Jan. 23, 1968 G. Q. EVANS 3,364,883

STACKING FRAME ASSEMBLY FOR A PALLET

Filed Sept. 6, 1966

FIG. 1.

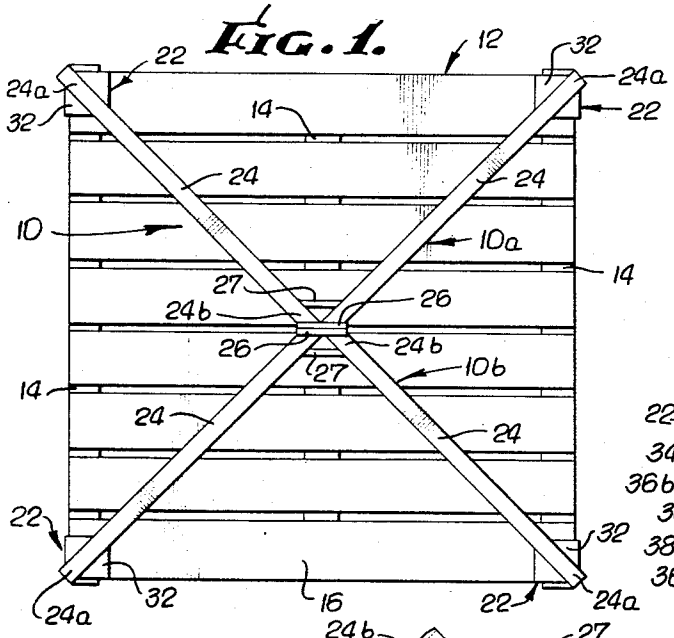


FIG. 6.

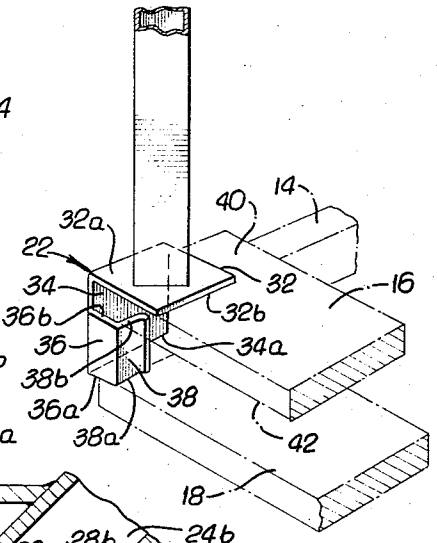


FIG. 2.

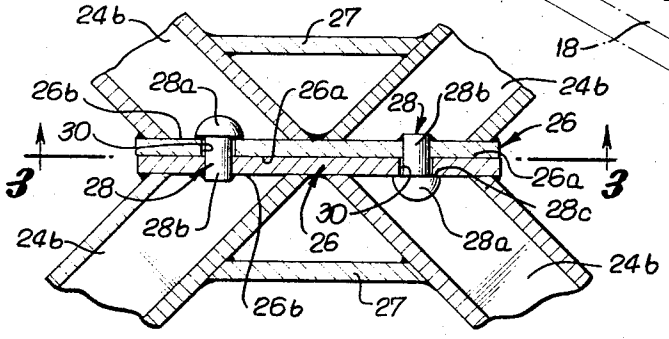


FIG. 3.

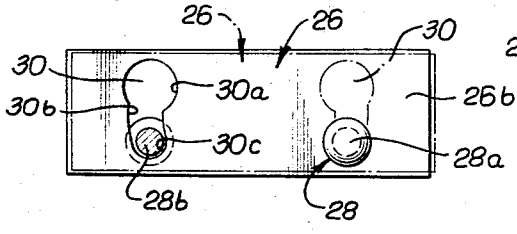


FIG. 5.

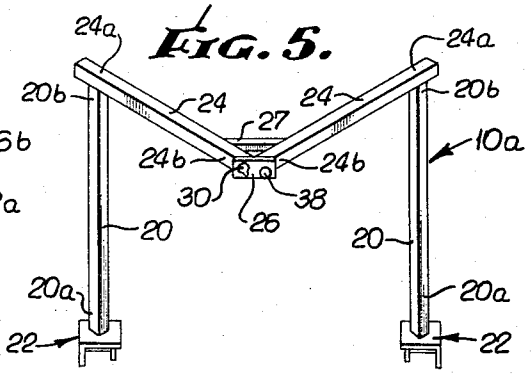
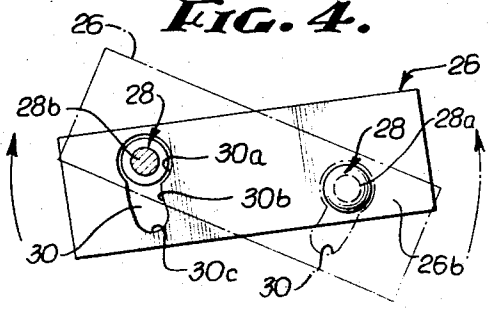


FIG. 4.



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3,364,883

STACKING FRAME ASSEMBLY FOR A PALLET

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6 Claims. (Cl. 108—53)

ABSTRACT OF THE DISCLOSURE

A stacking frame assembly for a pallet including two generally identical mating structures including a locking plate and engagement means on each plate adapted to interlock with each other and retain the mating structures securely together against perpendicular or horizontal separation in any transverse plane. The engagement means includes a slot and a headed pin transversely spaced from the slot on each structure, and the slot in one plate being generally opposite the pin on the other plate. The stacking frame structures also include foot bracket means for detachably securing the stacking frame assembly to a pallet when the structures are interlocked.

This application is a continuation-in-part of my patent application Ser. No. 482,756, now United States Patent No. 3,289,613, issued Dec. 6, 1966, and reissue application Ser. No. 641,721, filed Apr. 21, 1967. It relates to a frame assembly adapted to be used when stacking pallets and more particularly to a stacking frame assembly which may be disassembled into separate halves to facilitate storage and transit, yet can be quickly assembled without tools into a structure which detachably engages the periphery of a pallet to provide a solid support frame for tiering pallets.

In transporting and storing articles by means of fork lift trucks it is conventional to use pallets adapted to be lifted by the fork lift trucks and that include a platform upon which the articles are carried. Since often these pallets loaded with articles are tier stacked to conserve space the articles must be stacked evenly and be sufficiently strong to withstand the weight of additional loaded tiers of pallets. When the articles being stacked are of irregular size or fragile packaging then it is necessary to provide a supplementary frame assembly structure around the pallet in order to permit tiering. Such frame assemblies should be sturdy enough to rigidly support heavy loads, yet light enough to be easily attached to a pallet and preferably quickly disassembled when not in use for convenient storage. The structures prior to my invention sacrificed one or more of these preferred features so as to provide compromise frame assemblies interior in at least some respects to the most desirable form.

Therefore, it is the primary object of this invention to provide a frame assembly for stacking pallets which is sturdy, easy to engage with a pallet and detach therefrom and which can be quickly disassembled for storage.

Another object of this invention is to provide a stacking frame assembly for pallets which is resiliently engageable with and detachable from a pallet and which can be quickly disassembled by moving its separate parts in a different direction from the resilient pressure of the assembly when engaged with a pallet.

Still another object of this invention is to provide a stacking frame assembly comprised of a pair of mating structures which are quickly locked together by rotary movement into an assembly having members resiliently attachable to a pallet by movement substantially normal to the rotary movement by which the mating structures

are engaged together so as to rigidify the assembly when engaged with a pallet.

Other objects and advantages will become apparent from the following description and by reference to the drawings wherein:

FIGURE 1 is a top plan view of a stacking frame assembly in accordance with this invention secured in operative position to a pallet;

FIGURE 2 is a horizontally sectioned view of the interconnection between the mating portions of the stacking frame assembly;

FIGURE 3 is a vertical section taken through line 3—3 in FIGURE 2 showing the mating rivets and holes in locked position;

FIGURE 4 is a vertical section similar to FIGURE 3 showing the mating rivets and holes turned to the unlocked position;

FIGURE 5 is a perspective view of one of the mating halves of the stacking frame assembly; and

FIGURE 6 is a perspective view of the details of a foot bracket used in the assembly.

Briefly, a stacking frame assembly in accordance with this invention includes a pair of generally identical mating structures, each of which include normally vertically positioned, laterally resilient, leg portions interconnected at their upper ends by arm portions normal to the leg sections and parallel to a pallet when engaged therewith. The separate mating structures comprising the stacking frame assembly are locked together by engaging attachment means secured to the end of the arm portions which are remote from the interconnected leg portions. The attachment means between the mating structures is adapted to operate by rotary movement normal to the lateral resilient movement of the leg portions and the engagement of the leg portions with a pallet is by brackets at the lower ends thereof which require lateral springing of the leg portions. Thus, the engagement of a stacking frame assembly with a pallet is by movement substantially normal to the locking of the separate parts thereof together which serves to rigidify the entire assembly and prevent detachment of the separate parts without first disengaging the assembly from a pallet to which it may be secured.

Referring to the drawings the stacking frame assembly generally designated **10** is mounted on a conventional pallet **12** of the type which are designed to be lifted by fork trucks. The stacking frame assembly **10** provides a structure which, when mounted on a pallet **12**, will allow tiering of additional pallets and stacking frame assemblies spaced in such a manner that merchandise on the pallets will not be crushed.

Pallet **12** is comprised of parallel stringers **14** secured between an upper platform **16** and an identical lower platform **16** and an identical lower platform **18**. These platforms may be made of any suitable material such as sheet plywood or, as illustrated in the drawings, spaced parallel boards or slates. Normally both the upper and the lower platform have peripheral surfaces flush with the outer side faces of the two outside stringers **14** to which they are secured. The ends of stringers **14** are also generally cut off flush with the peripheral surfaces of the platforms.

The stacking frame assembly **10** is comprised of two generally identical mating structures **10***a* and **10***b*, each of which include a pair of generally parallel independent leg sections **20** which are longitudinally rigid and laterally resilient. The leg sections **20** have secured at their lower ends **20***a* foot members or brackets **22** and at their upper ends **20***b* arm sections **24**, the latter of which are disposed in a plane generally normal to the leg section **20** to which they are connected. The arm sections **24** are secured at their outer ends **24***a* to the upper ends **20***b* of the leg sections **20** by welding or any suitable means. Preferably the leg

sections **20** are inclined inwardly about 2° from the perpendicular relative to the plane of the attached arm sections **24** so that when they are laterally sprung outward to engage a pallet **12** they will assume a substantially normal relationship thereto.

The arm sections **24** of each half of the stacking frame assembly **10** are diagonally angled inwardly toward a centrally positioned flat locking plate **26** which is secured to the inner ends **24***b* of the arm sections **24** so as to interconnect arm sections **24** in each half of the asembly **10** together. Supplementary support between the inner ends **24***b* are provided by transverse bars **27**. The locking plates **26** each have face portions **26***a* which are disposed in a plane normal to the pair of arm sections **24** to which they are respectively secured and parallel with the plane in which both of the leg sections **20** lie. These locking plates **26** serve as a means for detachably securing the mating structures **10***a* and **10***b* of the assembly **10** together through rotary motion in the plane of the plates **26**.

Each of the locking plates **26** preferably has a rivet or headed pin **28** perpendicularly protruding from the face portion **26***a* of the plate **26** which is the portion remote from the interconnected arm sections **24**. The rivets **28** are formed with an enlarged rounded head **28***a* and a reduced circular shank **28***b* which is slightly longer than the width of a plate **26**.

Laterally spaced from each of the rivets **28** in the locking plates **26** are rivet holes or slots **30** which extend through the plates **26** and are adapted to receive the rivets **28** from the mating structures **10***a* or **10***b* of the assembly **10**. Thus, the rivet holes or slots **30** are comprised of an enlarged rounded end opening **30***a* which is larger than the head **28***a* of a rivet **28** and a reduced interconnected curved elongated opening **30***b* which is narrower than the diameter of a rivet head **28***a* but wider than the diameter of a rivet shank **28***b*. The elongated opening **30***b* terminates in a rivet seating end **30***c* which is in a plane tangential to the periphery of the shank **28***b* of the rivet **28** which is the same locking plate **26** and which is parallel to the plane of the arm sections 24. The curvature of the elongated opening **30***b* is defined by a portion of the arc of a circle, the middle of which is centered on the axis of rivet **28**.

The particular relative shape and configuration of the rivets **28** and the rivet holes **30** hereinbefore described are specifically constructed so that the mating structures **10***a* and **10***b* of the stacking frame assembly **10** may be securely locked together. Thus, during assembly the face portions **26***a* of the locking plates **26** of each of the structures **10***a* and **10***b* are placed flush against each other and rotated in the plane of the plates **26** so that the head **28***a* of each rivet **28** protrudes through the opening **30***a* in the complementary locking plate **26** as best viewed in FIGURE 4. Then the structures **10***a* and **10***b* are rotated in the plane of the plates **20** so that the shanks **28***b* are moved through the elongated opening **30***b* to its rivet seating end **30***c* as shown in FIGURE 3. At this point the respective plates **26** and their mating structures **10***a* and **10***b* are locked together so as to solidly resist unlocking save by reverse rotation in the plane of plates **26** since the length of shanks **28***b* of the rivets **28** are only slightly greater than the thickness of a plate **26**. That is, the interior surface **28***c* of the rivet heads **28***a* will bear firmly against the inside surface **26***b* of the plates **26**. Also, since the rivet seating end **30***c* of the hole **30** is in a plane which is parallel to the connected arm sections **24** and passes tangentially through the periphery of the rivet shank **28***b* which is in the same locking plate **26**, the arm sections **24** in both halves **10***a* and **10***b* will be in the same plane. It will be seen that when the complementary mating halves **10***a* and **10***b* are locked together an assembly **10** is formed wherein the arm sections **24** are disposed diagonally across the top of the assembly **10** to form a solid upper supporting surface in a plane substantially

parallel to the plane of a pallet **12** when it is secured in the foot brackets **22** of the assembly **10**.

When the complementary mating halves **10***a* and **10***b* of the stacking frame assembly **10** are locked together it is ready to be mounted on a pallet **12**. This is accomplished by springing the foot brackets **22** on the lower ends **20***a* of the leg sections **20** outward away from the locking plates **26** and then positioning the assembly **10** so that the foot brackets **22** snap into engagement with each of the corners of a pallet **12** by fitting around the ends of the outside stringers **14**.

The foot brackets **22** may be specifically constructed so as to be able to detachably, but securely engage the periphery of a pallet **12** as more fully described in my co-pending patent application now U.S. Patent No. 3,289,613, issued Dec. 6, 1966, and reissue application, Ser. No. 641,721, filed Apr. 21, 1967. They are formed into an inverted L-shaped structure which includes a flat base or horizontal plate **32** having a top surface **32***a*, a bottom surface **32***b* and a leg or vertical plate **34** depending downwardly from and generally normal to the horizontal plate **32**. The vertical plate **34** terminates in an end **34***a* generally parallel to the horizontal plate **32**. Protruding normally from the vertical plate **34** is a wing **36** which extends outwardly and has a lower edge **36***a* in the same plane as the end **34***a* of vertical plate **34**. The wing **36** extends upwardly from said edge **36***a*. A flange **38** is bent inwardly from the wing **36** and is generally parallel to the vertical plate **34** and terminates at its upper edge **38***b* in spaced relation to said base **32** the space being slightly greater than the thickness of the platform **16**.

The inner width of the wing **36** is slightly greater than the thickness of a stringer **14**.

Thus, in use, foot brackets **22** are disposed on the top surface **40** of upper platform **16** so that the bottom surface **32***b* of horizontal plate **32** will bear against it and the wing **36** bears against the end of a stringer, which is generally flush with the marginal edges of the platform. The side portions of stringer **14** will be securely engaged and disposed between vertical plate **34**, wing **36** and flange **38** and substantially all of the stringer immediately adjacent the point of engagement with foot bracket **22** will be protectively covered by the bracket. Hence, a tight secure fit will be provided by a foot bracket **22** both on the top and around the adjacent end of the stringer **14**.

The upper edge **38***b* of the flange **38** will serve as a stop to prevent the foot bracket **22** from becoming vertically disengaged from pallet **12**.

And it will be observed that the resilient attachment of the foot brackets **22** on a pallet **12** puts tension on the assembled stacking frame assembly **10** in a direction substantially normal to the plane in which the separate halves **10***a* and **10***b* are rotated when locked or unlocked together. Thus, a rigidified structure is formed which is substantially as solid in all respects as a single piece stacking frame assembly **10**. It can, in turn, be quickly and easily disassembled for storage, but only when it is disengaged from a pallet.

While a foot bracket **22** has been illustrated and described in detail it should be realized that the interlocking feature of the stacking rack assembly is the primary subject matter of this invention and any type of demountable foot brackets may be utilized without departing from the spirit of the invention.

Although I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures and devices.

I claim:

1. A stacking frame assembly for mounting on a

pallet comprising: two generally identical mating structures each of which includes a pair of laterally resilient and longitudinally rigid generally vertical spaced apart leg sections having upper and lower ends, foot brackets secured to said lower ends and adapted to be detachably and resiliently secured to the pallet when said leg sections are substantially perpendicular thereto by lateral springing movement of said leg sections, generally horizontal arm sections having outer and inner ends, the outer ends being secured to the upper ends of said leg sections and the arm sections extending diagonally inwardly toward each other in a plane substantially normal to said leg sections, and a locking plate rigidly interconnecting the inner ends of said arm sections, said locking plate of one structure including engagement means adapted to interlock with the engagement means of the locking plate of the other structure, said engagement means including a slot and a headed pin transversely spaced from the slot, the slot in one plate being generally opposite the pin on the other plate and formed with one portion of sufficient diameter to receive the head of the pin and another portion with a width smaller than the head of the pin, whereby the two plates are interlocked by a first mutual advance to pass the pin heads through the slots followed by an opposite relative rotary motion, and the interlocked engagement means retaining the mating structures securely together against perpendicular or horizontal separation in any transverse plane, and the lateral springing of the leg sections when the foot brackets thereof are engaged with a pallet contributing rigidity to said stacking frame assembly.

2. A stacking frame assembly as defined in claim 1 wherein the foot brackets each comprise a generally L-shaped inverted section of flat rigid material, the base of the inverted L-shaped section comprising a horizontal plate adapted to seat on top of a pallet and the leg of the inverted L comprising a vertical plate adapted to bear against the marginal edge of said pallet and a vertical flat wing which extends from and normal to said vertical plate, a vertical flange extending from said wing at an angle thereto and having an upper straight edge spaced downwardly from the bottom of said horizontal plate a distance slightly greater than the thickness of the pallet platform whereby said platform may be frictionally held between said wing and said flange and engaged against the bottom of said horizontal plate.

3. A stacking frame assembly for mounting on a pallet as defined in claim 1 wherein said headed pin includes an enlarged head portion and a shank portion having a diameter less than said head portion, and said shank being of a length slightly greater than the thickness of said locking plate.

4. A stacking frame assembly for mounting on a pallet as defined in claim 1 wherein said slot portion formed with a width smaller than the head of the pin is a curved elongated opening with a stop therein providing pin seating pin seating means remote from said slot portion of sufficient diameter to receive the head of said pin, said pin seating means arresting the opposite relative rotation of the plates at a predetermined position.

5. A stacking frame assembly for mounting on a pallet as defined in claim 4 wherein the stop is a closed end of the slot.

6. A stacking frame assembly for mounting on a pallet comprising: two generally vertical mating structures each of which includes a pair of laterally resilient longitudinally rigid generally vertical spaced apart leg sections having upper and lower ends, foot brackets secured to said lower ends and adapted to be detachably and resiliently secured to the pallet when said leg sections are substantially perpendicular thereto by lateral springing movement of said leg sections, generally horizontal arm sections having outer and inner ends, the outer ends being secured to the upper ends of said leg sections and the arm sections extending diagonally inwardly toward each other in a plane substantially normal to said leg sections, and a locking plate rigidly interconnecting the inner ends of said arm sections, said locking plate of one structure including engagement means adapted to interlock with the engagement means of the locking plate of the other structure, said engagement means including a slot and a headed pin transversely spaced from the slot and having an enlarged head portion and a shank portion of a diameter less than said head portion; the slot in one plate being generally opposite the pin on the other plate, and formed with one portion of a diameter greater than the enlarged head portion to receive the head of the pin and a curved elongated opening with a width slightly larger than the shank portion of said headed pin, said curved elongated opening including a closed end of the slot forming pin seating means remote from said enlarged slot portion, whereby the two plates are interlocked by a first mutual advance to pass the enlarged head of the pin through the enlarged portion of the slots followed by a opposite relative rotary motion which will be arrested when said shank moving in said curved elongated slot engages said pin seating means thereby preventing further opposite relative rotation of said plates, and the interlocked engagement means retaining the mating structures securely together against perpendicular or horizontal separation in any transverse plane, and the lateral springing of the leg sections when the foot brackets thereof are engaged with a pallet contributing rigidity to said stacking frame assembly.

References Cited

UNITED STATES PATENTS

1,520,520	12/1924	Thompson	108—153
2,953,340	9/1960	Skubie	108—53
3,114,339	12/1963	Baylink	108—53
3,289,613	12/1966	Evans	108—53
3,257,974	6/1966	McMasters	108—53
3,313,248	4/1967	Baylink	108—53

FOREIGN PATENTS

580,762	8/1959	Canada.
621,532	6/1961	Canada.

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