Dec. 16, 1969 D. R. BUTLER 3,483,998

SUPPORTING STRUCTURES

Filed July 25, 1967

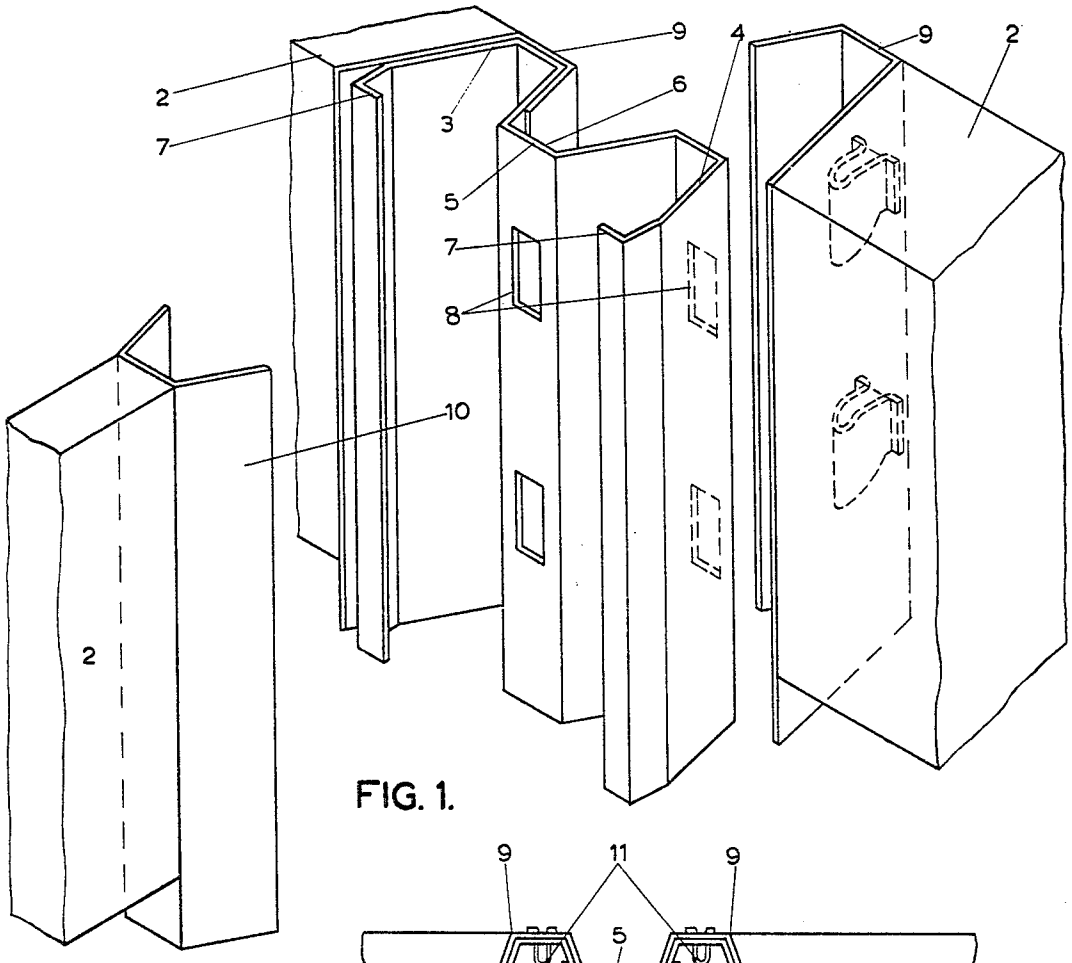


FIG. 1.

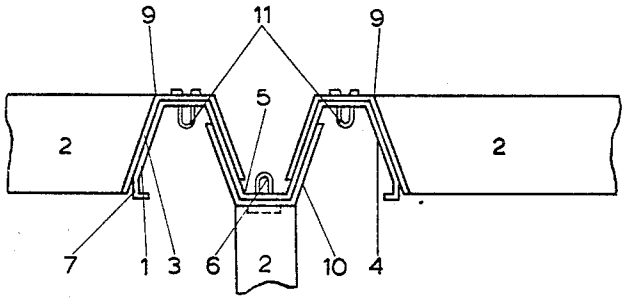


FIG. 2.

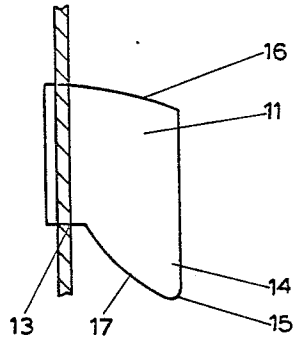


FIG. 3.

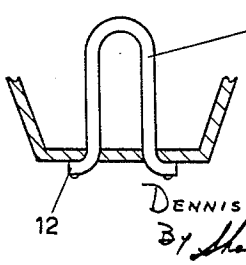


FIG. 4.

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SUPPORTING STRUCTURES

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Int. Cl. A47f 5/10
U.S. Cl. 211—177 4 Claims

ABSTRACT OF THE DISCLOSURE

A boltless racking system embodying beams detachably engaged by uprights the uprights shaped as identical oppositely directed contiguous bends and the abutting portions of the beams being of complementary shape.

This invention relates to supporting structures comprising columns and beams and more particularly to such structures which require no nuts and bolts or other additional fastening means to secure the parts together.

Structures of the type above referred to are known generally as boltless racking systems and are used both to provide shelved storage facilities and also have been used to provide skeletons to be suitably clad to form buildings.

It is the object of this invention to provide a racking system which will have generally at least the versatility of known systems combined with a high strength to weight ratio.

According to this invention there is provided a boltless racking system comprising uprights and beams each upright shaped in cross-section as a pair of substantially identical oppositely directed contiguous bends, said beams embodying connectors having one part of coupling means on said connectors, the uprights having co-operating parts of the coupling means to enable beams to be connected to the uprights at right angles and in line with each other and each connector shaped to extend around at least part of a bend in the upright.

Further features of this invention provide for the bends of the upright cross-section to be sharp angled bends and also for there to be three bends forming two pairs of bends as above set forth with parts of the centre bend having portions common with the outer bends.

The invention is illustrated diagrammatically in the accompanying drawings in which:

FIG. 1 is an isometric view of portion of the racking assembly,

FIG. 2 is a plan of FIG. 1 but with all parts connected, and

FIGS. 3 and 4 are an enlarged sectional side elevation and plan respectively showing the form of locking tongues used in the assembly.

As shown in the drawings there are provided uprights 1 adapted to be connected to horizontal beams 2. The uprights 1 are made from metal of suitable gauge to meet particular requirements and will be formed to have a cross-section in the shape of two truncated adjacent V sections 3, 4 with the contiguous arms of the V sections jointed together by a web 5 forming a centre section 6 having parts in common with the outer sections 3, 4.

The free ends of the outer arms of the V's may have flanged extensions 7 at angles thereto to provide added strength to the uprights 1 if such is required.

As will be seen from the drawings the outer sections 3, 4 of the uprights 1 are similarly directed to each other and oppositely directed to the adjacent centre section 6. The basic form of upright according to this invention

embodies only two adjacent bends such sections 3, 6 but the addition of the third section 4 gives considerable structural advantages.

Spaced rectangular slots 8 are formed in the truncated apices of sections 3, 4 and also in the web 5 which forms a truncated apex of section 6.

At the end of each beam 2 is secured a connector 9 or 10 of truncated V-shape complementary to at least the portions of the sections 3, 4, 6 in the vicinity of the truncated apices thereof. The beams 2 which are required to extend parallel to the width of the upright 1 are secured to one side of the corresponding connector 9 whereas the beams 2 required to extend at right angles to the width of the upright are secured to the truncated apex of the corresponding connector 10.

Secured to the truncated apices of the connectors 9, 10 are suitably shaped locking lugs 11 shaped to engage through the slots 8. As shown in FIGS. 3 and 4 the lugs 11 are of channel shape with outwardly bent edges forming flanges 12. The lugs 11 each comprise a short stem 13 having the flanges 12 at one end and a downwardly extending tongue 14 at the other. The tongue 14 is tapered from the bottom of the front end 15 up to the stem 13 and the top surface 16 of the tongue 14 also tapered downwardly. The whole assembly may be inexpensively made in the form of a metal pressing.

The tongue 14 of each lug 11 is fitted through a suitably positioned slot in a connector 9 or 10 to project from the exposed face of said connector, the flanges being spot welded or otherwise secured to the opposite face of the connector. A sufficient length of the stem 13 also projects from the connector to accommodate the metal thickness of the pillar 1 engaged by the tongue 14.

To connect the beams 2 to the uprights 1 the connectors 9, 10 are abutted against the corresponding sections 3, 4, 6 with the tongues 14 projecting through the slots 8 and the beams are then lowered.

The inclined surfaces 17 of the tongues cause them to ride inwardly on the bottom surfaces of the slots 8 drawing the connectors 9, 10 into close contact with the uprights and holding them in this position. The procedure is reversed to disconnect the beams from the uprights.

It will be seen that with the assembly above described and in particular due to the shaping of the connectors 9, 10 to extend around the bends of sections 3, 4, 6 and also due to the connectors having portions inclined at angles to the beams 2 a strong and stable structure is achieved.

If the racking structure is required to carry heavy unbalanced loads there may be a tendency for the tongues 14 to move out of the slots 8. This may easily be prevented by the use of suitable diagonal bracing or removable locking pins to prevent the tongues moving upwardly.

Instead of using lugs of the shape illustrated conventional tongues punched from the connectors engaging in slots or pockets may be used. However, it is preferred to use the type of lug illustrated as they provide intrinsic strength comparable to the remainder of the structure.

If desired the beams and particularly those extending parallel to the width of the uprights may have the top inner edges rebated to accommodate and locate wooden shelving or the like.

The shape of the uprights may also be varied and may for example be in the form of V sections, U-sections semi-circular sections or the like, the connectors being made of corresponding complementary shape.

What I claim as new and desire to secure by Letters Patent is:

1. A boltless racking system comprising uprights and beams each upright shaped in cross-section as a series of three substantially identical bends positioned in line and with the center bend having parts in common with and

being oppositely directed to the end bends, spaced slots in each of said bends, connectors embodied in said beams, coupling means on said beams cooperating with said slots in the uprights to connect the beams to the uprights with adjacent beams extending in line and at right angles to each other, and with each connector being of complementary shape to and embracing a separate bend of an upright.

2. A boltless racking system as in claim 1 in which said coupling means comprise lugs on the connectors, said lugs comprising a stem and a downwardly extending tongue with the lower portion of the tongue sloping upwardly towards the stem.

3. A boltless racking system as claimed in claim 1 in which said coupling means comprise sheet metal lugs bent to U shape in cross section, said lugs embodying a stem and tongue downwardly projecting from the stem with the lower portion of the tongue sloping upwardly towards the stem.

4. A boltless racking system as claimed in claim 1 in which the said bends are of truncated V shape.

References Cited

UNITED STATES PATENTS

2,508,032	5/1950	Kennedy	211—182 XR
2,925,181	2/1960	Saul et al.	211—148 XR
3,278,043	10/1966	Kimpton	211—148

FOREIGN PATENTS

293,573	4/1965	Netherlands.
985,765	3/1965	Great Britain.
1,110,473	7/1961	Germany.
1,445,566	6/1966	France.

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