Nov. 11, 1941. J. BROWNLIE ET AL 2,261,956

DEMOUNTABLE SHELVING

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Fig. 1.

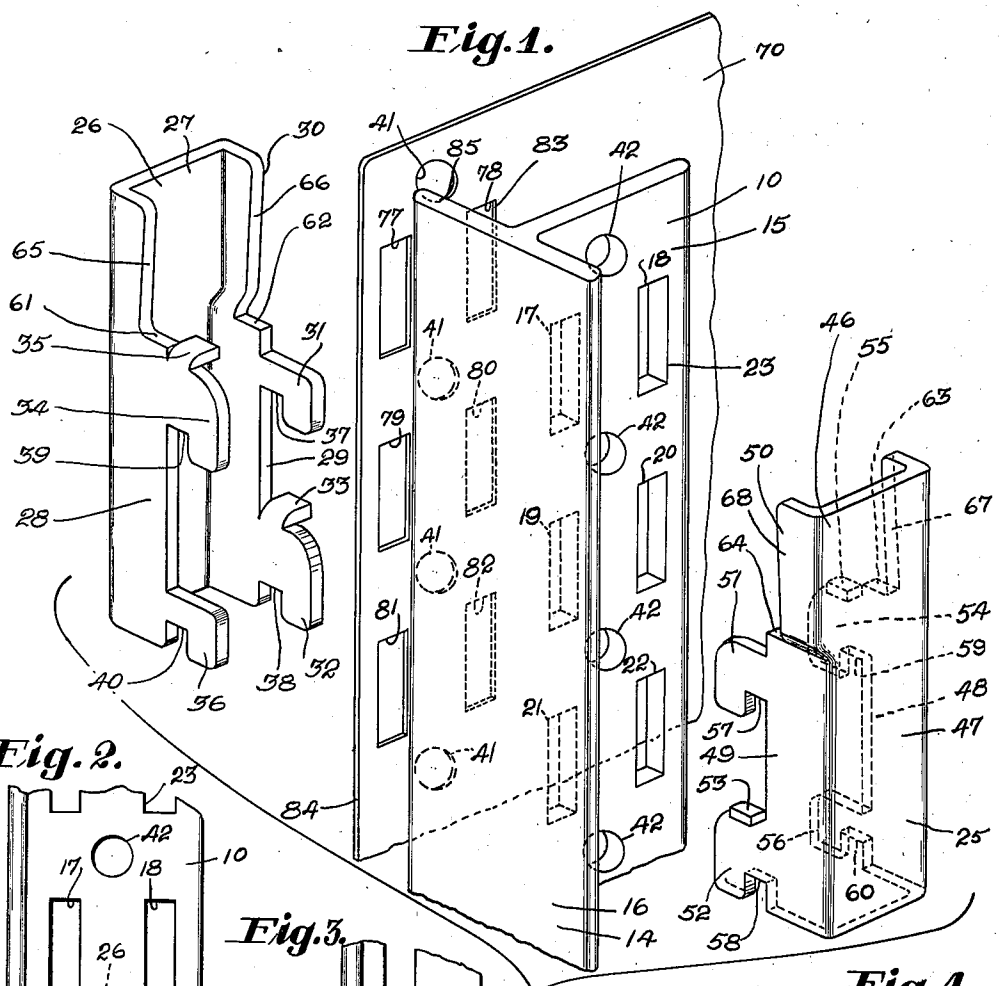


Fig. 2.

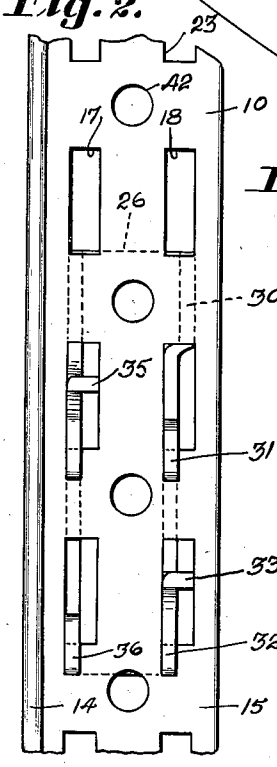


Fig. 3.

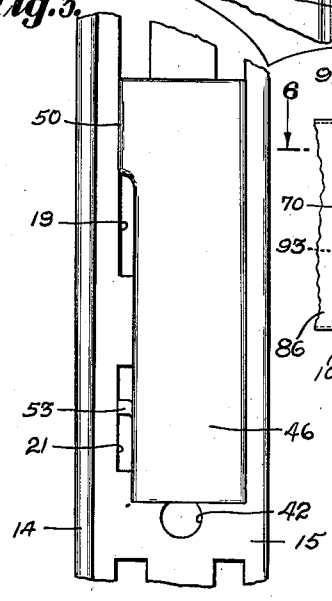
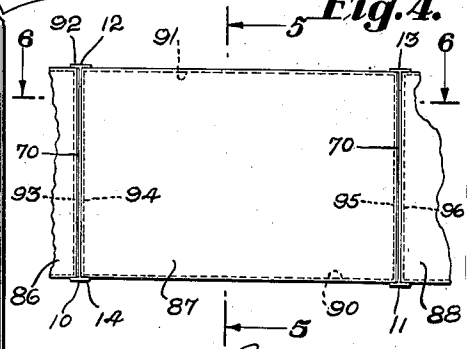


Fig. 4.



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Fig. 5.

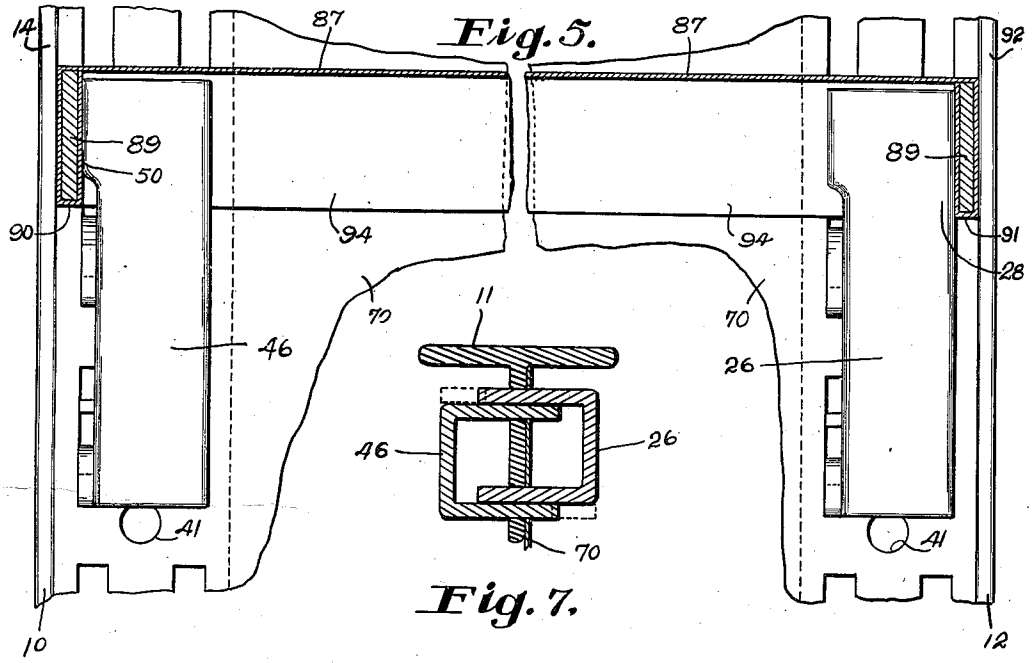


Fig. 7.

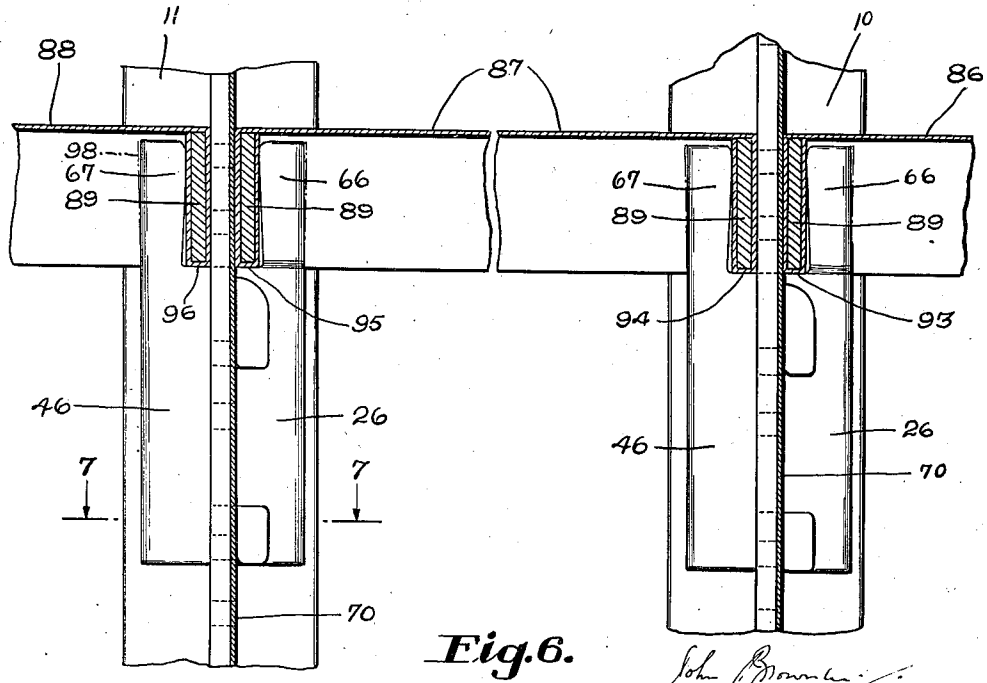


Fig. 6.

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Patented Nov. 11, 1941

2,261,956

UNITED STATES PATENT OFFICE

2,261,956

DEMOUNTABLE SHELVING

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Application February 16, 1938, Serial No. 190,824

9 Claims. (Cl. 248—243)

This invention relates generally to steel shelving and more particularly to such shelving which is readily assembled and dismantled.

Among the objects herein is the provision of structure, which is quickly and easily set up, requiring no special tools or unusual skill on the part of the person doing the assembling.

Another object of the present invention is the provision of a shelf supporting bracket or clip which is universal in its application, so that one shape or style of clip is suitable for use in any position in the shelving structure.

Another object herein is the provision of knockdown steel shelving in which the parts are adjustable after the shelving has been set up, so that any single shelf in an entire shelving installation may be adjusted in height or removed without disturbing any of the other shelves. Furthermore, when it is desired, additional shelves may be added to shelving installation after same has been originally installed.

Another object herein is the provision of shelf supporting means, which is of relatively great strength in proportion to the weight of the material used.

Another feature of this invention is the provision of a clip for the support of the shelves, which, when in position, presents a very attractive appearance with no undesirable sharp projections which may damage material or objects placed upon the shelves.

Another feature of the present invention is the provision of a detachable shelf supporting clip, which not only supports the shelf vertically, but also supports the shelf in conjunction with the uprights of the shelving installation, so that the shelves are prevented from shifting laterally.

Another object herein is the provision of vertical separating walls which are adapted for cooperation with the shelf supporting clips and the uprights, and may be used between the sections of the shelving as desired.

A feature of the present invention lies in the peculiar construction of the clip, which results in a wedging action as a shelf is placed in position, so that the entire unit is rigid.

An object herein is the provision in the clip structure of means for automatically decentering the clips, so that they are always in the proper position with relation to the upright, and individual clips may be inserted or removed from either side of the upright independently.

These objects and further incidental ends and advantages will more fully appear in the progress of this disclosure, and as pointed out, in the appended claims.

In the drawings in which similar reference characters denote corresponding parts throughout the several views:

Figure 1 is a fragmentary isometric view showing a portion of the upright, a portion of the separating wall and two shelf supporting clips in position, just prior to their insertion into a connection with the upright.

Figure 2 is a fragmentary elevational view showing one of the shelf supporting clips in position on the upright with the clip to the rear of the upright.

Figure 3 is a view taken similarly to Figure 2, with the exception that the clip has been rotated through 180 degrees and attached to the opposite side of the upright.

Figure 4 is a fragmentary plan view showing four uprights and portions of three shelves with the separating walls in place.

Figure 5 is a fragmentary sectional view as seen from the plane 5—5 on Figure 4.

Figure 6 is a fragmentary vertical sectional view, as seen from the plane 6—6 on Figure 4.

Figure 7 is a horizontal sectional view, as seen from the plane 7—7 on Figure 6.

As may be readily understood by those familiar with the art to which the present invention relates, shelving installations may be made in any size, depending upon the requirements of the individual installation. A single shelving unit is made up of four uprights 10, 11, 12 and 13, which may be of any suitable height. Since the uprights are of uniform construction, a description of one will suffice for all. Turning now to Figure 1, the upright 10 is provided with a face 14 and a tail portion 15. The uprights may be suitably fabricated from so-called T bar. The face 14 may be left as it comes from the mill or may be provided with other decorations, since the outer surface 16 thereof is not used for any functional purpose. The tail portion 15 is provided with a plurality of elongated slots 17, 18, 19, 20, 21 and 22, hereinafter generally indicated by numeral 23. As shown in Figure 1, the upright 10 is broken off at the bottom thereof. However, upright 10 may continue for any suitable distance and have further slots similar to the slots 23, which are placed symmetrically with relation to the above mentioned slots. The size and spacing of the slots 23 will depend upon several considerations, but are essentially dependent upon the size of the shelf supporting clips.

Since the shelf supporting clips, indicated generally by numeral 25, are all uniform in construction, a description of one will suffice for all. The clip 26 is preferably formed from a single blank, the thickness of which is approximately one-half the width of the slots 23. Clip 26 has a body including a back portion 27 and two forwardly bent flanges 28 and 29. Flange 29 has a laterally off-set portion 30, a small hook 31 and a large hook 32 and a guide 33. Flange 28 has a large hook 34, a guide 35 and a small hook 36. Hooks 31, 32, 34 and 36 have notches 37, 38, 39 and 40 respectively. Clip 46 has a body including a back portion 47 and two forwardly bent flanges 48 and 49. Flange 49 has a laterally off-set portion 50, a small hook 51, a large hook 52 and a guide 53. Flange 48 has a large hook 54, a guide 55 and a small hook 56. Hooks 51, 52, 54 and 56 have notches 57, 58, 59 and 60 respectively.

Flanges 28, 29, 48 and 49 are each recessed to provide horizontal shelf supporting portions 61, 62, 63 and 64 respectively. Flanges 28, 29, 48 and 49 have shelf gripping portions 65, 66, 67 and 68 respectively. A configuration of the parts just described is best seen in Figure 6, in which it may be seen that the shelf gripping portions 65 to 68 inclusive are angularly disposed at a slight angle with relation to the back portions 27 and 47.

A separating wall 70 is composed of any suitable relatively thin sheet material and is provided with a plurality of elongated slots 77, 78, 79, 80, 81 and 82, hereinafter generally indicating by numeral 83. Slots 83 are placed in the separating wall 70, so that they correspond exactly with the slots 23. The slots 77, 79 and 81 are spaced from the leading edge 84 so that when slots 79 and 19 are placed in alignment, the leading edge 84 will lie rearwardly of the rear portion 85 of the face 14. The width of notches 37 to 40 and 57 to 60 is slightly greater than or equal to the combined thickness of the separating wall 70 and the tail portion 15.

The operation of installing the clips 26 and 46 upon the upright 10, as viewed in Figure 1, will now be described. The clip 10 is grasped between the fingers of the operator's hand and moved forwardly and to the right, as viewed in Figure 1. Hooks 34, 31, 36 and 32 will penetrate slots 79, 80, 81 and 82 respectively, and slots 19, 20, 21 and 22 respectively, thereby compressing the separating wall 70 against one side of the tail portion 15. After the clip 26 has been moved all the way to the right, it will be in a position so that the lower edges of the slots 23 and 83 may engage the notches 39, 37, 40 and 38. In other words, the clip 26 is moved downwardly until the edges of said slots will strike the uppermost portions of the notches in said clip. In order to facilitate the operation just described, the entrances to the notches 39, 37, 40 and 38 are rounded. Since the guides 35 and 33 project to the right beyond flanges 28 and 29 and amount equal to the thickness of the blank from which 26 is formed or an amount equal to one half the width of the slots 23 and 83, it may be seen that the clip 26 will be shifted forwardly, as viewed in Figure 1, so that the same will occupy a position substantially that shown in Figure 2. The guides 35 and 33 definitely align the clip 26 with relation to both the separating wall 70 and the upright 10.

The insertion of the clip 46 is performed by moving the clip to the rear and to the left, as viewed in Figure 1. Here again, the guides 53 and 55 will shift the clip to the right and rearwardly, so that the hook 51 may penetrate the slots 19 and 79, and to the right and rear of the hook 34. By reason of the fact that the hook 51 is a small hook, even when the lower edge thereof rests upon the lower edge of the slot 19, the upper portion of the small hook 51 may pass below the guide 35 and penetrate slot 19 until the flange 49 strikes the near surface of the tail portion 15. What has just been said of small hook 51 is in similar fashion true of small hook 56, with relation to the slot 22 and the large hook 32 and the guide 33. The large hook 52 is moved to the rear and to the right by reason of the guide 53 when the hook 52 is passed through the slots 21 and 81, and the large hook 52 is of sufficient height, so that the guide 53 may pass through the slot 21 without interference with the small hook 36. The large hook 54 and the guide 55 act with relation to slots 20 and 80 and small hook 31 in a manner similar to the large hook 52 just described. It may thus be seen that either one of the clips 26 or 46 may be placed upon the upright 10 independently of each other and either of said clips, when in position upon the upright 10, will also hold the separating wall 70 in place. While the clips hold the separating wall 70 against horizontal displacement, said wall may tend to drop so that the upper edges of slots 83 will contact the guides 35 and 55. In order to secure the wall vertically in alignment holes 41 in the wall 70, and holes 42 in the tail portion 15 are provided. An ordinary bolt and nut placed in any pair of the aligned holes 41 and 42 will hold the wall 70 in vertical alignment.

Turning now to Figures 4, 5 and 6, the assembly of shelves in connection with uprights upon which clips have already been placed, will be described. Numerals 86, 87 and 88 represent shelves, the edges of which are formed by bending the shelf mattrial around a horizontally disposed reinforcing bar 89. Bar 89 is preferably rectangular in cross-section and continuous. In Figures 5 and 6, the clamping action which occurs between the upper portions of the clips and the uprights to which they are attached, may be readily seen. In the left hand portion of Figure 5 may be seen the offset portion 50, which is clamping shelf edge 90 thereat between said offset portion and the face 14. In the right hand portion of Figure 5 may be seen the flange 28 clamping the shelf edge 91 between said flange and the face 92 of the upright 12.

In Figure 6, the shelf edges 93, 94, 95 and 96 are shown supported by the horizontal shelf supporting portions, previously described. The shelf edges 93 to 96 are clamped between the upper portions of the clips 26 and 46 and the tail portions 15 and 97 of the uprights 10 and 12. By reason of the angular disposition of the shelf gripping portions 65 to 68, as has been previously described, the shelf edges 93 to 96 form a very tight fit and in forcing the shelf edges into place, the shelf gripping portions 65 to 68, together with the adjacent portions of the clip bodies, may be distorted slightly outwardly, as indicated by the dot-dash lines.

As may be readily understood, the clearance of the various parts may be adjusted to give varying degrees of rigidity to the structure and tension between the wedged parts. Where the shelving units are to be installed for semi-permanent use, it is desirable to reduce the clearance so that forcing the shelf edges 93 to 96 into place,

may require more than ordinary manual pressure, such as the pressure secured by a jack, screw or hammer. On the other hand, where the shelving is desired to be easily and quickly demountable, the clearance may be increased between the various parts, so that no unusual pressures are required.

It may now be seen that there has been disclosed a new and effective easily constructed shelving, which is capable of being quickly assembled, adjusted or dismantled and which possesses many inherent advantages. By reason of the uniform and symmetric spacing of the slots in the uprights and in the separating walls, the cost of manufacturing the tools and their maintenance is reduced. A single clip structure is suitable for use in all positions, and by reason of the peculiar arrangement of the hook members thereon, corresponding hooks of opposite clips occupy the same slots in the uprights and separating walls, novel means being provided for properly aligning each of the hooks within its respective slot with relation to the corresponding hook on the opposite clip, and with relation to the upright and the shelf which the clip supports. Each of the clips is positively supported at four independent points, so that there is no idle portion on any clip. The upper portion of the clip is provided with a novel offset which gives adequate clamping pressure upon a shelf edge which it supports in two different directions 90 degrees apart, and this result is secured regardless of the position of the clip.

The foregoing description has been made rather detailed for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

We claim:

1. In a shelving structure: an upright having a plurality of slots; a shelf supporting bracket having integral locking members insertible into said slots; said slots each being of a width at least equal to twice the thickness of each of said locking members; and guiding means integral with at least one of the locking members and coacting with the inside of the slot in which said locking member is placed for laterally positioning the locking member to one side of said slot, whereby sufficient space is left between the locking member and the opposite edge of the slot, so that another locking member of another bracket may be inserted therebetween.

2. In a shelving structure: an upright having a plurality of slots; a shelf supporting bracket having integral locking members insertible into said slots; said slots each being of a width at least equal to twice the thickness of each of said locking members; and guiding means including a laterally offset integral lug projecting from at least one of the locking members and coacting with the inside of the slot into which said locking member is placed, for laterally positioning the locking member to one side of said slot, whereby sufficient space is left between the locking member and the opposite edge of the slot, so that another locking member of another bracket may be inserted therebetween.

3. In a shelving structure including a shelf having a down turned flange which forms a certain first angle: the combination of an upright having a face and a tail portion with a plurality of slots in the tail portion, said tail portion forming a second angle with relation to the face and corresponding to said first angle whereby the shelf and flange may nest within the upright; a shelf supporting bracket having integral locking members insertible into said slots; said slots each being of a width at least equal to twice the thickness of each of said locking members; guiding means associated with at least one of the locking members and coacting with said upright for laterally positioning the locking member having the guiding means associated therewith to one side in said slot, whereby sufficient space is left between the locking member and the opposite edge of the slot, so that another locking member of another bracket may be inserted therebetween from the opposite side of the upright; and means associated with said first mentioned bracket for clamping said shelf flange between the bracket and the face and tail portion of the upright, while the bracket is in a laterally displaced position by reason of the action of said guiding means.

4. In a shelving structure shelf supporting bracket for use in connection with an upright and a shelf; a body formed substantially U shaped in cross section and including a pair of forwardly bent integral flanges extending substantially the length of said bracket, said flanges at the upper portions thereof being recessed to form horizontally disposed shelf supporting portions the vertical edges of said recessed upper portions being angularly directed downwardly toward the horizontal edges of the recessed upper portions, thereby forming shelf gripping portions.

5. In a shelving structure shelf supporting bracket for use in connection with an upright having slots of certain width; a body including a back and two oppositely disposed forwardly bent flanges; at least one locking member on each flange narrower than said slots; and means integral with one of the locking members and adapted to engage one of the walls of a slot and thereby to laterally displace its member, and hence the entire bracket, toward the opposite wall of the slot.

6. In a shelving structure shelf supporting bracket for use in connection with an upright having slots of certain width; a body including a back and two oppositely disposed forwardly extending locking members narrower than said slots; one of said members having means adapted to engage one of the walls of said slots and thereby displace the member, hence the entire bracket, toward the opposite wall of said slot, the other of said members being of lesser height than the member having said means; whereby a second bracket identical to the first may be inserted from a side opposite the first bracket into the upright, the shorter members passing under said means on each of the brackets.

7. In a shelving structure including a shelf having a peripheral flange: an upright having a first portion and a second portion disposed at an angle with relation to the first portion and having slots therein; a shelf supporting bracket having a lug narrower than said slots; means associated with said lug adapted to engage a side wall, nearest the apex of said angle, of said slots and thereby laterally displace said bracket toward the opposite wall of the slot and away from said apex; a projection extending laterally off said bracket in the same direction as said means, and adapted to engage said flange between said projection and the first portion of the upright when the bracket is in the displaced position.

8. In a shelving structure including a shelf

having a down-turned flange which forms a certain first angle: the combination of an upright having a face and a tail portion with a plurality of slots in the tail portion, said tail portion forming a second angle with relation to the face and corresponding to said first angle whereby the shelf and flange may nest within the upright; a shelf supporting bracket having integral locking members insertible into said slots; said slots each being of a width at least equal to twice the thickness of each of said locking members; guiding means associated with at least one of the locking members and coacting with said upright for laterally positioning the locking member having the guiding means associated therewith to one side in said slot, whereby sufficient space is left between the locking member and the opposite edge of the slot, so that another locking member of another bracket may be inserted therebetween from the opposite side of the upright; and first means associated with said first mentioned bracket for clamping said shelf flange between the first means and the face and tail portion of the upright, while the bracket is in a laterally displaced position by reason of the action of said guiding means; and second means associated with said first mentioned bracket, and oppositely disposed with relation to said first means, for clamping said shelf flange between the second means and the face and tail portion of the upright, while the bracket is in a lateral displaced position by reason of the action of said guiding means.

9. In a shelving structure, including a shelf having a peripheral flange: the combination of an upright having a plurality of aligned first slots therein; a sheet having a plurality of second slots disposed adjacent an edge thereof and arranged to correspond in position to the first slots; a shelf supporting bracket having a shelf gripping portion and a notched hook-shaped locking member, the notch thereof being substantially equal to the total thickness of the sheet and upright, whereby said hooked member may detachably secure the sheet and the bracket to the upright, the peripheral flange of the shelf in being placed between the shelf gripping portion and the upright, acting to compress the sheet between the bracket and the upright.

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