

[54] **SHELVING UNIT**

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[51] Int. Cl. **A47b 17/02**

[58] Field of Search **108/27, 60, 64, 107, 144, 108/155, 156, 110, 114; 312/108, 111, 257 R, 257 A, 257 SM, 195, 257 SK; 211/177, 148; 52/280-282, 753 D**

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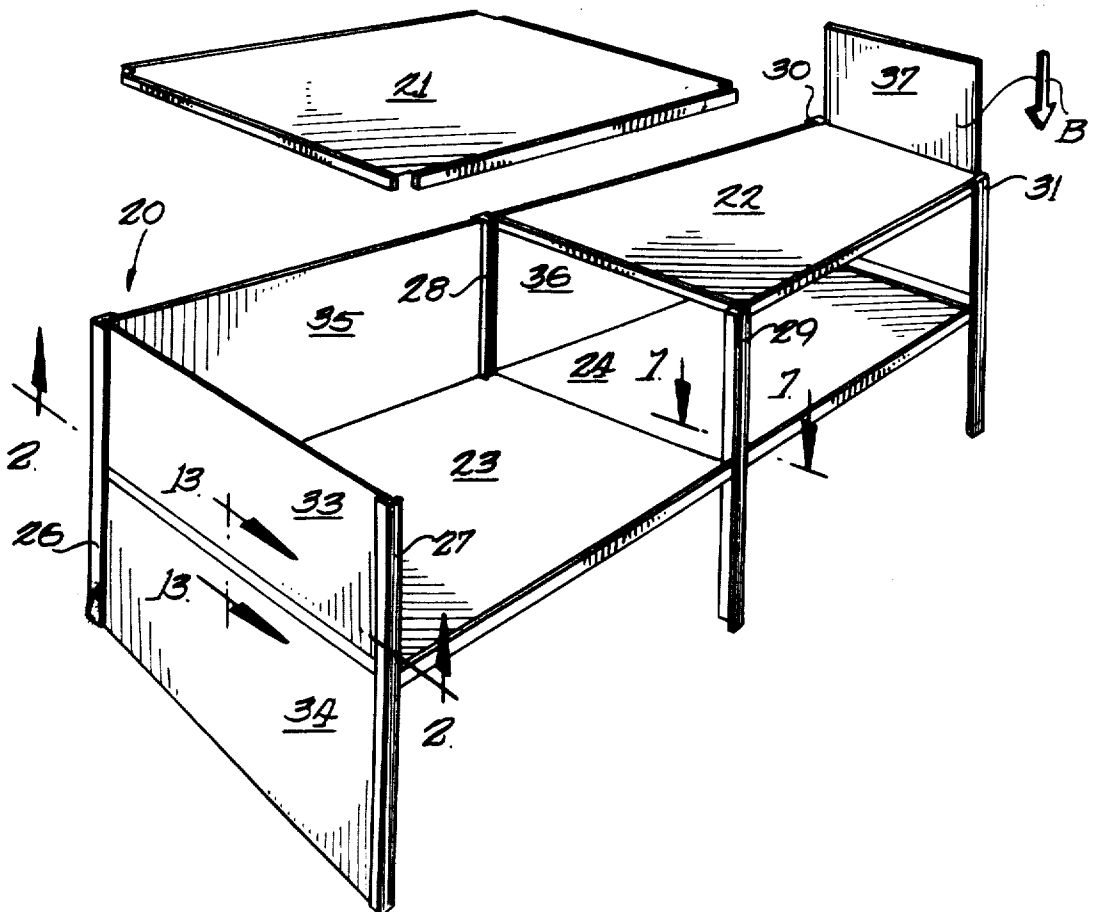
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[57]

ABSTRACT

A shelving structure is disclosed, wherein space-enclosing side panels can be secured between assembled legs and shelves. The legs are provided with inset inner perimeter sections which form flanges spaced apart from the shelf margins. Between the flanges and the shelf margins, the panels are secured. The shelves are attached to the legs by novel brackets which are preliminary attached to the shelves by dogleg-shaped tangs.

7 Claims, 13 Drawing Figures



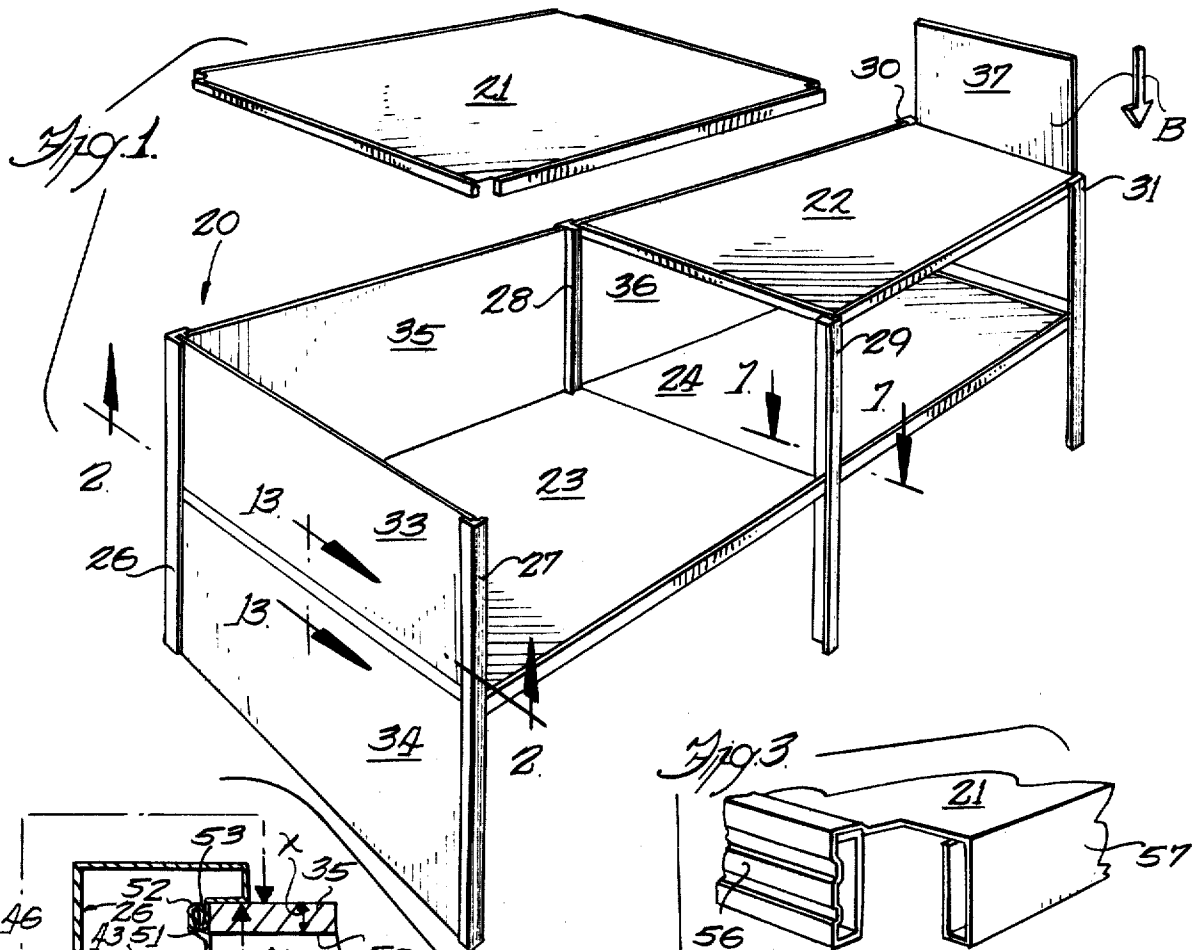
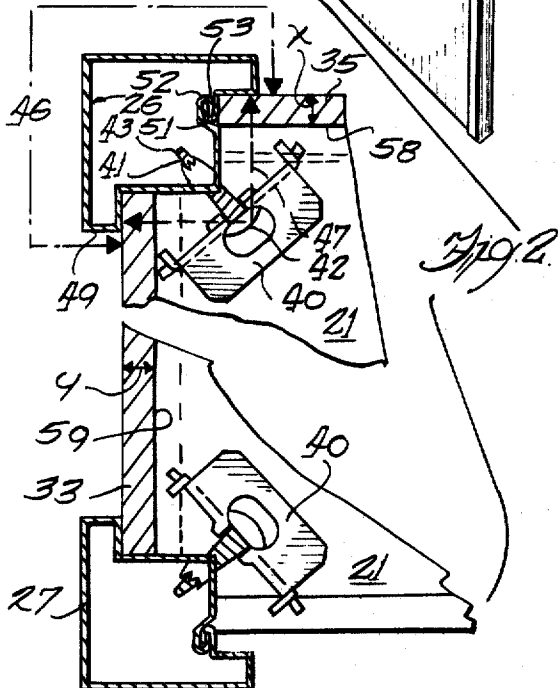
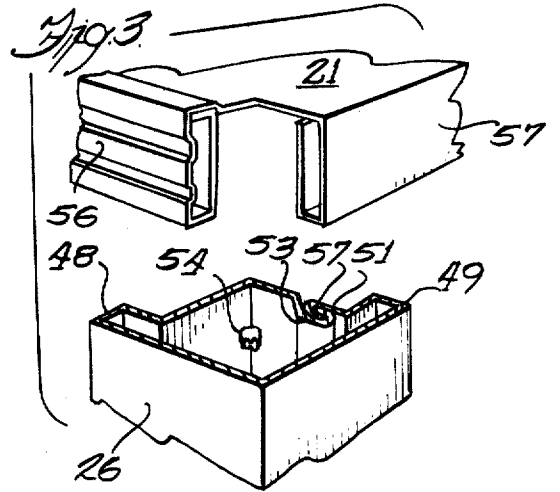
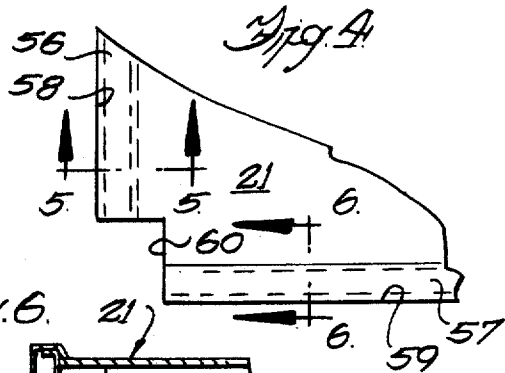
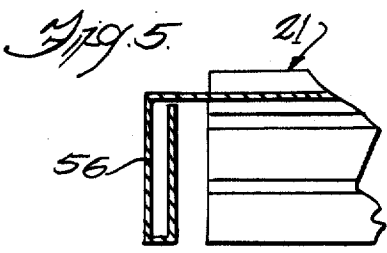
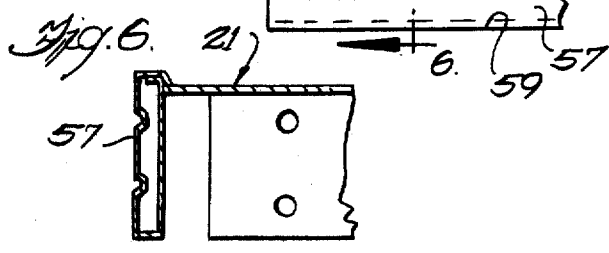


Fig. 7.

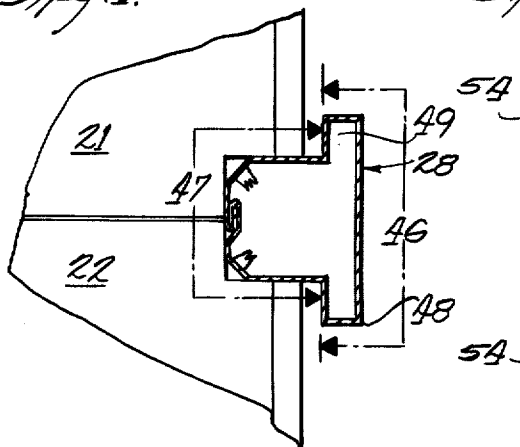


Fig. 8.

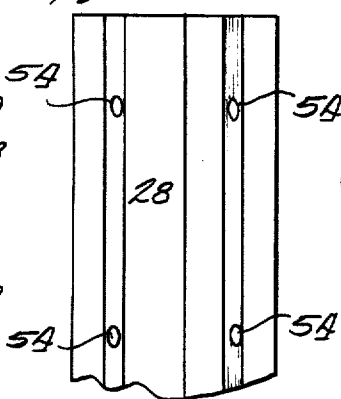


Fig. 9.

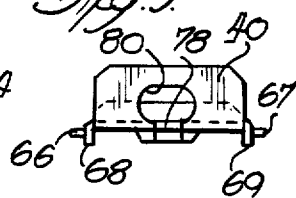


Fig. 10.

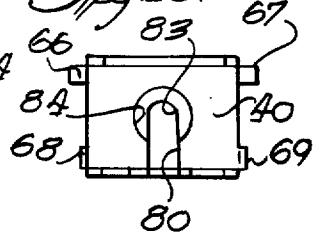


Fig. 11.

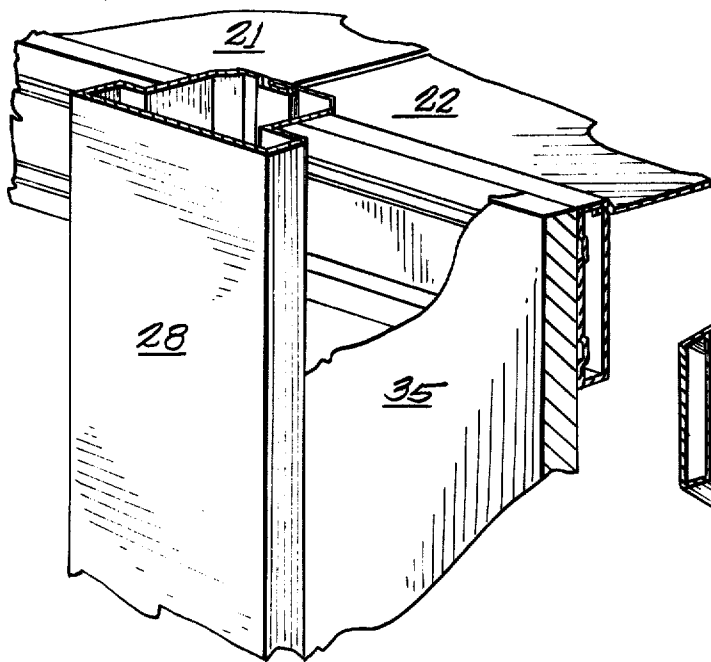


Fig. 12.

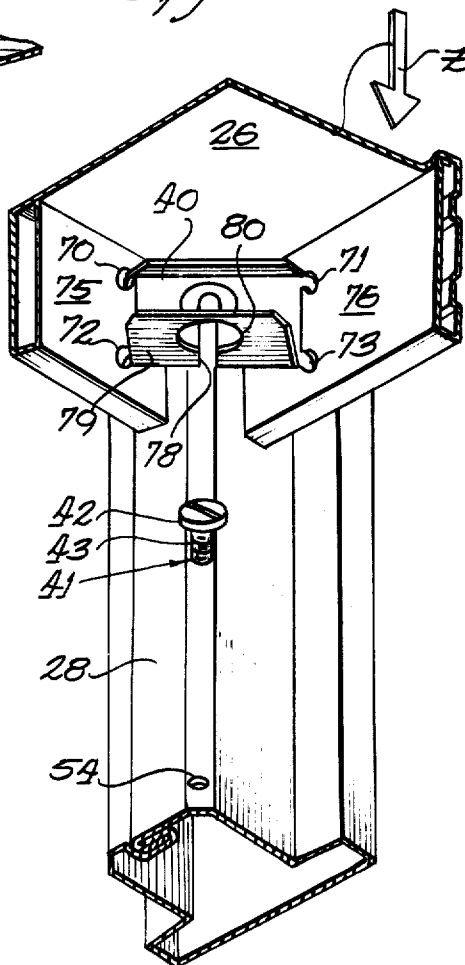
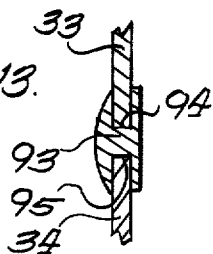


Fig. 13.



SHELVING UNIT

BACKGROUND OF THE INVENTION

This invention relates generally to shelving structures, and more particularly to shelving structures which can be assembled by end users into individually required shapes and arrangements.

Shelving structures and assemblies which can be shipped or transported in a relatively disassembled condition are meeting with great commercial success in the modern marketplace. On such commercially successful structure is that described and claimed in U.S. Pat. No. 3,677,416 to Block et al. This shelving can be assembled by users into a structure having an extent, shape and arrangement required by the users' individual requirements. Any improvement over prior devices which affords ease and rapidity of assembly is a desirable and important contribution to the art.

It is the general object of this invention to provide improved shelving at low cost, which can be quickly and easily assembled into a rigid, sturdy structure by even inexperienced personnel.

It is a more specific object of the invention to provide a shelving structure wherein the parts can be drawn tightly together, eliminating relative play or part movement.

Yet another object is to provide a shelving structure wherein the parts can be preliminarily assembled without tools of any kind. A related object is to provide such a shelving structure wherein the final assembly can be completed without any special tools.

A further object is to provide a shelving structure wherein the various parts positively lock together.

It is a still further object of the invention to provide a shelving structure wherein the locking mechanism is in a location easily accessible yet normally hidden from view, thereby enhancing the attractiveness of the structure without detracting from its ease of assembly.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings. Throughout the description, like reference numerals refer to like parts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an overall perspective view showing a shelving structure fabricated and erected in accordance with the present invention;

FIG. 2 is a sectional view taken substantially in the plane of line 2—2 in FIG. 1 and showing in further detail a typical shelf and several legs and connecting brackets associated with the present invention;

FIG. 3 is an exploded fragmentary perspective view showing a typical shelf and leg associated with the present invention;

FIG. 4 is a fragmentary plan view of a typical shelf member showing a corner thereof;

FIG. 5 is a sectional view taken substantially in the plane of line 5—5 in FIG. 4 and showing in further detail the construction of one portion of the shelf members;

FIG. 6 is a sectional view taken substantially in the plane of line 6—6 in FIG. 4 and showing in further detail the construction of another portion of the shelf member;

FIG. 7 is a fragmentary sectional view taken substantially in the plane of line 7—7 in FIG. 1 and showing in

further detail the interrelationship of a typical leg and adjacent shelf members;

FIG. 8 is a fragmentary elevational view of the leg member shown in FIG. 7;

FIG. 9 is a relatively plan view of the novel bracket member associated with the present invention;

FIG. 10 is a relatively elevational view of the bracket member shown in FIG. 9;

FIG. 11 is a fragmentary perspective view of the post and shelf members shown in FIG. 7, but including side panel members interconnected therewith;

FIG. 12 is a fragmentary perspective view showing in yet further detail the manner in which the shelf, the post, and the bracket are interconnected in accordance with the present invention; and

FIG. 13 is a fragmentary sectional view taken in the plane of line 13—13 in FIG. 1 showing the interattachment of several side panel members.

DETAILED DESCRIPTION

While the invention will be described in connection with a preferred embodiment, it will be understood that it is not intended to limit the invention to that embodiment. On the contrary, it is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention.

Turning first to FIG. 1, there is shown a shelving structure 20 manufactured and erected in accordance with the present invention. In general, this structure 20 includes shelves 21—24, inclusive, which are here supported on legs 26—31, inclusive. Side panels 33—37 are mounted to the structure, and they extend between vertically adjacent shelves and/or a floor to at least partially enclose a volume of space between the panels and the shelves.

As illustrated in FIGS. 2, 3 and elsewhere a typical portion of this shelving structure comprises an elongated leg member 26, a shelf member 21, and means for mounting the shelf 21 to the leg 26 at a predetermined location and in a rigid, sturdy and wobble-free manner. This interconnecting means includes a slotted bracket member 40 and a stud 41 having an enlarged head 42 and a reduced stem 43. In the illustrated embodiment, it will be seen that the stud takes the form of a metal screw, the enlarged head 42 being slotted for engagement by a screwdriver, and the stem being a threaded screw shank. This stud can be screwed into and out of the leg by appropriate manipulation of the screwdriver. Alternatively, a nut and bolt arrangement can be provided wherein a nut (not shown) takes the place of the screw; the nut can be moved toward or away from the leg 26 by a wrench. Still further, a headed rivet stud of appropriate shape could be used as the stud member 41.

In accordance with one aspect of the invention, the elongated leg member 26 is formed to accept and encourage the attachment of the shelf 21 and the bracket 40 in a rigid and wobble-free manner. To this end, the leg is formed with an outer perimeter section 46. An inner perimeter section 47 is inset with respect to the outer perimeter section 46, as illustrated in FIG. 2. The inset relation of the inner perimeter section 47 relative to the outer perimeter section 46 forms, in the illustrated leg 26, two leg flange portions 48 and 49. As illustrated in FIG. 7 for example, appropriate orientation of the inset inner perimeter section 47 relative to the

outer perimeter section 46 results in alternate locations of the flanges 48 and 49 on the leg 28.

In the illustrated embodiment, the leg 26 is formed of a rolled steel, and can be coated or otherwise covered in any desired manner, such as with a simulated wood grain finish. The leg 26 is formed of a single sheet of fabricating material such as sheet steel, and the edges 51 and 52 of the fabricating material are interlocked in a pressed knuckle grip 53 which extends substantially the entire length of the leg 26. Appropriately formed holes 54 accommodate the studs 41; these holes can be provided with a thread-accommodating configuration, if necessary.

In further accordance with the invention, the shelf 21 is adapted to engage the leg in a manner permitting the insertion of side panels between the leg flanges 48 and 49 and the shelf 21 itself. To this end, the shelf is provided with depending skirts 56 and 57 extending along the shelf margins 58 and 59. In addition, the shelf is provided with a cutaway corner portion 60 which is adapted to mate with a portion but not all of the inner leg perimeter section 47, as illustrated in FIG. 2 and elsewhere. When the shelf cutaway corner 60 is urged into abutting relation with the inner perimeter section 47 of the leg 26, the shelf margins 58 and 59 are oriented adjacent to but spaced apart from the leg flanges 48 and 49 by respective predetermined distances X and Y. These predetermined distances X and Y, between the shelf and the leg flanges, are selected to substantially equal the thicknesses of the vertical panel members 33 and 35 to permit their insertion between the leg flanges and the shelf margins.

It will be understood that an interference fit for the panels can be provided by selecting appropriate dimensions for the cutaway shelf corner 60, the outer leg perimeter section 46 and the inner leg perimeter section 47. In such cases, the predetermined distances X and Y can be selected to be slightly less than the thicknesses of the panels 33 and 35 intended to be retained upon the shelving structure. So selecting the distances X and Y allows the panels 33 and 35 to be fitted into the shelving structure 20 with a slight interference fit to insure their rigid retention upon the shelving structure. The degree of interference will, it will be understood, at least partly determine the degree of rigidity with which the associated panels 33 and 35 are retained upon the shelving structure 20. In the illustrated embodiment, all the legs 26-31 are provided with at least two leg flanges, thereby permitting the insertion of at least two space-enclosing panel members between the leg members and the adjacent shelf members mounted thereto. When a plurality of shelves 21-24 are mounted to the legs 26-31 at a corresponding plurality of locations spaced vertically apart along the legs, and when panels 33-37 are installed as illustrated and described between adjacent shelves or between a shelf and a floor, a volume of storage space is enclosed on at least some sides. This partially enclosed storage space is especially useful for storing irregularly shaped articles or deformable articles which cannot be stacked or shelved securely.

In carrying out the invention, the bracket 40 is adapted for installation upon both the shelf 21 and the leg 26 in a preliminary position without the use of any tools. By using a common tool such as a screwdriver, the bracket 40, leg 26, and shelf 27 can be tightened together from the preliminary assembly configuration

into a final interrelationship. To this end, the bracket 40 is provided with four tangs 66-69, inclusive. These tangs 66-69 are inserted into holes 70-73, inclusive, formed in depending shelf skirts 75 and 76. At least two of the tangs 68 and 69 take the form of offset doglegs, and initially engage and retain the bracket 40 upon the adjacent skirt 75 and 76. The two remaining tangs 66 and 67 take the form of finger inserts and also engage the skirts 75 and 76.

Assembly of the shelving is easy and quick. First, the bracket 40 is preliminarily installed upon the shelf 21. Then, with the shelf 21 positioned against the leg 26 at a position slightly above the stud 41 as illustrated in FIG. 12, the shelf 21 and bracket 40 are urged downwardly along the leg in the direction indicated by an arrow Z to engage the stud member 41. This stud 41 has been preliminarily positioned so that the stud extends only partially into the leg 26, a stem portion 43 and the head portion 42 projecting from the leg 28. When the shelf 21 and bracket 40 are moved further downward in the direction indicated by the arrow A, the stud stem 43 passes through a slot 78 formed in a flange 79 on the generally L-shaped bracket 40. The first slot 78 has an enlarged portion 80 to accommodate the passage of the stud enlarged head portion 42. Thereafter, the bracket 40 accommodates further downward movement over the stud stem 43 by means of a second slot 81. Since the stud head 42 is larger than the width of the slot 81, the head 42 at least partly covers the slot 81 during this movement.

At a terminal end 83 of the second slot 81, a recessed area 84 is formed. As the bracket 40 reaches the termination of its downward motion over the stud 41 and the stud stem 43 engages the terminal portion of the slot 83, the stud head 42 is superimposed over this recessed area 84. With the various parts positioned in this manner, a screwdriver or other suitable tool can be utilized to urge the stud 41 further into the leg, thereby drawing the stud head 42 firmly into the bracket recess 84. Simultaneously, the bracket tangs 66-69 more firmly engage the peripheries of the shelf skirt tang holes 70-73, inclusive. As the stud 41 is tightened progressively further into the leg 26, the bracket 40 and the engaged shelf 21 are drawn progressively toward the leg 26, and into progressively tighter engagement therewith.

After the shelf 21 has been at least preliminarily attached to the leg 26, the adjacent side panels 33 and 35 can be inserted, as by sliding the panels along the axis of the leg 26 between the leg flanges 48 and 49 and the adjacent shelf skirts 58 and 59 as indicated by the arrow B in FIG. 1.

If desired, the two vertically adjacent side panels 33 and 34 can be interattached as illustrated in FIG. 13. An interconnector 93 having a generally H-shaped cross-sectional configuration can be included and positioned between the legs 26 and 27. The adjacent side panels 33 and 34 are then slipped into panel-accommodating notches 94 and 95 formed in the interconnector 93. This arrangement provides a smooth yet strong interconnection of the panels 33 and 34, and can contribute to the overall strength of the shelving structure. If desired, the outer surface and/or the inner surface of the interconnector 93 can be coated or otherwise prepared with a simulated wood grain or other attractive finish similar to that provided on the legs 26-31. This surface provides a neat and finished appearance to the overall shelving structure.

The invention is claimed as follows:

1. A shelving structure comprising at least one elongated leg member having an outer perimeter section and an inner perimeter section inset with respect to the outer perimeter section to form at least one leg flange, a margined shelf member having skirt portions extending along the shelf margin and a cutaway corner portion adapted to mate with only a portion of said leg inner perimeter section for orienting the shelf margin adjacent to, but spaced apart from, the leg flange by a predetermined distance, said predetermined distance between the leg flange and the shelf skirt substantially equalling the thickness of a panel member thereby permitting the insertion of the panel member between the leg flange and the shelf margin and retention of the panel member between the leg flange and the shelf margin, and shelf-leg connecting means for mounting the shelf to the leg at a predetermined location.

2. A shelving structure according to claim 1 wherein said shelf-leg connecting means includes a stud member having a head and a stem and affixed to said leg member, and a slotted bracket member adapted to engage said shelf skirts and further adapted to slide over the stud stem with the stud head at least partly covering the bracket slot to locate at least one shelf skirt at a position spaced apart from said leg flange by said predetermined distance.

3. A shelving structure according to claim 2 wherein said slotted bracket is provided with tangs for engaging said shelf skirts, at least two tangs taking the form of outwardly extending offset doglegs for engaging and

initially retaining the bracket member between adjacent skirt portions of said shelf, and at least two tangs taking the forms of finger inserts for engaging the skirt portions and extending generally perpendicularly to the ends of said outwardly extending offset doglegs, said tangs cooperating to draw the bracket member and engaged skirt portions toward said leg member as said stud head is moved toward said leg member.

4. A shelving structure according to claim 1 wherein a plurality of shelves are mounted to said leg at a corresponding plurality of locations spaced apart along said leg, and further including panel members extending between adjacent shelves to at least partially enclose a volume of space between said panel members and said shelf members.

5. A shelving structure according to claim 4 including a leg member having two leg flanges, thereby permitting the insertion and retention of at least two panel members between said leg member and shelf members mounted thereto.

6. A shelving structure according to claim 4 wherein said panel members are secured between said leg member flanges and said shelf member by an interference fit.

7. A shelving structure according to claim 1 wherein said leg member is a hollow, single continuous sheet member, the edges of said single sheet forming said leg being interlocked in a continuous pressed knuckle grip extending substantially the entire length of the leg.

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