May 3, 1966 L. F. SKUBIC 3,249,072

PALLET TIERING FRAME WITH WEDGE JOINT

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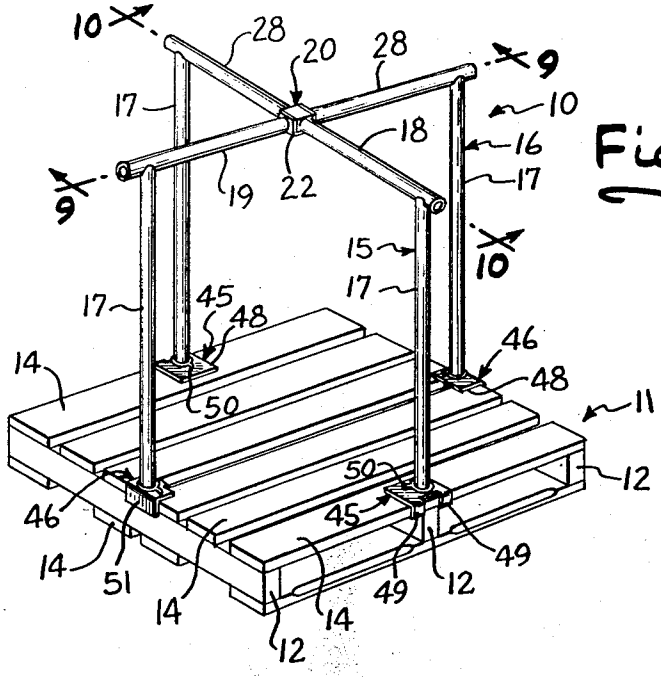


Fig. 1

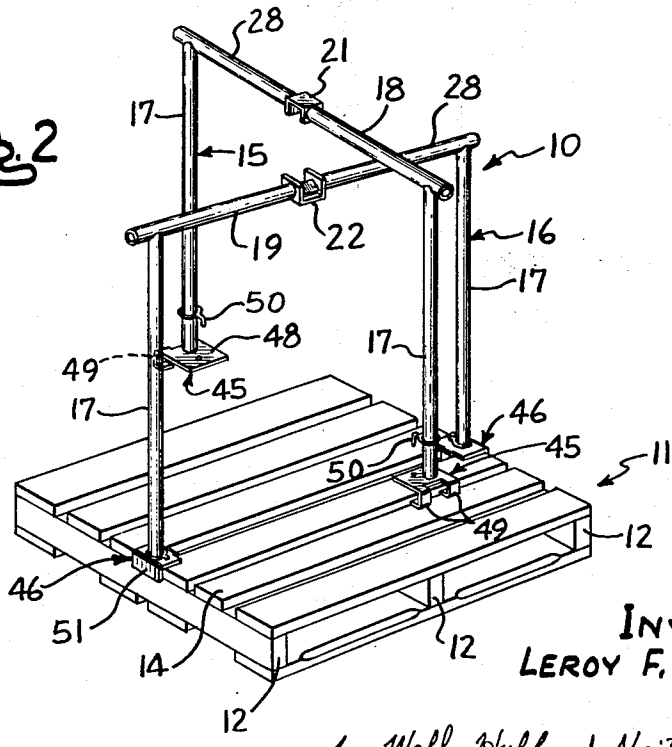


Fig. 2

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Fig. 3

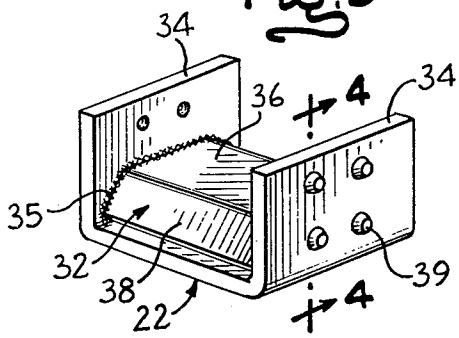


Fig. 4

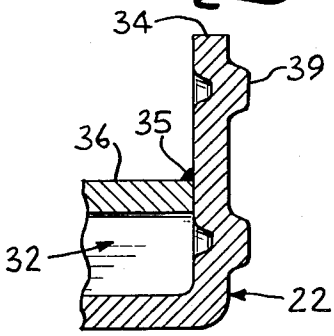
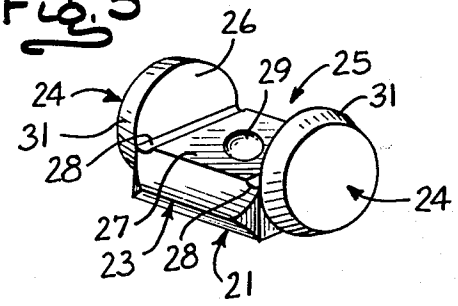


Fig. 5



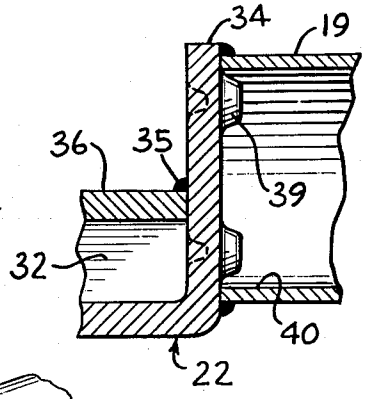


Fig. 7

Fig. 6

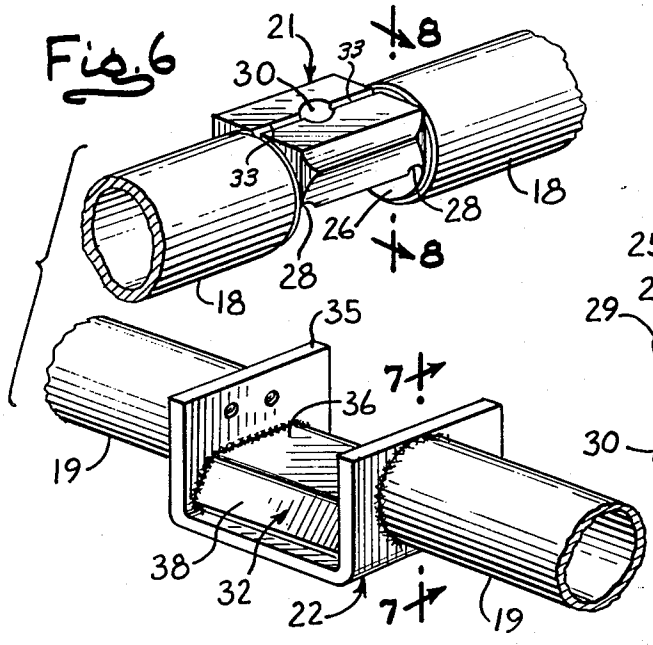
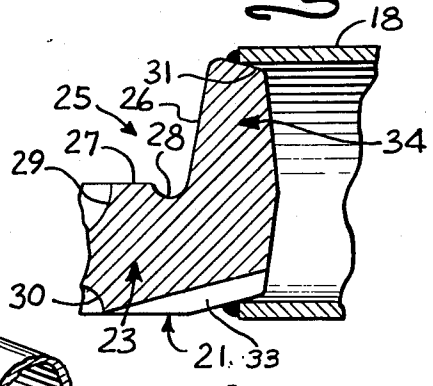


Fig. 8



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Fig. 11

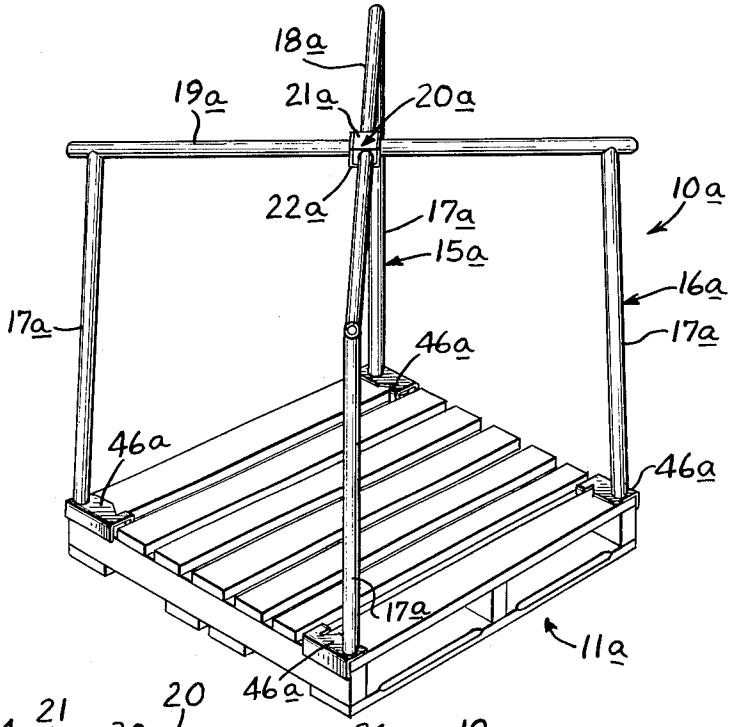


Fig. 9

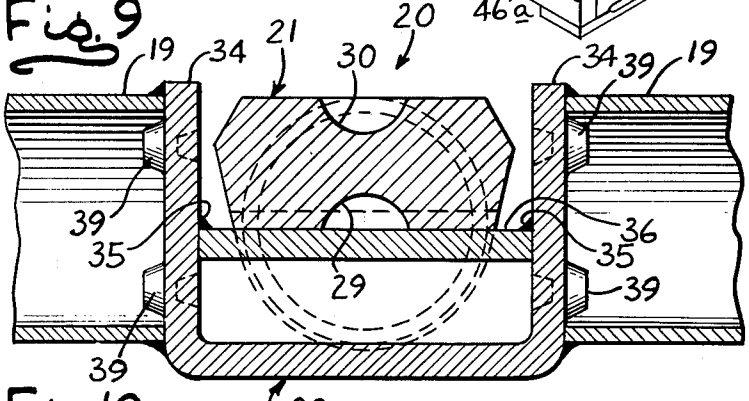
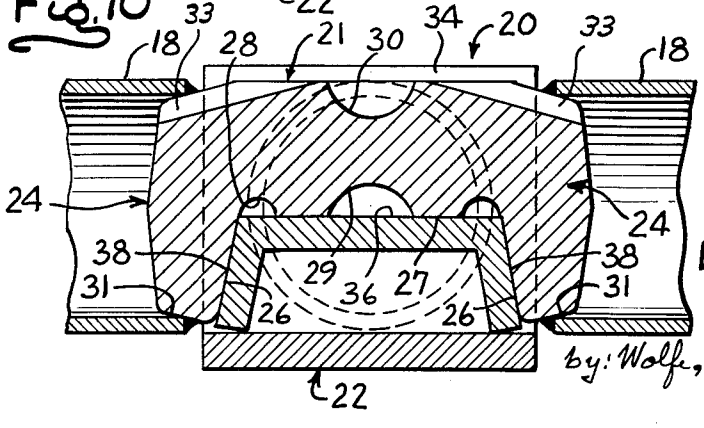


Fig. 10



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3,249,072

PALLET TIERING FRAME WITH WEDGE JOINT

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Filed Nov. 15, 1965, Ser. No. 507,731
5 Claims. (Cl. 108—53)

The present invention relates generally to load supporting pallet tiering frames, and more particularly to such a frame having an improved interlock device for securing together two main portions of the frame.

It is an object of the invention to provide a pallet tiering frame of the character set forth which can be quickly and easily assembled on a pallet, while providing an unusually rigid engagement between the main parts of the frame. It is a related object to provide a frame of the above kind which is of simple, rigid construction and economical to make and use.

Another object is to provide a pallet tiering frame as characterized above which is capable of preventing undesirable movement between the cross members of the frame without the need for bolts or other conventional fastening devices.

A further object is to provide a pallet tiering frame of the above kind that is compact in design and will not interfere with the support of a second pallet placed upon the tiering frame.

Other objects and advantages of the invention will become apparent from the attached detailed description and upon reference to the drawings, in which:

FIGURE 1 is a perspective view of one type of pallet tiering frame embodying the present invention;

FIG. 2 is a perspective view of the pallet tiering frame shown in FIG. 1 with one U-shaped member of the frame disassembled;

FIG. 3 is a perspective view of one member of the interlock device of the present invention.

FIG. 4 is an enlarged fragmentary sectional view of the member shown in FIG. 3, taken in the plane of the line 4—4;

FIG. 5 is a perspective view of the other mating member of the interlock device of the present invention;

FIG. 6 is an enlarged perspective view of the interlock device in disassembled condition, as shown in FIG. 2;

FIGS. 7 and 8 are enlarged fragmentary sectional views of the disassembled interlock device shown in FIG. 6, taken in the planes of lines 7—7 and 8—8, respectively.

FIGS. 9 and 10 are enlarged fragmentary sectional views of the assembled interlock device shown in FIG. 1, taken in the planes of the lines 9—9 and 10—10, respectively; and

FIG. 11 is a perspective view of another type of pallet tiering frame also embodying the present invention.

While the invention is susceptible of various modifications and alternative forms, certain specific embodiments thereof are shown by way of example in the drawings and will be described herein. It should be understood, however, that it is not intended to limit the invention to the the particular forms disclosed, but, on the contrary, the invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more specifically to FIGS. 1 and 2, the invention is there exemplified in an illustrative tiering frame **10** mounted on a conventional wood pallet **11**. In this instance, the pallet **11** includes a plurality of stringer members **12** which are parallel to each other and laterally spaced. Deck boards **14** are fastened transversely to the stringers **12** on either side thereof. In the exemplary pallet, a stringer is positioned at each end of the deck boards with one in the middle, although the number of

stringers and deck boards may vary depending upon the loads and usages for which the pallet is designed.

The tiering frame **10** is adapted to be detachably mounted on the pallet **11** in such manner that it can be quickly and easily assembled and disassembled, and when assembled will provide rigid support for one or more additional pallets in tiered relation to the first pallet. The tiering frame **10** comprises a pair of U-shaped support members **15, 16** each having a pair of legs **17** which are secured to the opposed ends of respective crossbars **18, 19**. In the illustrated form, the legs and crossbars are made of hollow cylindrical tubing and are secured together by an appropriate means such as welding.

Provision is made for detachably secured the two U-shaped members **15, 16** to each other by means of an interlock device interposed between the crossbars **18, 19** (FIGS. 1, 2, 6, 9 and 10). The device **20** is of sturdy, rigid construction and comprises interlock members **21, 22** which engage each other complementally so as to resist horizontal sliding movement between the crossbars **18, 19** when the frame **10** is assembled and loaded. The interlock device **20** further permits the two crossbars to lie in the same plane substantially parallel to the pallet so that a second pallet easily may be stacked in tiered relation to the first.

As shown more particularly in FIGS. 5, 6 and 8, the interlock member **20** is situated centrally of and in the general plane of the crossbar **18**, being dimensioned so as not to project above the latter. The member **20** is of bridge-like form, comprising a relatively heavy central portion **23** straddled by a pair of axially spaced bosses or hubs **24**. These elements define a transverse trough **25** in the member **20** having tapered sidewall bearing surfaces **26** and a horiozntal bearing surface **27** located approximately along the central axis of the member **20** and crossbar **18**. Relief grooves **28** may be provided along each side of the horizontal surface **27** adjacent each surface **26** so as to avoid possible interference with a mating interlock member at the corners of the trough and thereby insure an even bearing between the surfaces of the two members. To save material and help reduce the cost of the member **20**, spherical recesses **29, 30** may be formed at the center of the horizontal bearing surface **27** and at a corresponding position on the opposite side of the member **20**, respectively.

In order to provide a more rigid joinder between the crossbar **18** and the interlock member, the ends of the hubs **24** are tapered as at **31** and adapted to be partially inserted into the hollow cylindrical ends of the crossbar sections, as shown in FIG. 8. The ends of the two halves of the crossbar **18** are welded to the respective hubs **24** along the periphery of their tapered ends **31**. In some instances, the ends of the crossbar sections may have a slight inwardly projecting radial dimple as a result of being punch-cut. To accommodate such tube ends, the member **20** may be formed with a pair of longitudinal grooves **33** along its top surface (FIGS. 6, 8 and 10).

Turning now to the mating interlock member **22**, it will be noted upon reference to FIGS. 3, 6 and 8 that the same is situated centrally of and in the general plane of the crossbar **19**, being dimensioned so as not to project appreciably above the latter. The member **22** is formed as a relatively heavy channel disposed transversely of the crossbar **19**. A longitudinally extending tapered block **32** is mounted so as to extend between the leg portions **34** of the channel member **21** and in this instance is formed as a heavy sheet metal stamping welded as at **35** to the legs **34**. The block **32** is shaped to define thereon a horizontal bearing surface **36** and tapered side bearing surfaces **38** complementary to the bearing surfaces **26** formed in the trough of the member **21**.

The leg portions **34** of the channel-shaped interlock member **22** are formed with a plurality of protruding embossments **39** located in such manner that the inside diameter **40** of the hollow tubing of the crossbar **19** fits snugly around the configuration of such embossments. The embossments **39** thus serve to position the two halves of the crossbar **19** on the respective legs **34** of the channel member **22**. They also provide supplementary support for the welded joint between each leg portion of the channel and its respective section of the crossbar **19**.

In actual use, the two U-shaped members **15, 16** comprising the tiering frame **10** are mounted to the pallet **11** in such a manner that their leg portions **17** are perpendicular to the base of the pallet and the two crossbars **18, 19** are perpendicular to each other. Under these conditions, the tapered block **32** of the channel-shaped interlock member **22** is disposed in mating, bearing relation with the surfaces **26, 27** of trough **25** in the interlock member **21**. In this case, the channel-shaped member **22** happens to the bottom member of the joint with the member **21** located on top, although the reverse order also could be used. The crossbars **18, 19** intersect in rigid engagement in a common plane which is substantially parallel to the base of the pallet **11**, thereby providing a secure base upon which a second pallet may be supported. Furthermore, since the interlock members are formed so as to be substantially within the plane of the crossbars, there is no undesirable protuberance caused by the joint which would interfere with the support of the second pallet.

As shown in FIGS. 9 and 10, the bearing surfaces **26, 27, 36, 38** of the interlock members **21, 22** accurately mate to form a compact joint adapted to resist sliding movement between the two portions of the joint. The tapered surfaces **26, 38** permit the interlock members **21, 22** to be readily engaged even though these two members may be slightly misaligned during assembly, the tapered surfaces causing these members to be forced into mating position. The assembly or disassembly of the frame is accomplished quickly and easily, without need for manipulation of bolts or other conventional fastening devices.

It also should be appreciated that interlock members **21, 22** are of a sturdy and rigid construction adapted to resist bending forces when a load is applied to the tiering frame. The member **21** is a husky member of substantial thickness, while the channel-shaped member **22** is fitted with a wedge-shaped block **32** which acts as a reinforcing element to counteract compressive forces against the legs **34** when the member **22** is located in the bottom position of the joint as shown in the drawings. In addition, since the horizontal bearing surfaces **27, 36** of the interlock members are both approximately on the common axial plane of crossbars, an undue concentration of stresses on either interlock member is prevented.

In the form illustrated in FIGURES 1 and 2, the legs **17** of the U-shaped members **15, 16** are mounted to the pallet **11** at the midpoints of its sides. The legs **17** may be secured to the pallet by any appropriate detachable connection. In this case, mounting brackets **45, 46** are used for this purpose, each having a flat transverse web portion **48** to which a corresponding leg may be welded. The web **48** presents a flat surface to the face of the deckboard or deckboards on which it is mounted, thus distributing the vertical load over an area greater than the diameter of the leg.

The two brackets **45** located in the middle of the deckboards **14** are provided with a pair of L-shaped flanges **49** on each side of the middle stringer **12** which extend downward from the web **48** and hook under the deckboard. To keep the bracket **45** from sliding away from its position embracing the deckboard **14** while straddling the stringer **12**, a locking pin **50** is provided which is mounted to the leg **17** by a ring in such a manner that the pin may pass through a hole in the bracket **45** and deckboard **14**. The brackets **46** on the other two legs

17 located at the ends of the central deckboards **14** are provided with an outside flange **51** mating against the end of the deckboards and also with a second flange, not shown, on the opposite side of the web **48** having a finger portion extending under the deckboard to secure the bracket from upward movement.

Another form of tiering frame **10*a*** in which the interlock device of the present invention may be employed is shown in FIG. 11. The U-shaped members **15*a*, 16*a*** with crossbars **18*a*, 19*a***, interlock device **20*a***, and interlock members **21*a*, 22*a***, are similar to those described above. In this case, however, the legs **17*a*** of the U-shaped members are mounted at the corners of the pallet **11*a***. The brackets **46*a*** also are substantially similar to those used at the ends of the deckboards described above.

It should be appreciated that although the crossbars and legs have been described as being made from cylindrical tubing, rectangular tubing or other appropriate structural members could be used equally well.

I claim as my invention:

1. A pallet tiering frame comprising, in combination, a pair of support members each having two legs secured to the opposed ends of a crossbar, a first interlock member interposed at the center of the crossbar of one said support member and substantially in the same plane as said crossbar, said first interlock member being formed with a trough having tapered side wall bearing surfaces and a horizontal bearing surface approximately through the axis of said crossbar, a second interlock member interposed at the center of the crossbar of the second support member and substantially in the same plane as said crossbar, said second interlock member having a tapered block therein defining bearing surfaces complementary to and adapted to readily engage the bearing surfaces formed in said first interlock member so as to resist sliding movement therebetween.

2. A pallet tiering frame comprising, in combination, two U-shaped members each having a pair of legs secured to a crossbar, a first interlock member interposed at the center of one said crossbar and in substantially the same plane as said crossbar, said first interlock member being formed with a tapered trough having a horizontal bearing surface approximately along the axis of said one crossbar, a second interlock member interposed at the center of the other of said crossbars and in substantially the same plane as said other crossbar, said second interlock member having a block secured thereto defining a horizontal bearing surface approximately along the axis of said other crossbar, said first and second interlock members being adapted to enter into complemental engagement with said horizontal bearing surfaces in substantially the common axial plane of said crossbars upon assembly of said frame on a pallet.

3. A pallet tiering frame comprising, in combination, a pair of support members each including a pair of legs and a connecting crossbar of tubular cross-section, means for detachably mounting said legs on a pallet, a pair of mating interlock members each interposed in a respective one of said crossbars between two axially spaced sections thereof, one of said interlock members having a relatively heavy central portion straddled by a pair of axially spaced hubs, tapered end portions on said hubs projecting into the crossbar sections associated therewith, means rigidly joining said hubs to said associated crossbar sections, said central portion and said hubs defining a transverse trough in said one interlock member, the other of said interlock members having a longitudinally extending tapered block therein adapted to enter into complementary engagement with said trough.

4. A pallet tiering frame comprising the combination of a pair of support members each including a pair of legs and a connecting crossbar, means for detachably mounting said legs on a pallet, a pair of mating interlock members each interposed in a respective one of said crossbars between two axially spaced sections thereof,

one of said interlock members being formed with a transverse trough having tapered side walls, the other of said interlock members being formed as a relatively heavy channel disposed transversely of its associated crossbar, means for rigidly joining the legs of said channel to said associated crossbar sections, and a tapered block fixed between the legs of said channel and extending longitudinally of its associated crossbar, said block being adapted to engage said trough complementally.

5. A pallet tiering frame as defined in claim 3, wherein said other interlock member comprises a relatively heavy channel with spaced apart legs, said channel being disposed transversely of its associated crossbar, means defining embossments projecting outwardly from said channel legs and spaced to fit within and locate the crossbar sections associated therewith, and means rigidly joining said channel legs to said associated crossbar sections associated therewith.

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