

[54] RIGID STRUCTURE FOR SHELVING UNIT

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[22] Filed: June 18, 1973

[21] Appl. No.: 371,070

[52] U.S. Cl. 108/109, 211/134

[51] Int. Cl. A47b 57/06

[58] Field of Search 108/111, 109, 110, 107, 108/106; 211/182, 134, 148, 71; 248/249, 250

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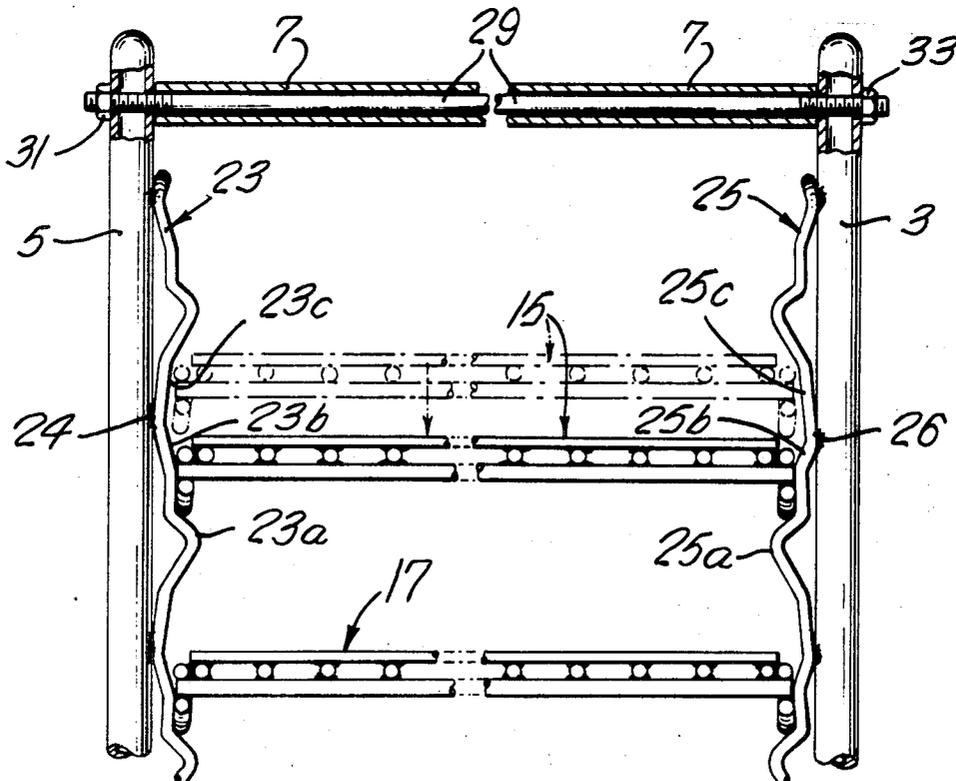
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[57] ABSTRACT

The invention relates to a novel rigid structure for a knock-down shelving arrangement. The structure includes two side frame members which include shelf-retaining means at the ends of the structure. The retaining means at each end face each other and comprise a plurality of retaining units. Each unit consists of a shelf-supporting protrusion, a resilient shelf-locking portion, and a shelf-clearing portion. The space between a pair of facing clearing portions is greater than the width of the shelf and the space between a pair of locking portions is less than this width. The space between a pair of protrusions is substantially less than the shelf width. Thus, a shelf can be inserted into the structure through the end of the structure in the space between clearing portions. It is then locked into place by forcing it into the locking space, and the supporting portion supports the shelf when it is carrying a load. With this arrangement, shelves can be spaced closely one on top of the other, and it is possible to remove a bottom or middle shelf without removing the shelves above or below the bottom or middle shelf.

6 Claims, 4 Drawing Figures



SHEET 1 OF 2

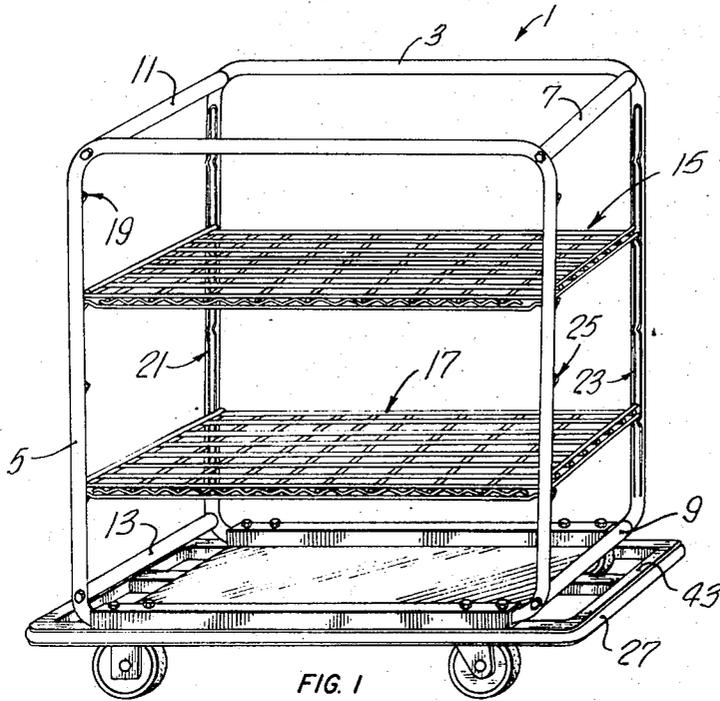


FIG. 1

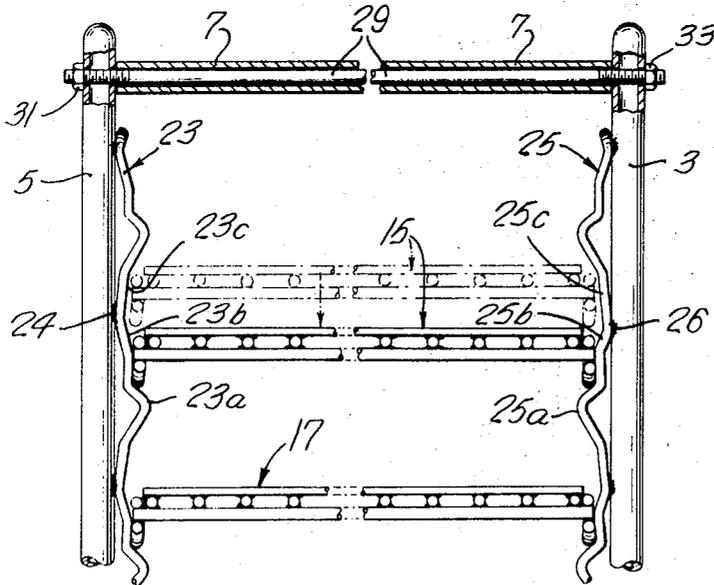


FIG. 2

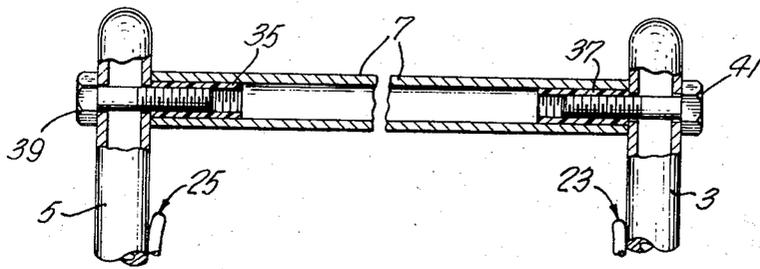


FIG. 3

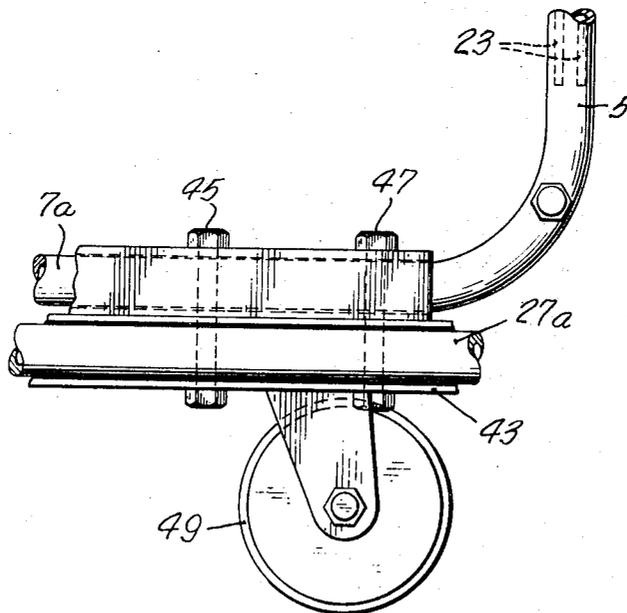


FIG. 4

RIGID STRUCTURE FOR SHELVING UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a rigid structure for a knock-down shelving arrangement. More specifically, this invention relates to such a structure wherein it is possible to remove shelves from the end thereof when the structure is in its standup position.

2. Description of the Prior Art

Knock-down shelving units are known as can be seen, for example, in U.S. Pat. No. 2,919,817, Maslow, Jan. 5, 1970. The problem with these units is that, in order to remove a shelf, it is necessary to tilt the shelf. Thus, the shelves must have large spaces between them if it is to be possible to remove a middle shelf without first removing the shelves above it. This prevents the most efficient utilization of the unit.

If the shelves are closely spaced one on top of the other, it is necessary to remove all shelves on top of a middle shelf before the middle shelf can be removed.

In addition, because the unit is supported by cross members at its ends, shelves must be removed through the sides of the unit. This can be inconvenient because it is necessary to manipulate the shelf along the full length thereof.

SUMMARY OF THE INVENTION

The rigid structure, in accordance with the invention, will permit the removal of shelves from the ends of the structure without any requirement for tilting the shelves. In addition, the structure is sturdy and capable of withstanding a great deal of physical abuse.

In accordance with the invention, a rigid structure for a knock-down shelving arrangement comprises:

two side frame members;

spacing bars spacedly separating said side frame members at each end of said frame members to define ends of said rigid structures;

shelf-retaining means mounted on the end portions of said frame members, the shelf-retaining means of adjacent end portions facing each other;

said shelf-retaining means comprising shelfsupporting protrusions.

Preferably, the frame members comprise tubular pipes shaped to form a closed loop. Alternatively, the frame members could comprise square pipes joined to form a rectangle.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood by an examination of the following description together with the accompanying drawings in which:

FIG. 1 is a perspective view of the structure with shelving mounted therein;

FIG. 2 is a partial end view partially broken away to illustrate the shelf-retaining means of the invention as well as securing means for the spacing bars;

FIG. 3 illustrates an alternative means for securing the spacing bars; and

FIG. 4 shows how the structure can be secured to a dolly.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to FIG. 1, the rigid structure, indi-

cated generally at 1, includes side frames 3 and 5, joined together by spacing bars 7 and 9 at one end and 11 and 13 at the other end. The bars 7 and 11 connect the top ends of the frames while the bars 9 and 13 connect the bottom ends of the frames. The frames can comprise tubular pipes shaped to form closed loops as shown in the drawing. However, the frame can also comprise rectangular pipes joined to form a rectangle. Although the frames are shown in the drawing as integral members, it is, of course, possible to make them in parts joined as by sleeve and rod connections. Such sleeve and rod arrangements would be advantageous in that the side frames could be broken down for ease of shipping.

The spacing bars can also be tubular or square pipes and the means for securing the spacing bars is discussed below relative to the descriptions of FIGS. 2 and 3.

Shelves 15 and 17 are supported in the structure by the shelf-retaining means 19 and 21 at one end and 23 and 25 at the other end. The construction of the shelf-retaining means is discussed below. The entire structure can be mounted on a dolly to make the entire arrangement movable.

The rigid structure is preferably made of a sturdy metal such as steel or aluminum as is well known in the art.

Referring now to FIG. 2, the shelf-retaining means 23 and 25 are shown to be facing each other and consisting of a plurality of paired shelf-supporting units. Each facing pair of units comprises a pair of shelfsupporting protrusions 23a and 25a. Each pair of such protrusions will, of course, be at the same height on the side frames so that shelves supported by a pair of protrusions will be horizontally disposed. It will also be appreciated that the spacing between the facing ends of the protrusions will be substantially less than the width of the shelves they support.

Immediately above each protrusion is a resilient shelf-engaging portion 23b. The spacing between the facing surfaces of the portions 23b is slightly less than the width of the shelves, so that a shelf must be forced in between a pair of resilient engaging members. Because of the resiliency of these members, when a shelf is forced into the space between them, the portions 23b will push outwards against the shelf and lock it into place.

The retaining means is secured to the side frames by a plurality of weld points 24, 26. The weld points are immediately above the resilient portions 23b, 25b, and immediately below shelf-clearing portions 23c, 25c. The spacing between the facing surfaces of the portions 23c, 25c is slightly greater than the width of the shelves.

As is obvious, each shelf-retaining unit comprises a clearing portion, a resilient portion and a protrusion.

In FIG. 2, shelf 15 is shown in broken lines adjacent a pair of shelf-clearing portions and shelf 17 is shown adjacent a pair of resilient retaining portions.

The rod 7 can be secured to the frame by a rod and bolts arrangement consisting of a rod 29, threaded at both ends, and nuts 31 and 33 threadedly secured to the ends of the rod. An alternative means for securing the spacing bar is shown in FIG. 3 and consists of plugs 35, 37, inserted in the ends of the bar, and mating screws 39, 41. The plugs are usually made of a plastic material and include internal threads to receive the threads of the screws 39 and 41. The bar may also be

welded to the side frames but of course, with the welded arrangement, the structure is less of a knock-down arrangement than with the bolting or screwing means. As will be apparent, the side frames will contain openings to receive the bolts or screws of the appropriate arrangements.

The structure can be mounted on a dolly in a manner shown in FIG. 4. Specifically, a nut and bolt arrangement which secures the caster to the dolly, can be extended to secure the structure to the dolly. The caster plate 43 contains openings for receiving nut and bolt arrangements 45 and 47. These arrangements also pass through openings in the side of the dolly 27a and the bottom of the side frame 7a. The caster wheel 49 is rotatably attached to the plate 43 as is well known in the art.

In operation, the structure is used as follows:

To ship the structure, it is knocked down into its component parts. When the side frames consist of integral tubular pipes, the component parts comprise the two side frames, four spacing bars, shelving units, and a dolly. Both the dolly and the frames can be made to break down further by rod and sleeve arrangements as described above. Also, if the frame is made of square pipe, then it will normally be made of separable parts which can be broken down.

The shelf-retaining means can be mounted on the frames at the factory.

The structure can be easily assembled by the user with the aid of only simple wrenches and screw drivers, depending on the particular embodiment used.

After the structure is assembled, the shelves are placed in position as follows.

A shelf is inserted into the structure through an end thereof in the space between the shelf-clearing portions immediately above the protrusion which will support the shelf. The shelf is then forced down into the space between a pair of resilient portions. This will lock the shelf in position and restrain vertical and horizontal movement under no load conditions. When a load is placed on the shelf, the resilient members will contract under the force of the load and the shelf would tend to move downward. However, the protrusions will prevent substantial downward movement and support the loaded shelves.

It can be seen that the retaining means must be made of material strong enough to support a load, but resilient enough to provide the locking function of the portions 23b, 25b. Preferably, heavy steel wire having a diameter of some one-fourth inch is used.

To remove a shelf, it is merely necessary to force the shelf out of the space between the resilient portions and into the space between the portions 23c, 25c. As this space is greater than the width of the shelf, the shelf can now be slid out through the end of the structure. Thus, the shelf does not have to be tilted, nor do adjacent shelves above have to be removed.

It can thus be seen that the inventive structure permits a much closer spacing between shelves one on top of the other, and a convenient and simple method for removing the shelves from the structure.

Although several embodiments have been described above, this was for the purpose of illustrating, but not

limiting, the invention. Various modifications which will come readily to the mind of one skilled in the art are in the scope of the invention as defined in the appended claims.

I claim:

1. A knock-down shelving arrangement comprising:

a pair of upstanding laterally spaced parallel frame members having upstanding end portions; spacing bars extending between said frame members holding the same in said spaced parallel relation; shelf retaining means on said upstanding end portions, the retaining means on one frame member facing those on the other and each comprising an elongated resilient integral member fixedly secured to said upstanding end portions at vertically spaced positions;

said shelf retaining members, between said spaced positions, being spaced from said upstanding end portions and comprising lowermost protrusions configured to support a shelf resting thereon and integral upstanding resilient portions adjacent said lowermost portions and positioned to resiliently press against the edges of a shelf resting on said protrusions to hold the same in position, said resilient portions merging into more widely spaced portions above said resilient portions and which are spaced apart a distance greater than the width of a shelf on said protrusions whereby a shelf resting on said protrusions may be slid upwardly along said resilient portions to a position between said more widely spaced portions and then withdrawn endwise from said frame members without restraint.

2. A structure as defined in claim 1, wherein facing pairs of protrusions of adjacent side frame members are at the same height and are also at the same height as corresponding pairs of protrusions of the other side frame members, whereby a shelf supported by corresponding pairs of said units is horizontally disposed.

3. A structure as defined in claim 1, wherein said side frame members comprise tubular pipes shaped to form a closed loop.

4. A structure as defined in claim 1, and comprising spacing bars at the top and bottom of both said ends of said structure.

5. A structure as defined in claim 1, wherein said spacing bars comprise tubular pipes;

rod means, threaded at both ends, extending through said bar and through openings in said side frame members adjacent said bar;

nut means, threadedly engaging the threads of said rod, mounted on the ends of said rod for securing said spacing bars to said side frame members.

6. A structure as defined in claim 1, wherein said spacing bars comprise tubular pipes;

plug means, having internal threads, being placed in the ends of each said spacing bars;

openings in said side frame members adjacent the ends of said spacing bars;

and screw means, extending through said openings and threadedly engaging said plugs to secure said spacing bars to said side frame members.

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