March 1, 1960 E. A. SEIZ 2,926,792

STACKING RACK FOR PALLETS

Filed Oct. 14, 1958

FIG. 1.

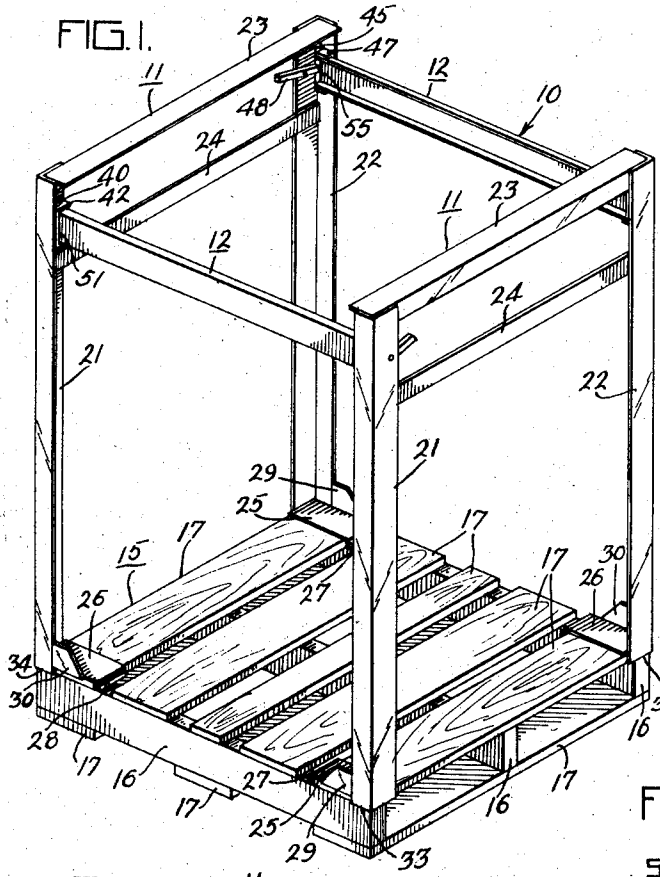


FIG. 2.

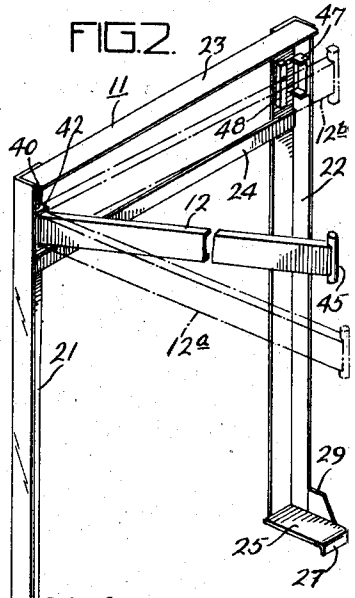


FIG. 5.

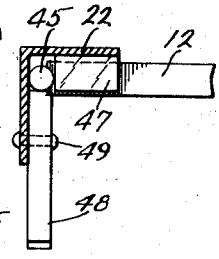


FIG. 3.

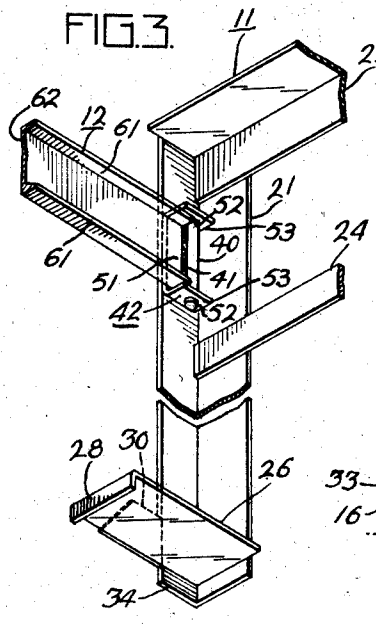
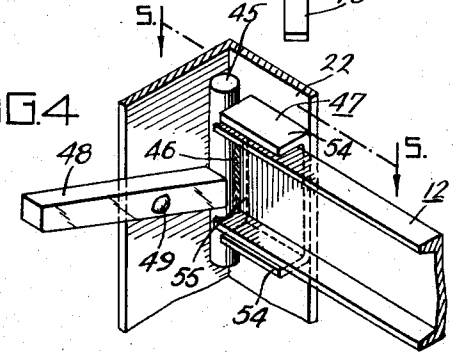


FIG. 4



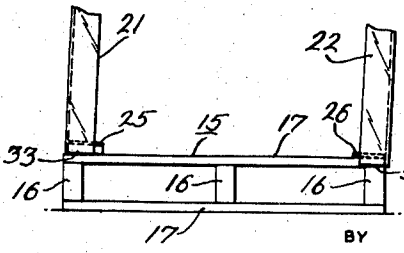


FIG. 6.

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STACKING RACK FOR PALLETS

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5 Claims. (Cl. 211—148)

The present invention relates to a stacking rack assembly for mounting loaded pallets in tiered relation. The invention has particular application to knock-down 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—requiring more than one man, extend 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 storing.

A primary object of the present invention is to provide a stacking rack which has none of the disadvantages listed above.

The rack of the present invention is of simple construction, but is designed for assembly into a sturdy and rigid assembly capable of supporting successive loaded pallets stacked thereon.

The present invention also provides an assembly which is simply and effectively locked in assembled condition and is not subject to unlocking by vibration or normal impacts of handling.

The present invention also provides a stacking rack assembly which is simply and expeditiously disassembled and is capable of being stored compactly in a limited space.

The invention also provides improved structural rigidity in the assembled rack.

All of the objects of the present invention are more fully set forth hereinafter with reference to the accompanying drawing in which:

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

Fig. 2 is a detached view of one element of the assembly showing that it stands upright without additional support;

Fig. 3 is a perspective view of the element shown in Fig. 2 with portions broken away and showing certain structural features thereof;

Fig. 4 is an enlarged perspective view showing the interlock between the elements of the assembly;

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 4; and

Fig. 6 is a fragmentary view in end elevation showing the first step in the mounting of the assembly on a pallet.

Referring to Fig. 1, the stacking rack assembly **10** comprises two identical support elements **11**, each having a cross brace **12** connected thereto and extending into locking engagement with the other support element. The support elements **11** are adapted to be mounted on a standard pallet **15**, which consists of longitudinal rails **16** mounting and supporting upper and lower series of boards **17** disposed transversely thereof and constituting the loading surface of the pallet. It is noted that the support members **11** are identical in form and it is therefore unnecessary to differentiate between right hand and left hand members and the like.

The support elements **11** comprise inverted U-shaped frames formed by uprights **21** and **22** connected across their top by a pair of cross pieces **23** and **24** respectively. Preferably, the uprights **21** and **22** and the upper cross pieces **23** are angle irons and the cross piece **24** is flat stock, all interconnected, for example by welding. Foot members **25** and **26** are secured to the uprights **21** and **22** respectively at a point spaced upwardly from the lower terminus of the uprights and extended perpendicular therefrom to overlie the end board **17** of the pallet. The free ends of the foot plates are formed with downturned toe flanges **27** and **28** respectively to engage behind the inner edge of the board **17** and prevent outward longitudinal displacement of the support element **11** when engaged thereon. Reinforcing webs **29** and **30** are provided to provide substantial rigidity to the foot plates. The lower terminal portions **33** and **34** of the uprights **21** and **22** engage over the corners of the pallet **15** to prevent inward displacement of the support element **11** relative to the pallet.

In accordance with the invention, the spacing between the terminal portions **33** and **34** is slightly less than the length of the end board **17**, as shown in Fig. 6, so that when the support element **11** is rested on the end of the pallet with the terminal portion **34** engaged over the corner thereof, the terminal portion **33** rests on the top of the board **17**. In order to engage the support element **11** on the pallet, it is necessary to spread the uprights **21** and **22** slightly to engage both terminal portions **33** and **34** over the respective corners of the pallet. This spreading of the uprights **21** and **22** places the cross pieces **24** under tension and contributes substantially to the rigidity of the suport member **11** when mounted on the pallet.

Since the toe elements **27** and **28** correspond approximately to the height of the terminal portions **33** and **34**, a firm base is provided to mount the support elements **11** in upright position on a flat surface. The possibility of tipping of the upright is avoided inasmuch as the center of gravity of the support element **11** overlies the base formed by the toe portions **27** and **28** and terminal portions **33** and **34**. When engaged on the pallet, the base firmly retains the support element against lateral displacement, and the foot portions **25** and **26** prevent tilting.

In accordance with the invention, displaceable cross braces **12** are mounted between the upper portions of the support members **11** to provide lateral support and substantial rigidity to the stacking rack assembly. In the illustrated embodiment, each cross brace **12** is hinged at one end **51** to the upright **22** and is free to swing between an outer limit position **12***a* perpendicular to the support member **11** and an inner limit position **12***b* substantially parallel to the support member **11** (see Fig. 2). When in its outer limit position, the free end of the cross brace **12** is adapted to lock in a latch on the upright **21** of the other support member **11**. In the present instance, the cross braces **12** are of channel form with flanges **61** and web **62**, and as shown in Fig. 3, the hinge comprises a pin **40** mounted at the end **51** of the brace, for example by welding as indicated at **41**. The hinge pin is journalled in a bracket **42** which in the present instance comprises a channel element snugly receiving the cross brace **12** and having pin-receiving apertures **52** in its flanges **53**. The snug fit of the brace **12** in the channel element **42** provides substantial rigidity to the cross brace when it is in its extended position and limits its outward displacement to the perpendicular disposition shown in Figs. 1 and 3. The hinge affords swinging movement of the brace against the support element

11 so that when the rack is disassembled and collapsed, the upright member 11 is not overbalanced by the brace.

When the brace is extended, it is adapted to be latched with the opposite support member 11. To this end, the free end of the brace 12 is provided with a pin 45, for example welded thereto as indicated at 46, which serves as a latch element. The keeper for the latch element 45 consists of a channel section 47 secured to the upright 21 and having flanges 54 adapted to snugly receive the brace 12 as shown in Fig. 4. The pin 45 engages behind the channel element 47 and a locking element 48 is provided to retain the pin securely behind the keeper 47. As shown in Fig. 4, the locking element 48 consists of a bar pinned as indicated at 49 to the channel 21 at an off-center position. The off-center position insures a greater length of the bar at one side of the pin which serves to bias the bar against the pin 45 when assembled. The bias of the over-balanced bar 48 engages the pin 45 firmly against the upright 21 behind the keeper 47 and the snug reception of the brace 12 in the keeper 47 produces a rigid interlock between the support member 11 and the free end 55 of the brace 12. Thus, when the rack is assembled, it is proof against inadverent disassembly, and is assured of substantial rigidity.

Where it is desired to use the stacking rack assemblies with pallets of varying length, it may be desired to latch the braces 12 at both ends to the support members 11 instead of hingedly mounting the brace 12 at one end on the support member. In this case, the hinge pin 40 may serve as a latch element such as shown at 45 and the hinge bracket 42 may be replaced by a keeper 47 and locking element 48.

The rigid assembly provided by the present invention permits the pallet to be loaded after the stacking rack is in place. Since the braces 12 are adjacent the upper ends of the elements 11, a substantial free space is provided for access from the sides, and in like manner, the U-shaped form of the elements 11 provide access from the ends. The rectangular form of the rack also permits the pallets to be loaded from the top without interference with the rack. Thus, the rack of the present invention provides greater flexibility and access in loading the pallet. Furthermore, the superstructure of the rack does not project over the loading area of the pallet except at the very upper extremity of the rack so that substantially no loading space is lost by the use of the rack of the present invention.

Assembly and disassembly of the rack is a simple procedure and may be performed by a single man. To disassemble the rack, the locking elements 48 are displaced and the braces 12 are swung to their closed limit position against the support elements 11. By reason of the construction at the base of the support elements 11, one will remain upright while the worker handles the other.

The construction also affords ready stacking of the elements since the base of one element 11 neatly supports the top of the other element and the top of the one element neatly receives the base or foot members of the other element. When the elements 11 are stacked for storage, the foot plate 25 is disposed between the cross piece 23 and the keeper 47 so that the toe portion 27 bears against the upright 22. In like manner, the foot plate 26 passes between the cross piece 23 and the hinge bracket 42, and the toe portion 28 rests against the upright 21. This provides a compact arrangement which enables a substantial number of knocked-down assemblies to be stacked on a pallet, or in a storage area, one upon the other without substantial danger of the stack falling over.

The assembly of the stacking rack is likewise a one-man operation. The nested pair of support elements 11 are removed from their storage area and each element is stood upright on the end of the pallet, the legs being spread apart as described above to fit over the corners of the pallet. The cross braces 12 are then swung into their outer limit position, one of the elements being tilted to afford passage of the braces past one another without interference. The free ends of the braces are then latched and locked in place by the smaller end of the locking bar 48 so that the large end of the bar provides a bias insuring locking engagement. When the rack is assembled in this manner, a sturdy and rigid support is provided to enable stacking of subsequent pallets thereon. It is noted that the support elements 11 are in line with the end of the pallets so that the fork truck operator doing the stacking may readily determine when the pallets are properly stacked in vertical alignment. The angle form of the cross pieces 23 provides a proper supporting surface for the subsequent pallets.

While a particular embodiment has 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 following claims.

I claim:

1. A stacking rack assembly for a storage pallet comprising a plurality of spaced parallel transverse boards, said rack comprising a pair of identical inverted U-shaped support elements, each adapted to overlie and engage the opposite ends of one end board of said pallet, each support element having a pair of vertically spaced horizontal cross pieces at its upper extremity and a pair of depending uprights each having a foot plate extending perpendicularly therefrom adjacent its lower end to overlie said end board at its end, and a toe portion depending from said foot plate to engage behind the inner edge of said end board, said foot plate adapted to disengage said board by simple upward displacement, angular terminal portions on said upright depending below said foot plate and adapted to engage over the corners of the pallet, said terminal portion corresponding in height to the height of said toe portion whereby said support element stands vertically independently, said terminal portions being normally spaced apart a distance less than the length of said end board whereby said uprights when engaged on the pallet are flexed apart to place tensile stress on the lower of said pair of cross pieces, and cross braces perpendicular to and spanning between said support elements adjacent their upper ends to overlie the side edges of the pallet, and connecting means to connect each of said cross braces at each end to said support elements, said connecting means affording displacement of said cross braces into a position substantially parallel to said support elements upon disassembly of said rack.

2. A stacking rack assembly according to claim 1 wherein each cross brace is hinged at one end to one support element for pivotal movement about a vertical axis and releasably latched at the other end to the other support element.

3. A stacking assembly for the storage pallet comprising a plurality of spaced parallel transverse boards, said rack comprising a pair of identical inverted U-shaped support elements adapted to engage the opposite ends of said pallet, each support element having at least one cross piece at its upper extremity and a pair of depending uprights to engage the corners of the pallet, and cross braces perpendicular to and spanning between said support elements adjacent their upper ends to overlie the side edges of the pallet, and connecting means to connect each of said cross braces at each end to said support elements, said connecting means including a hinge affording pivotal displacement of said cross braces into a position substantially parallel to said support elements upon disassembly of said rack, each said cross brace comprising a channel iron having a pin welded to one end parallel to the web of said iron and projecting above and below the upper and lower flanges thereof respectively to constitute the hinge pin of said hinge, said connecting means including a channel section snugly re-

ceiving said cross brace and having apertures in the flanges thereof receiving the projecting portions of said pin to hingedly mount the same.

4. A stacking rack assembly for a storage pallet comprising a plurality of spaced parallel transverse boards, said rack comprising a pair of identical inverted U-shaped support elements adapted to engage the opposite ends of said pallet, each support element having at least one cross piece at its upper extremity and a pair of depending uprights to engage the corners of the pallet, cross braces perpendicular to and spanning between said support elements adjacent their upper ends to overlie the side edges of the pallet, each said cross brace comprising a channel iron having a pin welded to said iron adjacent one end parallel to the web and projecting above and below the upper and lower flanges thereof respectively, and connecting means at said one end releasably latching said cross brace to said support element comprising a keeper of channel form snugly receiving said channel iron cross brace, the pin of said cross brace engaging behind

the flanges of said keeper, and a locking element operable to lock said pin in latching engagement with said keeper.

5. An assembly according to claim 4 wherein said locking element comprises a bar pivoted off center on a horizontal pivot parallel to said cross brace and spaced outwardly from the web of said keeper, said bar having its short end projecting angularly downward into engagement with said pin whereby its long end operates to bias said short end against said pin.

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