Aug. 2, 1960 H. A. STOLLENWERK 2,947,390

STORAGE RACKS

Filed April 2, 1958 2 Sheets-Sheet 1

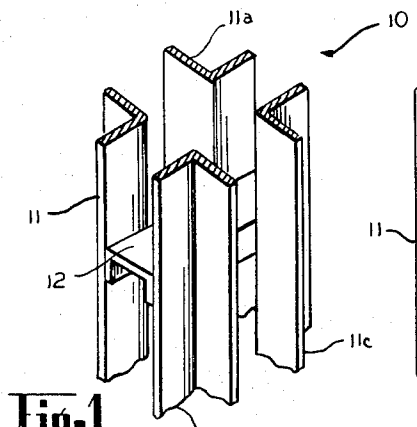



Fig. 1

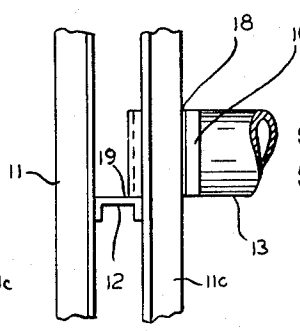



Fig. 2

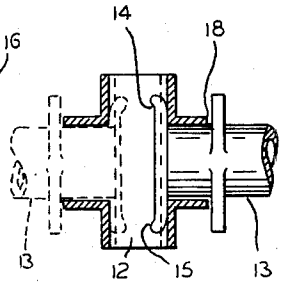



Fig. 3

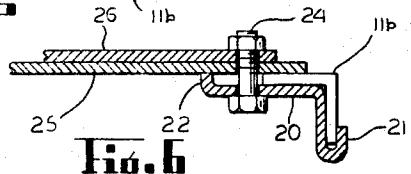



Fig. 6

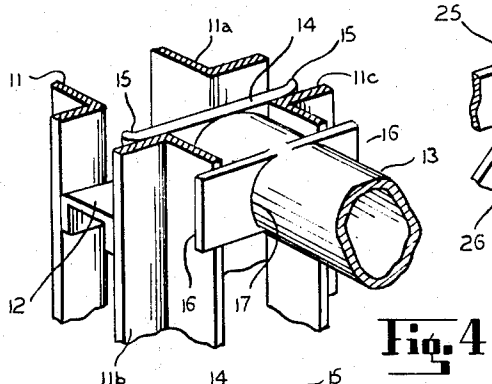



Fig. 4

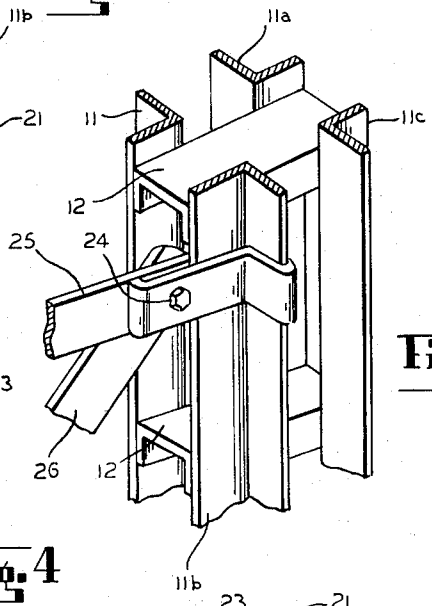



Fig. 5

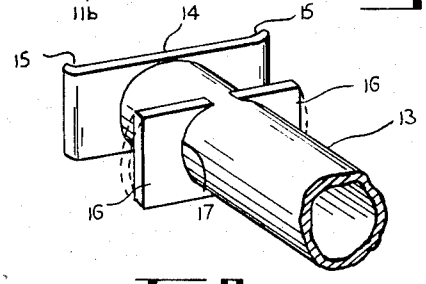



Fig. 8

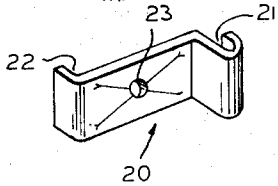



Fig. 7

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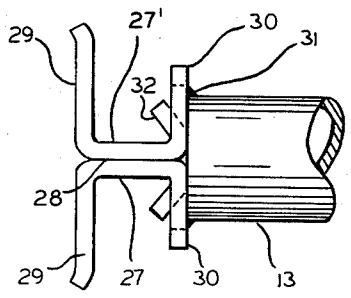



Fig. 9

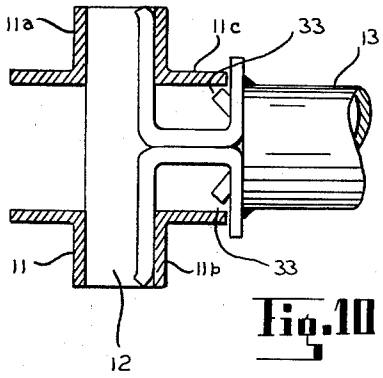



Fig. 10

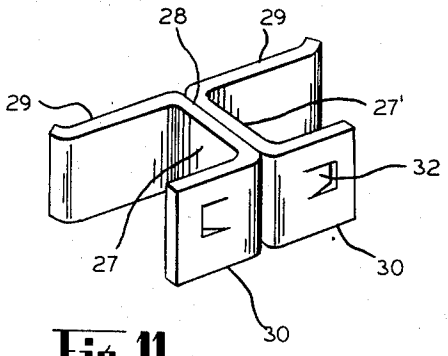



Fig. 11

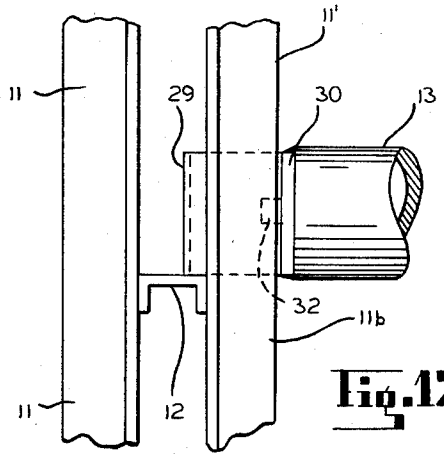



Fig. 12

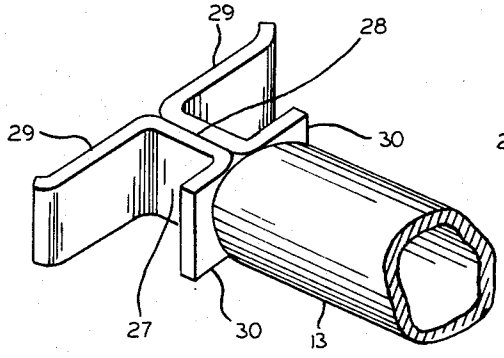



Fig. 13

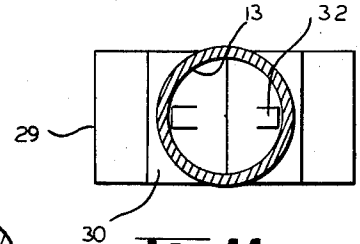



Fig. 14

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2,947,390

# STORAGE RACKS

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5 Claims. (Cl. 189—36)

My invention relates to storage racks and more particularly to portable racks for storing pallets, sheets, bar stock, or the like.

The object of my invention is to provide a rack that is easily assembled and disassembled to any size, as to length, height, depth, and with varied numbers of cross supports at varied heights.

Another object of my invention is to provide a storage rack that is slidably supported for adjustment of the vertical standards for any variation in the surface, or floor, to which the rack is applied.

Still another object of my invention is to provide a rack that supports itself rigidly in a vertical plane, without weaving, or leaning, one way or the other when weight is applied to the cross members forming the shelves.

It is manifest to anyone familiar with racks for storing materials, that when the racks are of a permanent nature and constructed rigidly, they very often outgrow their capacity which is limited to their governing dimensions. It is also quite frequently necessary to move the racks to a different location in the plant or warehouse, and due to their permanent structure it involves quite an expense in labor, and loss of material, in making this change of location.

The device described and illustrated herein represents a direct improvement on the racks such as covered by my Patents Nos. 2,510,433 and 2,710,735. It presents the portable feature being easily manipulated in standard parts, arranged for easy assembly and disassembly, the braces are arranged to retain the standards in a vertical plane at all times, even when the floor is uneven, or slanted. The cross members are constructed in a manner to prevent side sway or leaning, and are easily assembled with the vertical standards to provide racks of varied widths, depths, and heights, with the cross-bars placed at varied heights, one above the other.

Other and further objects of my invention will become more apparent as the description proceeds, when taken in conjunction with the drawings in which:

Figure 1 is a fragmentary perspective view of a portion of the vertical standards, constructed of four angle irons held in fixed relation to one another by spacer channels welded in position at predetermined distances apart from one another;

Figure 2 is a fragmentary front view of the vertical standard, with a cross-member in position and resting on the top surface of the spacer channel;

Figure 3 is a top view of the vertical standard as shown in Figure 2, and illustrating in phantom how cross-members may be applied opposite from one another;

Figure 4 is a fragmentary perspective view of a portion of the vertical standard with the cross-members in position;

Figure 5 is a fragmentary perspective view of a vertical standard as shown in Figure 1 with the brace assembly attached thereto, illustrating the manner in which the brace clamp is slidably supported on one of the vertical



angles and clamped to the brace rods for supporting the unit.

Figure 6 is a top cross-sectional view of the clamp arrangement shown in Figure 5;

Figure 7 is a perspective view of the brace clamp;

Figure 8 is a perspective view of one end of the assembled cross-member;

Figure 9 shows a top view of a modified form of bracket assembly for supporting the cross member;

Figure 10 illustrates the manner in which the modified bracket engages the vertical standard assembly;

Figure 11 is a perspective view of the modified bracket with the oppositely disposed sections welded to one another;

Figure 12 is a front view of the modified bracket as shown in Figure 10 with the bracket in engagement with the vertical standard;

Figure 13 is a perspective view of the modified type of bracket as shown in Figure 11, with the tubular cross brace welded thereto; and

Figure 14 is a front view of the assembly as shown in the various Figures 9, 10, 12, and 13, showing the cross brace in cross-section.

Similar characters of reference indicate corresponding parts throughout the several views, and referring now to the same, the character **10** illustrates a generally vertical standard consisting of four angle irons **11**, **11a**, **11b** and **11c**, held in spaced relation to one another by spacer channels shown as **12**, having their flat surface at the top. A plurality of spacer channels are disposed throughout the height of the vertical standards employed in the rack construction.

The angles **11** and **11a** are spaced apart farther as are the angles **11b** and **11c**, than the angles **11a** and **11c**, or the angles **11** and **11b**. This is to provide space to accommodate the diameter of a tubular cross-brace shown as **13**, and of a length to reach from one vertical standard to the other.

The cross-brace **13** is equipped with a flat end plate **14**, of a width equal to the diameter of the cross-brace **13**, and of a length which is greater than the width of the space between angle irons **11b** and **11c** and may be equal to the length of the spacer channel **12**. The ends **15** of the flat end plate are curved slightly, as shown to make it easier to put them into place. There are a pair of outwardly extending members **16** which are radially formed at **17** for engagement with the outer surface of the cross-brace **13**, when welded thereto in opposite relation to one another and in alignment with one another. These members **16** are spaced from the end plate **14** at a distance just slightly greater than the width of the legs of the angles **11**, **11a**, **11b**, and **11c** in the vertical standard **10**. This provides for ample clearance at **18**, as shown in Figures 2 and 3, when the cross-brace **13** is in position with the end plate **14** resting on top of the spacer channel at **19**, as shown in Figure 2.

When installing the cross-member **13** into engagement with the vertical standard **10** it is only necessary to insert the flat plate **14** between the angles such as **11b** and **11c**, and by revolving the cross-member **13** a half turn the end plate **14** will rest on the spacer channel **12** with the angles **11b** and **11c** spaced between the end plate **14** and the members **16**. The side portions of the tubular member **13**, between the members **14** and **18** tend to contact the angle irons and prevent lateral displacement.

The members **16** may be straight at their outwardly projecting ends, or cut radially, as shown by dots in Figure 8. Since the surfaces of the members **18** are flat they will tend to contact the outer face of the angles **11b** and **11c**, thus preventing the vertical standards from weaving or leaning sideways as would be the case

if a pin be inserted through the tubular cross-bar **13** at the point of contact with the angles.

In Figure 7, I show a brace clip **20**, formed into a channel at **21**, for engagement with one web of the angle as shown in Figures 5 and 6, and the longer section thereof is angularly disposed at its end **22**. There is an aperture **23** disposed through the brace clip **20** to accommodate a bolt **24** so it may be assembled with a straight brace **25** and an angularly disposed brace **26**, when placed in position to clamp the angle as shown in Figures 5 and 6. This type of brace clip permits the assembled brace extending from one vertical standard to the other to slidably adjust itself and clamp securely when the bolts **23** are fastened and tightened.

The modified bracket construction shown in Figures 9 to 14, inclusive, accomplishes the same purpose as outlined above, and consists of a pair of oppositely disposed sections **27** and **27'** formed into a U shape and welded together at the line **28**, to provide oppositely disposed plates **29** answering the same purpose as the plate **14**, namely, for resting on the spacer channel **12** forming an integral part of the vertical standard **10**.

There are other oppositely disposed contact plates **30** forming an integral part of the U-shaped sections **27** and **27'**. These contact plates **30** act as a support for the tubular cross brace **13**, which is welded to them at its surface, as at **31**.

The members or portions **32**, when the bracket is assembled with the angle irons, terminate a slight distance from the faces of the angle irons, thus preventing lateral displacement of the bracket and brace in a generally horizontal plane. Thus the portions **32** perform the same function as the tubular side portions between the members **14** and **18** in Figures 1 through 8.

There are angularly projecting members **32** integrally formed with the contact plates **30**, which act as guides, or spacers, as shown in Figure 10 at **33**, for preventing the bracket assembly from shifting, or sliding, between the angle irons forming a part of the vertical standards **10**.

In assembling a rack, a plurality of vertical standards as shown in Figure 1 are disposed in the spaced relation desired and the desired number of cross braces or supports **13** and braces **25** and **26** connect the standards.

It will be seen that the generally horizontal cross-braces **13**, may be easily inserted into and assembled with the vertical standards **10**, and when supported by the spacer channels **12**, which are an integral part of the vertical standards **10**, will prevent any side sway of the standards, and when the braces are assembled and clamped to the vertical standards **10** as shown, they will rigidly support the standards and retain them in vertical alignment even though the floor may be uneven.

Whereas I have shown and described an operative form of my invention, I wish it to be understood that there are many modifications of this invention which will fall within the scope and spirit of the invention and which will be apparent to those skilled in the art. The drawings and description of the invention should be taken in a diagrammatic or illustrative sense and the scope of the invention should be limited only by the scope of the hereinafter appended claims.

I claim:

1. A standard and brace assembly for use with demountable storage racks including a spaced pair of vertically extending angle irons disposed with legs of the irons generally parallel to one another to define a supporting standard, a plurality of spacer members connecting the angle irons and vertically spaced from one another, and an elongated cross brace connected to said standard, said brace having a first and a second pair of members spaced from one another and extending outwardly from the axis thereof, said pairs of members being disposed at one end of said brace with the spacing of the pairs being such as to allow the pairs of members to embrace said parallel legs therebetween, said pairs of members having a width such as to be insertable through the space between said legs, the members having a length such that after insertion of one pair through the space between said legs, and 90 degree rotation of said brace, said members are abuttable against said angle irons, at least one pair of said members being supported on one of said spacer members and means disposed between said spaced pairs of members for contact with said legs to restrict displacement of said brace in horizontal directions and transverse to the axis of said brace.



2. The structure of claim 1 wherein said brace is in the form of a tubular member having a diameter generally equal to the width of the space between the legs of said angle irons, and said pairs of members are fixed to said brace.

3. The structure of claim 2 wherein said pairs of members are in the form of U-shaped members fixed to one another intermediate their ends and with leg portions thereof fixed to the end of said cross-brace.

4. The structure of claim 3 characterized by and including an additional cross-brace slidably and frictionally engaging one of said angle irons.

5. A standard and brace assembly for use with demountable storage racks including two spaced pairs of vertically extending angle irons, the legs of each pair of angle irons being spaced apart generally parallel to one another, each leg of each angle iron being generally parallel to one leg of each of the other angle irons, the pairs of angle irons being spaced apart so as to define elongated and vertically extending openings between opposed legs of angle irons, a plurality of spacer members fixed to each of the angle irons and vertically spaced from one another, said angle irons and spacer members defining a supporting standard, and cross-braces engaged with said standard, each such cross-brace being elongated and having pairs of flanges on the ends thereof for embracing the leg portions of a pair of angle irons, one pair of flanges of each cross brace being supported on a spacer member, the cross braces extending outwardly from at least a pair of said openings with the flanges of said cross braces engaged with different pairs of angle irons.

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