July 4, 1961 E. A. SEIZ 2,991,033

STACKING RACK FOR PALLETS

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FIG. 1.

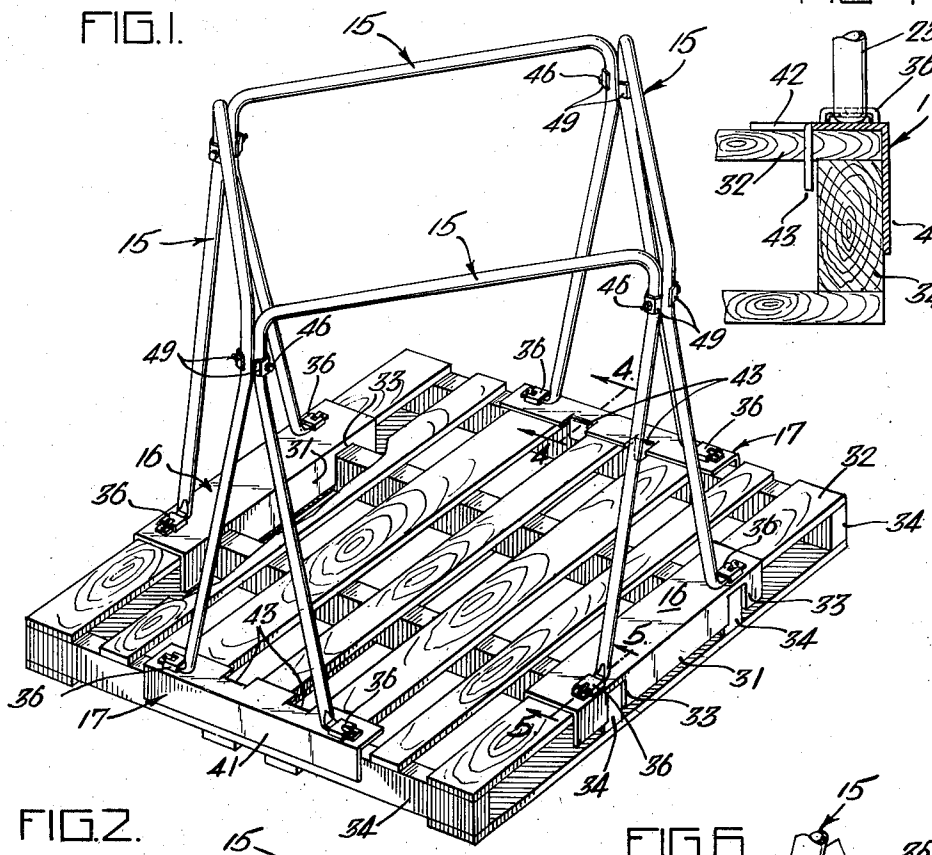


FIG. 4

FIG. 2.

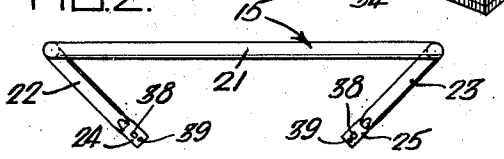


FIG. 3.

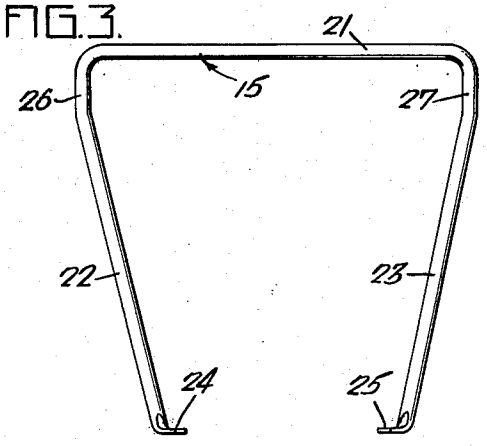


FIG. 6.

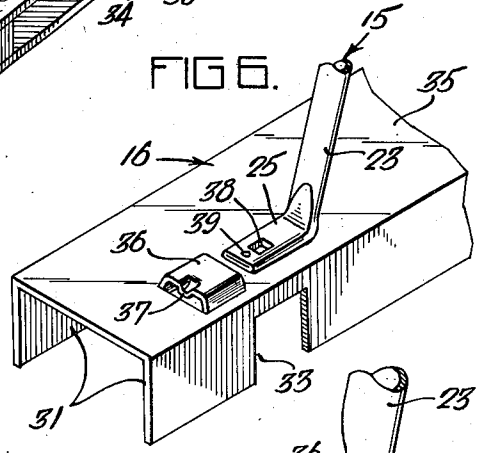
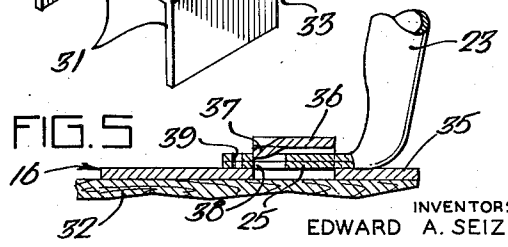


FIG. 5



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FIG. 7.

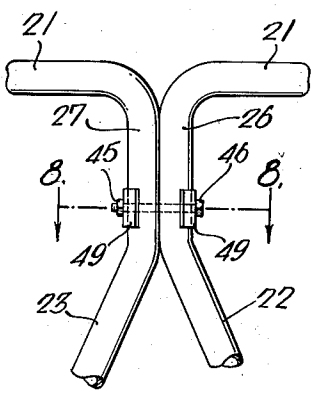


FIG. 8.

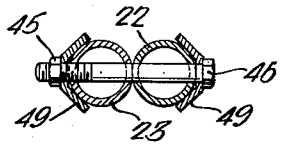


FIG. 9.

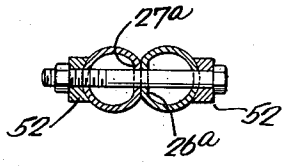


FIG. 10.

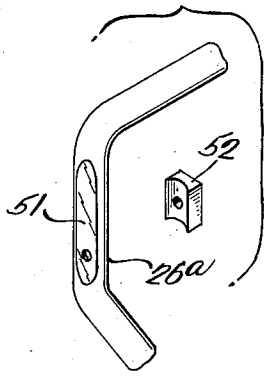


FIG. 11.

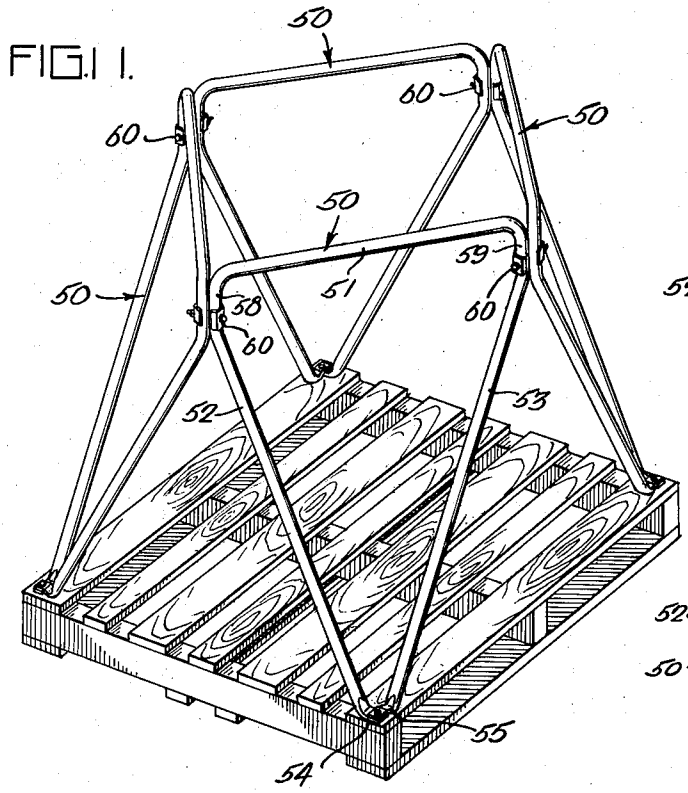


FIG. 12.

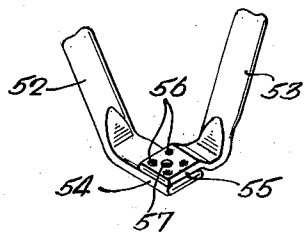
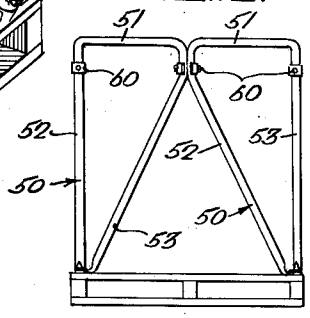


FIG. 13.



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FIG. 14.

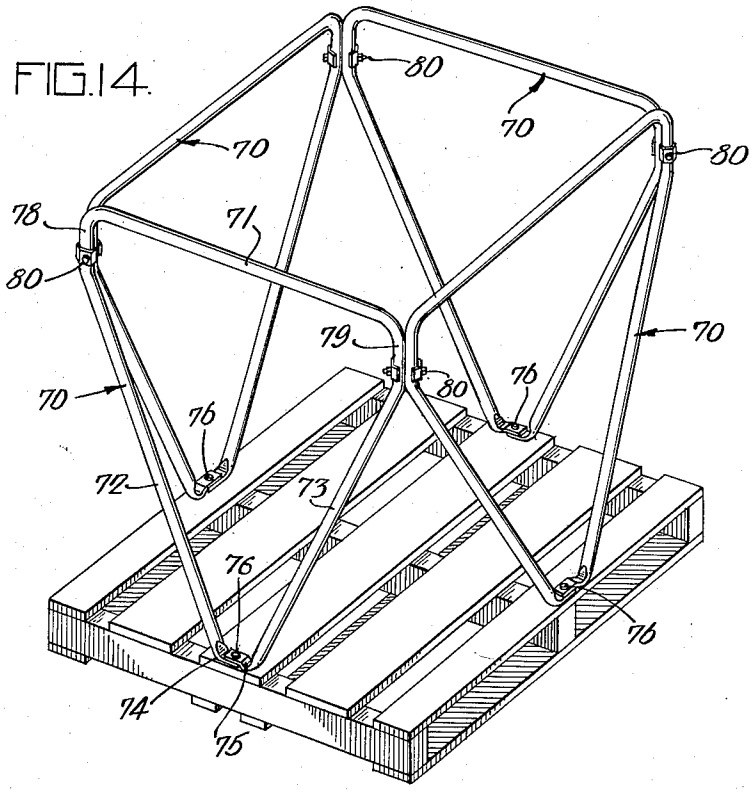
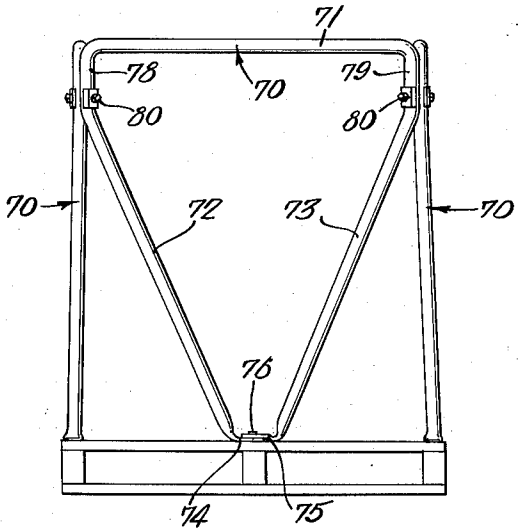


FIG. 15.



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STACKING RACK FOR PALLETS

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8 Claims. (Cl. 248—120)

The present invention relates to a stacking rack assembly for mounting loaded pallets in tiered relation. The invention has particular application to stacking rack assemblies for use with wooden pallets of standard dimensions.

Prior devices of this type are not entirely satisfactory since they do not permit easy loading of the pallet after the rack is in place, are difficult to assemble and mount on the pallet, extend to a substantial extent into the loading space and reduce the space available for loading of the pallet, and/or are cumbersome and space-consuming when knocked down for shipping.

A primary object of the present invention is to provide an improved stacking rack having substantial structural rigidity which is highly economical to fabricate and is possessed of none of the disadvantages listed above.

The stacking rack of the present invention provides a structure having a substantially open top for loading and unloading from above, but affords ample distribution of the load of the succeeding pallet over the entire top structure of the rack.

The present invention provides an assembly composed of four identical upright members interconnected into a sturdy and rigid structure capable of supporting the successive loaded pallets stacked thereon.

The present invention also provides a stacking rack assembly which is simply and expeditiously assembled and is capable of being shipped or stored in a limited space when knocked down.

All of the objects of the present invention are more fully set forth hereinafter with reference to the accompanying drawings wherein:

FIG. 1 is a view in perspective of an assembled stacking rack mounted on a pallet;

FIG. 2 is a plan view of one of the upright members of the assembly;

FIG. 3 is a view in side elevation of the member shown in FIG. 2;

FIGS. 4 and 5 are enlarged sectional views taken on the lines 4—4 and 5—5 respectively of FIG. 1;

FIG. 6 is an enlarged perspective view showing the method of assembling the upright elements to a base member of the assembly;

FIG. 7 is an enlarged fragmentary view in elevation showing the connection between two of the upright members;

FIG. 8 is a sectional view taken on the line 8—8 of FIG. 7;

FIG. 9 is a sectional view similar to FIG. 8 of a modified connection;

FIG. 10 is a detached perspective view of certain elements of the modified connection shown in FIG. 9;

FIG. 11 is a perspective view of an assembled stacking rack according to the invention which is particularly adapted for mounting on a smaller pallet;

FIG. 12 is an enlarged fragmentary perspective view of the base portion of one upright member;

FIG. 13 is a view at a reduced scale in side elevation of the rack assembly shown in FIG. 11;

FIG. 14 is a view similar to FIG. 11 of a modified form of rack assembly; and

FIG. 15 is a view in side elevation of the assembly shown in FIG. 14.

Referring to the drawings, the present invention provides a stacking rack formed of four substantially identical upright members having a horizontal cross piece and a pair of depending leg portions which converge downwardly and terminate in feet adapted to be mounted on a pallet. The four upright members are adapted to be connected adjacent their upper extremities so that the cross pieces define a framework having a square opening overlying the central portion of the pallet and constituting a support structure for the succeeding pallet mounted thereon. The connected leg portions of the two adjacent upright members diverge downwardly to form an inverted V-frame support whereby the assembled rack has four inverted V-frame supports for the square supporting framework in the upper portion of the assembly.

By reason of the structure described above, a stacking rack of improved rigidity is provided and the load of the succeeding pallet is uniformly distributed upon the eight leg portions of the rack assembly. The invention provides a substantial economy in construction inasmuch as the uprights may be formed of tubular members by simple bending operations and the number of welding operations is reduced to a minimum. The open area above the center of the pallet is highly desirable in many uses and at least four corners of the cubicle space within the rack are open for loading or unloading purposes.

In the embodiment of the invention illustrated in FIGS. 1 to 8 inclusive, the stacking rack assembly comprises four upright members designated generally at **15**, two end base members **16**, and two side base members **17**. The elements of the assembly are adapted to be interconnected to form a rigid supporting structure which may be readily inserted on and removed from the pallet by vertical displacement into and out of engagement therewtih. Each upright **15** comprises a horizontal cross piece **21** and a pair of leg portions **22** and **23** which converge downwardly and terminate in foot portions **24** and **25** respectively. A vertical connecting section is provided between each leg portion and the proximate end of the horizontal cross piece as indicated at **26** and **27**.

The end base members **16** take the form of channel irons having vertical flanges **31** adapted to bear against the sides of each end board **32** of the pallet along the length thereof. The flanges are cut away as indicated at **33** to receive the intermediate stringers **34** of the pallet. The horizontal web **35** of the base member **16** rests on the end board **32** of the pallet. Adjacent each end of the web **35**, a bridge **36** is formed, in the present instance, by pressing out a portion of the web. The bridge **36** is spaced upwardly from the web **35** a distance sufficient to permit passage of one of the feet **24** and **25** thereunder. A latch element **37** depends from the bridge at its outermost end and in the present instance, is formed by an indentation in the horizontal span of the bridge. By reason of this construction, there is a certain amount of resilience in the latch portion **37**. A keeper aperture **38** is formed in the leg to receive the latch **37**, the free end of the foot **25** operating to displace the latch **37** upwardly as the foot is inserted under the bridge **36**. A nail hole is provided at **39** in the foot in the event it is desired to use the upright without the base members.

The side base members **17** take the form of angle irons having a depending flange **41** adapted to bear against the side of the pallet along the length of the outside stringer **34**. The horizontal flange **42** of the base member **17** rests on the boards **32** of the pallet and is formed with downturned fingers **43** which are adapted to pass between the boards of the pallet and to lie inside of the stringer **34** to prevent lateral displacement of the base. The horizontal flange **42** of the base member **17** is provided adjacent its opposite ends with bridges **36** formed as described above in connection with the base member **16**.

In the assembly of the device, the feet **24** and **25** of the upright are snapped in place under the bridges **36** in the base members **16** and **17**, and the connecting portions **26** and **27** of adjacent uprights are secured together. Any suitable fastener may be employed, but I have shown in FIG. 7 a bolted connection provided by a nut **45** and bolt **46** passing through apertures in the respective connecting portions **26** and **27**. To prevent distortion of the tubular form of the connecting portions **26** and **27** by the nut **45** and the head of the bolt **46**, saddles **49** are provided as shown in FIGS. 7 and 8. To provide greater structural rigidity in the connection, the nut and bolt may be tightened so as to flatten the confronting faces of the tubular portions **26** and **27**. In the alternative, the tubular portions may be preformed as shown in FIGS. 9 and 10, with a flat portion **51** so that when the connecting portions **26***a* and **27***a* are engaged, substantial rigidity is provided. In place of saddles of sheet metal as shown in FIGS. 7 and 8, cast or machined saddles as shown at **52** may be provided. Thus, it is apparent that the entire stacking rack assembly may be assembled by one man with simple nuts and bolts and the use of wrenches may be eliminated by the use of a suitable snap fastener adapted to secure the connecting portions **26** and **27** together.

In this embodiment of the invention, the four cross pieces **21** of the uprights form a square framework having a central opening overlying the center of the pallet and upon which the succeeding pallets may rest with the load distributed substantially uniformly over the entire surface. This form of stacking rack leaves the corners of the pallet open for loading and unloading and the supporting legs **22** and **23** of the upright are in a vertical plane so that they do not project over the body of the pallet. Thus, the entire cubicle space overlying the pallet within the stacking rack is free for use. When using the support members **16** and **17**, the assembled rack may be engaged and disengaged from the pallet by simple vertical displacement. When it is desired to knock down the assembly, the fasteners for the connecting portions **26** and **27** may be disconnected and the feet may be disengaged from the bridges by flexing the latch **37** out of engagement with the keeper aperture **38**, and then sliding the foot from under the bridge **36**. When it is desired to permanently secure the rack to the pallet, the bases **16** and **17** may be omitted and the feet nailed directly to the pallet by means of the nail hole **39**.

Another form of stacking rack is illustrated in FIGS. 11 to 13 inclusive. The construction embodied in this form is particularly applicable to pallets of smaller dimensions. As shown, the rack comprises four uprights, each designated **50** and comprising a horizontal cross piece **51**, depending legs **52** and **53** which converge downwardly, and terminate in feet **54** and **55** which overlie one another and, in the present instance, are interconnected by welding as indicated at **56**. A central aperture is provided at **57** for securing the feet to the pallet. Intermediate the ends of cross piece **51** and the legs **52** and **53**, vertical connecting portions **58** and **59** are provided. Fasteners indicated generally at **60** secure the connecting portions **58** and **59** of adjoining upright members **50** together to unite the uprights into a rigid assembly. The details of the construction of the uprights and the fasteners are similar to those of the previously described embodiment.

The cross pieces **51** are united into a square framework having a central opening overlying the center of the pallet and providing a firm supporting structure for the succeeding pallet. The load on the cross pieces **51** is uniformly distributed to the eight leg portions **52** and **53** which are supported at the corners of the pallet. This construction not only leaves the upper corners of the cubicle defined by the rack open for loading and unloading, but also leaves the lower central portions of each side open. As in the previously described embodiments, the legs **52** and **53** are in a truly vertical plane so as not to obstruct the cubicle space defined within the rack thereby enabling the pallet to be loaded out to its edges for the full height (see FIG. 13). The rigid interconnection of the legs **52** and **53** of each upright provides substantial rigidity to the assembly and the rigid connection at **60** provides a strong supporting frame in the nature of an inverted V-frame for supporting the square framework formed by the cross pieces **51**.

When it is desired to have the lower corners of the enclosed space open, an assembly such as shown in FIGS. 14 and 15 may be employed. In this embodiment of the invention, the assembly comprises four uprights **70**, each having a cross piece **71** and depending leg portions **72** and **73** which converge downwardly and terminate in feet **74** and **75** which may be welded together and secured to the centers of the side edges of the pallet, for example by nailing, as indicated at **76**. Connecting portions **78** and **79** are provided between the leg portions and the cross piece and are adapted to be connected by a suitable fastener as indicated at **80**. In this embodiment of the invenion, the leg portions **72** and **73** are coplanar with the sides of the pallet and are inclined slightly over the body of the pallet to insure that the square framework formed by the cross pieces **71**, comes within the confines of the next succeeding pallet. The structure has the same advantages as the structure of FIGS. 11 to 13 as far as its structural rigidity is concerned, while only slightly reducing the usable space within the framework.

In each embodiment of the invention the tubular form of the structural members provides improved visibility when mounting the successive pallets in stacked relation. In the embodiments of FIGS. 1 and 11 the V-notch formed above the joined connecting portions provides a convenient sighting line for insuring proper alignment of the assembly with the previously stacked assemblies as the lift truck approaches the stack.

While particular embodiments of the present invention have been herein illustrated and described, it is not intended to limit the invention to such disclosure, but changes and modifications may be made therein and thereto within the scope of the following claims.

I claim:

1. A stacking rack assembly for mounting on a rectangular pallet comprising four similar upright members each having a horizontal cross piece and a pair of downwardly depending leg portions converging downwardly from the ends of said cross piece, means for mounting the lower terminal ends of said leg portions on a pallet against lateral displacement, and means connecting said uprights at the upper ends of said leg portions to form said cross pieces into a generally rectangular framework having an open center adapted to overlie the center of a pallet, the leg portions of adjacent uprights forming an upstanding inverted V-frame adapted to overlie the marginal edge of a pallet.

2. A stacking rack assembly according to claim 1 wherein each upright comprises a vertical connecting section intermediate each leg and the cross piece, and including fasteners interconnecting the adjacent vertical connecting sections of adjacent uprights to unite the same.

3. A stacking rack according to claim 1 wherein the adjacent leg portions forming each inverted V-frame are disposed in a vertical plane and are adapted to meet at the top at a point overlying the center of the underlying marginal portion of a pallet whereby said rectangular framework formed by said cross pieces is adapted to have its corners overlying the centers of the underlying marginal portions of a pallet.

4. Apparatus according to claim 1 wherein said means for mounting the lower end of said leg portions on a pallet includes an out-turned foot portion having an aperture therein.

5. A stacking rack assembly according to claim 4

wherein said mounting means includes means forming a bridge adapted to be secured to a pallet overlying said foot portions and having a latch element operable to engage in said opening.

6. A stacking rack assembly according to claim 5 including a base member adapted to engage a pallet along each marginal edge thereof and mounting said bridge means, said base member having means adapted to engage a pallet so as to prevent displacement thereof in a horizontal plane.

7. A stacking rack assembly according to claim 4 wherein the leg portions of each upright member converge downwardly to a point and the feet thereof overlap and are secured together at said point.

8. A stacking rack assembly according to claim 7 wherein the leg portions of each upright member are

substantially coplanar with said cross piece and are adapted to be coplanar with the marginal portion of a pallet and to connect with the leg sections of the adjacent upright member at points overlying the corners of a pallet whereby said rectangular framework provided by said cross pieces, overlies the periphery of a pallet.

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