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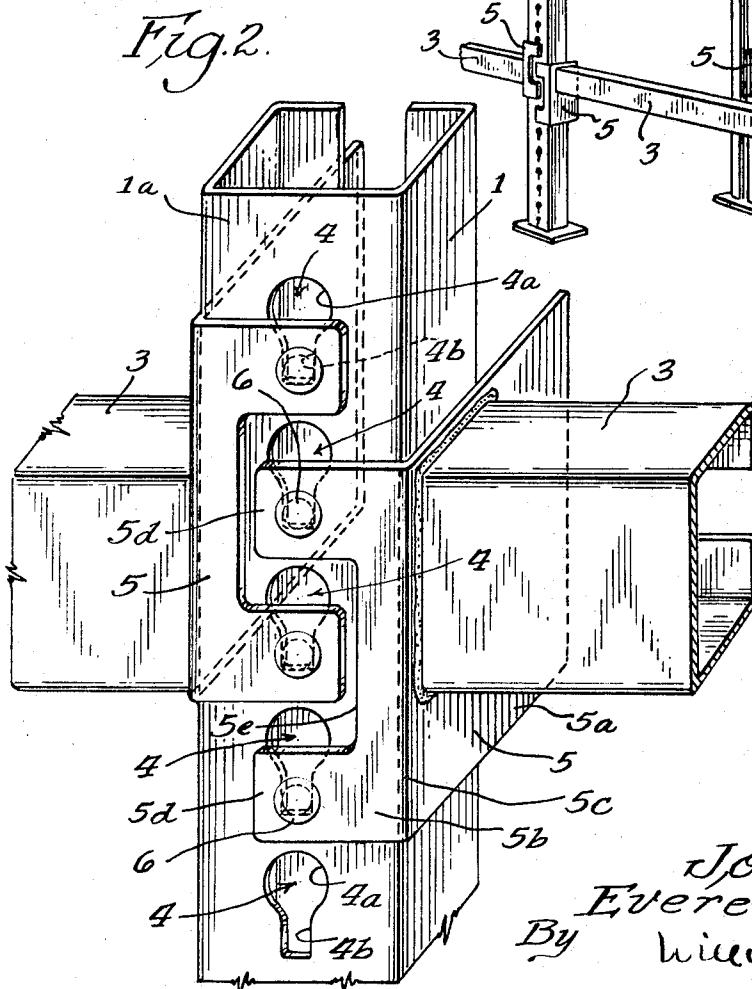
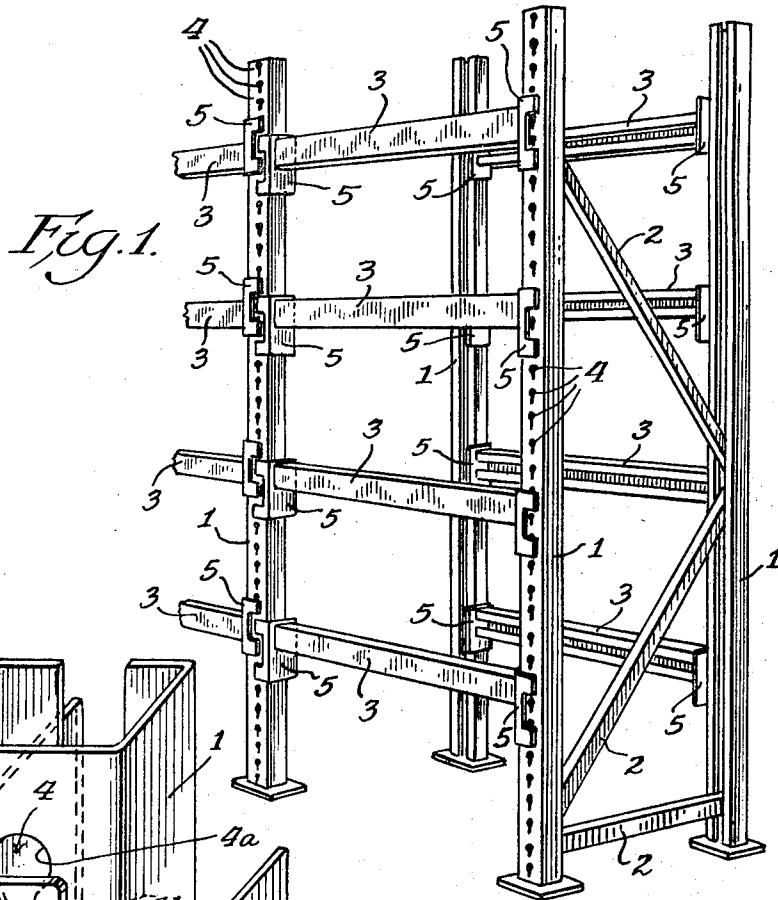
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3,422,962

PALLET RACK

Filed June 29, 1966

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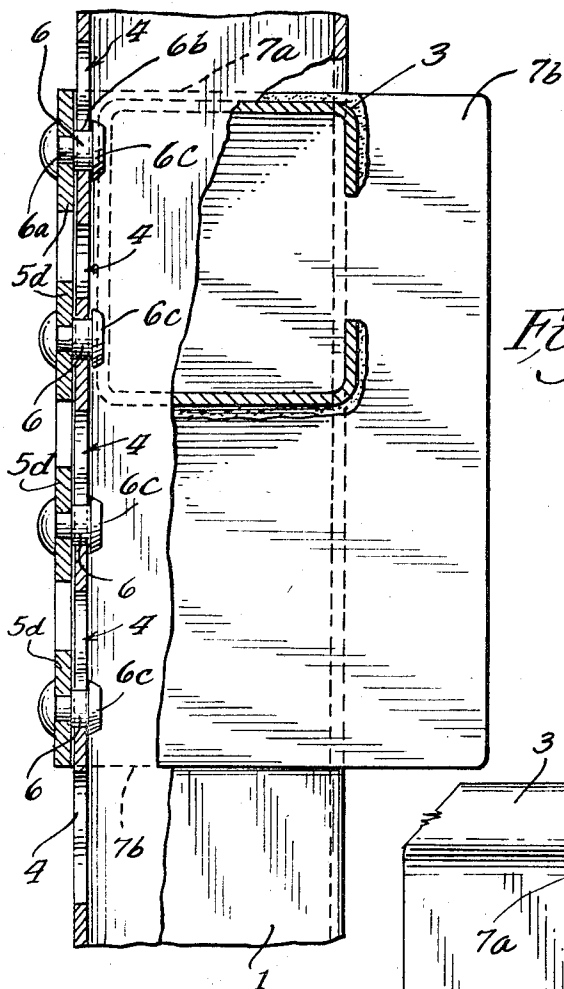


Fig. 4.

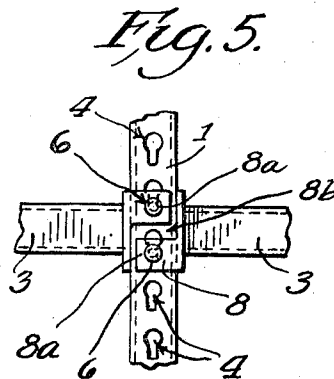


Fig. 5.

Fig. 3.

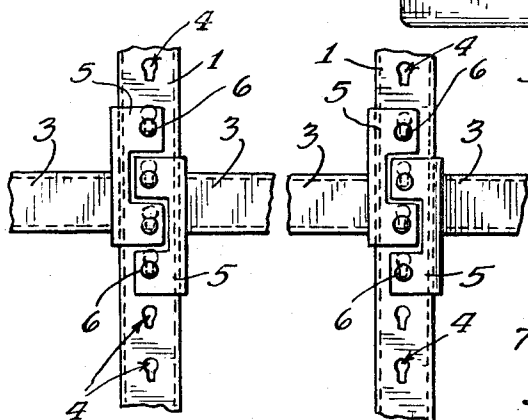


Fig. 6.

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PALLET RACK

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9 Claims

ABSTRACT OF THE DISCLOSURE

A connection assembly between a beam member and an upright. The upright has a single row of holes for receiving fastener means on the beam members. The fastener means are offset from the longitudinal centerlines of the beams so that the beams can be connected to the uprights along opposite sides of an upright while the beams remain in longitudinal alignment with each other.

This invention relates to the art of support structures commonly referred to as pallet rack and particularly relates to an improved construction for connecting together the beams and upright members of pallet rack.

In typical pallet rack structures, vertical support members are provided at regularly spaced intervals and connected together by means of horizontal beams joined at their ends to the upright members. It is common to employ upright members having keyhole openings extending in two vertical side by side rows. The row of keyhole openings on the left is used for joining ends of the beams to the left side of the upright, while the keyhole openings on the right are used for joining the beam members to the right side of the upright. In this way, it is possible to have any desired length of pallet rack structure by spacing upright members at intervals to any length and connecting beams between each adjacent upright member.

Efforts have been made to minimize the cost of pallet rack structures by minimizing the number of different pallet rack parts required. The ends of the beams are commonly provided with end plates carrying connector studs or lugs for engaging the keyhole openings of the uprights for providing the connections between the beams and the uprights. Oftentimes, the end plates are different for each end of the beam so that two kinds of end plates may be required to accommodate left-hand and right-hand connections.

It is an important object of this invention to provide an improved beam and upright connection requiring only a single end plate construction for either left-hand or right-hand connections.

It is another important object of this invention to provide economies of manufacture of pallet rack structures by means of beam and upright connections requiring only a single row of keyhole openings in the upright members and still accommodate either left-hand or right-hand connections. In order to accomplish this, it is another object of the invention to provide a beam end plate construction which has at least one cutout or recessed portion into which projecting portions of an adjacently mounted end plate can interfit so that the portions of the end plates which carry the headed studs or lugs for connections can be positioned along the single row of keyhole openings in an upright when one of the end plates is connected on the left-hand side of the upright and the other end plate is connected immediately adjacent on the right-hand side of the upright.

It is still another object of the invention to provide an end plate structure of the interfitting type for connection to an upright with a single row of keyholes, which

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end plate can be shaped to accommodate beams connected to the end plates in the same relative position on each end plate or at different positions on the end plates, depending upon whether or not alignment of the upper and lower portions of adjacent end plates is desired or required.

Other objects of the invention can be better understood by referring to the accompanying drawings in which:

FIG. 1 shows a perspective view of a portion of a pallet rack structure manufactured in accordance with one embodiment of the invention;

FIG. 2 shows a perspective view of one of the connections shown in FIG. 1 between an upright member and the ends of two adjacent beams;

FIG. 3 shows a perspective view of a second embodiment of a connection between an upright and the ends of two beams;

FIG. 4 shows a sectional view along the line 4-4 of FIG. 3;

FIG. 5 shows a simplified view on a reduced scale of a third embodiment of a connection between an upright and the ends of two beams; and

FIG. 6 shows a simplified view on a reduced scale of still another embodiment of the beam construction.

In FIG. 1, the portion of pallet rack shown consists of vertical upright members 1 which are spaced from each other front to back by means of spacer members 2 and laterally by means of beams 3. The length of the pallet rack structure can be increased by adding a sufficient number of spaced uprights 1 connected together by a suitable number of additional beams 3.

Each of these uprights 1 is provided with a single row of keyhole openings 4. These keyhole openings 4 are better shown in FIG. 2 where each of them consists of an enlarged portion 4a connected to a narrower portion 4b which together form the keyhole shape.

The ends of the beams 3 are provided with end plates 5 welded thereto. Each end plate 5 is provided with a wall 5a directly connected to a beam 3 and a wall 5b connected by a corner 5c perpendicular to the other wall 5a. The wall 5b is U-shaped provided by two projecting fingers 5d spaced between a recessed portion 5e. Each of these fingers 5d carries a stud or lug 6 which is riveted or welded to the finger 5d and projects from it in the same direction as the wall 5a extends. An example of the construction of a stud 6 is shown in FIG. 4 in a second embodiment of the invention, but the studs 6 shown in FIG. 4 are of the same construction. Each stud 6 is shown provided with a narrow portion 6a peened over as a rivet connection to secure it to the finger 5d. A body portion 6b extends from the narrow portion 6a and the widest dimension of the body portion 6b is less than the width of the narrow portion 4b of each keyhole opening 4. Connected to the free end of the body portion 6b is a head or flange 6c of larger diameter than the body portion 6b, but of smaller dimension than the large portion 4a of each of the keyhole openings 4. With this construction, in order to connect an end plate 5 to an upright 1, the two studs 6 on the end plate are passed through the enlarged portions 4a of two of the keyhole openings 4 and lowered so that the flange or head 6c of each stud passes behind the wall 1a of the upright 1 in which the keyhole openings are connected. This retains the studs 6 in the keyhole openings 4 and thereby retains the end plate 5 connected to the upright 1.

It should be observed that the finger portions 5d of each end plate are symmetrically placed with respect to the end plate and the spacing of the two studs 6 on an end plate 5 are of the same spacing as the distance between every third keyhole opening of the upright 1, the spacing of all of the keyhole openings 4 along the upright 1 being the same space increment. With one of

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the end plates 5 connected in this manner with its studs 6 in two alternately spaced keyhole openings, there is a keyhole opening between the location of the two studs 6. By employing an identical end plate 5 on an adjacent beam 3, it is possible to connect that end plate in a reverse position, as shown in FIGS. 1 and 2, to the opposite side of the upright so that one of the beam ends is connected from the right-hand side of the upright 1 and the other is connected to the left-hand side of the upright 1. Although the beams 3 are in alignment with each other, it should be noted that the upper and lower edges of the end plates 5 are not in alignment, respectively.

If it is essential to keep the end plates in alignment, the structure as shown in FIGS. 3 and 4 can be employed. The structure there shown embodies the same basic principle as the structure of FIGS. 1 and 2, whereby only a single row of keyhole openings in the upright is required. Further, the end plates 7 are of identical construction to each other. But, the beam 3 on the left, as viewed in FIG. 3, is connected closer to the end 7a of the end plate 7, while the beam 3 on the right is connected to the opposite end 7b of the end plate 7.

Although it is desirable to have the beams 3 in alignment with each other for uniformity of beam levels, it should be understood that the end plates can be shifted to different levels as long as the studs 6 on adjacent end plates of both embodiments can be positioned in empty keyhole openings 4. However, for alignment purposes of the beams 3, the two arrangements of connections shown in FIGS. 2 and 3 will accomplish the result.

If both of the beam connections of FIG. 2 are inverted and exchanged one for the other, they will still appear to have the same relationship with respect to upright 1. If the end plates 7 shown in FIG. 3 are inverted and exchanged one for the other, both end plates 7 will extend substantially above the level of the beams 3.

As shown, the end plate connections of FIGS. 1 and 2 require identical end plates 5 positioned on their respective beams 3 in identical positions so that only one construction of end plate is required and upright members with only a single row of keyhole openings are required. With respect to the construction of FIG. 3, identical end plates 7 are employed, but the beam ends are connected adjacent opposite ends 7a and 7b of the end plates 7, so that they are reversible in the same sense as the end plates 5 in FIG. 2. Whereas the end plates 5 of two adjacently positioned beams are not in alignment at their tops and bottoms, whether in one position or inverted, the upper and lower ends of the end plates 7, as shown in FIG. 3, are in alignment, whether inverted or not.

As shown in FIG. 5, a simplified connection is indicated which has only a single connecting stud on each end plate 8. Each end plate 8 is L-shaped as are the end plates 5 and 7, previously described, but they are each provided with only a single tab 8a which each carry one of the studs 6. It will be observed that each of the end plates is provided with a cutout portion 8b which exposes a keyhole opening 4 for connection by the stud 6 on the adjacent tab 8a. In effect, each end plate 8 has a projecting tab 8a extending to align its stud with the single row of keyhole openings 4. In this way, the studs on the tabs of adjacent beams intersect each other in alignment with the single row of holes so that the beams can be connected to the upright in end to end longitudinal alignment with each other. This principle is fulfilled by the first two embodiments also described.

With reference to FIG. 6, it shows a beam construction which does not require alternate inversion of the beams when they are of the type shown in FIGS. 1 and 2 or FIG. 5. In the embodiment shown in FIGS. 1 and 2, the two end plates 5 or a beam 3 are shown offset in the same direction, either both above or below the beam 3. In order to connect these beams to adjacent bays of a pallet rack structure, a beam in one bay must be inverted relative to the beam in the adjacent bay. With the ar-

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rangement shown in FIG. 6, having an end plate 5 on one end of the beam 3 offset in the opposite direction as the end plate 5 on the opposite end of the beam 3, the beams can be connected on adjacent bays without requiring inverting the beams in one bay relative to the adjacent bay. Whether inverted or not, they fit in the same relative locations with respect to the beams positioned on the adjacent bay.

Although only certain embodiments of the invention have been shown and described, it should be clearly understood that the invention can be manufactured in many different ways without departing from the true scope of the invention as defined by the appended claims.

We claim:

1. In connections between beam members and an upright comprising, a row of holes extending along the upright for receiving fastener means, each of the holes being of a size and shape to receive only one fastener means at a time in substantially central alignment along the row of holes, a first of said fastener means secured to a first beam member and connected through a first of the holes to connect the first beam member to the upright along one side of the upright, a second of the fastener means secured to a second beam member and connected through a second of the holes to connect the second beam member to the upright along the opposite side of the upright, the first fastener means being positioned on the first beam member in substantially central alignment with the row of holes and offset in one direction relative to the longitudinal center of the first beam, and the second fastener means being positioned on the second beam member in substantially central alignment with the row of holes and offset in the opposite direction relative to the longitudinal center of the second beam member by the same amount as the offset in the one direction to provide a total offset between the two fastener means when the beam members are in longitudinal alignment with each other equal to the spacing between said two holes to permit connection of the beam members to the upright by use of the two fastener means engaging said two holes while the beam members are in longitudinal alignment with each other.

2. In a connection between first and second beam members comprising, a row of connector portions extending along the first beam member for receiving connector means, each of the connector portions being of a size and shape to receive only one connector means at a time in substantially central alignment along the row of connector portions, a first of said connector means on the second beam member engageable with at least one of the connector portions in substantially central alignment with the row of connector portions to secure the beam members together, the second beam member having a cutout portion which exposes at least another of said connector portions which is thereby engageable with a second of said connector means on another similar beam member connected to said first beam member with the second connector means also in substantially central alignment with the row of connector portions.

3. In a connection between first and second beam members comprising, a row of holes extending along the first beam member, for receiving fastener means, each of the holes being of a size and shape to receive only one fastener means at a time in substantially central alignment along the row of holes, a first of said fastener means on the second beam member engageable in substantially central alignment with the row of holes through two of the holes which are spaced from each other with a third such hole positioned between them, said second beam member having a cutout portion which exposes said third hole and makes it available for engagement with a second of said fastener means on another similar beam to be connected to said first beam member with the second fastener means also in substantially central alignment with the row of holes.

4. In a connection between first and second beam mem-

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bers as defined by claim 3 characterized by said connector means being studs having flanged heads which react against the boundary portions of the connector portions in the form of holes to retain the connector means in the connector portions.

5. In a connection first and second beam members comprising, a row of holes extending along the first beam member, for receiving fastener means, each of the holes being of a size and shape to receive only one fastener means at a time in substantially central alignment along the row of holes, a first of said fastener means on the second beam member engageable in substantially central alignment with the row of holes through two of the holes which are spaced from each other with a third such hole positioned between them, said second beam member having a cutout portion which exposes said third hole and makes it available for engagement with a second of said fastener means on another similar beam member adapted to be connected to said first beam member with the second fastener means also in substantially central alignment with the row of holes, said fastener means being studs having flanged heads which react against the boundary portions of the holes to retain the fastener means in the holes.

6. In a connection between first and second beam members and an upright comprising, a single row of holes extending along the front face of the upright, each beam member having an end which is bifurcated to provide two spaced apart tabs, each tab having a fastener means engaging one of two of said holes spaced from each other with other of such holes positioned between them and on opposite sides of them, the spacing between the tabs on

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the beam members permitting two beam members to be connected end to end to the upright with the tabs of the beams intersecting each other in alignment with said single row of holes.

7. In a connection between first and second beam members and an upright as defined by claim 7 characterized by said ends on the beam members being in the form of end plates which are of identical construction.

8. In a connection as defined by claim 4 characterized by said ends on the second beam member and on the other beam member being in the form of end plates which are of identical construction.

9. In a connection as defined by claim 4 characterized by said ends on the second beam members being in the form of end plates which are of identical construction and secured to the ends non-symmetrically with respect to the longitudinal centers of the beam members.

References Cited

UNITED STATES PATENTS

2,893,567	7/1959	Steele	211—176
3,144,944	8/1964	McConnell	211—176 XR
3,278,043	10/1966	Kimpton	211—176 XR
3,303,936	2/1967	Barnawell	211—177 XR

FOREIGN PATENTS

1,379,043 10/1964 France.

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U.S. Cl. X.R.

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