to the pedestal portions, said deck consisting of cross-laid elements, the tops of said upright legs being secured to elements of the said cross-laid deck, and base plates secured below each of the said rows of upright legs.

6. An improved pallet construction comprising a deck, means for supporting the deck in an elevated position, said supporting means including upright legs having pedestal portions formed thereon, said upright legs being secured in spaced-apart relation by vertically extending tie rods fastened along the tops of adjacent legs, other laterally extending tie rods lying in abutting relation to the pedestal portions, said deck consisting of cross-laid elements, the tops of said upright legs being secured to elements of the said cross-laid deck, base plates secured below the said pedestal portions, said base plates presenting corrugated central sections, some of the upright legs having their pedestal portions lying transversely across the corrugated central sections, and the remainder of the upright legs having pedestal portions extending substantially parallel with the corrugated central sections.

7. In a pallet construction, a deck comprising a plurality of cross-laid elements, supporting means including upright legs having pedestal portions formed thereon, the tops of said legs being secured to the deck, base plates laying adjacent to the pedestal portions of the legs, said base plates presenting corrugated central sections, the pedestal portions extending transversely across the corrugated central sections and being of a shape adapted to conform to the corrugated central section.

8. An improved pallet construction comprising a deck formed of cross-laid elements, supporting means for the deck consisting of upright legs having pedestal portions formed thereon, corrugated base plates extending below the pedestal portions, said pedestal portions being curved to conform in general to the curvature of the corrugated base plates, and said pedestal portions being secured to the crowns of the base plate corrugations.

9. An improved pallet construction comprising a deck formed of cross-laid elements, supporting means for the deck member, said supporting means comprising upright legs secured in spaced-apart relation by laterally extending tie rods, said upright legs having pedestal portions formed at

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their lower extremities, base plates provided with corrugations extending below the pedestal portions, said pedestal portions being interrupted to present upwardly curved split ends secured to the base plate corrugations.

10. An improved pellet construction comprising a deck formed of upper cross-laid elements and lower cross-laid elements, upright supports for the deck, the extremities of said upright supports being welded to lower cross-laid elements, and tie rod means secured adjacent to the ends of the uprights in abutting relation to the lower cross-laid

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elements and being welded thereto, to form a three-point union at respective areas of contact.

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