United States Patent [19]

Onori

[11] **3,915,101**

[45] **Oct. 28, 1975**

[54] **SHELF DEVICE**

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[73] Assignee: **McGraw-Edison**, Elgin, Ill.

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[21] Appl. No.: **456,436**

[52] **U.S. Cl.** **108/111**; 108/106; 211/135; 211/177; 403/234; 403/217

[51] **Int. Cl.**[2] **A47B 3/00**

[58] **Field of Search** 108/106, 107, 111, 156, 108/135, 134, 148, 177; 248/230, 279; 403/234, 235, 236, 191, 217; 211/134

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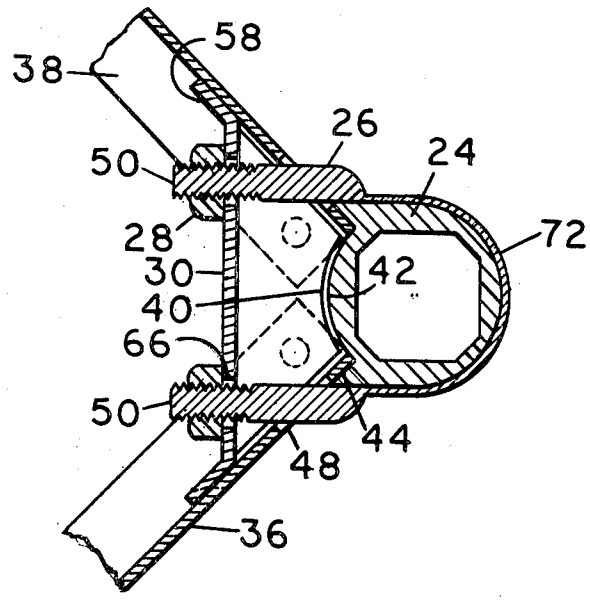
Primary Examiner—James T. McCall
Attorney, Agent, or Firm—Gustave Miller

[57] **ABSTRACT**

This is a portable or stationary shelf device wherein a plurality of supporting posts are provided for attachment to the corners of one or more of a plurality of vertically spaced shelves, the shelf or shelves having their corners cutaway complementary to the supporting posts, with U-shaped bolts having threaded legs secured to a U-strap at least partially countersunk in vertically spaced identified recesses partly about the corner post. The shelves have downturned vertical flanges, and each vertical flange has an inwardly turned rim. There are brackets across each cut-away shelf corner, the brackets being riveted or otherwise secured to the inwardly turned rims. The brackets have bolt receiving apertures aligned with bolt apertures in the flanges and provide a base through which the threaded bolts are secured, the nuts being biased against the inner faces of the brackets.

Each post is provided with a pair of spaced-apart projecting wedge-shaped ridges that extend flush against the sides of the shelf flanges as far as the bolts, thus assisting in making a very secure attachment. The posts are hollow, and feet or casters may be inserted at their bottoms. The U-bolts permit a shelf to be detached, tilted and removed without disturbing the other shelves, and, similarly, shelves may be inserted and added, if desired. A right and a left hand gusset plate may be added at each corner, together with an extra U-bolt for each pair of gusset plates. Gusset plates may optionally be added to each corner of each shelf to provide greater strength, if desired. In the case of a single shelf device, such as a dunnage rack or pallet, these gusset plates must always be used so as to keep the post rigidly secured.

11 Claims, 18 Drawing Figures



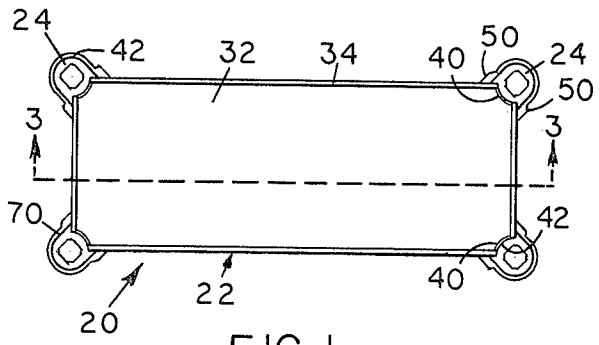


FIG. 1

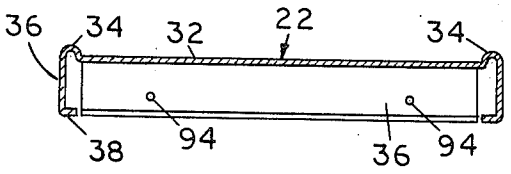


FIG. 3

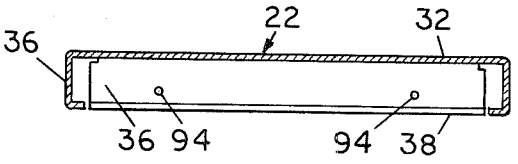


FIG. 4

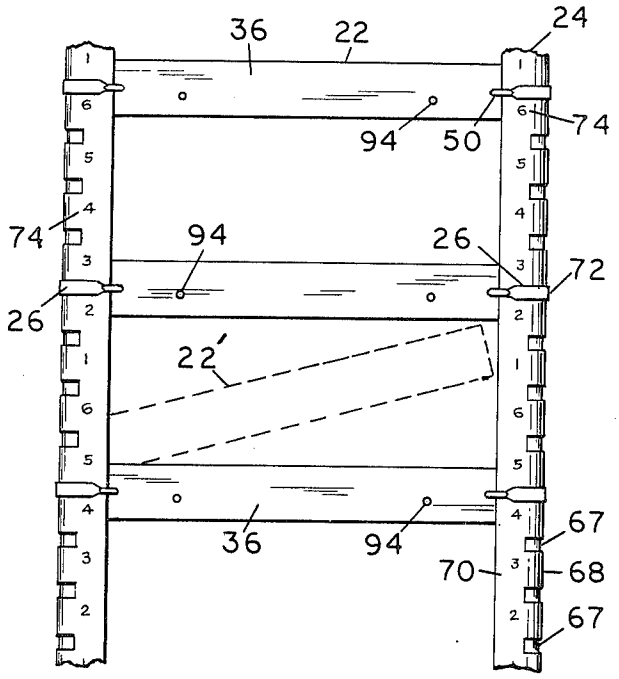


FIG. 2

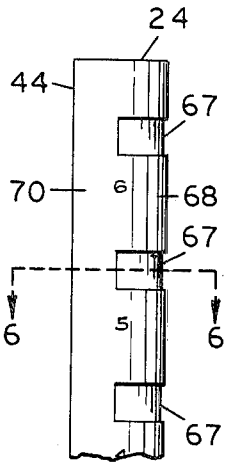


FIG. 5

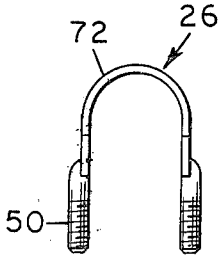


FIG. 7

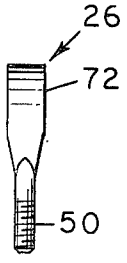


FIG. 8

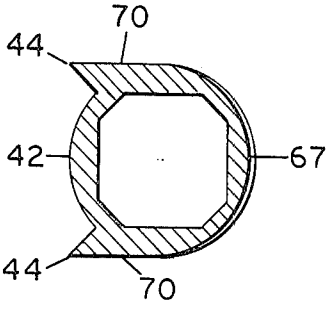


FIG. 6

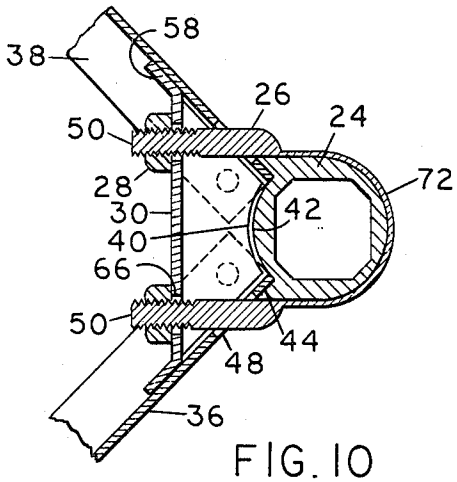


FIG. 10

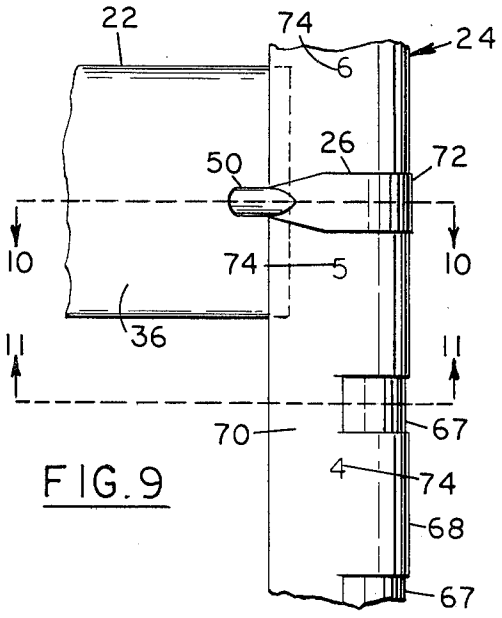


FIG. 9

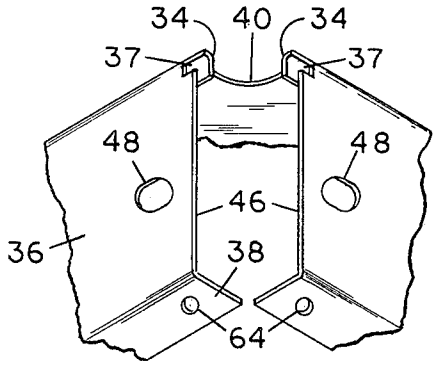


FIG. 12

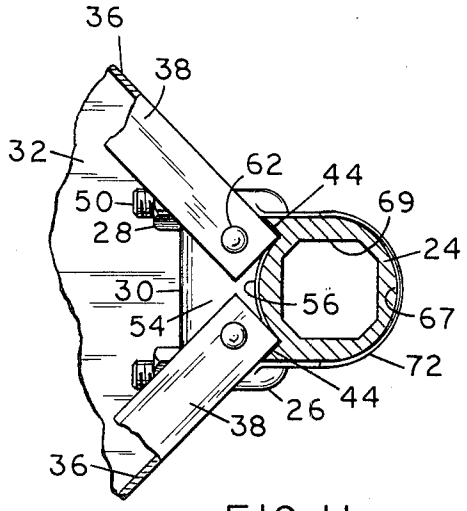


FIG. 11

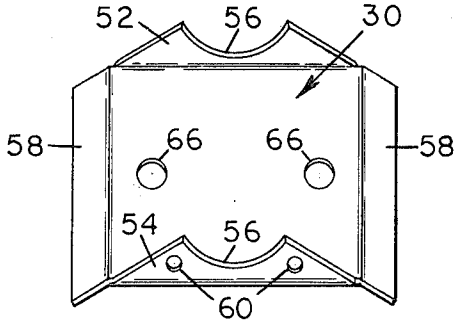


FIG. 13

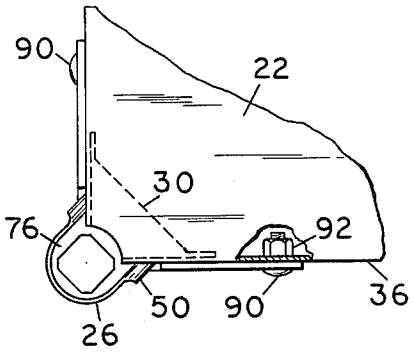


FIG. 15

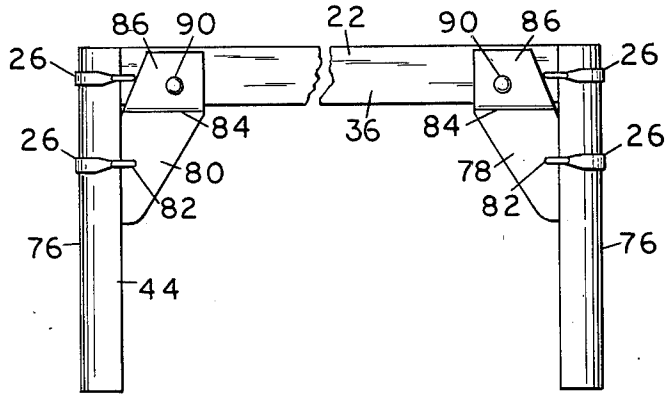


FIG. 14

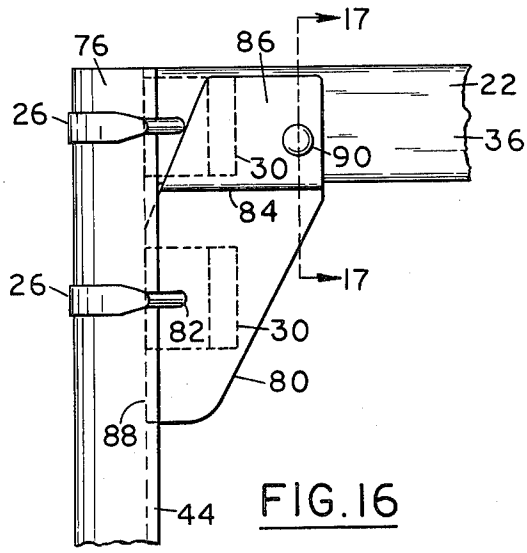


FIG. 16

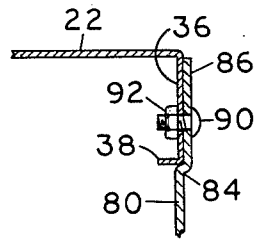


FIG. 17

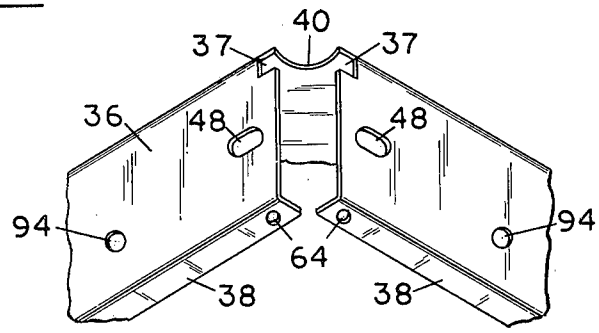


FIG. 18

SHELF DEVICE

OBJECTS OF THIS INVENTION

It is an object of this invention to provide shelves and shelf support posts that are complementary to each other for securely supporting the shelf at a desired height on the posts.

A further object of this invention is to provide a portable or stationary shelf structure wherein the shelves are securely fastened together, and wherein a shelf may be added or removed without disturbing any other shelf in place.

A further object of this invention is to provide a shelf structure having heavy duty support posts and heavy duty shelves which are firmly and securely, yet removably, mounted on the support posts located at the corners of the shelves.

Still a further object of this invention is to provide a readily portable shelf and post support structure which may be provided with either feet or casters at the bottom of the shelves.

Still a further object of this invention is to provide extremely strong shelf structure of metal or other suitable material, such as substantially rigid plastic, having vertical flanges and inturned rims at the bottom of the flanges and further provided with cutaway corners into which the posts fit, as well as corner reinforcing brackets supported on the inturned rims and secured thereto, and with posts having wedge-shaped projections fitting about the flanges while the cylindrical post portion extends into the cutaway corners, with U-shaped bolts extending about the posts and through the shelf flanges and the brackets with securing nuts inside the brackets.

A still further object of this invention is to provide supporting posts and cooperating U-bolts, the post having spaced and identified countersinks for partially countersinking the U-straps of the U-bolt there within.

A further object of this invention is to provide a pair of gusset plates for each corner of a shelf, particularly in the case of a single shelf dunnage rack or pallet, and optional in the case of a multi-tiered shelf and post device.

BRIEF DESCRIPTION OF THE FIGURES

With the above and related object in view, this invention consists in the details of construction, combination and arrangement of parts hereinafter set forth, claimed and disclosed in the accompanying drawings, in which:

FIG. 1 is a top plan view of the shelf and post structure of this inventions.

FIG. 2 is a side view of FIG. 1

FIG. 3 is partly sectional edge view of one form of shelf on line 3—3 of FIG. 1.

FIG. 4 is a similar view of another form of shelf.

FIG. 5 is a fragmentary view, on a larger scale, of a shelf post.

FIG. 6 is a further enlarged section on line 6—6 of FIG. 5.

FIG. 7 is an elevational view of a U-bolt for securing the shelves and posts together.

FIG. 8 is a view at right angles to FIG. 7.

FIG. 9 is a fragmentary view of a supporting post and attached corner of a shelf.

FIG. 10 is a section on line 10—10 of FIG. 9.

FIG. 11 is a section on line 11—11 of FIG. 9.

FIG. 12 is a perspective view of the shelf corner cutaway portion, this shelf top having a lip edge.

FIG. 13 is a perspective view of the cutaway shelf corner reinforcing bracket.

FIG. 14 is a side elevation of a one shelf shelf device, including reinforcing gusset plates at each corner.

FIG. 15 is a top elevation of a corner of FIG. 14, partly broken away to disclose part of the gusset plate attachment means.

FIG. 16 is a side elevation of FIG. 15, showing the gusset plate attachment.

FIG. 17 is a section through the gusset attachment to the shelf flange, on line 17—17 of FIG. 16.

FIG. 18 is a fragmentary, bottom, perspective view of a corner of a flat top shelf, showing particularly the apertures for receiving the U-bolts through the flange of the shelf and the apertures for receiving the bolts for fastening the gusset plates.

There is shown at 20 the shelf device of this invention. This shelf device is made of one or more preferably rectangular shelves 22, a shelf support post 24, one for each corner, a U-bolt 26 with two securing nuts 28, one bolt for each shelf corner, and also a corner reinforcing bracket 30 for each shelf corner.

The shelf 22 is made of strong material, such as stainless steel or other suitable strong material, such as appropriate plastic material or the like. The shelf 22 has a flat top 32 and in its preferred form has a lip 34 at each edge. However, as shown in FIG. 4, this lip 34 may be omitted, if desired for certain uses. Each edge of the shelf top 32 has a depending flange 36, from the bottom of which there extends an inturned rim 38. The shelf top 32 is cutaway at 40 at each corner, generally complementary to the cylindrical surface 42 of the supporting post 24. This surface 42 extends as far as two spaced apart projecting longitudinal wedge-shaped ridges 44 which, when placed against the shelf 22 into the cutaway 40, will overlap the vertical cutaway flange edges 46 toward the suitably positioned oblong apertures 48 for receiving the threaded legs 50 of the U-bolts 26 therethrough.

The reinforcing bracket 30 is provided with forwardly extending horizontal flanges 52 and 54, each having a circular edge 56 substantially identical in shape with the shelf top cutaway edge 40 and complementary to the post cylindrical surface 42, so that the post 24 may fit snugly thereagainst. Vertical wings 58, at substantially 135° to the plane of the bracket 30, extend therefrom to abut against the inside surfaces of the shelf flange 36 on opposites of the cutaway 40. The bottom horizontal flange 52 is apertured at 60 to receive rivets 62 or other securing means extending therethrough and through correspondingly located apertures 64 in the inturned rims 38, so that the bracket 30 is held in position rigidly reinforcing the shelf cutaway corner. Obviously, any other fastening may be used, such as a bolt and nut, electronic or spot welding, etc. The bracket 30 is also provided with circular bolt leg receiving apertures 66, so that the U-bolts threaded legs 50 may extend therethrough, after being suitably positioned about a post 24 and have the nuts 28 biased against its inner facing side.

To facilitate bending the flanges 36 down from the shelf tops 32, gauge slits 37 are provided in the tops of the flanges 36 adjacent to the cutaway corners 40, thus also eliminating any burrs that may be present from the cutting of the cutaway corners 40, and enabling the cutaway vertical flange edges 46, to fit snugly against the inner surfaces of wedge shaped ridges 44.

The posts **24** are generally externally cylindrical, except for the spaced apart forwardly extending longitudinal ridges **44** spaced apart about 90°, already described. Inwardly, the posts **24** are hollow with somewhat square inner flat surfaces with corners rounded where flat surfaces **69** meet to receive the stems of feet or casters at their bottoms and capped stems at their tops to provide a smooth surface.

In addition, each post **24** is provided with equally spaced countersunk recesses **67** extending about their semi-cylindrical surfaces **68,** from which parallel surfaces **70** extend tangent thereto and straight to the ridges **44** already described. Each U-bolt **26** has a U-shaped strap **72** from which the threaded legs **50** extend; the thickness of the strap **72** is somewhat more than the depth of the recesses **67** so that the U-strap countersinks partly into the recesses **67** but extend above the surfaces **68.** Within each recess **67** there is an identifying series of indicia **74,** such as numerals **1** to **6,** for instance, and then repeated as necessary or possibly extending in a continuous number series so that when several shelves **22** are mounted on the post **24,** they may easily be mounted identically on each post **24** and thus be all horizontal and parallel to each other. The recesses **67** are preferably spaced 3 inches apart allowing suitable spacing of the shelves **22.** When the shelves are not too close, an intermediate shelf **22'** may be installed by tilting it and then straightening and securing it in place by the U-bolts **26** in the same manner as the others. Likewise, a shelf **22** may be similarly removed when spacing permits, without removing upper and lower shelves.

When only a single shelf **22** is provided, with either long support posts **24,** or with short support posts **76,** it is necessary to compensate for the loss of rigidity due to the absence of additional shelves, and this is done by providing a pair of right hand and left hand gusset plates **78** and **80,** preferably shaped as shown in FIGS. **14** through **17.** Except for being mirror images of each other, the gusset plates **78** and **80** are identical. A second U-bolt **26** on the support post **76** has its U-strap **72** partially countersunk in recesses similar to those at **67,** and has its legs **50** extend through apertures **82.** Its nuts **28** are biased against the inner surface of a second bracket **30** placed about the support post **76** and within plates **78** and **80,** and the legs **50** extend through similar oblong apertures **82** in the gusset plates **78** and **80.**

As shown in FIG. **17,** each gusset plate **78** and **80** is offset a bit at **84** so that its upper portion **86** contacts flush against the outer surface of flange **36** and its lower vertical edge **88** extends against the post **76** flush within the post ridge **44.**

The upper portion **86** is secured against the outside of flange **36** by a bolt **90** and nut **92** extending through aligned bolt holes **94** in the gusset portion **86** and flange **36.**

Although the gusset plates are shown only in the shelf dunnage rack or pallet of FIG. **14,** where it is a necessity to provide rigidity to its support posts, it may optionally be used in the multi-tiered shelf devices to provide extra strength and rigidity.

ABSTRACT OF THE DRAWINGS

In the drawings, like numbers refer to like parts, and for the purpose of explications, marshalled below are the numbered parts of the ADJUSTABLE SHELF DEVICE of this invention:

Ref. Nos.	Shown in FIGS.:
20 Shelf device	1,2
22 Individual Shelf	1,2,3,4,9,14,15,16, 17.
24 Support posts	1,2,5,6,9,10,11,14, 15,16
26 U-bolt	1,2,7,8,9,10,11,14, 15,16
28 Securing nuts on 26	10,11
30 Corner reinforcing bracket	10,11,13,16
32 Shelf flat top	1,3,4,11,12
34 Lip	1,3, 12
36 Depending vertical flanges of 22	2,3,4,9,10,11,12,14 15,16,17,18
37 Guageing and burr removing slot	3,4,12,18
38 Inturned rim on 36	3,4,10,11,12,17,18
40 Cutaway corner in shelf top 32	1,10,11,12,15,18
42 Cylindrical surface of 24 between ridge 44	1,6,10,11,15
44 Wedge shaped ridges on 24	6,10,11,14,16
46 Cutaway vertical flange edges	3,4,9,10,12,18
48 Oblong apertures in 36	10,12,18
50 U-bolt threaded legs	1,2,7,8,9,10,11,14, 15,16
52 Upper horizontal flange on 30	13,16
54 Lower horizontal flange on 30	11,13,16
56 Circular edge in 52 and 54	10,11,13
58 Vertical wings of bracket 30	10,13,16
60 Rivet receiving apertures in 54	13
62 Rivets	11
64 Rivet receiving apertures in rims 38	10,12,18
66 Circular bolt leg receiving apertures in bracket 30	10,13
67 Partially countersunk recesses in 24	2,5,6,9,10, 11,15,16
68 Semi-cylindrical surface of 24 between 70	2,5,6,9
69 Inner flat surfaces of 24	1,6,10,11,15
70 Parallel surfaces tangent to 68 extending to ridges 44	1,2,5,6,9,10, 11,14,15,16
72 U-shaped strap of 26 connecting 50	1,2,7,8,9,10, 11,14,15,16
74 Identifying indicia	2,5,9
76 Short support posts of dunnage rack	14,15,16
78 Right hand gusset plate	14,15
80 Left hand gusset plate	14,15,16

-continued

Ref. Nos.	Shown in FIGS.:
82 Oblong apertures in 78 and 80 through which legs 50 extend	14,16
84 Offset in Gusset plates 78 and 80	14,16,17
86 Upper offset portions of 78 and 80	14,15,16,17
88 Lower edge of gusset plates extending within 44	16
90 Bolt through rim 36	14,15,16,17
92 Nut on 90	15,17
94 Bolt hole in rim 36	2,3,4,18

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A shelf device (**20**) comprising horizontal shelving means (**22**) having depending vertical flanges (**36**) and inturned horizontal rims (**38**) on said flanges, support post means (**24**) and cutaway corners (**40**) on said shelving means (**22**) complementary to said post means (**24**), U-bolts (**26**) extending about said post means (**24**), said U-bolts (**26**) having threaded legs (**50**) extending through suitable apertures (**48**) in said vertical flanges (**36**), and a reinforcing bracket (**30**) within each of said cutaway shelf corners (**40**) supported on said corner inturned shelf rims (**38**), said brackets (**30**) having threaded bolt leg receiving apertures (**66**) aligned with said vertical flange apertures (**48**).

2. The device of claim **1**, said bolt leg receiving apertures (**48**) in said vertical flanges (**36**) being slightly spaced from the vertical edges (**46**) of said cutaway corner (**40**), said support post means (**24**) having spaced apart extending wedge shaped vertical ridges (**44**) complementary to the adjacent outer surface of said vertical flanges (**36**) within said U-bolt legs (**50**).

3. The device of claim **1**, and means (**62**) securing said brackets (**30**) to said inturned rims (**38**).

4. The device of claim **3**, said bracket securing means comprising inturned flanges (**54**) on the bottom of said brackets (**30**) overlying said inturned rims (**38**) of said shelf vertical flanges (**36**), and rivet means (**62**) extending through said bracket bottom inturned flanges (**54**) and said shelf flange inturned rims (**38**).

5. The device of claim **1**, said post means (**24**) having identifying indicia (**74**) at each U-strap receiving recess.

6. The device of claim **1**, said shelving means (**22**) having a flat top (**32**), said depending vertical flanges (**36**) each having an upwardly extending lip (**34**) connecting them to said shelving means flat top (**32**).

7. A shelf device comprising horizontal shelving means (**22**) having depending vertical flanges (**36**) and inturned horizontal rims (**38**) on said flanges, support post means and cutaway corners (**40**) on said shelving means (**22**) complementary to said post means, U-bolts (**26**) extending about said post means, said U-bolts (**26**) having threaded legs (**50**) extending through suitable apertures (**48**) in said vertical flanges (**36**), a reinforcing bracket (**30**) within each of said cutaway corners (**40**) supported on said corner inturned shelf rim (**38**), said brackets (**30**) having threaded bolt leg receiving apertures (**66**) aligned with said vertical flange apertures (**48**), and gusset plate means (**78, 80**) providing additional rigidity, said gusset plate means (**78, 80**) being secured to said vertical flanges (**36**) at its upper portion (**86**) and being secured at its lower portion by second U-bolts (**26**) extending therethrough and through second reinforcing brackets (**30**), said second brackets being biased against said support post means.

8. The device of claim **7**, said gusset plate means (**78–80**) being offset (**84**) at its upper portion (**86**) whereby said upper portion may extend over the outer surface of said vertical flange (**36**) and its lower portion may extend against said support post means (**76**).

9. The device of claim **1**, said shelving means (**22**) comprising a plurality of super-posed shelves cooperating with said post means (**24**) providing rigidity to said shelf device (**20**).

10. A shelf device comprising horizontal shelving means (**22**) having depending vertical flanges (**36**) and inturned horizontal rims (**38**) on said flanges, support post means (**76**) and cutaway corners (**40**) on said shelving means (**22**) complementary to said post means (**76**), U-bolts (**26**) extending about said post means (**76**), said U-bolts (**26**) having threaded legs (**50**) extending through suitable apertures (**48**) in said vertical flanges (**36**), a reinforcing bracket (**30**) within each said cutaway corners (**40**) supported on said corners inturned shelf rims (**38**), said brackets (**30**) having threaded bolt leg receiving apertures (**66**) aligned with said vertical apertures (**48**), said shelving means (**22**) comprising a single shelf (**22**), means making said single shelf (**22**) and said post means (**76**) rigid with each other comprising a pair of gusset plates (**78, 80**) at each corner of said shelf (**22**) and the post means (**76**) secured thereto, a second but lower bracket (**30**) at each corner, said gusset plates (**78, 80**) being secured at their upper portions (**86**) to said shelf flanges (**36**) and at their lower portions by said second brackets and second U-bolts (**26**) extending about said post means (**76**) and through said gusset plates and said second brackets, and nut means (**28**) on said second U-bolts biased against the inner surfaces of said second brackets (**30**).

11. The device of claim **10**, said support post means (**76**) having spaced apart extending wedge shaped vertical ridges complementary to the adjacent outer surface of said vertical flanges (**36**) within said U-bolt legs (**50**), said upper portions (**86**) of said gusset plates being offset to extend over the outer surfaces of said flanges (**36**), and the long vertical edges (**88**) of the lower portions of said gusset plates (**78, 80**) biasing against said corner post means (**76**) between said vertical ridges (**44**) and the post means surfaces therebetween.

* * * * *