April 5, 1966 R. J. EVANS 3,244,127

CANTILEVER SHELVING

Filed Dec. 26, 1963 3 Sheets-Sheet 1

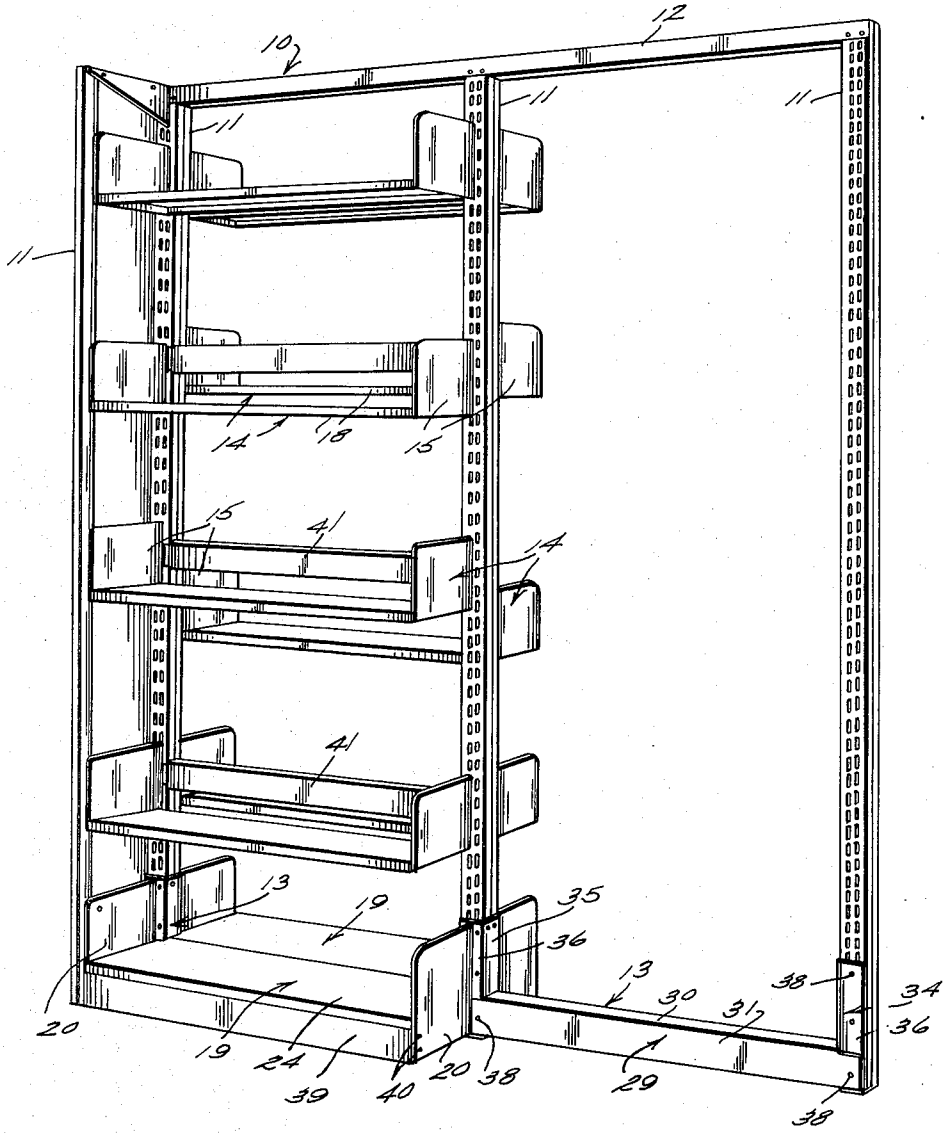

FIG. 1

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CANTILEVER SHELVING

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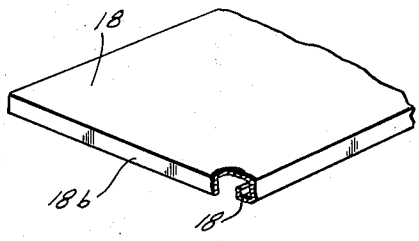

FIG. 3

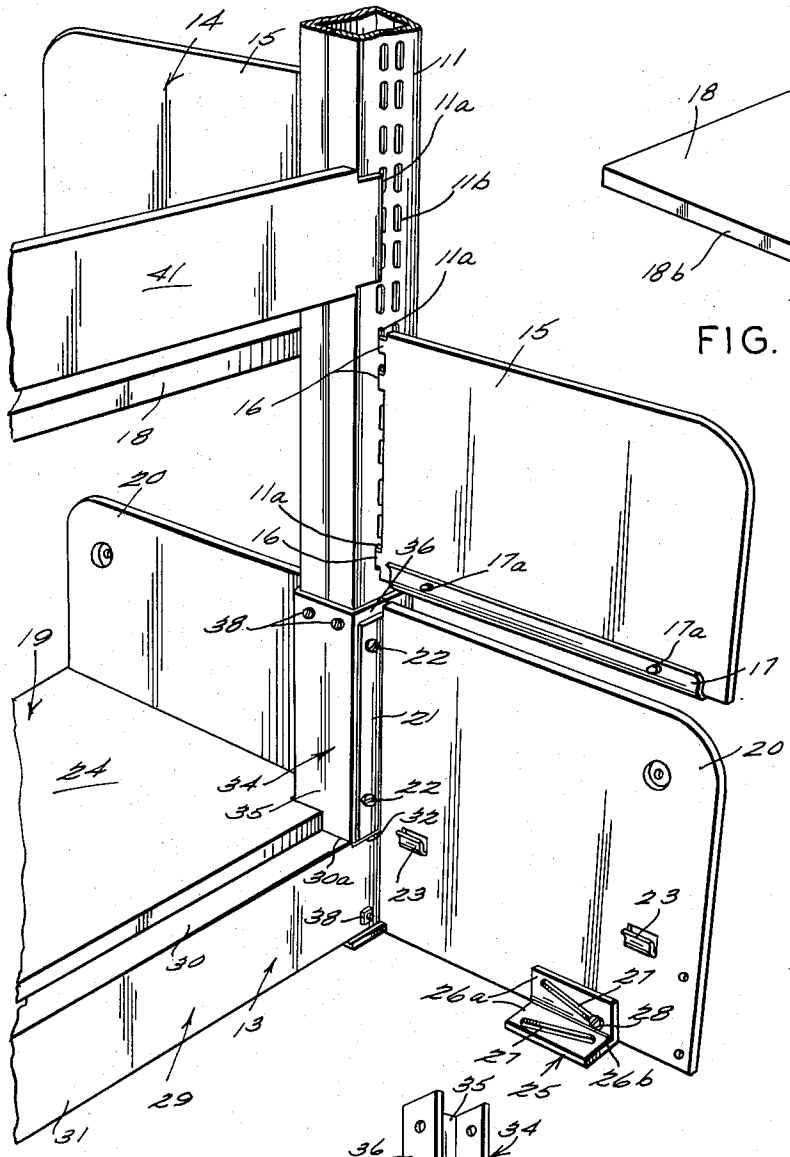

FIG. 2

FIG. 4

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CANTILEVER SHELVING

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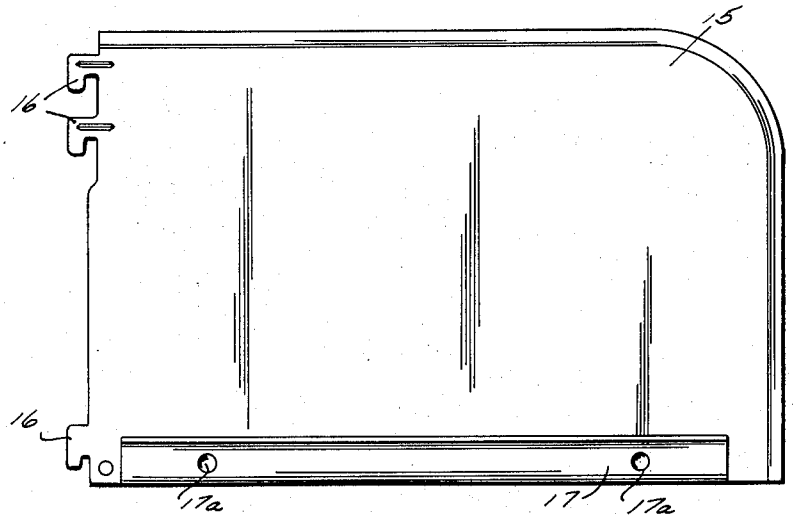

FIG. 5

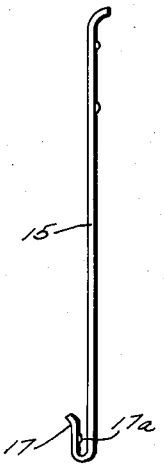

FIG. 6

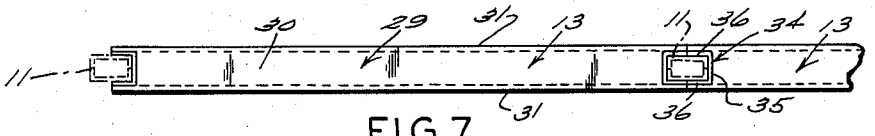

FIG. 7

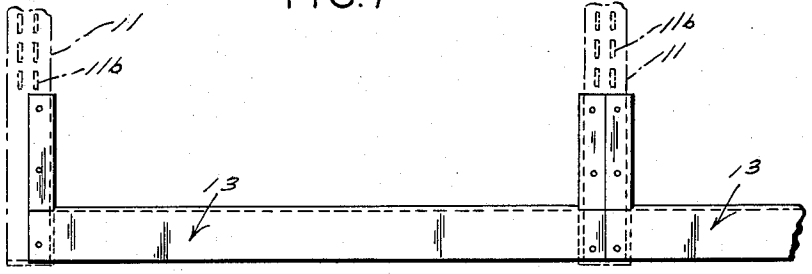

FIG. 8

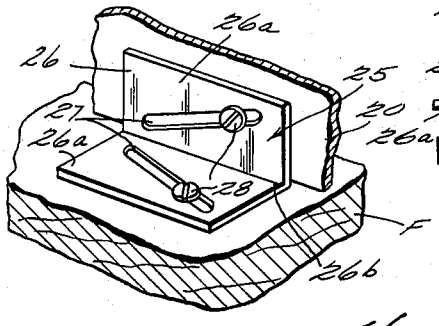

FIG. 11

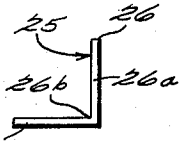

FIG. 9

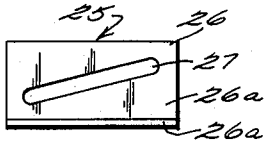

FIG. 10

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3,244,127

CANTILEVER SHELVING

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2 Claims. (Cl. 108—108)

The present invention relates to cantilever shelving such as can be used in a library bookstack. The invention is further concerned with a new and improved supporting structure for securing the components of the shelving in rigidified assembly.

In the past, one of the weaknesses of cantilever book shelving has been that the structure is wobbly and sway braces have been required to rigidify the shelving. These sway braces are very often as heavy as ⅜" rods arranged in the shape of an X at the rear of the shelving. These sway braces are also unsightly and on occasion prevent larger books from being pushed through the shelves when the shelves are disposed at the same level on opposite sides of the rack.

According to one of the important features of this invention, a new supporting structure has been developed for securing the components of the shelving in rigidified assembly which eliminates the need for the unsightly and cumbersome sway braces previously employed. By developing a new and improved library bookstack having the new supporting channel structure, the appearance of the bookstack has been materially improved.

In view of the foregoing, an important object of this invention is to provide a new and improved library bookstack of the cantilever type which eliminates the necessity of sway braces.

Yet another object of this invention is to provide a new and improved cantilever book shelving structure which can be assembled and disassembled with a minimum of effort and which can be more economically manufactured without any sacrifice in the strength of the bookstack.

According to other important features of this invention, a new and improved leveling means has been provided for leveling the bookstack on a floor surface.

Still another important feature of this invention is to provide a new and improved shelf structure for the bookstack enabling the shelf and books carried thereon to be lifted from the bookstack and reattached to the bookstack at some other position, as is desired.

According to still other important features of this invention, a new and improved supporting sturcture has been provided which structure comprises a base channel having base and side legs with the base leg being shorter in length than the side legs providing recessed areas at opposite ends of the base legs between the side legs. The supporting structure further includes upright channels which are disposed in the recessed areas at opposite ends of the channels with the upright channels each having upright base and side legs. The upright side legs of the upright channels are joined by any suitable means with the opposite ends of the side legs of the base channel in unitary assembly.

According to further important features of this invention, the vertical posts or columns of the bookstacks are adapted to be engaged within the upright channels and secured therewith. The bookracks or shelves are then suspended from the upright posts or columns.

According to still other important features of this invention, the racks include end brackets having shelf support hooks or channels and dimples which fit into the shelf so that if the shelf is pushed down into the shelf support hooks or channels, the entire shelf assembly including the end brackets in the shelf can be lifted with

books and attached at any desired position on the vertical posts or columns of the bookstack.

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 a single embodiment and in which:

On the drawings:

FIGURE 1 is a perspective view of a library bookstack embodying important features of this invention;

FIGURE 2 is an enlarged fragmentary perspective view with certain components removed for illustrating the coaction of the remaining elements of the structure;

FIGURE 3 is an enlarged fragmentary partially sectioned perspective view of a shelf for the bookstack;

FIGURE 4 is an enlarged fragmentary perspective view of a base supporting structure for the bookstack that embodies important features of this invention;

FIGURE 5 is a side elevation of a bookrack end bracket;

FIGURE 6 is an an end view of the bracket shown in FIGURE 5;

FIGURE 7 is a fragmentary plan view of the base supporting structure or units illustrating the manner of coaction with vertical columns or posts of the bookstack;

FIGURE 8 is a fragmentary front elevation of the structure shown in FIGURE 7;

FIGURE 9 is an end view of a leveling bracket;

FIGURE 10 is a side view of the leveling bracket shown in FIGURE 9; and

FIGURE 11 is a perspective view partially in section illustrating the manner in which the leveling bracket is employed for leveling a bookstack.

As shown on the drawings:

The reference numeral **10** indicates generally a library bookstack of a type that can be readily assembled and disassembled in schools, libraries, homes, offices and the like. In order to economically manufacture the bookstack, the components are preferably made from sheet material such as steel although it is also conceivable that the bookstack could be made from certain types of synthetic plastics.

The bookstack **10** includes a series of posts **11** each having rows of post slots **11***a*. Each of the slots **11***a* is defined by a slot edge **11***b*. Mounted on a pair of the vertical posts on each bookstack **10** is an upper post **12**. Mounted at lower ends of the vertical posts **11** is a base supporting structure **13** embodying important features of this invention which will be discussed in greater detail hereafter.

Also mounted on the vertical posts **11** are bookracks **14**. These racks are preferably disposed in vertically spaced relation and can be attached to opposite sides of the posts **11** so that a single set of posts **11** can support bookracks **14** from opposite sides to provide a cantilever-type shelving structure. Each of the bookracks **14** includes a pair of bookrack end brackets **15** and **16**. Each bracket **15** has a series of bookrack end bracket hooks **16** which are adapted to be engaged in the post slots **11***a* and retainingly secured with the slot edges **11***b*.

The brackets **15** are further provided with a shelf support hook or channel at its lowermost end and these hooks or channels comprise integral turned terminal edges or flange portions of the bracket **15**. The hook or channel **17** is adapted to cooperate with a shelf **18** for suspending the shelf at opposite ends between a pair of the bookrack end brackets **15**, **15**.

The shelf **18** has a channeled front shelf edge **18***a* for reinforcing the shelf along its length. Opposite ends of the shelf **18** are provided with angled shelf side flanges **18***b*, **18***b* which are adapted to be engaged in the shelf sup-

port hooks or channels 17 carried on the brackets 15, 15. Within the channels 17 are a series of inwardly projected dimples 17*a* which provide means for locking the shelf side flanges 18*b*, 18*b* in assembly with the end brackets 15, 15 so that the shelf 18 can be lifted together with the end brackets along with any books which might be on the shelf 18 to permit the bookrack 14 to be moved to an adjusted position and reattached to the posts 11. The space between the tipmost end of the dimples 17*a* and the bookrack end bracket 15 disposed adjacent thereto is slightly smaller than the width of the shelf side flange 18*b* so that when the shelf side flange 18*b* is engaged in the channel, these components will be tightly secured in assembly together. Depending on the dimension of the space between the tip end of the dimples 17*a* and the end brackets 15, and the width of the shelf side flange 18*b*, the hooks 16 can be caused to be sprung slightly away from the bookrack end bracket 15 when the shelf side flange 18*b* is forced into the channel 17.

In order to provide an adequate support foundation for the bookstack 10, the bookstack is provided with a bookrack base shelf assembly 19. These assemblies 19 project outwardly from opposite sides of the posts at the bottom end of the posts 11 as shown in FIGURES 1 and 2. Each of the assemblies 19 includes a pair of bookrack base end brackets 20, 20. Each bracket 20 has an attachment flange 21 and fasteners 22 are provided for securing the attachment flange 21 with the support structure 13 as well as with the posts 11 to hold the components in assembly together. Each bracket 20 is further provided with shelf support hooks or channels 23, 23 and a base shelf 24 similar to the shelf 18 is secured therewith. The hooks 23, 23 on the end brackets 20, 20 hold the base shelf 24 in assembly therewith.

The base end brackets 20, 20 are also each provided with new and improved leveling means 25 embodying other features of this invention. The leveling means 25 includes an angled bracket 26 having bracket legs 26*a*, 26*a* disposed at right angles to one another and merging at a common juncture 26*b*. The bracket 26 is further provided with converging elongated bracket link slots 27, 27 which tend to converge on the juncture 26*b*. A pair of fasteners 28, 28 are provided for engagement in the link slots 27, 27 for attaching the leveling bracket 26 to the base end bracket 20 and for attaching the leveling bracket to a floor F as shown in FIGURE 11. When it is desired to level the bookstack 10, and after the component parts of the bookstack have been assembled, the leveling brackets 26 are secured to the base end brackets 20, 20 at outer ends thereof remote from the attachment flanges 21. The bookstack 10 is then manually positioned so as to be level and the bracket 26 is moved on the fasteners 28, 28 so that the bracket 26 will be in a position to hold the bookstack 10 in the leveled position whereupon the fasteners 28 are tightly secured to hold the bookstack 10 in the leveled position. Excellent results will be obtained where one of the fasteners 28 comprises a stud bolt permanently welded to the end bracket 20. The leveling bracket 26 is slidable on this stud bolt 28. It will be appreciated that leveling brackets 26 are disposed on opposite sides of the posts 11 so that the bookstack can be permanently secured in the aforesaid leveled position.

The base supporting structure 13, embodying important features of this invention, is comprised of a base channel 29 having a base leg 30 as well as side legs 31, 31. The base channel 29 is notched at opposite ends by cutting away portions of the base leg 30 to form recessed areas 32, 32. It is in this manner that the base channel 29 is formed with side legs 31, 31 having a greater length than the base leg 30. The base supporting structure 13 further includes a pair of upright channels 34, 34 each of an identical construction. Each channel 34 has a base leg 35 and side legs 36, 36. The side legs 31, 31 on the base channel 29 are suitably secured by welds or fasteners or adhesive with the side legs 36, 36 of the upright channels 34. In addition, the channels 29, 34, 34 are provided with attachment holes 37 and attachment fasteners such as bolts and nuts 38 are further provided for securing the base supporting structure 13 with the vertical posts 11. When the base supporting structure 13 is assembled with the posts 11, the posts 11 are engaged in the cavity or channel defined by the upright channel legs 35, 36, 36. The fasteners 38 extend through the posts 11 as well as through the holes 37 for securing the base supporting structure in unitary assembly with the posts 11 as shown in FIGURE 2.

It will further be noted that when the upright channels 35 are secured in assembly with the base channel 29 that the base leg 35 of each upright channel is engaged in face-to-face relation with one of the outermost ends 30*a* of the base leg 30 (FIGURE 2). It is in this way that the base legs 30 and 34 are disposed in normal or right angular relation with respect to one another. In order to further rigidify the assembly of the base supporting structure 13 with the posts 11, additional fasteners 38 can be extended through the upright channel 34 for this purpose and as is shown in FIGURE 2.

The bookstack 10 can further be provided with a base plate 39 as is shown in FIGURE 1. This base plate 39 is secured by means of fasteners 40 to the base end brackets 20, 20 beneath the base shelf 24.

The bookracks 14 are further provided with a book stop plate 41 comprising a flat relatively narrow length of material that is joined by means of hooks 42 at opposite ends with the posts 11, 11. The hooks 42 are preferably of the same general type provided on the end brackets 15 as shown at 16.

Excellent results have been obtained in the manufacture of a bookstack of the type shown at FIGURE 10 in the present drawings where the channels 29 and 34 are manufactured from a 16 or 18 gauge steel. Tests have further shown that where base supporting structures 13 are employed of the type herein disclosed, only one structure 13 is required between every second or third set of posts 11. Between the base supporting structures 13, a less expensive type of support can be joined with the vertical posts 11 for maintaining them in an upright position. Of course, if it is desired, the base supporting structures can be joined with all of the posts 11. In any event, it is now possible to provide a rigidified bookstack 10 without the necessity of attaching sway braces to the posts as has been the practice in the past.

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. A knockdown type stack comprising

vertical and horizontal posts joined together and shelves suspended from the posts,

supporting structures disposed in end-to-end relation each comprising a base channel including base and side legs with the base legs being shorter in length than the side legs providing recessed areas at opposite ends of the base leg between the side legs,

upright channels secured in assembly with said base channel and disposed in the recessed areas at opposite ends of the base channel with the upright channels at opposite ends of one of said supporting structures confronting upright channels on adjacent supporting structures disposed on opposite ends thereof,

the upright and the horizontal channels comprising said supporting structures and cooperating together when said supporting structures are disposed in end-to-end relation providing continuous uninterrupted vertical post holders extending transversely on opposite sides of the base leg and with a plurality of said vertical posts disposed in said holders at opposite

ends of each of said supporting structures for ground engagement so as to function as columns, and

detachable means for securing the posts to said upright channels.

2. A library stack comprising

vertical and horizontal posts joined together and shelves provided on the stack,

supporting structures disposed in end-to-end relation each comprising a base channel including base and side legs with the base legs being shorter in length than the side legs providing recessed areas at opposite ends of the base leg between the side legs,

upright channels of generally C-shaped cross-section secured in assembly with said base channel and disposed in the recessed areas at opposite ends of the base channel with upright channel legs secured with the base side legs in confronting assembly with the upright channels at opposite ends of one of said supporting structures confronting upright channels on adjacent supporting structures disposed on opposite ends thereof,

the upright and the horizontal channels comprising said structures and cooperating together when said supporting structures are disposed in end-to-end edgewise engagement providing parallel-sided post holders defining continuous uninterrupted openings and with a plurality of said vertical posts disposed in said openings in said holders at opposite ends of each of

said support structures and with said vertical posts extended vertically on opposite sides of the base leg so as to function as columns, and

detachable means for securing the posts to said upright channels and for securing said supporting structures together.

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