United States Patent

Brown

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[54] PRESS-ON SUPPORT FOR A PALLET

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[21] Appl. No.: **835,115**

[52] **U.S. Cl.** **108/51**, 248/216

[51] **Int. Cl.** **B65d 19/00**

[58] **Field of Search** ..... 248/216, 188.8; 108/51, 52, 108/53, 56, 57, 58; 85/14, 11, 13; 52/615, 618, DIG. 6; 287/20.92 L

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Primary Examiner—J. Franklin Foss

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[57] **ABSTRACT**

Metal supports having upright walls for self-fastening to a wooden or composition deck of a pallet to provide support for the deck. Each support has a plurality of prongs extending from at least one end of the upright walls to penetrate into the pallet deck during construction of the pallet. The walls of the support may be tapered so as to facilitate the nesting of a plurality of like supports to reduce storage space requirements and increase ease of handling prior to use in assembly of the pallet.

14 Claims, 16 Drawing Figures

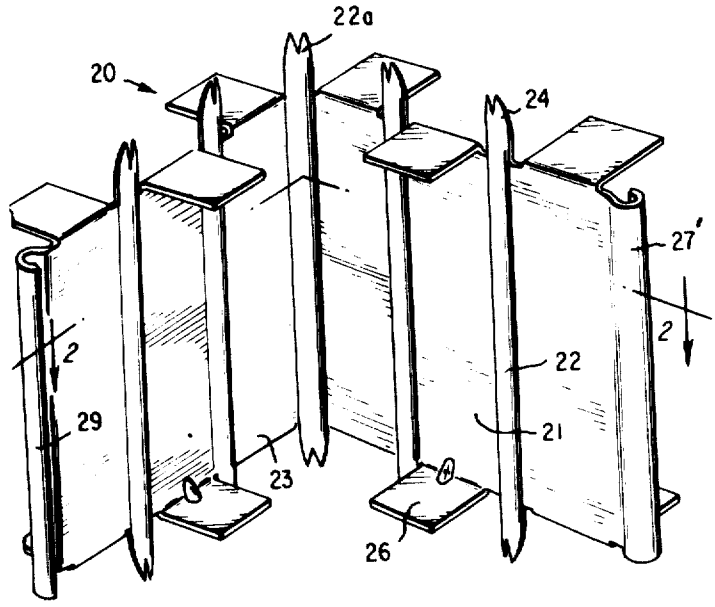


FIG. 1

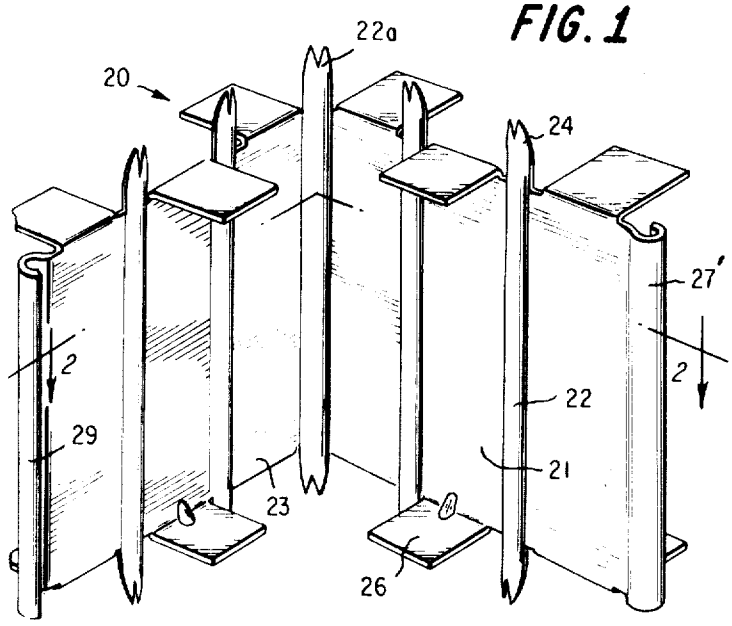


FIG. 4

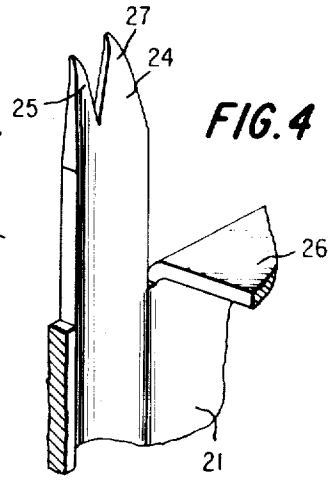


FIG. 2

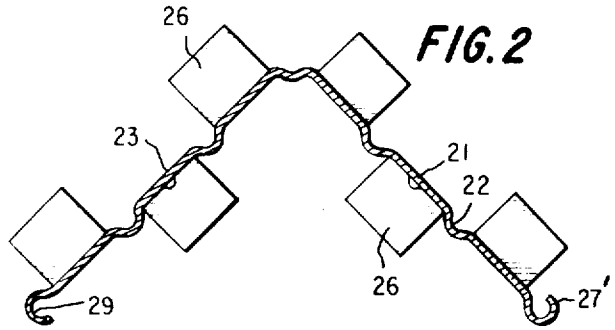


FIG. 5

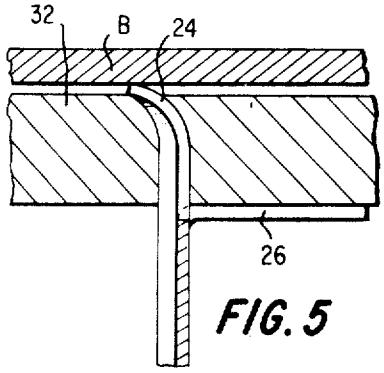


FIG. 3

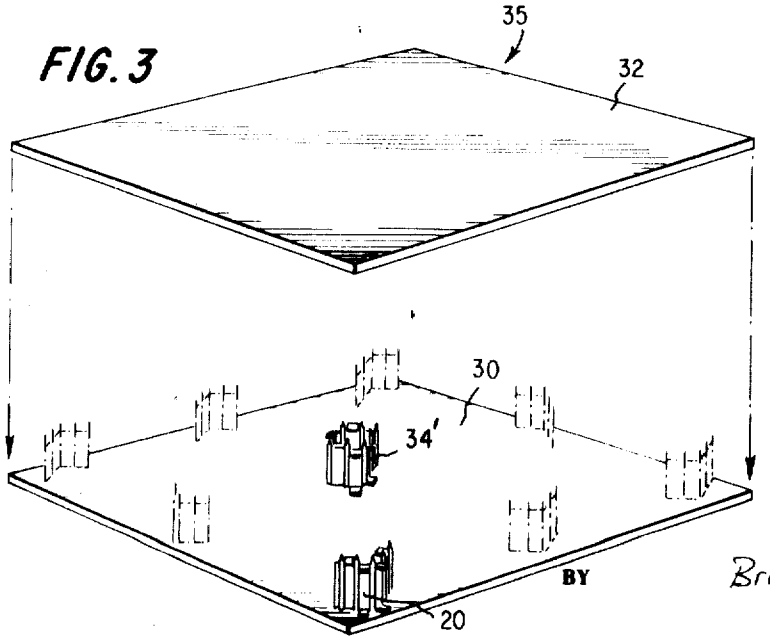
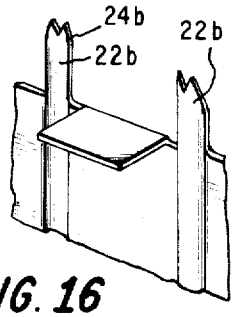


FIG. 16



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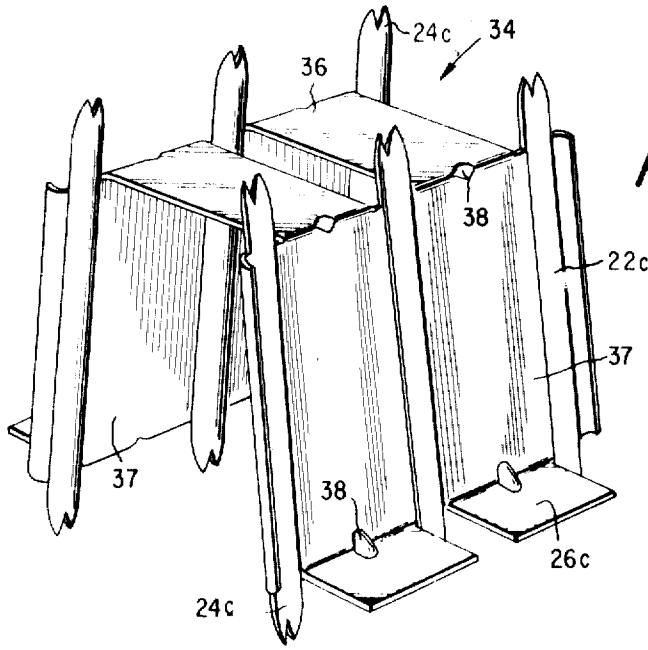


FIG. 6

FIG. 7

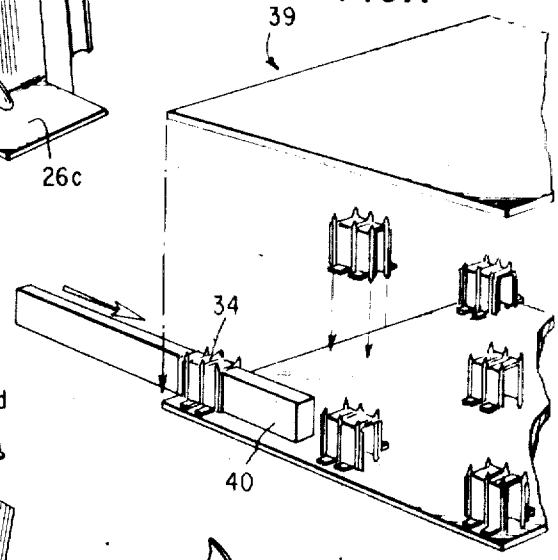
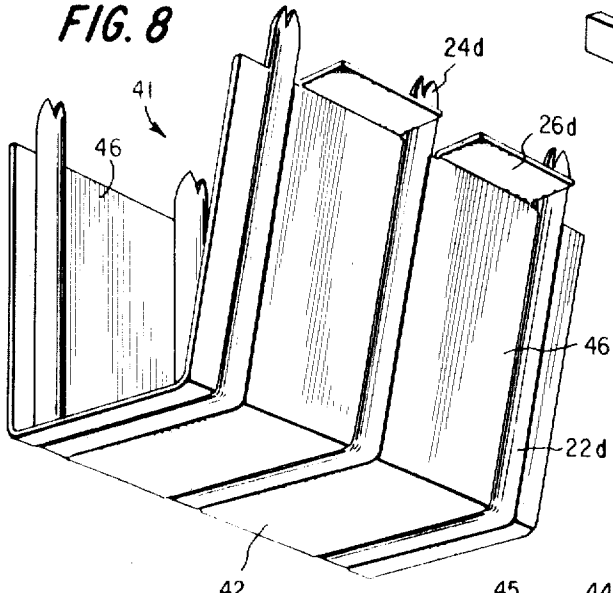


FIG. 8



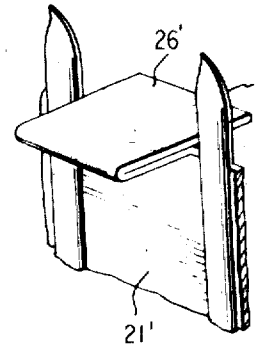


FIG. 15

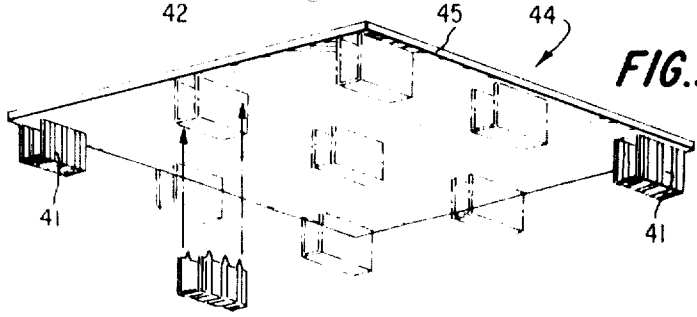


FIG. 9

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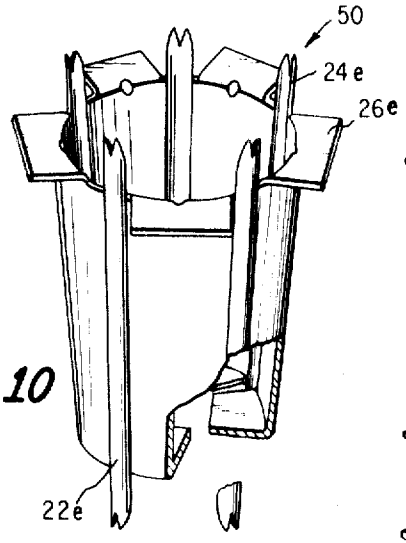


FIG. 10

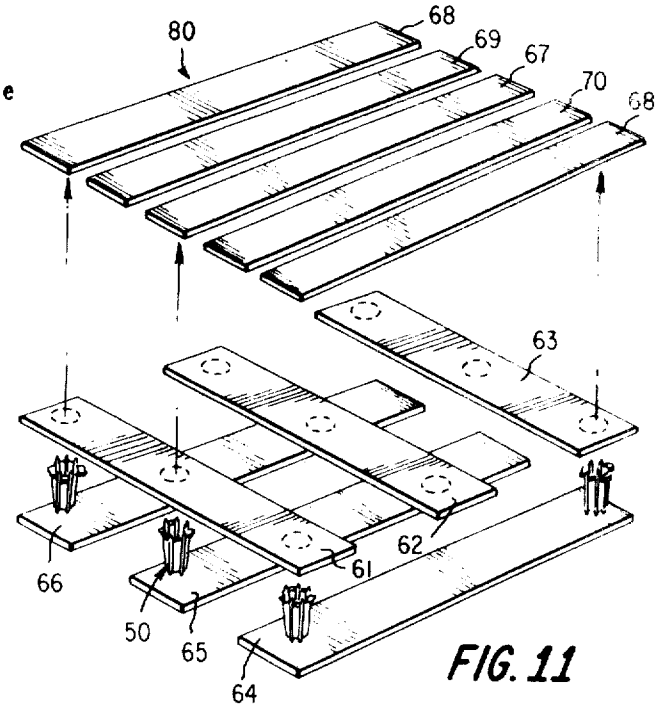
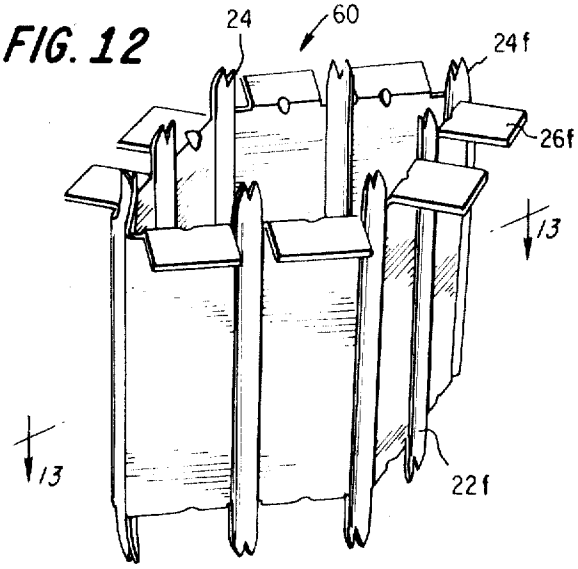


FIG. 11

FIG. 12



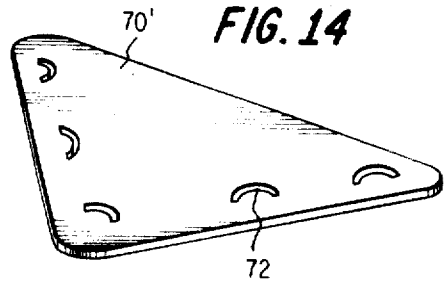


FIG. 14

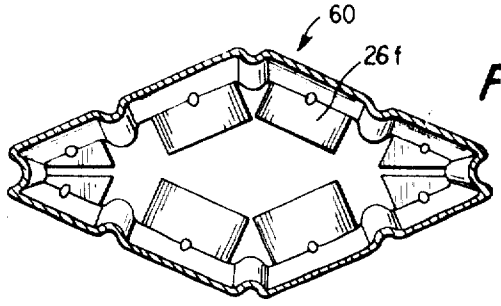


FIG. 13

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PRESS-ON SUPPORT FOR A PALLET

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to supports for a pallet deck and more particularly to a support for a pallet deck having prongs that are pressed into and through the deck to fasten the support to the deck, thus eliminating the need for conventional type fasteners, such as nails, staples, etc.

2. Description of the Prior Art

Pallets are widely utilized in connection with the handling, storage and distribution of merchandise. Typically, wooden pallets comprise rectangular single- or double-deck platforms, constructed from plywood sheet material or spaced individual lumber boards fastened to a plurality of spaced wooden support runners or blocks arranged with or without stringer boards. The wood supports are positioned with respect to each other so as to provide proper load support distribution and also to permit the insertion of the forks of a forklift truck or the forks of a handlift truck under the top deck, so that the pallet and any load thereon can be lifted, moved, and stacked in storage.

Four-way entry pallets are utilized widely in a variety of industries since this type pallet permits insertion of lifting forks beneath the top deck on any of the four perimeters of the pallet. Typically, a four-way entry single deck wooden pallet is constructed by nailing, stapling or gluing nine individual wooden blocks to the bottom surface of solid sheet material, at equally spaced distances in columns and rows of three supports each. Alternatively, three elongated wooden support runners, each equally spaced and extending the entire length or depth of the pallet deck, are utilized as support members in the construction of a two-way entry pallet.

The construction of a four-way entry pallet using support blocks and individual lumber boards in lieu of solid material for the top deck, generally requires the use of stringer boards to maintain the individual lumber boards in spaced relation. The stringer boards are attached to both the support blocks and the deckboards. In a double-deck construction including a top deck of solid material and a bottom deck consisting of three individual lumber boards spaced apart to provide for receipt of a handlift pallet truck, stringer boards are not required.

As noted above, pallets may be of the single-deck or double-deck design in which a parallel, full or partial, bottom deck is furnished for additional rigidity and horizontal support. In the double-deck construction, the wooden support members are generally nailed to both the top and bottom deck components.

Pallets that have been constructed with wooden supports fastened to the decks with nails or staples tend to loosen with continued usage and the gradual drying out of the lumber. This condition causes the nails or staples to pull out and protrude from the top surface or deck of the pallet. This problem is a major one and is due to the fact that it is generally not possible to obtain any clinch of the nail or staple used to fasten the decks to the solid wood support block or runner.

In many instances the protruding nailhead or staple damages the merchandise stored on the pallet by tearing or ripping a storage bag, carton, or other type package. To overcome this problem pallet decks are occasionally bolted to the supports. This construction technique is expensive as it requires that holes first be drilled in the decks and through the wooden supports prior to insertion of the bolt.

Additionally, the use of wood supports increases the overall weight of the pallet which results in higher transportation costs when the pallet is shipped empty or in use. Also, such wood supports are bulky and costly to store and ship prior to construction of the pallet.

SUMMARY OF THE INVENTION

The pallet deck support of this invention comprises a self-supporting, upright metal body member including at least one substantially upright wall having a plurality of prongs extending therefrom, which are adapted to penetrate and be bent into a pallet deck as the deck is pressed onto the support, avoiding the problems of protruding nails and loosening of the pallet elements. The wall is also provided with a plurality of longitudinal reinforcing ribs integrally formed therein, each of the ribs terminating at one or both ends in a prong, and a plurality of horizontal tabs spaced between the ribs for contacting and supporting the pallet deck after the fastening of the support thereto. The walls of the support may be tapered so as to facilitate nesting of a plurality of like supports in a compact form prior to use in the construction of pallets. Pallets constructed with the support members of this invention may be either single- or double-deck pallets and may be of either the two-way or four-way entry type.

Accordingly, one object of this invention is to provide a pallet support having integral fastening means consisting of a plurality of prongs suitable for simple and fast attachment to various types of pallet deck materials such as lumber, plywood, fiberboard, or the like, as for example, by a press-on or drive-on type operation which would result in faster pallet assembly than is now possible and would reduce overall pallet construction cost.

Another object of this invention is to provide a lightweight pallet support, without loss of deck support area, subject to variable positioning for obtaining the maximum amount of support under any given load condition.

Still another object of this invention is to provide a nesting pallet support which requires a minimum amount of cube space for storage and shipment prior to use in pallet construction.

Still another object of the invention is to provide a pallet support which can be used in combination with a removable, auxiliary support member, such as a piece of lumber, scored fiberboard, etc., for the purpose of providing additional vertical support and rigidity, if required.

Other advantages and features of the present invention will become more apparent from the following description and claims, and the accompanying drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of an angle-shaped support for a pallet deck comprising the subject of the present invention;

FIG. 2 is a cross-sectional view of the support of FIG. 1 taken along the plane indicated by line 2—2 in FIG. 1;

FIG. 3 is an exploded perspective view, of a typical solid-sheet, double-deck pallet constructed with the support illustrated in FIG. 1;

FIG. 4 is a fragmentary perspective view of a portion of the support illustrated in FIG. 1 and including an enlarged showing of the prong fastener integrally carried by the support;

FIG. 5 is a fragmentary cross-sectional view illustrating the manner in which the prong of FIG. 4 is inserted into a pallet deck;

FIG. 6 is a perspective view of another embodiment of the support of the invention;

FIG. 7 is a fragmentary exploded perspective view of a typical solid-sheet double-deck pallet constructed with supports of FIG. 6 and further showing the insertion of removable wood members into the supports to provide additional rigidity and vertical support;

FIG. 8 is a perspective view of still another embodiment, of the support of the invention, designed for construction of single-deck pallets;

FIG. 9 is a perspective view of a typical single-deck pallet constructed with supports as shown in FIG. 8;

FIG. 10 is a perspective view, partially broken away, of still another embodiment of the support of the invention having a fully enclosed conical nesting shape;

FIG. 11 is an exploded perspective view of a typical pallet constructed from stringer boards, a plurality of top and bottom individual deck boards, and the supports of FIG. 10;

FIG. 12 is a perspective view of yet another embodiment, of the support of the invention, having an enclosed four-sided, nesting, diamond-shape design;

FIG. 13 is a cross-sectional view of the support of FIG. 12 taken along the plane indicated by the line 13—13 in FIG. 12;

FIG. 14 is a perspective view of an additional support plate for use in connection with the support of FIG. 1 to provide additional contact and bearing surface with the pallet deck;

FIG. 15 is a fragmentary perspective view of still another embodiment of the support of the invention, showing an alternate single-point prong and an alternate fold-over tab support arrangement; and

FIG. 16 is a fragmentary perspective view of still another embodiment of the support of the invention, illustrating that adjacent prongs may be of opposite curvature.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings, wherein like numerals indicate like elements throughout several views, FIGS. 1–3 illustrate one embodiment of a support **20**, comprising the subject of the present invention.

The support **20** includes a self-supporting, substantially upright body member including generally vertical support walls **21**, **23** having a plurality of longitudinal reinforcing ribs **22**, arcuate in cross section, integrally formed therein. Walls **21** and **23** have vertically displaced ends, and ribs **22**, which extend beyond both of said ends, terminate in fastening prongs **24**. The prongs **24** are bifurcated and each furcation **25**, **27** terminates in a point or tip which is tapered and canted to insure that it will tend to clinch or bend back into a pallet deck after penetration of a pallet deck, as illustrated for example, in FIG. **5**.

Walls **21** and **23** are joined at an acute angle by a rib **22***a* and include horizontal tabs **26** extending laterally from their vertically displaced ends, between adjacent prongs **24**. Adjacent tabs **26** extend in opposite directions. Support **20** is formed from heavy gauge metal, such that the ribbed support walls **21**, **23**, in combination with the horizontal tabs **26** which will contact the bottom surface of a top pallet deck and the upper surface of a bottom deck after fastening of the support to the deck, as shown in FIG. **5**, will provide sufficient vertically distributed support, even under heavy pallet loads. By virtue of tabs **26** extending in opposite directions, additional deck support is provided on both sides of walls **21**, **23** and tabs **26** aid in stabilizing and centering support **20** as it is fastened to opposite pallet decks.

Support walls **21**, **23** also include two longitudinal, laterally displaced, curled end ribs **27'** and **29**. These end ribs are designed such that two supports **20** may be interlocked with each other forming an enclosed support to provide where required, additional strength at selected locations along the pallet deck surface.

FIG. **3** illustrates the use of a plurality of supports **20** in the construction of a four-way entry, double deck plywood pallet **35**. A total of nine supports **20** are positioned on the bottom deck **30** of pallet **35** in columns and rows of three supports each. Top deck **32** and bottom deck **30** are positioned on both sides of the supports **20**, respectively, and the two decks are then pressed together by hydraulic or other type pressing equipment.

The prongs **24** penetrate the decks **32**, **30** of the pallet **35** such that the tips **25**, **27** of the prongs **24** extend through the decks and because of their shape are initially bent and deformed back toward the deck and upon contact with a metal backing plate B carried by the press equipment, as shown in FIG. **5**, they are fully depressed so as to embed themselves into the decks to effect secure fastening of the support thereto, without protruding sharp surfaces. The pallet decks are pressed against the supports until the surface of the decks are substantially flush with each horizontal support **26**. If desired, as illustrated in FIG. **16**, adjacent longitudinal rigs **22***b* can have opposite curvatures wherein the tips of adjacent prongs **24***b* will be deformed and bent oppositely from each other to effect an even stronger and permanent fastening of the support to the pallet decks.

The center support **34'**, as shown in FIG. **3**, may consist of two interlocked supports **20** of the type shown in FIG. **1**. This interlocked construction provides for additional support for the central surface of the pallet **35** and is achieved by telescopically sliding end ribs **27'** and **29** of two similar supports **20** together to form an enclosed diamond-shaped support **34'**.

FIG. **6** illustrates another embodiment of the support of the invention. The support **34** includes a generally upright self-supporting body member comprising two approximately vertical support walls **37**, joined by a horizontal web **36**. Each wall **37** includes a plurality of longitudinal reinforcing ribs **22***c* terminating in prongs **24***c* extending beyond the vertically displaced ends of each wall **37**. Extending laterally from the lower end of walls **37** between each prong **24***c* is a horizontal tab **26***c*. The supports **34** may also include crimps **38** at selected joints in the support to provide additional strength and support capability. As can be seen in FIG. **6** the support walls **37** are slightly tapered inwardly so as to permit nesting of a plurality of identical supports to reduce cube storage space and facilitate handling of the supports prior to use.

The support **34** as shown in FIG. **6** is designed to permit insertion of a removable support runner **40**, as shown in FIG. **7**, of a double-deck, two-way entry pallet **39**. The use of the removable support runner **40** provides additional rigidity and vertical support for a load carried by pallet **39**. Construction of pallet **39** is otherwise identical to construction of pallet **35**.

The support **41**, shown in FIG. **8**, may readily be used in the construction of the single-deck, four-way entry pallet **44** shown in FIG. **9**. The support **41** is generally similar to the support **34** of FIG. **6**, except only one end of each reinforcing rib **22***d* terminates in a prong **24***d* for securement to the top deck **45** of single-deck pallet **44**. The walls **46** of support **41** are joined by a generally flat web **42** designed to be placed in contact with the supporting surface of the merchandise storage facility. The supports **41** are pressed onto deck **45** as described heretofore in equidistantly spaced rows and columns to provide four-way entry. If additional support is desired, short wooden blocks or wood runners can be positioned within the channel of each support **41**, defined by walls **46** and web **42**.

FIGS. **10** and **12** illustrate additional embodiments of the support of the invention.

The fully enclosed nesting support **50**, illustrated in FIG. **10**, includes reinforcing ribs **22***e* terminating in prongs **24***e* extending beyond the vertically displaced ends of the upright wall of the support. Horizontal tabs **26***e*, extend laterally from the ends of the upright walls between prongs **24***e*, as in the other embodiments.

Support **50** is conical in configuration and therefore has a tapered upright wall to readily permit nesting of a plurality of identical supports. Tabs **26***e* extending laterally from the bottom edge of the upright wall extend inwardly towards the interior of the support **50** so as to permit nesting.

Support **60**, illustrated in FIG. **12**, is of one-piece construction and has a diamond-shaped cross section. Its upright walls are also tapered to permit nesting of identical units and as in support **50**, tabs **26***f* extending laterally from the bottom edges of the upright walls extend inwardly towards the interior of the support to permit nesting. As in the other embodiments, support **60** includes reinforcing ribs **22***f* terminating in prongs **24***f* extending beyond the vertically displaced ends of the upright walls of the support.

The supports **50** of FIG. **10** are shown in FIG. **11** as supports for a four-way entry pallet **80**. Pallet **80** is formed from individual lumber boards **67–70** nailed to stringer boards **61–63** to form a top deck, and lumber boards **64–66** which form a bottom deck. The prongs **24** of the supports **50** are designed to be pressed into and penetrate the bottom lumber boards **64–66**, and the three stringer boards **61–63**, along with middle board **67** and end boards **68** to fasten the decks together and

provide support for the decks. As in the previously described four-way entry pallets, supports **50** are arranged in three equally spaced rows and columns.

A triangular horizontal support plate **70'**, as illustrated in FIG. **14**, including a plurality of arcuate apertures **72** is designed to fit over the support **20** of FIG. **1** prior to the construction of a pallet **35** and may be used to provide additional support for each support **20** and to provide more support area and better distribution of the pallet load onto the support. Other configurations of plates, such as circular or rectangular, are contemplated and apertures therein may readily be designed to accommodate any number or arrangement of prongs for any of the supports of the invention.

In lieu of horizontal tabs **26** extending laterally from the ends of the upright walls of the support, FIG. **15** illustrates an alternative construction. The horizontal tab **26'** is doubled over itself so as to distribute the pallet load more evenly on a vertical support wall such as **21'**, and will also preclude the sharp line at the ends of the walls from cutting into the pallet deck and thus weakening it. FIG. **15** also illustrates an alternate one-point prong **24'** tapered and canted to insure proper clinching.

In addition to reinforcing the various supports under heavy pallet loads, when in assembled relation, ribs **22–22*f*** inclusive, bear substantially the entire load placed on the support during the pressing operation when the pallet deck is applied thereto, thus avoiding buckling of the flat, upright walls on opposite sides of each rib. Tabs **26–26*f*** inclusive also act as bearing surfaces for limiting penetration of the prongs into the pallet decks to control the depth of penetration to obtain a proper clinch in conjunction with the press apparatus.

It is understood that the length of the prongs may vary according to the thickness of the deck components used including any stringer boards, and whether or not it is desired that prongs protrude through both deck boards and any stringer boards used. In stringer board construction of four-way entry pallets, where individual lumber boards are used for spaced-apart decking, the deck boards may be nailed and clinched to the stringer boards to form a top deck, by use of conventional nailing methods. Such top deck assembly would then be pressed on to one of the applicable supports of this invention together with any required bottom deck components.

It is contemplated that powered press equipment will normally be used to attach pallet decking simultaneously to nine supports at one time, thus providing fast and economical complete assembly of the pallet. However, by use of special hammers or other special manually operated mechanical equipment, attachment of the supports can be accomplished on many types of decking material such as thin plywood, polyveneer, fiberboard and hardboard.

In addition, the supports **50** and **60** could be fabricated from flat metal by metal die cutting and stamping operations, and joined along a single seam, as well as deep-draw molding from one piece of metal.

What is claimed is:

1. A pallet support comprising:

wall means constructed for nesting having vertically disposed opposite edges;

a plurality of substantially upright spaced reinforcing ribs formed in said upright wall and extending between said opposite edges;

a plurality of spaced prongs upwardly extending from an edge of said wall means and integrally connected to said reinforcing ribs, each of said prongs having tapered and canted portions to facilitate clinching of said prongs upon penetration of a pallet deck;

upper and lower horizontal load supports formed integral with said wall below the plane defined by the tips of said prongs at a distance sufficient to permit effective penetration of said prongs into a pallet deck;

the distance between said support being sufficient to accommodate pallet-lifting means.

2. A support as recited in claim **1** wherein each of said prong means includes:

an elongated tip extending beyond the end portions of said upright wall said tip including

a bifurcated end, the furcations of which terminate in tapered and canted points to facilitate clinching of said prong means upon penetration of said pallet decks.

3. A support as recited in claim **1** wherein:

the ribs on said body member are arcuate in cross section.

4. A support as recited in claim **1** wherein adjacent horizontal tabs on said upright wall extend in opposite directions.

5. A support as recited in claim **1** wherein each of said tabs are bent back upon themselves to extend over the said one end portion of said upright wall.

6. A support as recited in claim **1** wherein the upright walls of said body member are tapered whereby a plurality of identical supports may be placed in nested relationship so as to facilitate handling of said supports.

7. A support as recited in claim **1** wherein said body member includes:

two upright walls joined to each other at an acute angle,

the upright walls of said body member terminating in laterally displaced end portions,

each of said laterally displaced end portions including an upright curved rib,

each rib being of opposite, complementary curvature with respect to the other, whereby two supports may be interlocked with each other.

8. A support as recited in claim **1** further including:

a substantially horizontal, flat plate having a plurality of apertures corresponding to the number of prong means on said upright wall receiving said prong means therethrough, said plate providing additional support and bearing area for said pallet deck.

9. A pallet support as recited in claim **1** wherein said upright wall further includes an elongated reinforcing element and said prong tip portion is formed with a bifurcated end.

10. The pallet assembly of claim **1** further including a bottom deck in secured spaced parallel relationship to said top deck by said supports, the distance between top and bottom decks being sufficient to accommodate pallet lifting means, said supports further including prong means in penetrating contact with said bottom deck.

11. The pallet assembly of claim **1** wherein said prong means includes:

an elongated tip extending beyond the edge of said wall means, said tip formed with a bifurcated end, the furcations of which terminate in tapered and canted points to facilitate clinching of said prong means upon penetration of said pallet decks.

12. The pallet assembly of claim **1** wherein said support wall means includes:

two upright walls joined to each other at an acute angle which terminate in laterally displaced end portions,

each of said laterally displaced end portions including an upright curved rib,

each rib being of opposite, complementary curvature with respect to the other.

13. The pallet assembly of claim **1** further including:

a substantially horizontal, flat plate having a plurality of apertures corresponding to the number of prong means extending from said wall means for receiving said prong means therethrough, said plate providing additional support and bearing area for said pallet deck.

14. A pallet assembly comprising a top deck supported by the pallet support defined in claim **1**.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,641,948 Dated February 15, 1972

Inventor(s) Dwight C. Brown

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claims 10, 11, 12 and 13, first line, the claim reference numeral "1", each occurrence, should read -- 14 --.

Signed and sealed this 20th day of February 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O-366-334