July 16, 1963 E. M. SELKREGG, JR., ETAL 3,097,747

PALLET RACK

Filed May 19, 1959

2 Sheets-Sheet 1

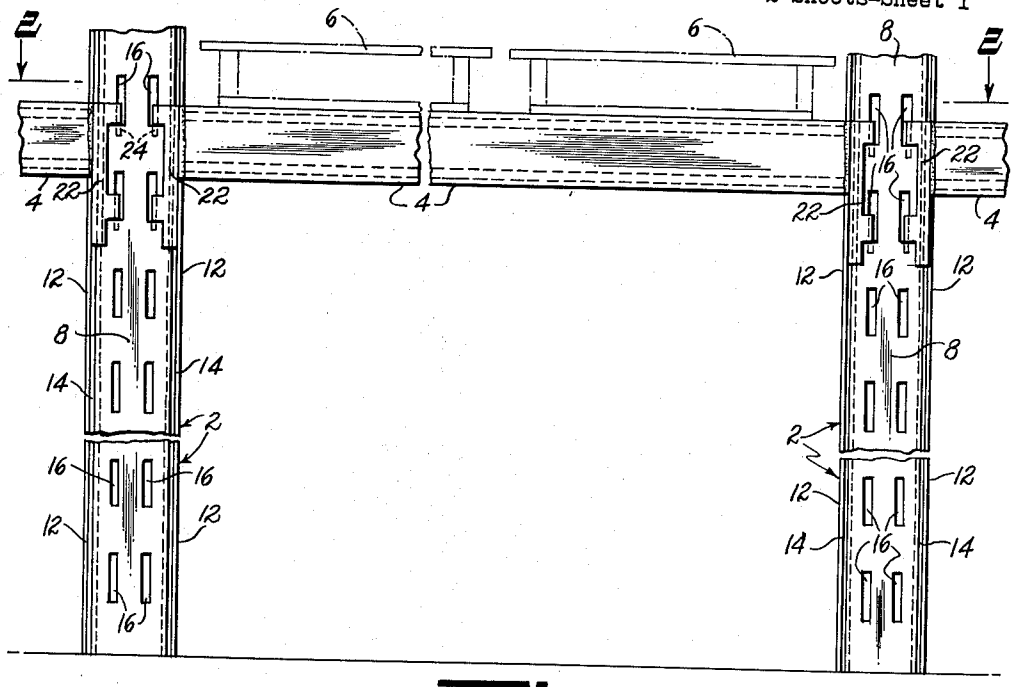


Fig. 1.

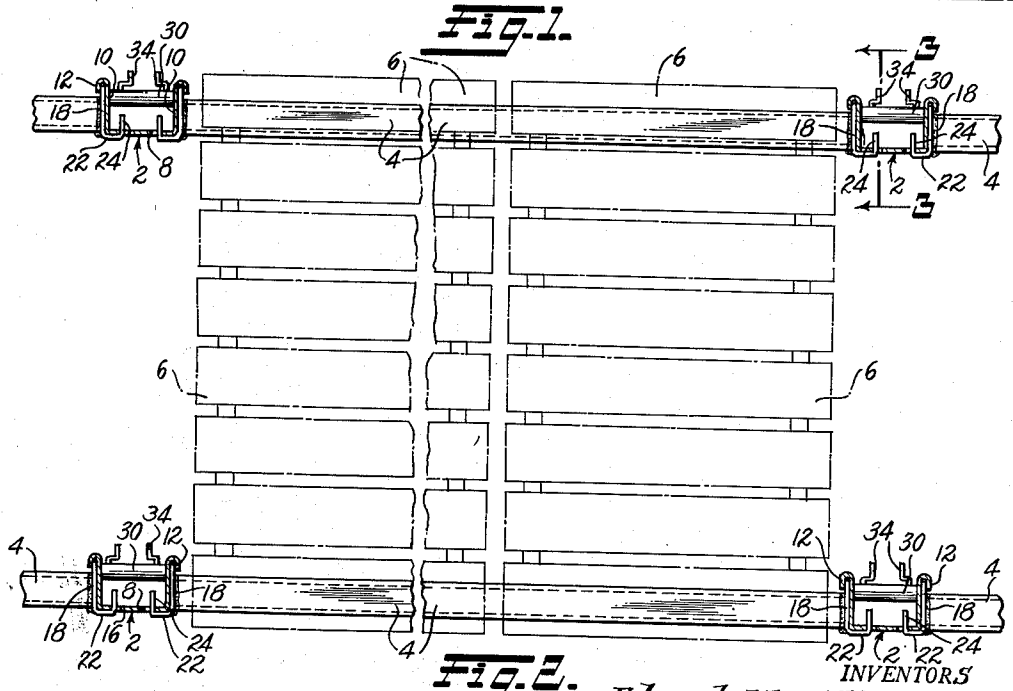


Fig. 2.

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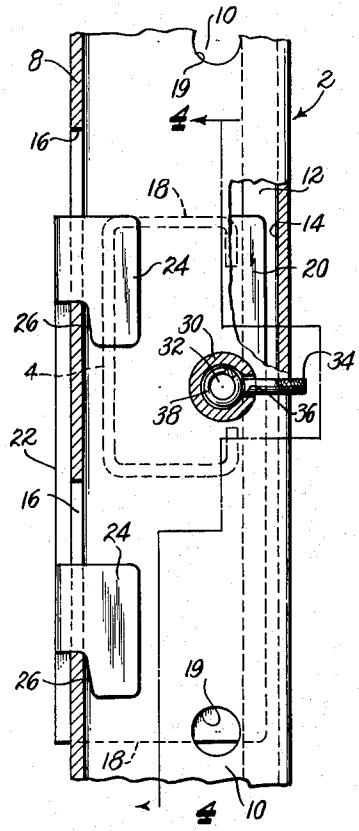


Fig. 3.

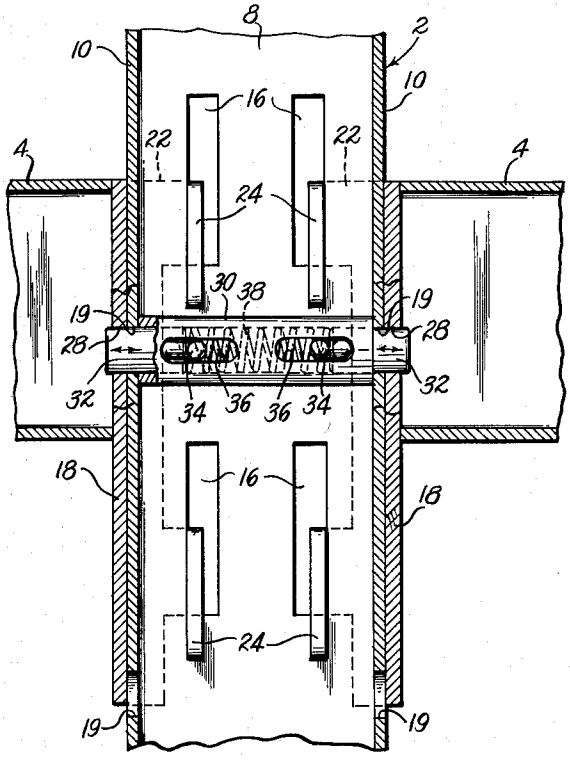


Fig. 4.

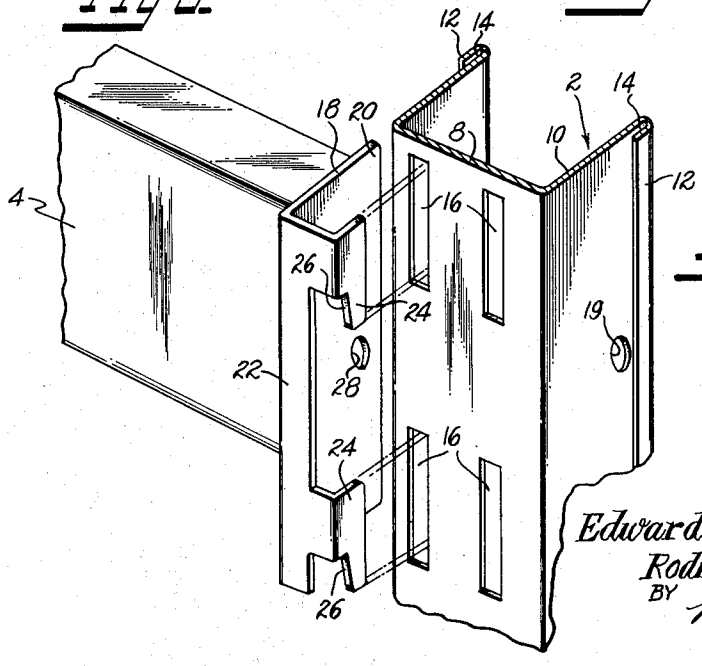


Fig. 5.

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PALLET RACK

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This invention relates to pallet racks comprising separable members whereby racks may be assembled according to the wishes of the user or disassembled at will. While the description relates specifically to pallet racks, it is to be understood that the invention is applicable to other structures of a similar nature, for example, shelving, scaffolding and the like.

In general, the invention comprises a plurality of columns or pillars and horizontal stringers or support bars engageable at their ends with the columns to be supported thereon. The columns are provided with vertical rows of openings engageable by hooks on the ends of the stringers whereby the stringers may be adjusted vertically at will.

According to the present invention the vertical rows of openings in the columns are provided in the web of a channel-shaped column and the stringers are provided with transverse end plates adapted to abut the side faces of the channel flanges while hooks thereon engage in the openings in the web of the column. The end plates have vertical edge portions receivable in a longitudinal groove at the free edge of the side flanges of the column to thereby positively restrict the stringers against the possibility of horizontal swinging movement, relative to the columns, about an axis defined by the supporting edge portions of the openings engaged by the hooks. The invention further contemplates the provision of additional openings in the side flanges of the column structures and openings in the end plates, which openings are in alignment when the stringers are mounted on the column so that a suitable locking pin may be inserted in said aligned openings to prevent inadvertent disengagement of a stringer from its supporting column.

It is therefore an object of this invention to provide a demountable but highly stable pallet rack that is completely rigid when assembled.

Another object of the invention is to provide a pallet rack having the features noted above but which is simple and economical to construct and extremely rugged and reliable in operation.

It is still another object of this invention to provide a pallet rack having the characteristics set forth and which can be assembled or disassembled without employing specialized tools or other accessories.

A further object is to provide a novel column structure for pallet racks, scaffolding and the like.

An additional object is to provide a novel stringer or support bar structure for pallet racks, scaffolding or the like.

Other and additional objects and advantages will become apparent to those skilled in the art as the description proceeds with reference to the accompanying drawings, wherein:

FIG. 1 is a front elevational view of a portion of a pallet rack embodying the present invention;

FIG. 2 is a horizontal sectional view taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged fragmentary vertical sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a vertical sectional view taken along the line 4—4 of FIG. 3 with parts broken away; and

FIG. 5 is a perspective exploded view of a portion of a column and cooperating stringer embodying the present invention.

The present invention contemplates members adapted to be assembled into a pallet rack or the like, as suggested in FIG. 1, wherein upright columns 2 are provided with removable and adjustable support bars or stringers 4 extending therebetween. As shown in FIG. 2, it is contemplated that the arrangement shown in FIG. 1 be duplicated so as to provide parallel spaced front and rear frame structures adapted to receive pallets 6 (shown in dotted lines) for storage. The pallets 6 are illustrated as conventional pallet structures adapted to have a product to be stored stacked thereon. The pallets are conventionally adapted to be engaged and transported by conventional lift trucks whereupon they may be lifted and placed upon horizontal stringers 4 with the pallets spanning the space between front and rear stringers, as suggested in FIG. 2. As is obvious, it is desirable that the stringers 4 be vertically adjustable to accommodate for products of different bulk. If desired, front and rear corresponding columns 2 may be connected by suitable bracing and spacing struts (not shown) or they may be retained in the desired relative positions in any other suitable manner.

It is often desirable to construct pallet racks and position them with very little space between adjacent racks, in which case it is customary to drive the fork trucks between the front and rear frames of each rack whereby to lift the products to the desired level from whence they may be transferred to the stringers 4. Under such circumstances it is essential that the front and rear pallet rack frame structures be rigid so that bumps or inadvertent collisions will not spread them apart. With conventional pallet rack structures such spreading is possible by virtue of the manner of engaging the stringers with their supporting columns.

According to the present invention, each of the columns 2 is of channel cross-sectional shape with a front web 8 (see FIG. 5) and parallel side flanges 10. Each of the flanges 10 is reversely bent at its free edge to define a short edge flange 12 which in turn defines a longitudinal groove 14 between the edge flange 12 and its side flange 10. The front face or web of each column 2 is provided with a pair of rows of vertically spaced aligned slots or openings 16. The side flanges of each column are further provided with openings 19 therethrough, for a purpose to be described later. However, it is to be noted that the openings 19 are preferably vertically spaced and positioned at elevations substantially midway between the openings 16 in webs 8. The stringers 4 may be of any desired cross-sectional shape, for example, as shown in dotted line in FIG. 3. Transverse end plates 18 are permanently secured to the ends of the stringers 4 as by welding or the like so as to be perpendicular to the longitudinal axis of the stringers 4. As shown, the end plates 18 are of greater vertical dimension than the stringers 4 but it is to be understood that such proportion is not essential. The end plates 18 extend rearwardly of the stringers 4 to define a flange edge portion or holding element 20. At their forward edges the plates 18 are bent to define front flanges 22 extending parallel to the length of stringers 4 and having rearwardly extending hook elements 24 formed thereon. The hook elements 24 are so dimensioned and positioned that they can be inserted in vertically adjacent openings 16 of a row of openings in the web 8 of a column 2 to support that end of the stringer 4 on the column. As shown in FIG. 3, the hooks 24 are provided with cam edges 26 engageable with the lowermost edges of the openings 16 to forcibly hold front flanges 22 firmly against the front face of web 8. The end plates 18 are so dimensioned relative to the side flanges 10 of the columns 2 that the rear flange edge portions or holding elements 20 enter into the vertical groove 14 when the parts are assembled as shown in FIG. 3.

When the parts are thus assembled, the outer faces of end plates **18** firmly abut the outer faces of side flanges **10** and since the flange portions **20** of plates **18** are engaged in grooves **14**, the stringers **4** are held rigidly in place on columns **2**. Even though the opposite end of a stringer **4** may be unsupported or free to swing laterally, it cannot swing relative to the column **2** because of the engagement between hooks **24** and openings **16** at the front and the engagement of flange portions **20** in grooves **14** at the rear.

It is to be understood that the present invention also contemplates other than the specific edge flanges **12** disclosed herein. For example, any structure at the rear of the side flanges **10** providing a forwardly facing opening may be resorted to along with the corresponding rearward projection on a plate **18** adapted to enter into such opening and effect the locking herein described. Also, other forms of interengaging means at the rear of plates **18** and flanges **10** will occur to those skilled in the art. The end plates **18** are each further provided with an opening **28** therethrough, which opening is aligned with an opening **19** in the side flange **10** of its supporting column when the parts are in the position shown in FIG. 3. A suitable locking device may be inserted in the aligned openings **19** and **28** and thus securely lock each stringer **4** against inadvertent displacement from its supporting column **2**. In FIG. 4, the openings **19** and **28** are shown in alignment with a suitable locking pin therein. The locking pin structure shown may include a tubular element **30** of a length to freely fit between the side flanges **10**. The tubular member **30** slidably supports locking pins **32** projecting from the ends thereof and having laterally extending manipulating pins **34** extending outwardly through slots **36** in the tubular element **30**. A compression spring **38** urges the locking pins **32** outwardly of the ends of tubular element **30**. By manipulating the pins **34** to force the pins **34** toward each other against the action of spring **38**, the pins **32** may be withdrawn from aligned openings **19** and **28**, thus releasing the stringers **4** for removal from the column **2**. It will be obvious that the positioning of stringers **4** in the aligned relationship shown brings openings **19** and **28** into alignment whereupon the locking pin structure described may be inserted to lock the stringers in position. It is to be understood that the specific locking pin structure herein shown is by way of example only and any suitable form of locking bolt or the like may be employed.

As is obvious, the fact that the hooks **24** are forward of the stringers **4** and engage the columns **2** at their forward face results in eccentric loading of the structure. The carefully located locking pins **32**, however, further function as major bearing members to transfer part of the load from the stringers to the columns and thus makes the loading of the columns symmetrical.

While a single specific form of the invention has been shown and described herein, it is to be understood that the same is by way of illustration only and that other forms may be resorted to within the scope of the appended claims.

We claim:

1. In a pallet rack, a column member having a front face and a side flange, forwardly facing openings in said front face, means at the rear edge of said side flange defining a forwardly facing groove, a stringer having a plate at one end thereof abutting said side flange of said column member, means at said one end defining hooks engaging in said forwardly facing openings in said front face, said stringer having a holding element engaging in said forwardly facing groove at the rear edge of said side flange, a locking opening through said side flange and a locking opening in said end plate, said openings being in alignment when said hooks and holding element are in their corresponding forwardly facing openings and grooves and being adjacent said grooves, and a locking and supporting element in said aligned openings to prevent separation of said column member and said support bar and to distribute vertical loads transmitted from said support bar to said column member.

2. In a pallet rack, a generally channel-shaped column member comprising a front web and side flanges extending rearwardly from opposite side edges of said web, the rear edges of said flanges being bent outwardly then forwardly to define forwardly facing narrow grooves extending along the rear edges of said side flanges, longitudinally spaced openings through said front web, an elongated stringer, a plate secured to said stringer to extend transversely across an end thereof and adapted to abut one of said side flanges with the rear edge of said plate in said forwardly facing narrow groove, the front edge of said plate being bent to define a front flange overlying a portion of said front web, hooks carried by said front flange engaging in said openings of said web to support said stringer on said column while holding the rear edge of said plate in said groove, said side flanges being provided with aligned openings therethrough adjacent said grooves, said plate having an opening therethrough adapted to register with an opening in one of said side flanges whereby aligned stringers on opposite sides of said column may be simultaneously locked thereto, and a locking and supporting element in said aligned openings to prevent separating of said column and stringers and to distribute vertical loads transmitted from said stringers to said column member.

3. A column member as defined in claim 2, wherein each of said side flanges is provided with a row of said aligned openings, each being longitudinally positioned substantially midway between openings in said web.

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