SHELVING WITH REMOVABLE CORNER STRUCTURES

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References Cited
UNITED STATES PATENTS
3,065,860 11/1962 Swanson ................................... 211/153
3,294,250 12/1966 Evans .................................. 211/176
3,424,111 1/1969 Maslow .................................. 108/144
3,523,508 8/1970 Maslow .................................. 108/144
3,604,369 9/1971 Maslow .................................. 108/144
3,675,598 7/1972 Kesilman et al. .................. 108/144
3,754,728 8/1973 Bowman .................................. 108/156 X
3,757,705 9/1973 Maslow .................................. 108/144
R27,186 10/1971 Ferdinand et al. .................. 108/144

FOREIGN PATENTS OR APPLICATIONS
946,374 1/1964 United Kingdom .................. 108/156

ABSTRACT

A shelf has a generally rectangular planar member having truncated corners. The planar member is provided with peripheral skirts which extend substantially normally to the plane defined by the planar member. The portions of the skirts in the regions of the truncated corners define support flanges when the planar member comprises a sheet metal member. When the planar member comprises a wire grid, the support flange comprises upper and lower sets of peripheral wires which are diagonally bent and form extensions extending about the corners of the planar member. The support flanges extend substantially normally to the plane defined by the planar member. A corner connector has a corner structure adapted to be mounted on a post structure and to at least partially receive a respective support flange. A clamping bar is positioned on the other side of a support flange relative to an associated corner structure. Screws are utilized to draw the corner structure and clamping bar together with a respective support flange positioned therebetween.

7 Claims, 23 Drawing Figures
SHELVING WITH REMOVABLE CORNER STRUCTURES

BACKGROUND OF THE INVENTION

The present invention generally relates to shelving, and more particularly it relates to novel constructions associated with shelving having removable corner structures.

Shelving of many types are already known. Typically, a shelf is generally uniform in cross-section. Although the weight placed on a shelf may be uniformly distributed over the surface area thereof, the stresses which are generated in the shelf member are considerably higher in the regions at which the shelf is supported. Thus, the stresses are concentrated at the corners of the shelves. Many attempts have been made to reinforce portions of a shelf which are exposed to large stresses. However, the methods utilized have had shortcomings in both the manner and ease of reinforcing the shelf portions as well as the enhancement of support to counteract the increased stresses. For example, various types of reinforcing members have been attached to the shelves in the regions where the increased stresses develop. However, the reinforcing members have generally merely transferred the stresses from one region of the shelf to another region thereof. Also, the prior art reinforcing structures have generally been complex in construction and consequently have been expensive to manufacture.

Prior art reinforced shelves have generally not provided the desired flexibility in removing or interchanging the reinforcing members. This has limited the manner in which the shelves could be used in various applications.

A further disadvantage of prior art shelf structures has been that the means for reinforcing areas of increased stress concentrations could not generally be utilized on various forms of support structures on which the shelves are mounted. Stated otherwise, reinforcing means suitable for one type of support structure was frequently not suitable for another type.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a shelf which is not possessed of the disadvantages associated with comparable prior art shelves.

It is another object of the present invention to provide a shelf which is simple in construction and economical to manufacture.

It is still another object of the present invention to provide a shelf with removable corner structures which are adapted to be adjustably supported on support posts.

It is yet another object of the present invention to provide a shelf having truncated corner portions from which normally extend skirt portions which are adapted to be clamped by corner connectors.

It is a further object of the present invention to provide a shelf having corner connectors which are adapted to uniformly distribute the stresses, formed at the supporting corners, to the rest of the shelf.

It is still a further object of the present invention to provide a planar shelf, either of sheet metal or wire grid, which is adapted to cooperate with corner connectors in the form of clamps which securely clamp truncated corners thereof.

It is yet a further object of the present invention to provide a shelf which is reinforced against the concentrated stresses generally formed in shelves at the regions of support.

It is an additional object of the present invention to provide corner connectors which are adapted to clamp the truncated corners of planar shelf members, which corner connectors are adapted to slidably and adjustably be mounted on support posts.

It is an additional object of the present invention to provide a shelf which is provided with reinforcing corner connectors which are easily interchangeable and which are adapted to be mounted on support posts having various configurations and dimensions.

It is further an additional object of the present invention to provide a blank which can easily be formed into a planar member having truncated corners from which depend supporting flanges adapted to be gripped by corner connectors.

In order to achieve the above objects, as well as others which will become apparent hereafter, a shelf in accordance with the present invention comprises a generally rectangular planar member having truncated corner portions. Corner connectors are provided each of which is engaged to a respective truncated corner portion. Said corner connectors are provided with means for mounting the same on a support post. In this manner, said planar member is supportable on a support post by means of said corner connectors which are connected to said truncated corner portions.

Said planar member may either comprise a sheet metal member or a wire grid member.

Said planar member is, according to the presently preferred embodiment, provided with peripheral skirt portions in the regions of the corner portions. Each skirt portion extends substantially normally to the plane defined by the planar member and defines support flanges. Each corner connector comprises a clamp adapted to clamp a respective support flange.

Advantageously, each corner connector comprises a corner structure complementary to a respective corner portion to form with the latter a square corner of the shelf. Said corner structure is positioned on one side of a respective support flange while a clamping bar is disposed on the other side of the respective support flange. Means in the form of screws are provided for drawing a respective clamping bar and a corner structure towards each other with a support flange therebetween. In this manner, said corner connectors are rigidly fixed to said planar member.

Optionally, said planar member is provided with a peripheral reinforcing bead. In this instance, said corner connectors comprise clamping means having a clamping bar a portion of which is configured to mate internally of said bead in a complementary manner.

Either or both the clamping bar and the corner structure are provided with recesses or grooves which are adapted to receive the support flange or skirt portions of the planar member in pressure fit relation when the corner connectors are mounted on the planar member.

The presently preferred embodiment provides tapered bores in the corner structures. Complementary tapered sleeves are provided which are movement on support posts and receivable in the tapered bores. In this manner, the positions of said corner connectors can be adjusted along the post by moving the sleeves on the post and supporting said corner connectors on said sleeves.
The present invention also comprises the construction of the planar member. According to such construction, the planar member has truncated corner portions and peripheral skirt portions in the regions of said corner portions. Each skirt portion defines a support flange which is adapted to be clamped and rigidly held by a respective corner connector. The planar member is also advantageously provided with a bead about the periphery thereof for reinforcing said planar member.

The present invention also contemplates a shelf corner connector which is adapted to cooperate with an above described planar member. Such a corner connector comprises a first clamping member adapted to be mounted on a post structure and to at least partially receive a respective skirt portion. A second clamping member is positioned on the other side of a skirt portion relative to an associated first clamping member. Means in the form of screws are utilized for drawing the clamping members together with a respective skirt portion positioned therebetween. According to a preferred construction, said first clamping members comprise corner structures which are complementary to the truncated corners. Said first clamping members thereby form square corners on said planar members when mounted thereon.

A blank for forming a shelf planar member of the type under discussion also forms part of the present invention.

A shelf incorporating the novel features of the present invention provides a shelf which overcomes most of the above described disadvantages of prior art shelves. Firstly, the corner connectors of the present invention absorb the load placed on the shelf and distribute the same to the shelf planar member. Such reinforcement is effective and increases the load capacity of the shelf. The shelf of the present invention is also simple in construction and economical to manufacture. The corner connectors are easily detachable from the shelf planar member and different corner structures may be attached thereto. The corner structures of the present invention are provided with tapered bores which are adapted to receive therein tapered sleeves or post supports which are slidably mounted on support posts and adjustably positioned thereon. By permitting the interchangeability of corner structures, apertures of different dimensions and configurations may readily be provided on any shelf to make same mountable on various forms of support posts.

**BRIEF DESCRIPTION OF THE DRAWINGS**

With the above and additional objects and advantages in view, as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

FIG. 1 is a top plan view of a shelf in accordance with the present invention, showing a planar member whose truncated corners are fitted with corner connectors;

FIG. 2 is a bottom plan view of the shelf of FIG. 1;

FIG. 3 is a front elevational view of the shelf of FIG. 1;

FIG. 4 is an enlarged fragmented view of one corner of the shelf shown in FIG. 2;

FIG. 5 is a cross-section of the shelf corner shown in FIG. 4, taken along line 5-5;

FIG. 6 is similar to FIG. 5, showing the shelf inverted and mounted on a support post by means of a sleeve or post support which is adjustably movable on a support post and receivable in a tapered bore of the corner connector;

FIG. 7 is a top plan view of a blank suitable for forming a shelf or planar member in accordance with the present invention which is adapted to be connected to corner connectors as shown in FIG. 1, the blank being divided by fold lines to indicate where various panels and tabs are folded to produce the finished planar member;

FIG. 8 is a front elevational view of a support flange formed at each truncated corner of the planar shelf member, showing the various tabs and panels of the blank of FIG. 7;

FIG. 9 is similar to FIG. 8 but showing a rear elevational view of the support flange;

FIG. 10 is a bottom plan view of a corner structure forming part of a corner connector in accordance with the present invention;

FIG. 11 is a cross section of the corner structure shown in FIG. 10, taken along 11-11;

FIG. 12 is a front elevational view of the corner structure shown in FIG. 11;

FIG. 13 is a cross section of the corner structure shown in FIG. 12, taken along line 13-13;

FIG. 14 is a front elevational view of a clamping bar forming part of the corner connector shown in FIG. 1;

FIG. 15 is a side elevational view of the clamping bar shown in FIG. 14;

FIG. 16 is a top plan view of the clamping bar shown in FIG. 14;

FIG. 17 is a cross-section of the clamping bar of FIG. 14, taken along line 17-17;

FIG. 18 is a top plan view of a shelf in accordance with another embodiment of the present invention, showing a wire grid member instead of a planar sheet metal member as shown in FIG. 1;

FIG. 19 is a front elevational view of the shelf in accordance with the second embodiment shown in FIG. 18;

FIG. 20 is an enlarged fragmented view of a corner portion of the shelf structure shown in FIG. 18, showing the details of a corner connector mounted on the wire grid member;

FIG. 21 is a front elevational view of the corner structure adapted to engage the wire grid member shown in FIG. 18, showing upper and lower grooves adapted to engage inclined wire portions which are clamped by the corner connectors;

FIG. 22 is a top plan view similar to FIG. 20, but with the corner structure removed to illustrate how a clamping bar forming part of the corner connector engages the diagonally disposed wire portions of the wire grid member; and

FIG. 23 is an enlarged fragmented side elevational view of the shelf in accordance with the second embodiment of the present invention shown in FIG. 18.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring now to the drawings, in which the same reference numerals have been utilized to designate similar or identical parts throughout, and first referring to FIGS. 1–3, a shelf in accordance with the present invention is generally designated by the reference nu-
The shelf 10 comprises a generally rectangular planar member in the form of a sheet metal member 12. The sheet metal member 12 has two sets of opposite parallel sides 14 which are mutually orthogonal to each other. Peripheral skirts 16 project from the sides 14, each skirt extending substantially normally to the plane defined by the sheet metal member 12. This is best shown in FIG. 3. Provided that the upper periphery of the sheet metal member 12 is a sheet metal bead 18 which is utilized to reinforce the sheet metal member 12, as to be more fully described hereafter.

The sheet metal member 12 is provided with truncated corners 20. Corner connectors 22, in the form of clamping members to be more fully described hereafter, are provided at each truncated corner portion 20. The corner connectors are adapted to be rigidly fixed to the truncated corners 20. The basic structure of the corner connectors 20 is shown in FIG. 2, wherein corner structures 24 are connected to fastening or clamping bars 28 by means of screws 30 which extend through the clamping bars 28 into the corner structures 24. Supporting flanges (not shown in FIGS. 1–3) are clamped between respective ones of the clamping bars 28 and corner structures 24. In this manner, the corner connectors 22 are rigidly fixed and connected to the sheet metal member 12.

The corner connectors 22, to be more fully described hereafter, are provided with means, in the form of tapered bores 26, for mounting the corner connectors on support posts, as to be described in connection with FIG. 6. The shelf 10 is further reinforced by forming the skirts 16 as single sheet metal skirt edges. The folding of the sheet metal and the doubling thereof is extended into the region of the planar sheet metal member 12 as tabs 17 to form single sheet metal planar edges therewith. Advantageously, the tabs 17 are welded to the planar sheet metal members 12.

The details of the construction of each corner of the shelf is shown in FIG. 4. Primarily, the relationship between the skirts 16 and the planar edges 17 is more fully disclosed here. Essentially, the tabs 17 are continuations of the sheet metal skirt edges. The tabs 17 define a plane which are parallel and adjacent to the plane of the sheet metal member 12. Also shown in FIG. 4 are the details of the tapered bore 26. More specifically, the bore 26 is shown to be tapered in such a manner so as to define increasingly large diameters in the direction of the bottom of the shelf 10. The purpose for providing such a taper will be described more fully in connection with FIG. 6.

In FIG. 5, the details of a shelf in accordance with a presently preferred embodiment are shown. Here, the sheet metal member 12 is shown to be provided about the periphery thereof with the bead 18. The clamping bar 28 is provided with an end portion 32 which is configured in a complementary manner to the interior of the bead 18 to thereby fit securely therein. A lateral portion 34 projecting from the end portion 32 projects beneath the sheet metal member 12 in the region of the bead 18 and forms additional support to the structure in the region of the periphery of the shelf. Also shown in FIG. 5 is the manner in which a corner connector 22 engages or clamps a corner skirt portion or support flange which projects from the sheet metal member 12. The support flange which is clamped by the corner connector comprises a corner tab 40 which is directed normally to the plane defined by the sheet metal member 12 and extends from the bead 18. The support flange formed at the corner of the sheet metal member 12 also comprises a single sheet metal skirt edge 42 which partially overlaps the corner tab 40, as to be more fully described in connection with FIGS. 8 and 9.

The corner structure 24 is provided with a recess defined by spaced lips 46 which are adapted to at least partially receive the support flange forming the truncated corners of the shelf 10. The corner structure 24 is disposed on one side of the support flange while the clamping bar 28 is disposed on the other side thereof. The clamping bar, as shown, fits interiorly between recess lips 46 and a bead 18. The screw 30 draws the clamping bar 28 and the corner structure 24 towards each other while the support flange is positioned therebetween. In this manner, the corner connector 22 becomes rigidly fixed to the sheet metal member 12 at the truncated corners 20 thereof.

The tapered nature of the bore 26 is clearly illustrated in FIG. 5, wherein the diameter of the bore continuously decreases in the upward or towards the top surface of the shelf. The details of construction of the support flange will be more fully described hereafter.

In FIG. 6, the corner section as shown in FIG. 5 is shown oriented in its normal supporting position. Also shown in FIG. 6 is the manner in which the shelf is supported on a support post 50.

For this purpose, a corner support post 50 is shown which is provided with a plurality of spaced indentations or annular recesses or slots 52. The distance between successive annular recesses 52 along the length of the support post 50 determines the degree of adjustability or selectability of possible positions along the support post 50 along which the shelf 10 can be fixed.

The support post 50 is adapted to cooperate with a sleeve or post support 60 which has a cylindrical inner surface and a tapered outer surface 62. The sleeve 60 may be constructed to have two mating halves which are engageable with one another when mounted on the support post 50. When mated, the two halves tend to hold another in a fixed position. To this end, there is provided a tongue and groove construction (not shown) suitable for connecting the halves to one another. In this connection, reference may be had to my U.S. Pat. Nos. 3,424,111; 3,523,508; 3,604,369 and my Application Ser. No. 215,579, dated Jan. 5, 1977, now U.S. Pat. No. 3,757,705. These patents and pending patent applications are incorporated by reference into this application to supplement the description of the support means or securing means for the shelves. Generally, the external tapered surface 62 defines a frustoconical shape which corresponds to the internal taper of the bore 26. By fixing the sleeve 60 on the support post 50 as shown in FIG. 6, namely with an external upwardly decreasing taper, and by mounting the corner structure 24 on the sleeve 60 with the internal surface of the bore 26 having a decreasing taper in the upward direction, as shown in FIG. 6, a tight and secured fitting relation may be obtained between the sleeve 60 and the corner structure 24.

By adding a load or weight onto the planar member 12, the corner structure 24 is urged downwardly — this causing a wedging action to result which provides a gripping force against the external surface of the sleeve 60 which increases as the shelf is loaded. In this con-
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connection, when the sleeve is formed of two halves, the confronting edges of each half advantageously do not make actual contact to thereby permit full pressure to be exerted against the surface of each corner post 50. A more specific description of the above described action is more fully described in my patent entitled "Readily Assemblable and Adjustable Shelving," U.S. Pat. No. 3,424,111. Advantageously, an annular lip 64 is provided about the lower periphery of the sleeve 60 which limits the extent of movement of the sheet metal member 12 and the corner member 24 in the downward direction.

By securing the corner structure 24 on the support post 50 as described above, the corner connector 22 provides substantial support to the planar sheet member 12. The lips 42 define a cavity or recess which mat ingly receives the bead 18 and the corner tab 40 of the shelf as well as the single sheet metal skirt edge 42. The clamping bar 28 assures that these elements remain within the recess formed by the lips 46 and provides added support for the planar sheet metal member 12 by the mating configurations of the end portion 32 and lateral portion 34.

In FIG. 7, a blank is illustrated which is suitable to be folded into a planar sheet metal member 12, as described above, for forming a shelf to which corner connectors 22 can be connected. FIG. 7 illustrates a fragmented portion of a complete blank, showing only one corner thereof.

A blank 70 comprises a planar sheet in the form of a sheet metal member 12. The corner portion 40 thereof is foldable or bendable about a corner fold line 72 to a plane which is substantially normal to the plane of the planar sheet 12. The corner fold line 72 is diagonally disposed relative to orthogonal sides 71 and 73. It should be clear that by bending the corner portion 40 about the fold line 72, a truncated corner is formed on the planar sheet, as suggested above and designated by the reference numeral 20. The corner portion 40, when so bent, forms part of a support flange to be more fully described hereafter.

To reinforce both the sheet metal member 12 as well as the corner region, the sheet metal member 12 is provided with first panels 74 which extend along sides 71 and 73 and are bendable about fold lines 76. Second panels 78 extend in parallel relation to the panels 74 and are separated from the latter by fold lines 80. Similarly, tabs 17, parallel to panels 74 and 78, are bendable about fold lines 84.

The panel 74 and 78 each extend approximately from the region of the corner fold line 72 to a corresponding corner fold line at the other end of the sides 71 and 73. Each of the panels 74 and 78 therefore extends between two corner fold lines 72 along each of the orthogonal sides of the sheet metal member 12.

A tab 86 projects or extends beyond the end of each of the panel 78 and a tab 90 similarly projects beyond the ends of the panels 74. The tabs 86 are bendable about fold lines 88 while the tabs 90 are bendable about the fold lines 92. Each of the tabs 86, 94, are provided with holes 94 therein whose function will be described hereafter.

One possible method of forming the shelf planar member 12 from the blank 70 will now be described. Firstly, the tabs 82 are folded about fold lines 84 to one side of the panels 74 and 78 into planes which are normal to the plane of the planar sheet 12. The panels 78 are now folded about fold lines 80 to bring both of these panels into planes adjacent to panels 74. Simultaneously, the tabs 86 are brought into adjacent abutment against the tabs 90 with both holes 94 on each of the tabs in alignment with one another.

Panels 74 and 78, in abutting or adjacent planes parallel to the plane of sheet 12, are now together folded about the fold lines 76 to bring these new two parallel panels into planes which are normal to the planar sheet 12. Such folding about the fold lines 76 bring the tabs 17 into abutment against the planar sheet 12. The tabs 86 and 94, now adjacent and aligned with each other, project beyond the respective panels 74 and 78 along the direction of the orthogonal sides 71 and 73 respectively. The two tabs 86 and 90 are now together bent about fold lines 88 and 92 to substantially bring the tabs into alignment with the corner fold lines 72.

Panels 74 and 78, in abutting or adjacent planes parallel to the plane of sheet 12, are now together folded about the fold lines 76 to bring these new two parallel panels into planes which are normal to the planar sheet 12. Such folding about the fold lines 76 bring the tabs 17 into abutment against the planar sheet 12. The tabs 86 and 94, now adjacent and aligned with each other, project beyond the respective panels 74 and 78 along the direction of the orthogonal sides 71 and 73 respectively. The two tabs 86 and 90 are now together bent about fold lines 88 and 92 to substantially bring the tabs into alignment with the corner fold lines 72. More particularly, the two tabs 86 and 94 are bent relative to the now upright panels 74 and 78 so that an angle defined between the tabs and the panels corresponds to the angle defined between the fold lines 72 and 76.

The corner tab 40 is now folded about the corner fold line 72 into a plane substantially normal to that defined by the planar sheet 12. In so folding the corner tab, the latter overlaps and comes into abutment against the bent tabs 86 and 94 which are now substantially coextensive with the corner fold line 72. Advantageously, the various folded elements above described are now welded to each other to assure that the elements remain in their above described folded positions.

Referring to FIGS. 8 and 9, the resultant shelf planar member formed from the blank 70 is illustrated. As best shown in FIG. 8, the folding of the panels 74 and 78 in the manner described forms what is commonly known as a sheet metal single edge 42. Such a single edge reinforces the sheet metal member 12 about the peripheral edges thereof. Similarly, the tab 17 forms in a single sheet metal planar edge. This connection may also be considered to be an ordinary sheet metal lap joint when the tab 17 is welded to the sheet metal member 12.

As suggested in FIGS. 8 and 9, the folding of the panels as described in connection with FIG. 6 generates skirts 16 which extend about the periphery of the sheet metal member 12. The skirt 16 depends from the sides 14 of the sheet metal member 12. At the corners of the planar member 12, the skirts are modified to incorporate corner tabs 40. The apertured ends of skirts 16 associated with different sides 14, with a corner tab 40, together define a support flange corner portion 96 which is formed at the truncated or diagonally formed corners of the planar member 12. The support flanges or corner portions 96, which comprise the sheet metal skirt edges 42, the corner tabs 40 and the beads 18, are configured to be receivable in the recesses between lips 46 of the corner structure 24.

An important feature of the present invention, as should become clear from the above description, is the ability of the present construction to distribute stresses. Not only are these stresses distributed along extended diagonal dimensions of the corners but the stresses are also distributed to the reinforcing skirts 16 which extend along the sides 14 of the sheet metal member. Thus, not only are the stresses, generated at the corners of the shelves, evenly distributed, but the same reinforcing means, namely the beads 18 and the skirts 16,
improve the shelf performance by preventing the shelf from buckling or otherwise becoming deformed.

Although the skirts in accordance with the presently preferred embodiment extend substantially about the entire periphery of the entire shelf metal member 12, this is not a critical requirement and skirt portions may be provided which only project or extend from the planar sheet 12 in the regions of the corners thereof. With such construction, referring to FIGS. 8 and 9, equivalents of tabs 86 and 90 as well as corner tabs 40 would be provided. However, the equivalents of panels 74 and 78 would be reduced or totally eliminated. The broad aspects of the present invention include shelves which are not provided with skirts or other projections from the planar sheet member. It is possible, for example, to merely fold a corner tab 40 about a fold line 72 or cut off the corner tabs 40 to provide a truncated or diagonally cut corner. Suitable clamping means may then be utilized to clamp a now enlarged length or surface area of the planar sheet 12. Thus, according to the broad aspects of the present invention, a corner connector is mounted on a truncated corner to provide a better grip thereon and for the purpose of more evenly distributing the stresses.

The corner connectors 22 in accordance with the present invention are advantageously clamping connectors which clamp the shelf planar sheet 12. When the shelf is provided with a support flange 96 as described above, the corner connector 22 is advantageously of the type shown in FIGS. 10-17. However, the specific construction of this corner connector is not critical and any other construction which is suitable for connection to support flanges 96 as above described or to other truncated corner arrangements is equally suitable.

The corner connector 22 comprises a corner structure 24 which is advantageously cast. The corner structure 24 itself has a square corner and an elongate recess 98 defined by upper and lower recess lips 46 and lateral recess shoulders 100. The recess 98 receives the support flange or corner portions 96 therein. A triangular depression 102 is provided for matingly receiving the corner portion 40 which is positioned exteriorly or slightly beyond the tabs 90. The lateral shoulders 100 are configured to abut the skirts 16 when the support flange or corner portion 96 is received in the recess 98.

Threaded holes 104 are provided in the corner structure 24, which threaded holes are aligned with holes 94 of the support flanges 96.

The clamping bar 28 is illustrated in FIGS. 14-17 and shown to comprise a bar provided with two spaced holes 106 positioned to be aligned with holes 94 and threaded holes 104 when the clamping bar 28 is mounted as shown in FIG. 4. As described above, the clamping bar 28 is provided with an end portion 32 which is configured to fit interiorly of the bead 18 and is provided with a lateral portion 34 which is configured to mate and abut against the sheet metal member 12 in the region of the bead 18.

The basic principal of the present invention, namely the provision of corner connectors which are interchangeable and readily detachable from truncated corners of a shelf member, may be utilized with other forms of shelf constructions. Another embodiment of example of a further shelf construction which may incorporate the present invention is illustrated in FIGS. 18-23. Here, the shelf comprises a wire grid planar shelf member 110 which is defined by elongate longitudinal parallel wires 112 and longitudinal transverse wires 114 which are welded to each other or other intermediate members connected to each other at respective crossing points. As best illustrated in FIG. 23, the shelf supporting structure comprises the upper elongate longitudinal and transverse wires 112, 114. However, to provide reinforcement to the shelf, as with the sheet metal member 12, a skirt is advantageously provided which comprises additional lower longitudinal and transverse wires 112, 114 which extend about the periphery of the wire grid shelf member. Disposed between the peripheral spaced wires is a corrugated wire 116 which is connected to the respective upper and lower wires at successive peaks thereof.

The upper and lower peripheral wires each terminate in the region of the corners of the wire grid shelf member 110 and are bent to produce diagonally disposed wire portions 112a and 114a which form support flanges or corner portions which serve a function similar to that of the member designated by the reference numeral 16 above.

A slightly modified corner connector 22' comprises a corner structure 24' whose construction is best shown in FIG. 21. In FIG. 21, similar to FIG. 12, the corner connector 24 is shown to be provided with grooves 120 instead of the triangular depression 102 of the corner structure 24. Each groove 120 is adapted to receive a respective wire portion 112a, 114a. Alternately, the clamping bar 28' associated with the corner structure 24' may be provided with grooves. The wire portions in the nature of support flanges or corner portions 112a, 114a are thereby received in clamping relation in at least one set of grooves and are clamped between the corner structure 24' and the clamping plate 28' by means of screws 30 similarly as with the corner connector 22.

As evident from the FIGURES, the corner connectors are configured to be complementary to the truncated corners. In this manner, square corners are formed when the corner connectors are mounted on the planar shelf members. This is shown, for example, in FIGS. 1, 2 and 18. The corner connectors 22 can be readily and advantageously detached from the planar members 12 and 110. Such interchangeability makes it possible to interchange various corner structures as required by different corner support posts. Clearly, the tapered bores 26 of the corner structures 24 and 24' can be replaced with any other suitably dimensioned or configured apertures. This added flexibility makes it possible to utilize the same shelving with various configured corner support posts.

As should be evident from the above description as well as an examination of the drawings, the shelving construction above suggested provides numerous manufacturing advantages which permit more efficient and more economical manufacture of the shelving. The shelving hitherto manufactured has the tapered corner portions welded into the shelf. The above described two-piece corner connector, as related to wire shelving, eliminates the difficult welding of four 1/4 inch diameter wires to each tapered sleeve, as described in several of the above referenced patents and application. In the version that relates to sheet metal shelving, the present corner arrangement eliminates all welding and, of course, thereby the need for grinding and polishing or secondary operations to alleviate distortion that may be
Another advantageous feature of the present construction described above relates to the sanitary aspects of the shelving, which is frequently utilized in establishments handling foods of various types. With increased supervision on the part of health departments, there is an increasing emphasis on the need for "crevice-free" constructions, especially on work surfaces. The work surfaces are frequently known in the food service field as "food contact zones". As should be more readily apparent from FIGS. 5 and 6, in the instance of sheet metal shelving and in FIG. 20, in the instance of wire shelving, the corner structures and their associated clamping plates are configured to mate with each other and substantially closed off openings which may form food-receiving crevices. The crevices may be almost totally eliminated by dimensioning the corner structures and clamping plates with close tolerances and by sufficiently tightening the clamping screws. In this manner, the clamping plates are fully received within the recesses in close abutment with the recess lips. Therefore, the corner connectors have the advantage that they may clamp a portion of either a sheet metal or a wire shelving while presenting, when fully assembled, a substantially solid block or unit which is free of the above described undesirable crevices.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and is not to be construed as a limitation of the invention.

What is claimed is:

1. A shelf comprising a generally rectangular one piece planar member having downwardly depending corner portions, said corner portions being disposed in a plane substantially normal to the plane defined by said planar member, each connector comprising a corner structure disposed on one side of a respective corner portion and a clamping bar disposed on the opposing side of the respective corner portion, at least one of said corner structure and clamping bar being provided with a recess dimensioned to receive a corner portion when the latter is clamped between an associated corner structure and clamping bar, the surfaces of said corner structure and clamping bar being substantially complementary to each other, and fastening means for maintaining each corner structure and associated clamping bar in abutment against each other and against a respective corner portion with the latter being received within the respective recess, said corner structures further being provided with means for mounting the same on a shelf support post, whereby each corner connector forms a substantially closed crevice-free structure which houses a corner portion.

2. A shelf as defined in claim 1, wherein said planar member comprises a sheet metal member.

3. A shelf as defined in claim 1, wherein said planar member comprises a wire grid member.

4. A shelf as defined in claim 1, wherein said planar member comprises a sheet metal member provided with a peripheral bead, said corner connectors comprising clamping means having a clamping bar a portion of which is configured to mate interiorly of said bead in a complementary manner.

5. A shelf as claimed in claim 1, wherein said planar member comprises a wire grid, said corner portions comprising wire portions diagonally oriented relative to the sides of said planar member, said corner connectors comprising clamping means having grooves formed therein for receiving said wire portions in pressure fit relation when said corner connectors are mounted on said planar member.

6. A shelf as claimed in claim 1, wherein each of said means for mounting said corner structures is provided with a tapered bore, and further comprising complementary tapered sleeves receivable in said bores, said sleeves being adjustably movable on the support post, whereby the positions of said corner connectors can be adjusted along the post by moving the sleeves on the post and supporting said corner connectors on said sleeves.

7. A shelf as defined in claim 1, wherein said planar member has truncated corners, and said corner portions each extend across a truncated corner of said planar member.