Dec. 27, 1966 R. J. EVANS 3,294,250

SHELVING STRUCTURE

Original Filed March 5, 1964 2 Sheets-Sheet 1

FIG. 1

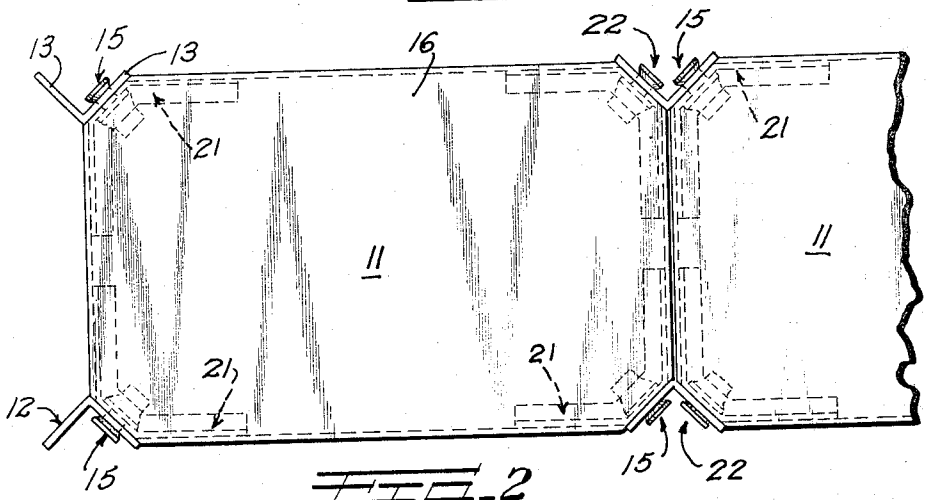


FIG. 2

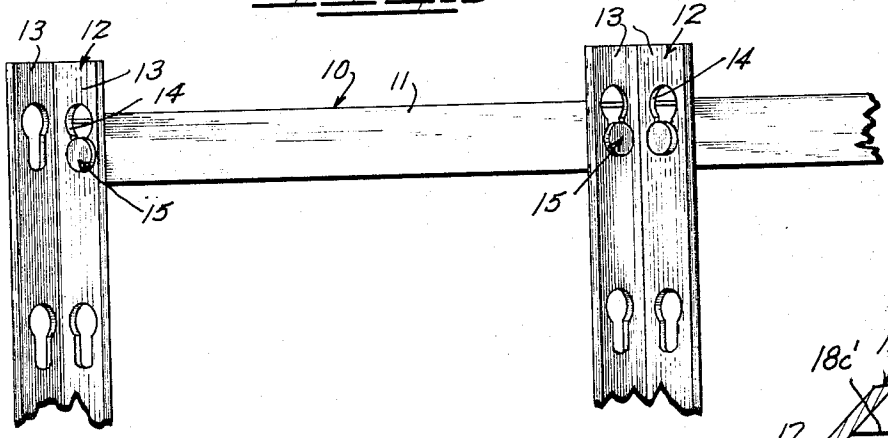


FIG. 3

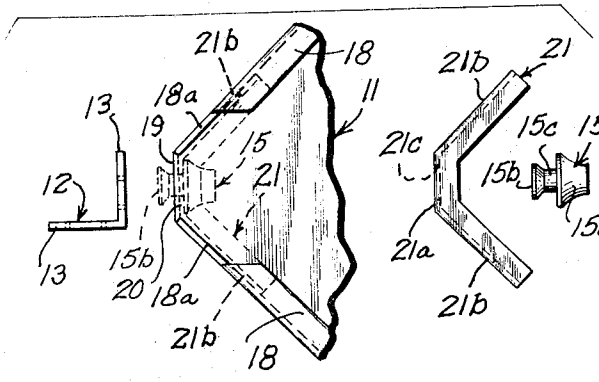
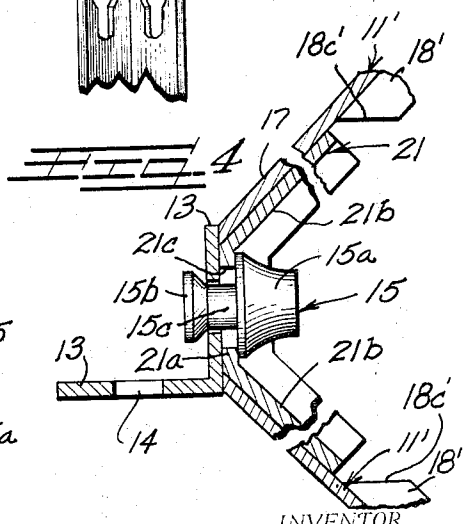


FIG. 4



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SHELVING STRUCTURE

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FIG. 5

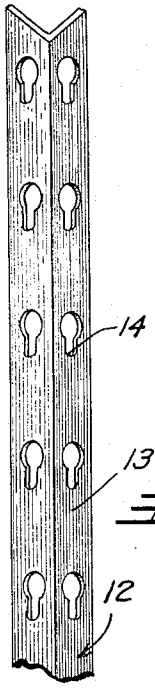


FIG. 6

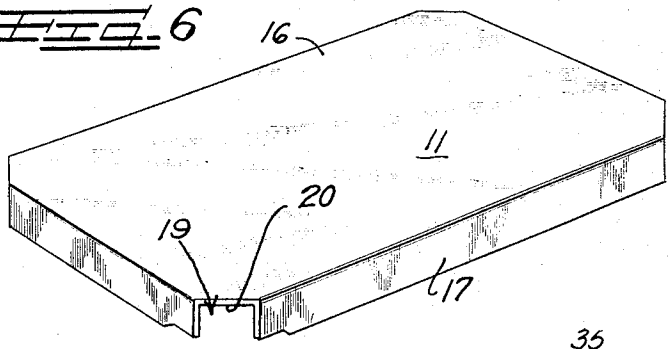


FIG. 7

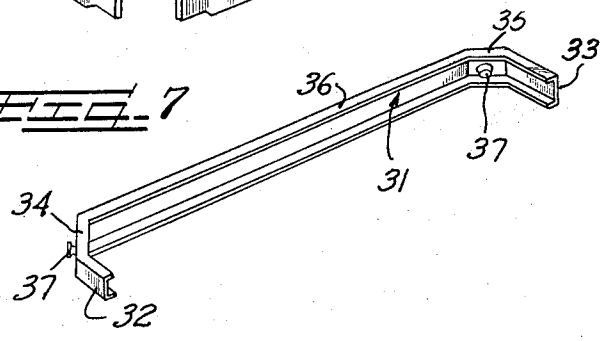


FIG. 10

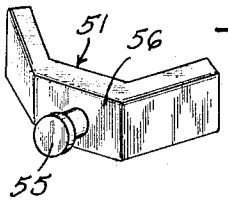


FIG. 8

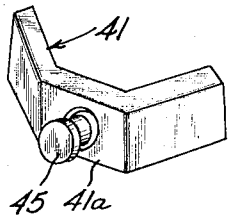


FIG. 13

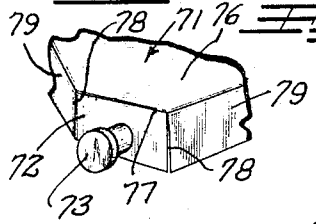


FIG. 9

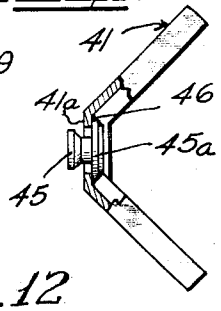


FIG. 11

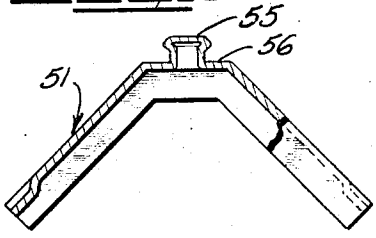
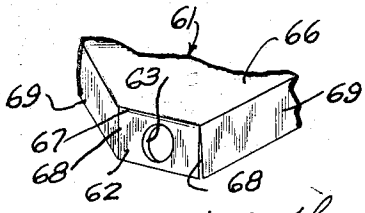


FIG. 12



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3,294,250

SHELVING STRUCTURE

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Original application Mar. 5, 1964, Ser. No. 349,623. Divided and this application Oct. 23, 1965, Ser. No. 503,875

15 Claims. (Cl. 211—176)

The present application is a division of my copending earlier filed application entitled, "Shelving Structure," Serial No. 349,623, filed March 5, 1964, only directed to non-elected subject matter.

The present invention relates generally to a new and improved shelving structure.

An important object of this invention is to provide a new and improved shelving structure that is adapted for using only one-half the number of posts as is currently employed by most manufacturers.

Still another object of this invention is to provide a new and improved post for use in a shelving structure which can be more economically manufactured from strip stock having a width of only two inches.

Still another important object of this invention is to provide a new and improved manner of coaction between posts or uprights and shelves attachable thereto.

A still further important object of this invention is to provide a new and improved technique for connecting or mounting the the shelves on the posts.

According to the general features of this invention, I have provided a new and improved shelving structure which includes shelves that are disposable in end-to-end relation and which each possesses cut-away corners. The contiguous end-to-end related shelves define post receiving pockets. A series of corner posts are disposed in the pockets and are provided with portions nestingly coordinated with the pockets. Means join the nested portions of the posts and the cut-away corners together to separate the shelves on the posts. In one form of my invention, the pockets are of a V-shaped configuration when the shelves are positioned in end-to-end relation. In this form, the posts are generally of a V-shaped cross section. In another form of my invention, the pockets are of an arcuate configuration and arcuately configured posts are provided for coaction therewith.

According to other features of this invention, different types of means have been provided for mounting the shelves on the posts. An an example, one important form utilizes a stud bearing bracket that is supported on ledges positioned beneath the associated shelf with the stud carried thereon extending through the cut-away corner or corner recess of the shelf for attachment with a key-hole slot on the post associated therewith.

Other objects and features of this invention will more fully become apparent in view of the following detailed description taken in conjunction with the accompanying drawings illustrating therein several embodiments and in which:

On the drawings:

FIGURE 1 is a fragmentary top plan view of a shelving structure embodying important features of this invention;

FIGURE 2 is a fragmentary front view of the shelving structure shown in FIGURE 1;

FIGURE 3 is an enlarged fragmentary exploded bottom view of the shelving structure;

FIGURE 4 is an enlarged fragmentary cross-sectional view with the stud shown in elevation illustrating the coaction of the components in assembly with a modified shelf;

FIGURE 5 is a fragmentary perspective view of a post;

FIGURE 6 is a perspective view of a shelf;

FIGURE 7 is a perspective view of one type of stud bearing bracket useable with the shelf shown in FIGURE 6;

FIGURE 8 is a perspective view of another type of stud bearing bracket useable with the shelf shown in FIGURE 6;

FIGURE 9 is a side view of the bracket shown in FIGURE 8 only with a portion of the bracket being broken away and shown in section;

FIGURE 10 is a perspective view of still another type of stud bearing bracket where the stud is formed as an extrusion;

FIGURE 11 is a cross-sectional view of the bracket shown in FIGURE 10;

FIGURE 12 is a fragmentary perspective view similar to FIGURE 6 but illustrating a modified type of shelf corner; and

FIGURE 13 is a fragmentary view of a corner shelf with a stud formed as an extrusion thereon.

As shown on the drawings:

The reference numeral **10** indicates a shelving structure and the structure has a series of vertically spaced shelves **11** which are attachably mounted on a series of angular posts **12** positioned at the four corners of each shelf. As is illustrated in FIGURE 1, the shelves **11** can be disposed in side-by-side relation and the pair of posts **12** positioned between the side-by-side related shelves can serve to support separate rows of shelves rather than a single row.

Each of the angular posts has a pair of post legs **13, 13** and vertically spaced key-hole slots or post slots **14** are provided on the legs. A series of studs **15** are also provided for securing the shelves **11** to the angular posts **12** according to other important features of this invention. Each stud **15** has an enlarged head **15***a* and a reduced head **15***b* disposed at opposite ends of a central cylindrically shaped stud portion **15***c*.

The shelves **11** each include a flat shelf portion **16** which is peripherally bound by underturned marginal flanges or sides **17**. Joined with the sides **17** are a series of inwardly turned angle bracket carrying shelf flanges or ledges **18**. Each shelf has four flatted or cut-away corners **19**. These corners **19** are formed by die cutting flat sheets of steel whereby corner portions of the shelf portions **16, 17** and **18** are removed. After the shelf portions **16, 17** and **18** are formed to shape as shown in FIGURE 6 and as a result of the previously described notching operation, corner notches or recesses **20** are formed at the four corners of each shelf **11**. The ledges **18** are reduced in width at **18***a*, **18***a* (FIGURE 3) adjacent to each of the cut-away corners **19** to enable the studs **15** to be more readily projected through the notches **20**.

As a result of my tests and study, a number of new types of systems have been developed for securing the shelf **11** having the cut-away corners **19** to the posts. One of the preferred forms which I have developed is illustrated in FIGURE 3. In this instance a stud supporting bracket **21** has been provided for each corner. The bracket **21** is generally C-shaped and is channeled along its length. The bracket **21** has a central bracket portion **21***a* and a pair of converging bracket leg portions **21***b* are joined with its opposite ends. The central bracket portion **21***a* has a hole **21***c*.

Before the shelves **11** are mounted on the posts **13**, a group of corner brackets **21** are positioned so that the holes **21***c* are in alignment with the corner notches **20**. The ledges **18** provide means for supporting the brackets **21** in assembly with the shelves before the shelves are finally mounted on the angular posts **12**. The shelves are then mounted between the angular posts **12**, and the reduced heads **15***b* of the studs **15** are projected through the holes **21***c*, the notches **20** and the key-hole slots **14**.

The assembled position of the stud **15** is clearly illustrated in FIGURE 3 and it will here be noted that the enlarged head **15***a* bears against the central section **21***a* of the bracket **20** to hold the bracket securely against the post leg **13**. The reduced stud head **15***b* bears against an inside surface of the post leg **13** to insure that the shelf will be securely attached with the post leg. By utilizing the key-hole shaped slots **14**, the cylindrically shaped stud section **15***c* can be wedgingly engaged with diverging side edges of the slots. The shelves **11** can be readily disassembled from the posts by forcing each shelf in an upward direction to release the wedge fit between the studs **15** and the post legs so that the reduced head **15***b* of the stud can be disengaged from the associated key-hole slot **14**.

When the shelves are positioned in side-by-side relation, the contiguous flatted corners **19** coact to form post receiving pockets **22**. In the shelf structure illustrated in FIGURES 1–3, the post legs **13** on each post **12** are of equal length and positioned 90° from one another. The shelves **11** are notched in such a way to permit the post legs to be engaged in flush relation against the flatted corners. Also, the post legs are nested within the post receiving pockets **22**.

A modified form of shelf bracket is illustrated at **31** in FIGURE 7. Each bracket **31** can be used in place of a pair of the brackets **21** illustrated in FIGURE 1. The bracket **31** is continuously channeled along its length and includes a pair of end legs **32** and **33** which are joined with diagonal legs **34** and **35**. The diagonal legs **34** and **35** are joined together by an elongated bracket leg **36** which extends substantially the entire front to back dimension of the shelf. The bracket **31** is adapted to be supported on the shelf legs **18** in the same manner as previously described. If desired, studs **37, 37** can be extruded from the diagonal bracket legs **34** and **35** or welded to them. As illustrated, the studs **37, 37** are secured by welds with the bracket **31** in the same manner illustrated in FIGURES 8 and 9 to be hereafter described in further detail.

In FIGURES 8 and 9, a further modification is illustrated. In this instance, a stud supporting bracket or corner bracket **41** is illustrated as being provided with a stud **45**. The bracket **41** and the stud **45** are very similar to the bracket **21** and the stud **15** except that an enlarged head **45***a* of the stud is welded at **46** to a central section **41***a* of the bracket **41**. The bracket **41** can be assembled with the shelf **11** and the posts **12** in essentially the same manner as previously described.

In FIGURES 10 and 11 is still another modified type of stud supporting bracket **51**. Here the bracket is provided with a stud **55** which comprises an extrusion and is formed from the metal of central bracket section **56**. The bracket **51**, as well as the other brackets previouly described, can be formed from any suitable material and excellent results are obtainable where sheet steel is used.

In FIGURES 12 and 13 modified shelves are indicated at **61** and **71**. In both instances, the shelves are formed from flat sheet stock and the corners are notched, but corner flaps **62** and **72** remain attached with flat shelf portions **66, 76** along fold lines **67, 77**. Side flap edges **68, 68** and **78, 78** may be welded to underturned marginal flanges or sides **69, 69** and **79, 79**. By forming the shelves **61** and **71** with the flaps **62** and **72**, it is not necessary to use stud brackets to assist in attaching the shelves to shelf posts. With the shelf **61**, a stud such as the stud **15** can be projected through corner flap hole **63**. In FIGURE 13, a stud **73** is formed as an extrusion from the material of the flap **72**.

In FIGURE 4 a modified shelf **11′** is illustrated with the bracket and stud being identical to those in FIGURE 3. In FIGURE 3, the bracket **21** is adapted to be carried on the flanges **18**, while in FIGURE 4 the flange **18′** and its edges **18***c′*—**18***c′* are shorter providing clearance

to permit the shelf to be moved directly on top of the bracket **21** to facilitate assembly.

In the assembly of the shelving components shown in FIGURE 4 the brackets such as the bracket **21** can be assembled on the post **13** by engaging the stud head **15***b* in the key-hole slot **14**. Thereafter, the shelf **11′** can be guided into position in such a way that flatted or cut-away corners **19** are positioned in assembled relation between the stud end **15***a* and the associated leg of the post **13**. In the assembly of the stud bracket with the post **13**, the stud would be extended through the stud bracket hole **21***c* thus securing the stud **15**, the stud bracket **21** and the post **13** together. Where the stud is operatively connected with the stud bracket such as is shown in FIGURES 8, 9, 10 and 11, the separate step of positioning the stud with respect to the stud bracket would not be required so that the stud bracket would itself be directly mounted on the post and so that the shelf **11′** can thereafter be moved into assembled relation with these previously assembled components with the modified shelf **11′**. It will be appreciated that this type of operation facilitates the rapid assembly of the components and effects labor savings by the user of the subject invention.

Although minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such modifications as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. In a shelving structure,

a shelf having cut-away corners,

a series of corner posts each comprising strip stock and having a pair of integrally connected convergently related leg portions each of which has a row of vertically spaced lug-receiving slots and the slots of each row being horizontally aligned with the corresponding slots of the other row, said leg portions confronting said cut-away corners with certain of said slots aligned therewith, studs projecting outwardly from said cut-away corners into and engaged in said slots and havinig enlarged stud heads at opposite ends, and

stud supporting brackets at inner sides of said cut-away corners with each bracket having a bracket portion held in face-to-face relation against one of said leg portions on said posts by said enlarged stud heads and with said studs being projected through respective slots in said stud supporting brackets,

one of each of the enlarged stud heads being engaged against respectively oppositely facing sides of said leg portion and said stud supporting bracket, the distance between said enlarged heads on each stud being only slightly greater than the combined thickness of the associated leg portion of the post and the bracket portion to insure that the three associated components including the leg portion, the shelf and the associated bracket may be readily assembled but are held in substantially rigid assembly together.

2. In a shelving structure,

shelves disposed in end-to-end relation each having cut-away corners and with adjacent cut-away corners defining post receiving pockets,

a series of corner posts complementary to and disposed in said pockets and each having leg portions with each leg portion having a pair of integrally connected convergently related vertically spaced key-hole slots for association with said cut-away corners and with one of said leg portions engaging one of said cut-away corners on one of said shelves and with another of said leg portions engaging one of said cut-away corners on another of said shelves, and

supporting brackets engaged by said shelves and having studs extending through holes in said brackets,

the studs having enlarged heads at opposite ends with one head being disposed at the inside of said bracket and with another head being disposed in said pocket and the stud engaged in a keyhole slot of said post.

3. The structure of claim 2 further characterized by said studs being in welded assembly with said brackets.

4. The structure of claim 2 further characterized by at least one of said brackets having opposite ends carrying said studs and associated with a pair of said cut-away corners.

5. The structure of claim 2 further characterized by said cut-away corners each including an upright portion having a hole therein, the stud supporting brackets each having a stud projected through the hole in said upright portion of said corner into engagement with a slot in said corner post.

6. In a shelving structure,

a shelf having a central shelf portion and angular marginal shelf flanges about the perimeter and with the shelf having cut-away corners at the corner junctions of the angular marginal shelf flanges which are open at bottom ends,

a series of corner posts complementary to said cut-away corners and having a pair of integrally connected convergently related leg portions with said leg portions having vertically spaced post slots for association with said cut-away corners, angular stud supporting brackets each having a stud engaged in an associated one of said post slots for enabling said posts to support shelves,

the shelf being mountable on the corner posts by positioning the shelf in overlying relation to the studs and moving the shelf downwardly engaging the cut-away corners of the shelf between the stud supporting brackets and the post and supporting the shelf by means of the studs.

7. The shelving structure of claim 6 further characterized by said stud being formed integral as an embossing on said stud supporting bracket.

8. The shelviing structure of claim 6 further characterized by said stud comprising a separate element for assembly with the stud supporting bracket.

9. In a shelving structure,

shelves disposed in end-to-end relation each having recessed corners and with adjacent recessed corners defining outwardly opening post receiving pockets, a series of corner posts complementary to and disposed in said pockets and each having a pair of integrally connected inwardly convergently and outwardly flaringly related leg portions with each leg portion having vertically spaced slots for association with said recessed corners and with one of said leg portions engaging one of said recessed corners on one of said shelves and with another of said leg portions engaging one of said recessed corners on another of said shelves, and projections extending outwardly from said recessed corners into and releasably engaged in said slots for supporting the shelves on the posts.

10. A shelving structure as defined in claim 9, in which said projections comprise studs extruded from shelf material at said recessed corners.

11. A shelving structure as defined in claim 9, including shelf engaging brackets from which said projections extend.

12. A shelving structure as defined in claim 9, including brackets engaging the shelves and extending longitudinally therealong and having opposite end portions aligned with opposite recessed corners of said shelves and said projections extending from said aligned portions of the brackets.

13. A shelving structure as defined in claim 9, including brackets with which the shelves are engaged and which brackets have said projections comprising studs welded thereto.

14. A shelving structure as defined in claim 9, including brackets engaged by said shelves and said projections comprising studs extruded from the material of the brackets.

15. A shelving structure as defined in claim 9, in which said recessed corners of the shelves have underturned corner flanges each provided with a hole therethrough and said projections comprising studs extending through said holes.

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