

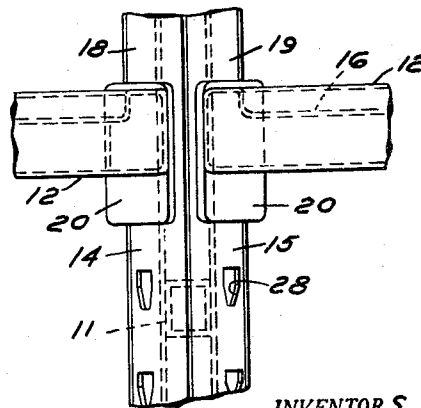
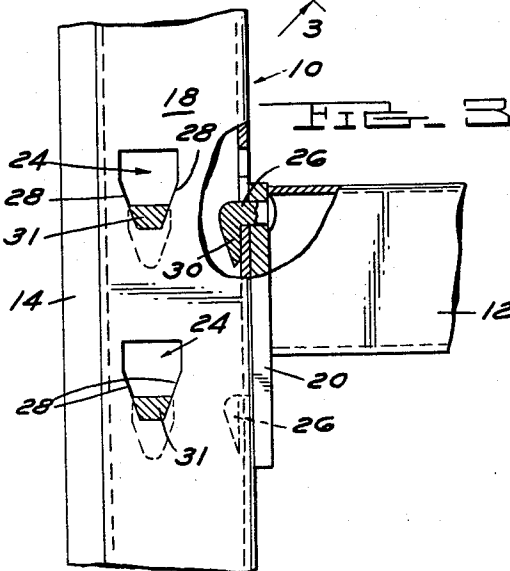
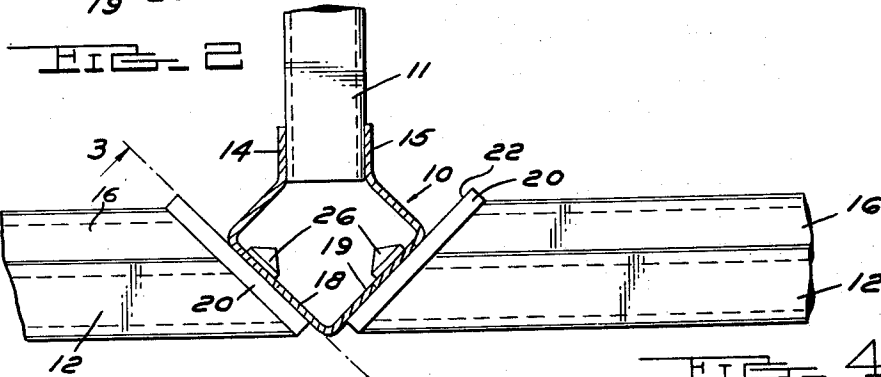
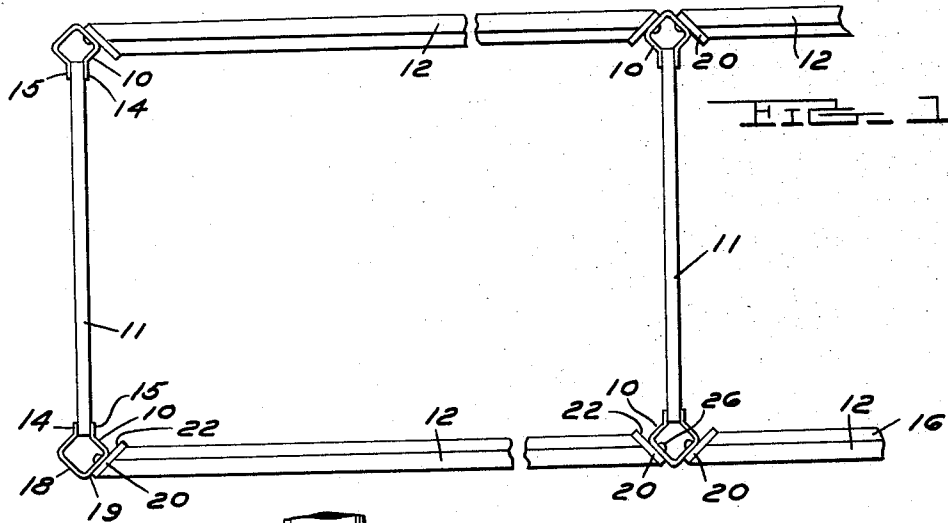
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RACK CONSTRUCTION

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RACK CONSTRUCTION

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6 Claims. (Cl. 211—147)

This invention relates to an improved construction for storage racks and includes an improved detachable connection between a horizontal and a vertical member of a storage rack structure.

Many constructions have been proposed for storage racks and all of these seek to provide a rack structure which may be generally described as a four sided open framework of vertical and horizontal members. The horizontal members which carry the load are usually termed "side rails," and some means is provided for detachably connecting the side rails to the upright members so that the rack structure may readily be assembled, disassembled, extended and rearranged to suit changing storage requirements. The usual connection is also an adjustable one so that the vertical spacing between side rails can be varied to suit the height of the articles being stored on the structure.

The present invention pertains to a rack of the general type described and is characterized by the provision of an improved form of connection between a side rail and an upright member of the structure. This improved connection is obtained by providing a vertical attachment surface on the upright member with this attachment surface being disposed in outwardly facing angular relation to one side of the rack structure defined by a side rail. Such side rail is provided with an abutment surface disposed in angular relation to the length of the side rail for engagement with the attachment surface of the upright. Connector elements are included on the aforementioned surfaces of the upright member and side rail, these connector elements being engageable on movement of the side rail horizontally and vertically relative to the upright member.

This form of connection defines the direction in which the side rail extends from the upright member. When employed on a pair of upright members between which a side rail is to be mounted, the abutment surface mentioned above is formed by a connector plate secured to each end of the side rail in converging relation toward the inner longitudinal edge of the side rail. The attachment surfaces of the upright members between which the side rail is mounted diverge outwardly of the rack structure and as a result a connection between the side rail and the upright members may be established with far greater ease than is possible with any other presently known structure. One operator can place the side rail in connected relation, and due to the angular relationship between the length of the side rail and the surfaces to be engaged, the connector elements are always visible and a small amount of relative horizontal movement between the side rail and a vertical member establishes a relatively large amount of clearance for maneuvering the side rail into position.

The invention also includes an improved form of upright member which provides the angular attachment surfaces, a high strength factor, and a rigid, relatively light upright frame structure when a pair of upright members

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are interconnected by members other than the side rails.

A presently preferred embodiment of the invention is illustrated in the accompanying drawing which includes the following views:

5 Figure 1, a plan view of a portion of a storage rack structure;

Figure 2, an enlarged plan view showing the relationship between a vertical member and a pair of longitudinally aligned side rails connected to the vertical member;

10 Figure 3, a sectional elevation taken on the line 3—3 of Figure 2; and

Figure 4, an elevation on a slightly reduced scale of the structure shown in Figure 2.

Referring to Figure 1, the vertical or upright members of the rack structure are designated by the reference 10. These uprights 10 are connected in pairs by suitable transverse members 11, this connection usually being a permanent one, forming vertical frame assemblies. Each of these uprights is formed with a modified square tubular section, one corner of a square configuration being opened to provide parallel portions 14 and 15. These portions 14 and 15 define a longitudinal slot into which the transverse connecting members 11 can be inserted and connected anywhere along the length of the upright member 10. These portions 14 and 15 may be of any length desired to add to the cross-sectional area and therefore the strength of an upright member. When the portions 14 and 15 are interconnected at intervals by the transverse members 11, a very rigid upright frame structure is formed for the amount of material employed.

Side rails of the rack structure are designated 12. The sectional shape of each side rail is conventional, and as indicated in Figure 4, includes an inwardly directed ledge 16 for mounting decking boards or other suitable material for forming shelves.

The sectional configuration of each upright 10 provides a pair of vertically extending attachment surfaces 18 and 19 which are disposed in outwardly facing angular relation to one side of the rack structure. Each side rail 12 is provided with a connector plate 20 at each of its ends with each connector plate 20 being mounted in inwardly facing angular relation to the side of the structure defined by a side rail.

Considering one side rail 12 and a pair of upright members 10 between which it is connected as shown in Fig. 1, the attachment surface 18 of one member of the pair and the attachment surface 19 of the other member of the pair diverge outwardly of the rack structure and the abutment surfaces 22 of the side rail connector plates 20 converge toward the inner longitudinal edge of the side rail.

Means are provided for connecting a side rail between a pair of uprights with the side rail end plates abutting the attachment surfaces of the uprights, these means consisting of connector elements on the abutting surfaces. In the representative construction shown, the connector elements consist of a series of apertures 24 formed in the attachment surfaces 18 and 19 of each upright and a pair of projecting members 26 carried by each of the side rail end plates 20. Each aperture 24 preferably includes a pair of tapered side walls 28. Each projecting member is generally hook shaped and includes a headed portion 30 and a shank portion 31 (Figure 3), with the shank portion having tapered sides to engage the tapered side walls 28 of an aperture.

Dimensioning of the aperture 24 relative to the projecting members 26 is such that when a side rail 12 is being assembled to an upright the projecting members 26 can be inserted in a pair of apertures 24 by relative horizontal movement between the side rail and upright members which is in a direction substantially normal to a line drawn

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through the pair of uprights to which the side rail is being connected. Once the projecting members 26 have been so inserted, a connection is established by a slight vertically downward movement of the side rail relative to the upright to place the headed portion 30 of each projecting member into overlapping relation with the inner wall of the attachment surface.

While preferred embodiments have been described above in detail, it will be understood that numerous modifications might be resorted to without departing from the scope of our invention as defined in the following claims.

We claim:

1. In a storage rack structure, means for providing a detachable connection between a vertical member and a horizontal member which defines the direction said horizontal member extends from said vertical member; comprising a vertically extending attachment surface on said vertical member, said attachment surface being disposed at an acute angle to said direction, an abutment surface defining the end of said horizontal member, said abutment surface being disposed at the same acute angle to the length of said horizontal member, and connector elements on said surfaces of said vertical and horizontal members engageable on relative horizontal and vertical movement between said members.

2. A rack structure of the type which includes pairs of uprights interconnected by transverse members to form vertical frames and side rails detachably connectable between the uprights of a pair of said frames characterized by each of said uprights being formed with a pair of vertically extending attachment surfaces which converge longitudinally outwardly of said frame, said side rails each being provided with a pair of connector plates at the ends thereof, said connector plates converging toward the inner longitudinal edge of said side rail, and connecting means provided on said upright members and side rail connector plates for engagement on movement of said side rail horizontally and vertically relative to said upright members.

3. A rack structure of the type which consists of upright frames and side rails detachably connectable thereto characterized by said upright frames each comprising a pair of spaced interconnected upright members, each upright member forming one end of a frame and having a pair of vertically extending attachment surfaces which converge toward such end, each of said side rails having a pair of connector plates defining the ends thereof, said connector plates converging toward the inner longitudinal edge of said side rail with an angular relation corresponding to the said convergence of the attachment surfaces of an upright member, and interlocking connector element means on each upright member attachment surface and on each side rail connector plate whereby each side rail can be connected between oppositely facing attachment surfaces on any adjacent pair of upright frames.

4. A rack structure as defined in claim 3 further characterized by said interlocking connector element means comprising a series of vertically spaced apertures formed in each upright member attachment surface, each aperture including an enlarged upper portion and a lower portion which includes a pair of tapered converging side walls, a connector member projecting from each side

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rail connector plate, said member having a headed portion dimensioned for passage through said aperture on movement of a side rail horizontal and normal to its said inner longitudinal edge, said connector member also including a shank portion having converging tapered sides for engagement with said aperture side walls on vertical movement of a side rail relative to an upright.

5. A rack structure according to claim 3 further characterized by each of said upright members having a second pair of longitudinally extending surfaces converging oppositely from said attachment surfaces, each of said second pair of converging surfaces extending into a pair of longitudinal parallel surfaces which form a slot along the length of said upright member, and transverse members interconnecting a pair of upright members to form one of said upright frames, each of said transverse members having its ends each positioned in the slot of an upright member and connected to the side walls thereof to reinforce such upright member.

6. A rack structure of the type which consists of upright frames and side rails detachably connectable thereto characterized by said upright frames each comprising a pair of spaced interconnected upright members, each upright member forming one end of a frame and having a pair of vertically extending attachment surfaces which converge toward such end, a slot extending the length of said upright member, said slot facing generally oppositely from said attachment surfaces, transverse members connected between a pair of uprights to form a frame, the ends of said transverse members each engaging one of said slots and being connected to the side walls thereof, each of said side rails having a pair of connector plates defining the ends thereof, said connector plates converging toward the inner longitudinal edge of said side rail with an angular relation corresponding to the said convergence of said upright attachment surfaces, and interlocking connector element means on each upright member attachment surface and on each side rail connector plate, said means comprising a series of vertically spaced apertures formed in each upright member attachment surface, each aperture including an enlarged upper portion and a lower portion which includes a pair of tapered converging side walls, a connector member projecting from each side rail connector plate, said member having a headed portion dimensioned for passage through said aperture on movement of a side rail horizontal and normal to its said inner longitudinal edge, said connector member also including a shank portion having converging tapered sides for engagement with said aperture side walls on vertical movement of a side rail relative to an upright.

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