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S. SAUL, JR., ET AL
RACK CONSTRUCTION

2,925,181

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2 Sheets-Sheet 1

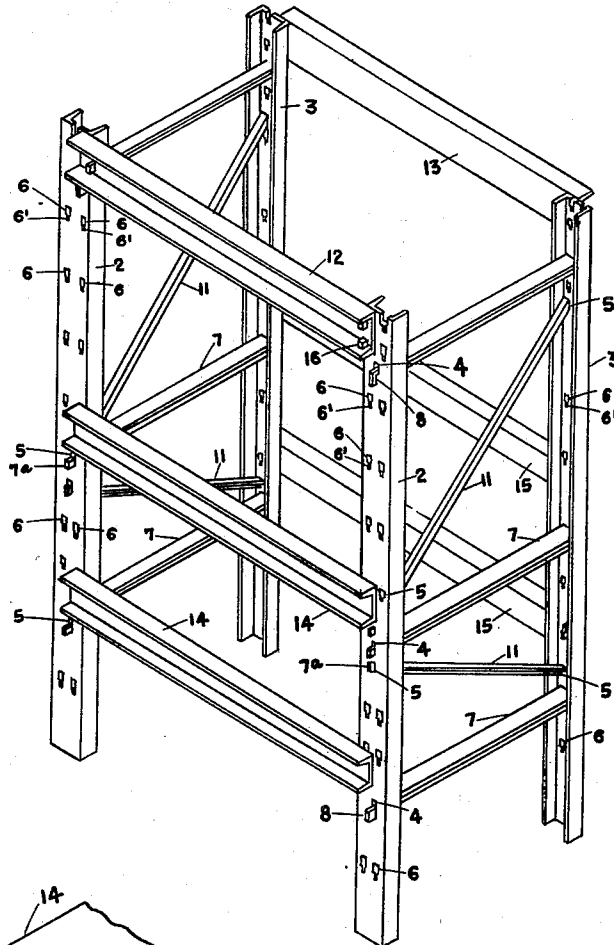


FIG. 1

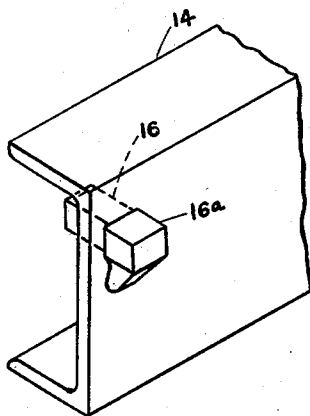


FIG. 4

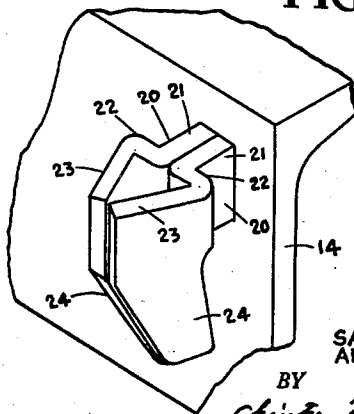


FIG. 5

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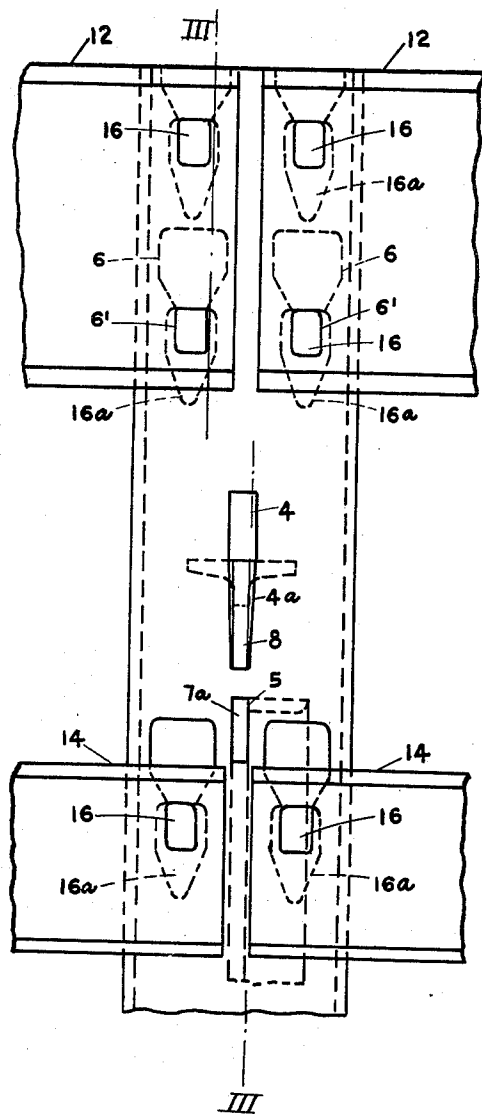


FIG. 2

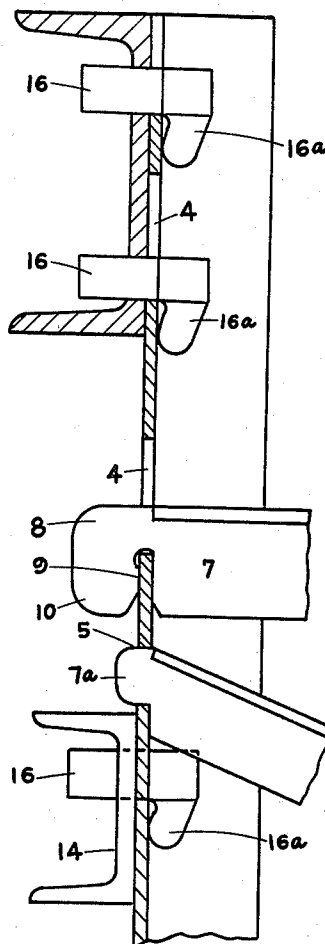


FIG. 3

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RACK CONSTRUCTION

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2 Claims. (Cl. 211-147)

This invention pertains to storage racks formed of structural sections and is for such a rack which may be shipped in knocked-down or unassembled condition and erected at the place where it is to be used without welding, bolts, or separate fastenings.

The particular rack herein illustrated is designated a pallet rack for the reason that it is ordinarily used for the support of pallets which may be stored in it and removed and replaced at will, but the invention provides a rack which may be used for various other purposes as well.

Our invention has for its principal object to provide a rack formed of structural sections which may be readily assembled or disassembled without the use of separate fastenings or welding, and which is economical to make, strong and firm when in use, and adequately braced to prevent sway.

Our invention may be more fully understood by reference to the accompanying drawing, in which:

Fig. 1 is a perspective view of rack embodying our invention;

Fig. 2 is a fragmentary front elevation of the top of one of the front uprights and the associated parts, the view being on a larger scale than Fig. 1;

Fig. 3 is a staggered vertical section in substantially the plane of line III-III of Fig. 2;

Fig. 4 is a fragmentary perspective view of one end of one of the adjustable shelf members; and

Fig. 5 is a view similar to Fig. 4 showing in detail a preferred form of lug construction.

Referring now more particularly to the drawings, the rack is comprised of four upright channel sections, the two at the front being designated 2, and the rear ones 3. The channels are turned with the flanges of the uprights 2 turned toward the flanges of the opposing upright 3, so that the flat web faces of the channels face outwardly. Each upright has a spaced series of narrow slit-like openings 4 through the webs located vertically on the center line, the sides of each slot at the top of the slot being parallel and being slightly convergent beginning at a point about half way between the top and bottom. The downwardly-converging sides of the slots are designated 4a. Other smaller rectangular slits or slots 5 are also provided in these webs on the center line. As shown, there are two of the slots 5 in the front members, one above and one below but adjacent the middle slot 4. There are two widely-spaced slots 5 in the rear upright, one just below the uppermost slot 4, and one just above the lowermost slot 4. Actually both front and rear uprights may have slots at all positions to make them interchangeable, but we have shown for illustration the minimum required by the structure.

Extending down each side of the center line of the web are a series of key hole slots, these being openings 6 which are wide at the top and have narrow downward extensions 6'.

An end frame for the rack is comprised of a front upright 2 and a rear upright 3. These are connected by

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horizontal sections 7, termed upright braces, and there is a minimum of three of these braces for a normal installation. Each upright brace is preferably a T section with the horizontal flange cut away adjacent the ends, leaving a projecting vertical web portion 8 in the lower edge of which is a deep notch 9 (see Fig. 3) forming a hook-like terminal 10 at each end of the brace. These ends are passed through the vertical slots 4 and pushed down so that the web of the upright is engaged in the notch 9 which is just wide enough to receive the web of the channel. The uprights are thereby joined together by the horizontal braces, with the inner face of each channel web abutted against the cut-away ends of the horizontal flanges of the T section to provide additional stability.

When assembling the end frames, diagonal braces 11, which are also in the form of flanged sections, such as angle bars smaller than the horizontal members 7, and which have the horizontal flanges cut away to form a projecting tongue 7a put into position with the tongues projecting through the slots 5. These are put in position before the horizontal braces are forced down into position, and the braces are of such length that when the cross bars are forced down into their final position, the webs of the respective channels will jam against the ends of the sections 11 rearwardly of the projecting tongues so that there can be no looseness in these diagonal braces at all. The parts are first loosely fitted together and the horizontal braces are then hammered down into position.

When two end frames have been assembled they may be connected by front and rear top members 12 and 13 respectively. Additional similar front and rear shelf members 14 and 15 connect the end frames below the top members. All of these members are in the form of flanged sections, such as channels, with lugs 16 welded to the flat faces at each end thereof, these lugs having an enlarged head portion 16a capable of passing through the enlarged openings in the key hole slots and short neck portions of smaller section capable of being received in the extensions of the slots. There are two such lugs 16 at each end of the top members 12 and 13 to give added rigidity, and preferably only one is provided at each end of the lower horizontal members.

Since the key hole slots are at each side of the vertical center of the uprights, horizontal bars may extend in each direction from the corner posts, so that when the rack is built in lengths of two or more sections, the intermediate uprights serve as the common support for the adjoining ends. The spuds or studs 16 are so designed that when the heads of the studs are passed through the key hole slots and the shanks or necks of the studs forced downwardly into the narrow extensions of these slots, the horizontal bars will be drawn into tight engagement with the uprights, so that the rack will be tight and firm against end play. Because of the number of key hole slots, the horizontal members may be placed at various heights and in varying numbers, depending upon the purpose of the racks.

In Fig. 5 we have shown the lug as being formed from sheet metal plate. It is comprised of two similar but oppositely formed pieces 20 having shank-forming portions 21 that are flat against each other. The metal at the outer end of the shank is turned laterally forming a shoulder 22. From the shoulder the metal of the two pieces converges toward the outer edge of the lug, these converging portions being designated 23. They each have downwardly-projected hook-like extensions 24 and the edges of these extensions which confront the web of the channel 14 are closest to the web at the lowermost ends of the hook.

As a result of this arrangement, when the lug is en-

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tered into a key hole slot in the upright, and the channel 14 is driven down, the bight or end of the hook will urge the channel 14 tightly against the upright, providing a wedge effect that contributes much to the stability of the structure. Also the shoulders 22 bearing against the faces of the uprights eliminate sway in a direction normal to the faces of the shoulders.

The solid lugs in Fig. 4 are similarly formed, but the contour is less readily seen.

It will be seen that the racks may be shipped in knocked-down form and readily assembled with no tools other than a hammer. They are relatively cheap to fabricate and serve all of the requirements of the much more expensive racks now available for this purpose.

We claim as our invention:

1. A knock-down rack structure comprising two front corner posts and two rear corner posts, each corner post being similar to the other and comprising a channel having a flat web and two flanges, there being two corner posts at one end of the structure and two at the other, the front and back corner posts at each end being turned with their flanges in confronting relation, the webs of each corner post having a series of vertically-spaced keyhole shaped slots therein and also having a series of vertically-spaced slits therein, horizontally-extending structural sections having a horizontal flange and a vertical leg extending between the front and rear corner posts at each end of the structure, the vertical leg of each such horizontal section extending at each end beyond the horizontal flange and providing a hook-like extension at each end that projects through one of said slits in the corner post and hooks over the web of the corner post at the bottom of the slit, the horizontal flange of the section at each end abutting against the confronting faces of the webs to rigidly hold the corner posts in vertical spaced relation, horizontal shelf sections connecting the two front corner posts and similar horizontal shelf sections connecting the two rear corner posts, each shelf section having a flat vertical web, the ends of the vertical web of each shelf section lapping over and bearing

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against the outer faces of the webs of the corner posts which it connects, the vertical web of each shelf having a headed stud projecting therefrom normal to the web near each end thereof, the headed studs of the shelf sections being engaged in the keyhole slots in the corner posts.

2. A knock-down rack construction as defined in claim 1 in which the studs on the shelf sections each have a head portion designed to pass through the enlarged area of the keyhole slot and a shank portion which fits tightly into the reduced extension of such slot, the head of each stud having shoulders at each side of the shank for engaging the web of the corner post with the web of the corner post confined between the shoulders and the vertical web of the shelf section, the head of the stud having a down-turned hook portion spaced outwardly from the web of the shelf section with the face of the hook that engages the corner post being sloped from the tip away from the web of the leg to increase its wedging action.

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