

[72] Inventor **Irving W. Shell**
442 Wellington, Chicago, Ill.
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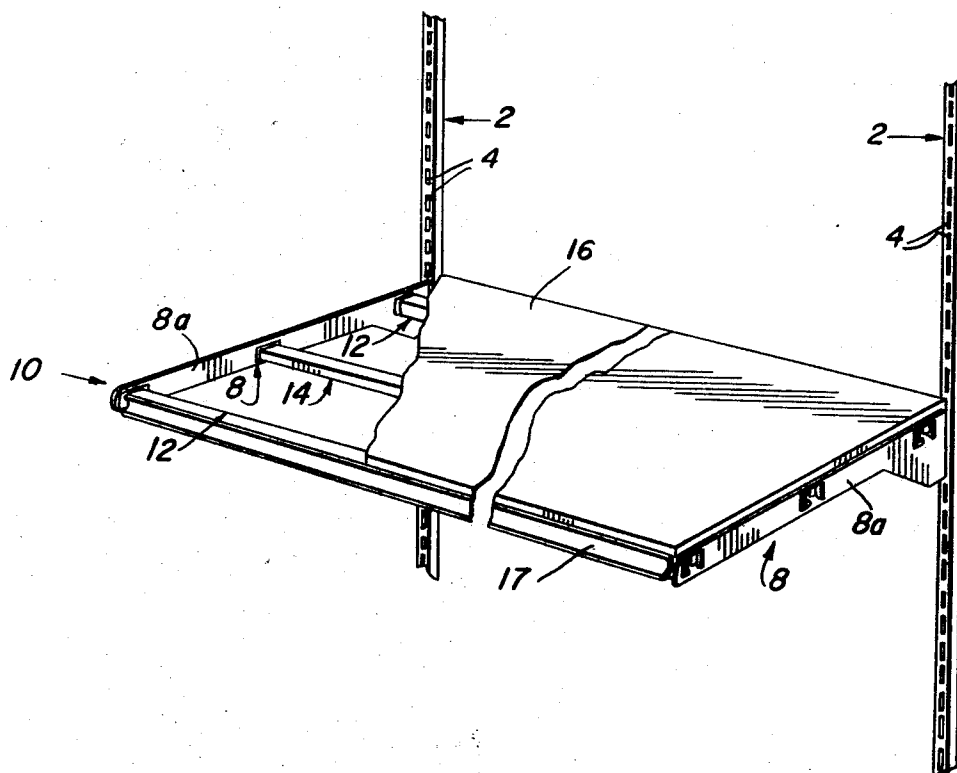
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Primary Examiner—Ramon S. Britts
Attorney—Wallenstein, Spangenberg, Hattis & Strampel

[54] **SHELF SUPPORTING STRUCTURE AND JOINT THEREFOR**
10 Claims, 9 Drawing Figs.

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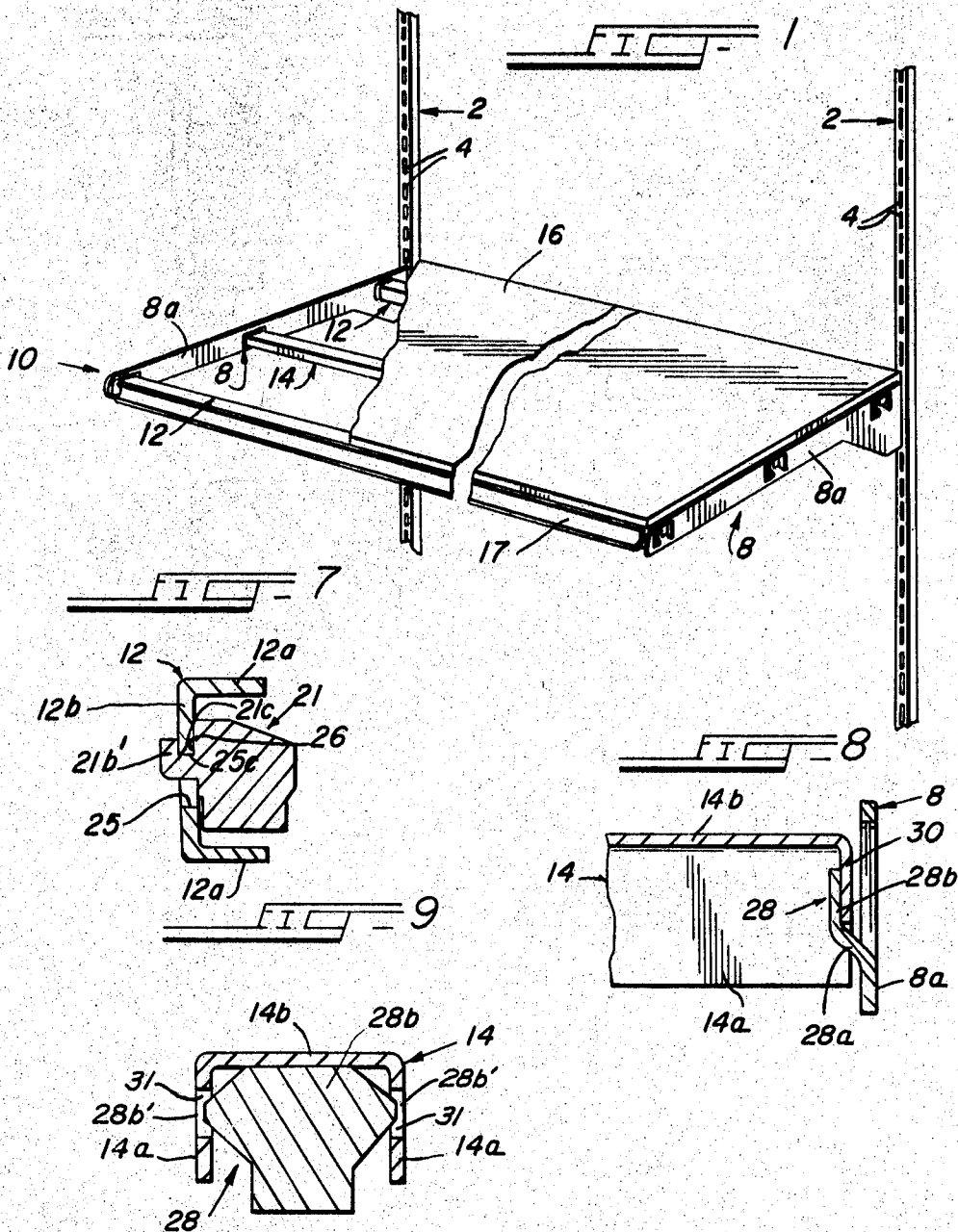
ABSTRACT: A shelf supporting structure comprising a pair of horizontally spaced brackets and a plurality of horizontal shelf supporting members extending therebetween and including an interlocking joint between the brackets and the respective ends of each of the shelf supporting members, the joint comprising: a mounting tongue extending upwardly from the bracket, a tongue extending downwardly from the shelf supporting member into interlocking facial contact with the mounting tongue of said bracket, the shelf supporting member having a downwardly vertically extending wall portion having a laterally facing opening therein and into which extends a hooked-shaped projection of the tongue of said bracket which hooked-shaped projection hooks upwardly around the defining edge of said laterally facing opening.



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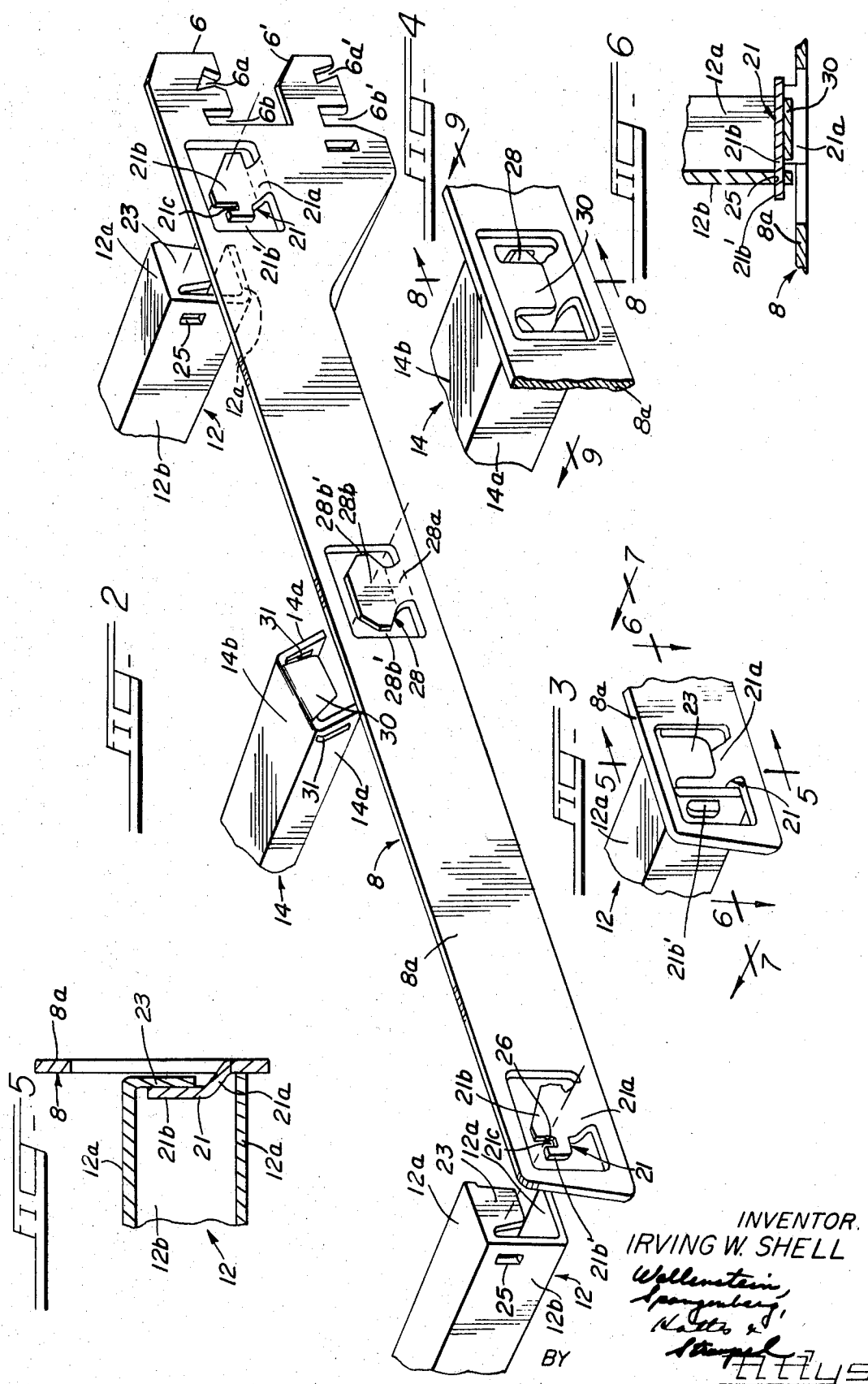
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SHEET 1 OF 2



INVENTOR.
IRVING W. SHELL

BY *Wallenstein, Spangenberg,
Harris & Stumpf* ATTORNEYS.



SHELF SUPPORTING STRUCTURE AND JOINT THEREFOR

This invention relates to joints for interconnecting various structural members, particularly horizontal shelf supporting frame members used in store display and storage racks and the like.

Display and storage racks frequently include shelving supported on horizontal frame members secured to brackets which are mountable at selected elevations in slotted uprights. In some cases, the end user prefers the frame members to be welded to the brackets and in other cases prefers the frame members to be separable from the brackets.

The present invention provides interlocking joints for structural support members, such as for the interconnection of the aforementioned horizontal shelf supporting frame members with the brackets, where the joints are designed selectively to form easily weldable joints or secure joints which can be easily separated and reassembled, where desired.

The features of the invention will become apparent upon making reference to the specification to follow, the claims and the drawings wherein:

FIG. 1 is a perspective view of a shelf assembly with horizontal shelf supporting frame members interlocked with horizontal brackets through joints constructed in accordance with the invention;

FIG. 2 is an exploded perspective view of the interlocking portions of the horizontal frame members and bracket at one end of the shelf assembly;

FIG. 3 is a perspective view of the assembled joint interconnecting a bracket with a channel member forming one of the horizontal frame members, where the channel member has horizontally oriented flanges;

FIG. 4 is a perspective view of the assembled joint interconnecting a bracket with a channel member forming one of the horizontal frame members, where the channel member has vertically oriented flanges;

FIG. 5 is a vertical section through FIG. 3, taken along section line 5-5 therein;

FIG. 6 is a horizontal section through FIG. 3, taken along section line 6-6 therein;

FIG. 7 is a vertical section through FIG. 3, taken along section line 7-7 therein;

FIG. 8 is a vertical section through FIG. 4, taken along section line 8-8 therein; and

FIG. 9 is a vertical section through FIG. 4, taken along section line 9-9 therein.

Refer now to the drawings, which show an application of the invention to a display or storage rack structure which includes horizontally spaced uprights 2-2 having vertically spaced slots 4-4 into which may be extended the teeth 6-6' of a pair of brackets 8-8 of a shelf assembly 10. The brackets 8-8 are most advantageously sheet metal stampings which, when the brackets are mounted in place on the uprights 2-2, present vertically wall surfaces or faces in vertical planes on generally horizontally extending bracket arms 8a-8a. A number of such shelf assemblies 10 may be mounted at different elevations along the uprights 2-2 to form any desired shelving arrangement.

Each shelf assembly 10, in addition to the brackets 8-8, includes front and rear horizontal shelf supporting frame members 12-12 which are, most advantageously, channel members having vertically spaced flanges 12a-12a oriented horizontally and a web 12b oriented vertically and extending between the inner ends of the flanges 12a-12a. The front and rear channel members 12-12 extend between and are interlocked with the generally horizontally extending arms 8a-8a of the brackets 8-8. The arms 8a-8a of the brackets 8-8 may extend in a perfectly horizontal plane or may be tilted a small angle with respect thereto. In the shelf assembly shown in the drawings, the adjustability of the angle of the brackets 8-8 is dependent upon the manner in which bracket teeth 6-6' engage with the upright slots 4. Thus, the bracket teeth 6-6' include a number of slots 6a, 6b, 6a' and 6b' which engage in different combinations with the defining walls of the upright slots, as fully dis-

closed and claimed in U.S. Pat. No. 3,346,226 granted on Oct. 10, 1967.

The shelf assembly also includes one or more intermediate shelf supporting frame members 14 between the front and rear shelf supporting frame members 12-12. Each intermediate shelf supporting frame member 14 most advantageously comprises a channel member with its flanges 14a-14a extending vertically downwardly from a web 14b. A shelf 16 rests upon the uppermost flanges 12a-12a of the channel members 12-12 and the webs 14b of each intermediate channel member 14. A molding 17 is provided for covering the forwarding facing side front channel member 12, the molding 17 hooking over the top of the channel member 12, as shown in FIG. 1.

As previously indicated, the present invention when applied to shelving construction relates to the manner in which the horizontal shelf supporting frame members 12, 14, etc. interlock with the horizontal extending bracket arms 8a-8a. To this end, each bracket arm 8a has preferably struck therefrom front and rear mounting tongues 21-21 which are designed to interlock with the adjacent ends of the front and rear channel members 12-12. Each of the tongues 21 has a base portion 21a which inclines inwardly away from the vertical plane of the bracket arm 8a and an outer portion 21b which extends in a plane parallel to and spaced from the plane of the bracket arm 8a. The outer portion 21b of each tongue 21 has an upwardly extending hooked-shaped section 21b' which is in the same plane as the rest of the outer portion 21b of the tongue 21. An upwardly opening slot 21c separates the hooked-shaped projection 21b' from the main body of the outer portion 21b of the tongue 21. The slot 21c has a width equal to or slightly greater than the thickness of the vertical web 12b of the channel member with which it interlocks as illustrated.

There is provided at each end of each channel member 12 a depending tongue 23 which extends only part way across the space between the flanges 12a-12a. The channel member tongue 23 is sized to fit into the space between the associated bracket arm tongue 21 and make extensive facial interlocking engagement with the tongue 21. There is provided at each end of the vertical web 12b of each channel member 12 a hook-receiving opening 25 through which the hook-shaped section 21b' of the bracket arm tongue 21 readily passes. The width of each opening 25 is equal to or slightly greater than the thickness of the hooked-shaped section 21b'.

Each channel member tongue 23 is positioned in interlocking engagement with the bracket arm tongue 21 by moving the ends of the channel member flanges 12a-12a over the side of the tongue 21 on which the hooked-shaped section 21b' of the tongue 21 is located, to bring the channel member into a position where the hooked-shaped section 21b' of the bracket arm tongue 21 projects through the web opening 25 and the channel member web 12b abuts a shoulder 26 on the tongue 21 above the hooked-shaped section 21b'. Then, the channel member 12 is allowed to drop so that the upper defining edge 25a of the web opening 25 rests upon the bottom defining wall of the slot 21c where the hooked-shaped section 21b' of the tongue 21 hooks around and interlocks with the channel member 12. The channel member tongue 23 then is in facial interlocking contact with the bracket arm tongue 21. The channel member 12 is then fully interlocked with the bracket arm tongue 21 so that the channel member 12 cannot be removed from the tongue 21 without first raising the channel member 12 and then pulling the same horizontally from the tongue 21. It is apparent that the weight of the shelf 16 and any articles carried thereby will keep each of the channel members 12-12 solidly in place on the associated bracket arm tongues 21-21.

For mounting each end of each intermediate channel member 14 there is provided on each bracket arm 8a a mounting tongue 28 preferably struck from the bracket arm 8a. The tongue 28 has a base portion 28a inclining inwardly away from the plane of the bracket arm 8a and an outer portion 28b which extends in a plane parallel and spaced from the plane of

the bracket arm 8a. The outer portion 28b of each tongue 28a has forwardly and rearwardly extending tapered projections 28b'-28b'.

At each end of each intermediate channel 14 there is provided a tongue 30 which extends vertically downwardly from the outer edge of a horizontal web 14b. The tongue 30 is sized to interlock and make extensive contact with the outer portion 28b of the tongue 28 of the bracket arm 8a. The vertical flanges 14a-14a of each intermediate channel member 14 are provided at each end thereof with a tongue receiving opening 31 having a width equal to or slightly greater than the thickness of the associated bracket arm tongue 28. The distance between the outermost edges of the tapered tongue projections 28b'-28b' is greater than the space between the flanges 14b-14b so that the projections 28'-28' will enter the flange openings 31-31 when the channel member 14 is positioned over the tongue 28. The end of an intermediate channel member is mounted upon the associated bracket arm tongue 28 by tilting the channel member 14 so that one flange 14a is higher than the other, as shown in FIG. 2. Then, the lower flange is slid into a position where the tongue 30 is in interlocking facial contact with the bracket arm tongue 28 and the tapered projection 28' enters the opening 31 of the lower flange 14a. The shelf supporting member is then turned into a horizontal position by a slight rotational motion thereof which will bring the other tapered tongue projection 28b' into the associated flange opening 31.

The exposed faces of the interlocking pairs of tongues 21-23 and 28-30 are readily accessible to the electrodes of a welding device where it is desired to weld channel members 12 and 14 to the bracket arms 8a. However, secure and stable joints are formed between the channel members and the bracket arms 8a without such welding due to the interlocking joint construction described.

It should be understood that numerous modifications may be made in the most preferred form of the invention described above without deviating from the broader aspects thereof.

I claim:

1. An interlocking joint between first and second weight supporting members respectively having first and second longitudinal walls extending in mutually perpendicular direction, said joint comprising: a first tongue extending from said first longitudinal wall and having a base portion attached to said first longitudinal wall and an outer portion extending generally parallel and in spaced relation to said first longitudinal wall; a second tongue extending transversely from an end of said second member and interlocking and making facial contact with said first tongue; the oppositely facing outermost surfaces of said interlocking tongues being exposed to receive the electrodes of a welding device for welding the two tongues together, where desired; means for holding said first and second members against substantial relative movement when said interlocking tongues are unwelded comprising an opening in a wall portion of said second member extending transversely of said second longitudinal wall and a projecting portion at the side of the tongue of the first member which projecting portion passes through said opening.

2. The interlocking joint of claim 1 wherein said projecting portion is hooked shaped and hooks around the defining edge of said opening of said second member.

3. The interlocking joint of claim 1 wherein said projecting portion of said first tongue is hooked shaped and hooks around the defining edge of said opening in said second member.

4. An interlocking joint comprising first and second weight supporting members respectively having first and second longitudinal walls extending in mutually perpendicular and generally horizontal directions, said first longitudinal wall being a vertical wall; a first tongue extending upwardly in a vertical plane from and in spaced relation to said first longitudinal wall; a second tongue extending downwardly from the end of said second member into interlocking relation and making facial contact with said first tongue, the oppositely

facing outermost surfaces of said interlocking tongues being exposed to receive the electrodes of a welding device for welding the two tongues together, where desired; said second member having a vertical wall extending downwardly from one of the longitudinal margins of said second longitudinal wall which vertical wall has an opening facing in the direction of the length of said first member and a projecting portion on the side of the tongue of said first member passing through said opening.

5. The interlocking joint of claim 4 wherein said projecting portion of said first tongue is hooked shaped and hooks around the defining edge of said opening in said vertical wall of said second member.

6. The interlocking joint of claim 4 wherein said second member has, in addition to the vertical wall extending downwardly from one of the longitudinal margins of said second longitudinal wall, a second vertical wall extending downwardly from the opposite longitudinal margin of said second longitudinal wall, said last mentioned vertical wall of said second member having an opening, and said tongue of said first member has a second projecting portion extending into the latter opening.

7. In combination, a horizontally oriented channel member having horizontally extending, vertically spaced flanges and a vertical web extending between the inner ends of the flanges; a generally horizontally extending support upon which the channel member is to be mounted; said support member having a tongue extending upwardly therefrom in spaced relation thereto; the end of said channel member adjacent said support member having a tongue extending downwardly from the uppermost flange thereof into interlocking relation with said tongue of said support member, the horizontal flanges of said channel member extending above and below the support member tongue; the vertical web of said channel member having an opening thereon; the tongue of said support member having an upwardly extending, hooked-shaped projection which passes freely through said opening when the channel member is placed around the upper defining edge of the opening and moved horizontally into position over said tongue of said support member and then hooks around the upper defining edge of said opening in said vertical web of said channel member when the channel member is dropped onto said support member tongue.

8. In combination, a horizontally oriented channel member having vertically extending, horizontally spaced flanges, a horizontal web extending between the flanges and openings in said flanges near an end of the channel member; a horizontally extending support member upon which said channel member is to be mounted, said support member having a tongue extending upwardly therefrom in spaced relation thereto; the end of said channel member adjacent said support member having a tongue extending downwardly from the web thereof into interlocking relation with said tongue of said support member, the vertical flanges of said channel member straddling said support member tongue; said support member tongue having horizontally extending projections which respectively pass into said openings in said channel member flanges with sufficient clearance that the channel member can be removed from the support member tongue by a rotation and lifting motion imparted to the channel member.

9. A shelf support structure comprising: a pair of horizontally spaced brackets having generally horizontally extending arms, said bracket arms having front, rear and intermediate mounting tongues extending upwardly from the confronting sides of the bracket arms; horizontal shelf support members extending respectively between said front, rear and intermediate mounting tongues of said bracket arms, the shelf supporting members extending between said front and rear bracket arm mounting tongues and each comprising a channel member with vertically spaced horizontal flanges and a vertical web extending between the ends of the flanges, there being a mounting tongue receiving opening on the latter web at each end thereof; each shelf supporting member extending between

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a pair of said intermediate mounting tongues comprising a channel member with horizontally spaced vertical flanges extending downwardly from the longitudinal margins of a horizontal web, there being a mounting tongue receiving opening at the end of each of the latter flanges; and a tongue depending vertically downwardly from each end of each channel member into interlocking facial engagement with the associated bracket arm mounting tongues; the vertical flanges of each channel member extending between each intermediate pair of bracket arm mounting tongues and the horizontal

flanges of the channel members extending between the front and rear bracket arm mounting tongues, with the side portions of said bracket arm mounting tongues entering said tongue receiving openings in said channel members.

10. The combination of claim 9 wherein said front and rear tongues of said bracket arms have hooked-shaped projections which hook around the upper defining edges of the tongue receiving openings of the associated channel members.

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