United States Patent [19]

Thompson

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[54] **STACKING FRAME**

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[73] Assignee: **Interlake, Inc.,** Chicago, Ill.

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[52] **U.S. Cl.** ..... **211/177,** 108/53, 211/183, 214/10.5 R

[51] **Int. Cl.** **A47f 5/10,** B65d 19/38

[58] **Field of Search** ..... 211/177, 60 R, 60 S, 148, 211/49 R, 183, 126; 108/53, 91, 55; 220/97 B, 97 R; 214/10.5 R

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[57] **ABSTRACT**

In a stacking frame installation, a plurality of stacking racks for support of articles are spaced from each other by a plurality of support posts extending between the racks and a saddle member is fixed to the upper ends of the posts. The saddle member includes a rigid V-shaped member, the apex of which defines an exposed supporting edge, and a pair of projections extending from the ends of the supporting edge. A V-shaped nesting member is fixed to the racks and positioned to fit over the respective saddle members for mounting the racks in spaced relationship to each other.

10 Claims, 6 Drawing Figures

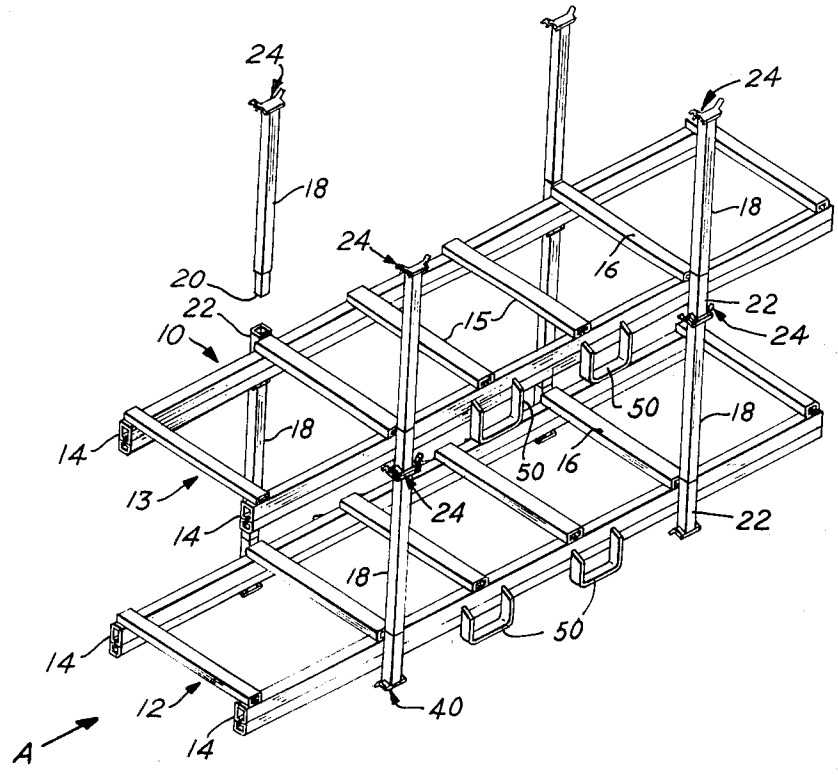
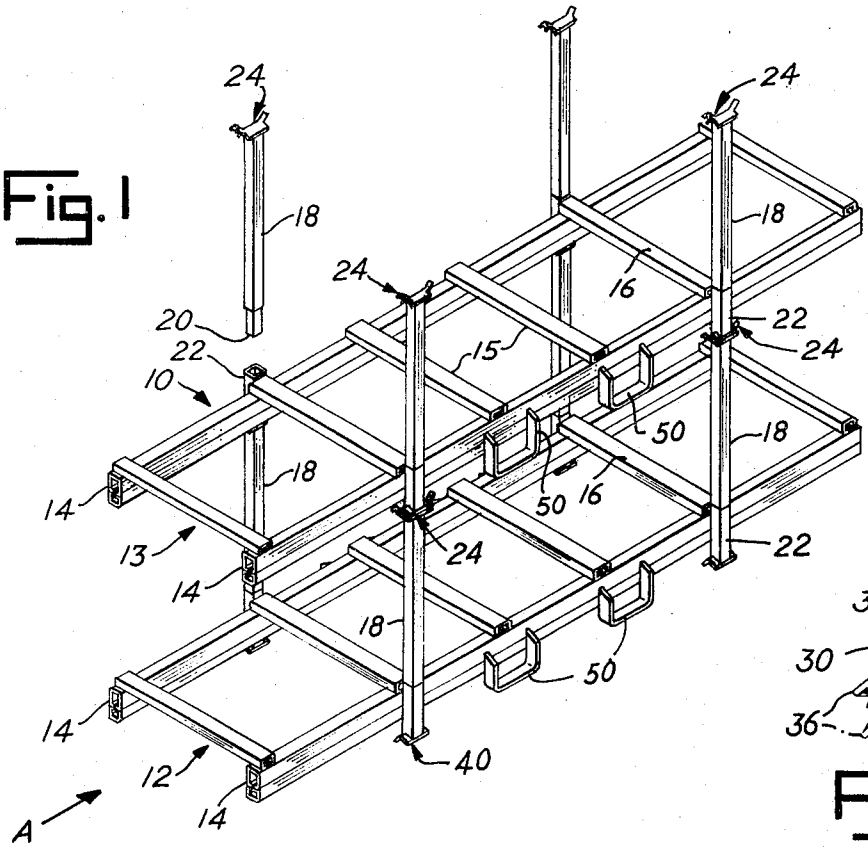


Fig. 1



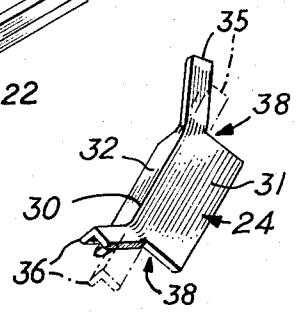


Fig. 6

Fig. 2

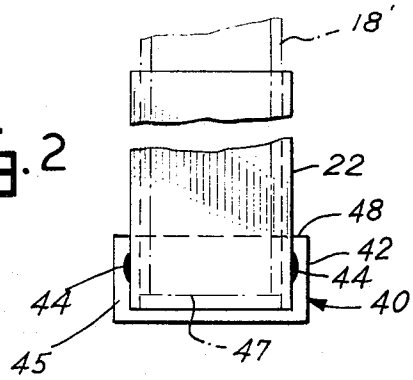


Fig. 3

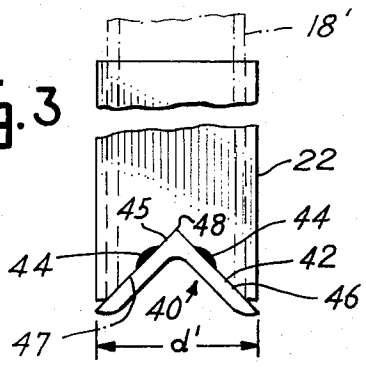


Fig. 4

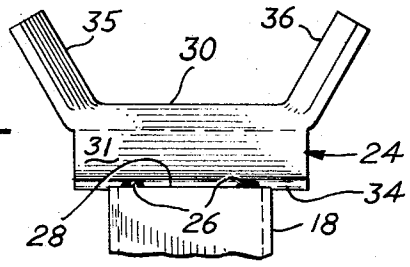
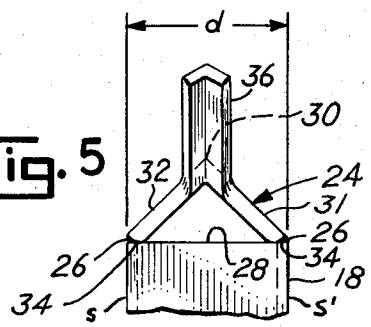


Fig. 5



STACKING FRAME

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to stacking frames and, more particularly, to interfitting nesting members for such frames.

Stacking frame components have been widely used in the past in the construction of stacking frames for the storage of articles thereon. The components of such storage installations may be selectively assembled together in varying numbers and spacial relationships so as to construct finished storage frame installations which widely vary in either size or configuration or both, depending upon storage needs and the configuration and size of the space available. Such components generally comprise two or more horizontal stacking racks which are spaced from each other in elevation by vertical, spaced stacking posts. Each of these horizontal stacking racks includes an article receiving surface, such that when the racks have been assembled into the finished storage frame installation, articles may be stored upon or retrieved from the respective rack surfaces by a fork lift truck or the like.

It is also desirable that the stacking components be capable of being readily assembled or disassambled, such that if it is desired to change the size or the configuration of the storage frame installation, the previously assembled components may be easily disassembled and rearranged as necessary. In order to realize the last mentioned capability, tube and socket type constructions have generally been employed in which sockets are stationarily fixed at spaced points about the edges of the horizontal racks and the support posts, which are slightly smaller than the openings in the sockets, are inserted therein, thus, affording the capability of on site assembly and disassembly.

Such tube and socket constructions suffer several disadvantages, however. In the first instance, an excessive usage of metal is generally required, since the effective height of the storage frames is always less than the sum of the lengths of the individual vertical stacking posts and sockets, since the stacking posts must be long enough to provide for their insertion into the stationary sockets. Moreover, if the external cross-sectional dimensions of the stacking support posts are substantially close to the internal cross-sectional dimensions of the sockets into which they fit, the likelihood of sticking is substantially increased, both during assembly and disassembly. Such sticking becomes even more prominent where the support frames may have been exposed to moisture and rusting. On the other hand, if the difference in the cross-sectional dimensions of the sockets and posts is increased to reduce such sticking, a wobbly frame construction results.

The stacking frame construction of the present invention overcomes these several disadvantages. The stacking frame construction of the present invention may be both easily and inexpensively fabricated and substantially reduces the amount of metal which is needed in the final storage frame installation. Moreover, in the stacking frame construction of the present invention an interfitting nesting construction is realized which is exposed at all times, thus facilitating manipulation of the various components by a fork lift operator during both assembly and disassembly. In addition,

even though the stacking frame construction of the present invention firmly and rigidly supports the storage frame installation during use, the likelihood of sticking together of the respective components during assembly and disassembly is substantially non-existent. Finally, in the stacking frame assembly of the present invention all of the vertical components may be of identical width as exposed to the tines of fork lift vehicles and to the direction of movement of the articles into, out of and within the storage frames, thereby substantially reducing the likelihood of damage from the tines and damage to the articles.

In a preferred locking device of the present invention, a stacking component includes a stacking support member having a saddle member positioned on an end of the support member. The saddle member includes an elongate substantially linear supporting edge positioned external of the support member and a pair of projections extending from the ends of the supporting edge in angular relationship thereto.

In another principal aspect of the present invention, a stacking frame installation includes at least a pair of horizontal stacking racks having surfaces for receipt and support of articles and a plurality of spaced posts extending between the racks for supporting the racks in spaced relationship to each other. A saddle member is positioned on one of the racks or the posts and comprises a rigid member having an elongate substantially linear exposed supporting edge and a pair of projections extending from the ends of the supporting edge in angular relationship thereto. A nesting member comprising a generally V-shaped rigid member is positioned on the other one of the racks and the posts and the V-shaped member and the saddle member are positioned relative to each other such that the supporting edge of the saddle member and the apex of the V-shaped member are in supporting contact with each other.

These and other objects, features and advantages of the present invention will be more clearly understood through a consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWING

In the course of this description, reference will frequently be made to the attached drawing in which:

FIG. **1** is a perspective view of a stacking frame installation incorporating the principles of the present invention;

FIG. **2** is an enlarged side elevation view of a nesting member constructed in accordance with the principles of the present invention;

FIG. **3** is an end elevation view of the nesting member shown in FIG. **2**;

FIG. **4** is a side elevation view of a saddle member constructed in accordance with the principles of the present invention;

FIG. **5** is an end elevation view of the saddle member shown in FIG. **4**; and

FIG. **6** is a perspective view of the saddle member showing its manner of forming.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring particularly to FIG. **1**, a storage frame installation **10** is shown which includes a plurality of horizontal stacking racks **12** and **13**. Each of the stacking members **12** and **13** includes a pair or more of spaced

longitudinally extending side beams 14 and a plurality of spaced cross beams 15 which are firmly affixed across the side beams as by welding. The upper surfaces 16 of the cross beams 15 are preferably flat, whereby surfaces are provided upon which articles may be deposited for storage or removal by way of a fork lift truck or the like.

The horizontal stacking racks 12 and 13 are spaced from each other and rack 13 is supported in such spaced relationship by a plurality of elongate stacking posts 18. The bottom end 20 of each of these posts 18 may either be fixed permanently to the side beams 14 of the racks or may be slightly reduced in width so as to fit into complementary sockets 22, as shown in FIG. 1. Also the entire external width of the posts 18 may be slightly smaller than the width of the sockets 22 so that the posts may be directly inserted into the sockets. Such narrower width posts 18' are shown dot and dash inserted in socket 22 in FIGS. 2 and 3. The sockets 22, in turn, are of a length not much longer than the height of the side beams 14 and are stationarily affixed to the outside of the side beams in spaced relationship to each other as by welding and as shown in FIG. 1.

In the present invention, nesting is accomplished between the posts and the stacking racks by way of a saddle member 24 which is firmly affixed, as by welds 26 to the upper ends 28 of the stacking posts 18. The saddle members 24, as shown in FIGS. 4–6, are formed of rigid angle metal, such as an angle iron, which is V-shaped in cross section, whereby to define an apex 30 which forms a substantially linear supporting edge and a pair of downwardly depending, diverging rectangular legs 31 and 32. The linear edges 36 of the respective legs 31 and 32 opposite the apex 30 are preferably spaced from each other by a distance d which does not exceed the distance between two opposite sides *s* and *s'* of the rectangular support posts 18, such that when the saddle member 24 is welded at its edges 34 to the top 28 of the support post, the legs will not extend or project beyond the sides *s* and *s'* of the support posts.

Each of the saddle members 24 also includes a pair of upward extending projections 35 and 36 which extend upward in coplanar relationship from the ends of the apex supporting edge 30 and in angular relation thereto as shown in FIG. 4. The saddle members 24 may be formed in a manner shown in FIG. 6 by notching the two opposite ends of a short piece of angle iron at 38 to form the axially extending projections 35 and 36 as shown in dot and dash in FIG. 6. These axially extending projections 35 and 36 are then bent upward as shown in solid in FIG. 6, such that the projections extend upward in angular relationship to the apex 30 of the saddle member 24. Thus, the apex 30 and upward extending projections 35 and 36 define a saddle shape which is adapted to receive a complementary nesting member 40, the construction of which will now be described.

Referring to FIGS. 2 and 3 in particular, the nesting member 40 comprises a short angle member 42 which is welded at 44 to the bottom of the socket tubes 22 as shown. The angled nesting member 40 is preferably also V-shaped in cross section, as shown in FIG. 3, having a pair of rectangular legs 45 and 46 which diverge downward from the apex 48 of the nesting member 40. Again the lower edges of the legs 45 and 46 are spaced at their bottom edges from each other by distance *d'* which is equal to or less than the width of the rectangular socket member 22. Thus, as in the case of the saddle member 24, the spaced lower edges of the nesting members 40 do not project beyond the sides of the socket member 22. The bottoms of the posts 18' are also preferably V-notched at 47 as shown in FIGS. 2 and 3 such that when the post bottoms are fully inserted into sockets 22 the posts are locked to the top side of nesting member 40.

To assemble the respective stacking frame components, it is only necessary to position four or more support posts 18 in their respective sockets 22 on the lower most rack 12 as shown in FIG. 1. Once the posts have been inserted in their respective sockets 22, or where the posts 18 are permanently welded to the side beams 14 of the horizontal racks, it is only necessary to then position the next upper horizontal rack 13 in vertical alignment with the lower rack 12 and lower the upper rack onto the saddle members 24 at the top of the support posts 18, such that the nesting members 40 on the upper rack fit down over and are supported upon the lower saddle members 24. The racks 12 and 13 are preferably handled by way of a fork lift truck, the appendages 50 being provided for receipt of the tines of the fork lift truck. It will be seen that the saddle members 24, with their upwardly angled projections, provide a visual target which assists the fork lift operator in visually positioning the racks and their nesting members 40 in alignment with the saddle members 24.

It will also be seen that in the nesting construction of the present invention, the supporting edge 30 defined by the apex of the saddle member 24, as well as the upward facing rectangular surfaces of the legs 31 and 32 will directly support the apex 48 and downward facing rectangular surfaces of the legs 45 and 46 of the nesting member 40 upon assembly. Moreover, lateral motion of the racks will be prevented by the inclined engaged surfaces of the legs 31 and 32 of the saddle member 24 and the legs 45 and 46 of the nesting member 40 and fore and aft movement will be prevented by the upstanding projections 35 and 36. Thus, a firm nesting construction is provided which is capable of rigidly supporting the several components and yet may be readily disassembled. Since the saddle member 24 and the nesting member 40 are no wider than the stacking posts in the direction of insertion and removal of the tines and articles into the stacking frame installation as shown by arrow A in FIG. 1 and movement of the articles within the frame, the likelihood is substantially reduced of inadvertantly striking the vertical components of the installation by the tines of the fork lift truck or the articles. Moreover, it will be seen that the amount of material which need be employed in the vertical stacking posts 18 is substantially reduced by the exposed nesting construction of the present invention and direct socket and tube insertion, which increases the likelihood of sticking, may be substantially reduced and may be eliminated altogether where the posts are welded directly to the side beams 14.

It will be understood that although only two stacking racks 12 and 13 have been shown, many more such racks may be stacked in the vertical and also the racks may be staggered to allow for substantially longer assemblies than shown in FIG. 1. Thus, a stacking frame installation incorporating the principles of the invention may be assembled into widely varying sizes and configurations.

In addition, it should also be understood that although the saddle member **24** has been described as being fixed to the top **28** of the stacking posts **18,** and the nesting member **40** as being fixed to the bottom of the stacking posts **18** or rack sockets **22,** the position of these members may be reversed without deviating from the principles of the present invention.

Finally, it will be understood that the embodiment of the present invention which has been described is merely illustrative of one of the applications of the principles of the invention. Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

What is claimed is:

1. A stacking component for a stacking frame installation, comprising:

a support member, and

a saddle member mounted at an end of said support member, said saddle member including an elongate substantially linear supporting edge facing away from said end of said support member and a pair of projections extending from the ends of said supporting edge in substantially coplanar relationship with said supporting edge, but in angular relationship thereto, and away from said end of said support member.

2. The component of claim **1** wherein said saddle member comprises a substantially V-shaped member having a pair of diverging legs depending from the apex of said V-shaped member, the edges of said legs opposite said apex being spaced from each other by a distance which does not exceed the width of said support member, and said apex defines said linear supporting edge.

3. The stacking member of claim **2** wherein said support member is rectangular, the spaced edges of said legs do not project beyond the sides of said rectangular support member.

4. The stacking member of claim **1** wherein said support member is rectangular and comprises an elongate stacking post.

5. In a stacking frame installation having at least a pair of substantially horizontal stacking racks having surfaces thereon for receipt and support of articles, and a plurality of spaced posts extending between said racks for supporting said racks in spaced relationship to each other; the improvement therein comprising in combination therewith:

a saddle member mounted on one of said racks and posts and comprising a rigid member defining an elongate, substantially linear exposed supporting edge facing away from said one of said racks and posts, and a pair of projections extending from the ends of said supporting edge in substantially coplanar relationship with said supporting edge, but in angular relationship thereto, and away from said one of said racks and posts, and

a nesting member comprising a generally V-shaped rigid member positioned on the other of at least one of said racks and posts, said V-shaped member and said saddle member being positioned relative to each other such that the supporting edge of the saddle member and the apex of the V-shaped member are in supporting contact with each other.

6. The installation of claim **5** wherein said saddle member is positioned on an end of said posts and said nesting member is positioned on said racks.

7. The installation of claim **5** wherein said supporting edge of said saddle member faces upward and is positioned within said V-shaped nesting member.

8. The installation of claim **5** wherein said posts are rectangular and wherein the width of said saddle member and said nesting member does not exceed the distance between two opposite sides of said posts.

9. The installation of claim **5** wherein said saddle member also comprises a substantially V-shaped member the apex of which defines said supporting edge.

10. The installation of claim **9** wherein said V-shaped nesting member and saddle member each include diverging rectangular surfaces, the surfaces of one said member overlying the corresponding surfaces of the other said member.

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