United States Patent

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[54] **LIBRARY STACKS AND BASE SUPPORTS THEREFOR**
14 Claims, 5 Drawing Figs.

[52] U.S. Cl. **108/108,** 108/111, 211/148
[51] **Int. Cl.** **A47b 57/06**
[50] **Field of Search** 108/153, 107, 108, 109, 111, 114; 211/148, 177; 248/188.4, 159

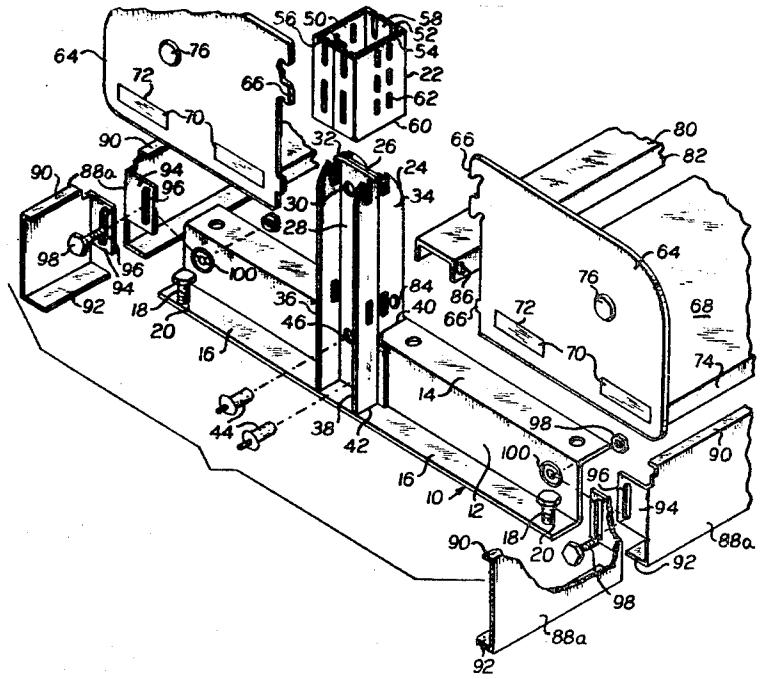
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ABSTRACT: The invention is for library stacks and the construction thereof, and includes special base elements, upright supports, and shelves, with joints so designed as to facilitate quick assembly of the components into self-supporting shelf stacks, multiple shelf stacks, and movable shelf stacks. Spread footings of special construction are employed for optimum stability, with upright end posts carried by the footings, and the posts provided with slotted openings to receive locking projections of shelf supported brackets, the brackets in turn being constructed for firm supporting engagement with shelves.



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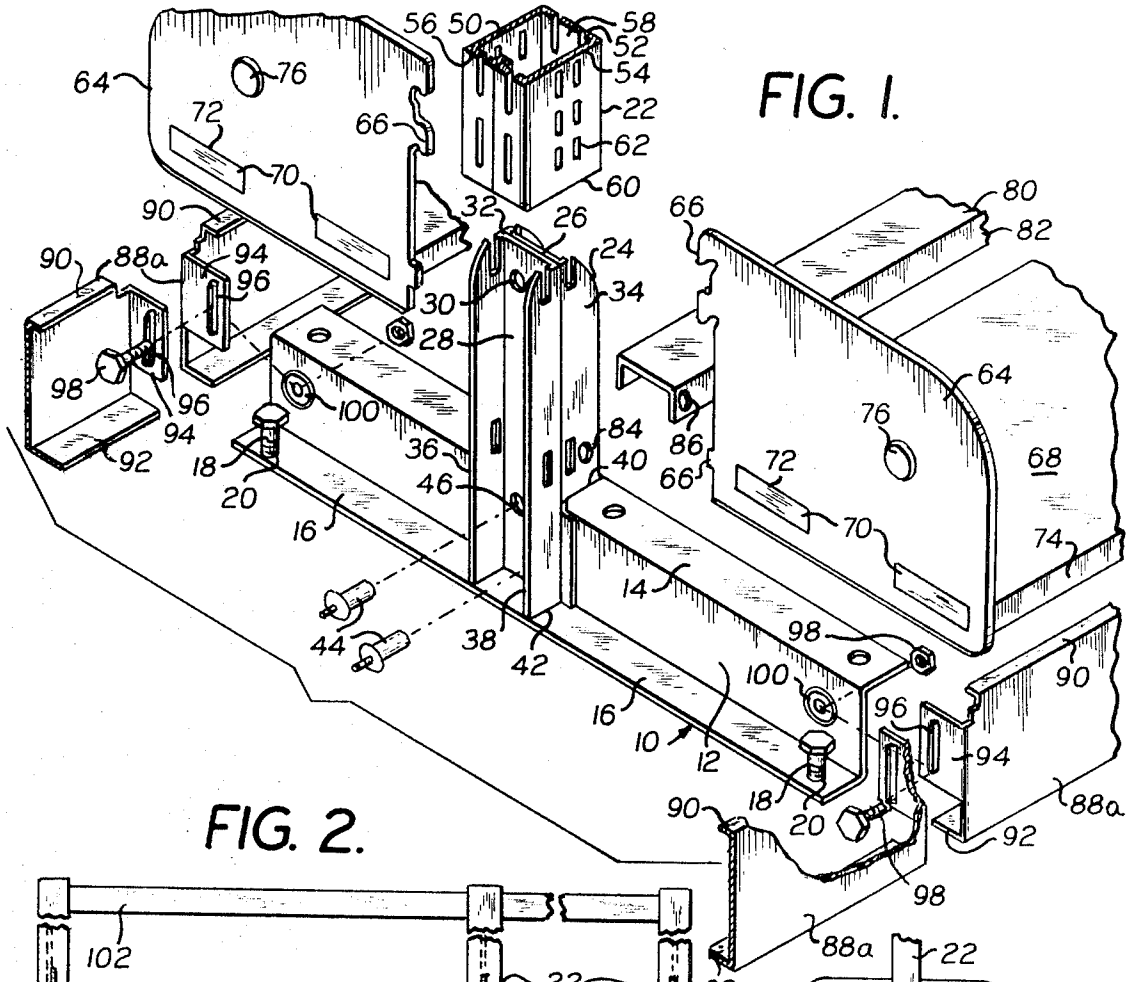


FIG. 1.

FIG. 2.

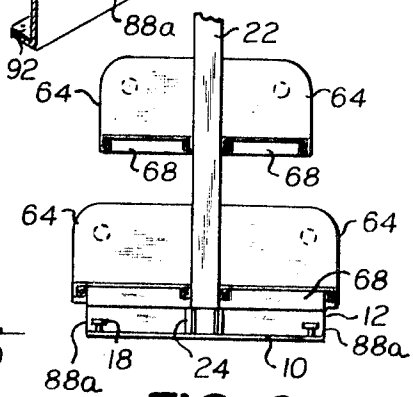


FIG. 3.

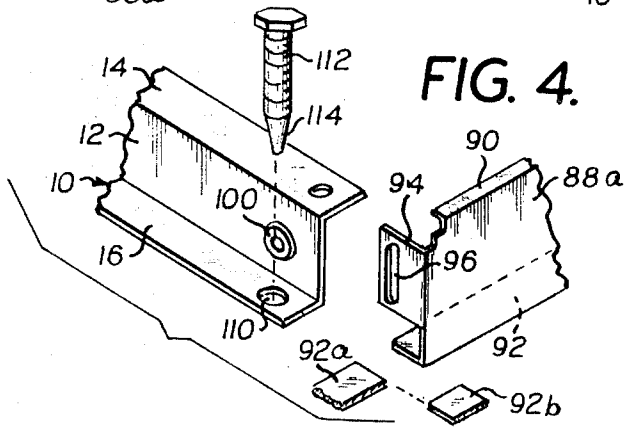
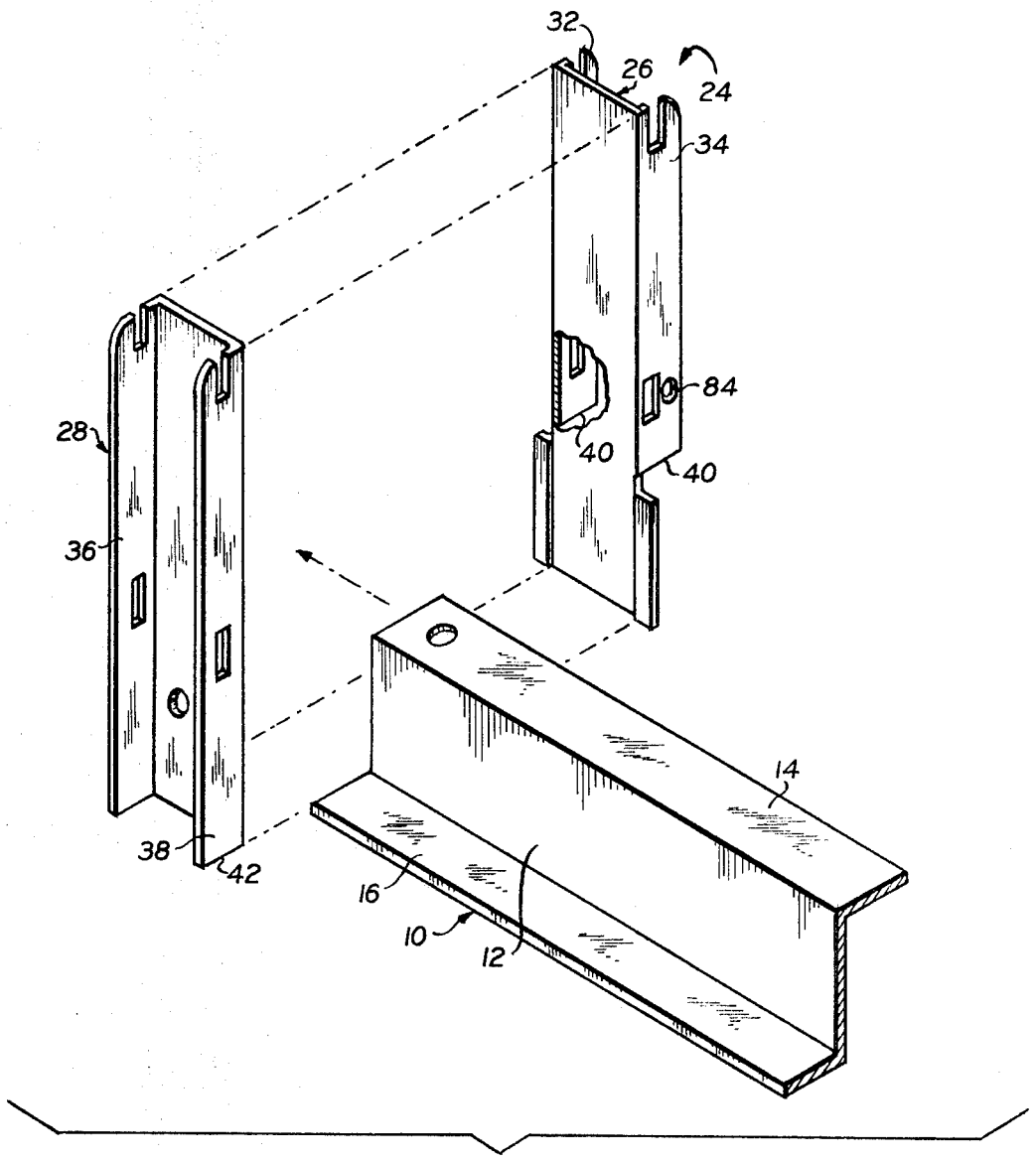


FIG. 4.

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FIG. 5.



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LIBRARY STACKS AND BASE SUPPORTS THEREFOR

The invention is for library stacks and the construction thereof, and includes special base elements, upright supports, and shelves, with joints so designed as to facilitate quick assembly of the components into a finished self-supporting fixed shelf stack, multiple shelf stacks, and movable shelf stacks. Spread footings of special construction are employed for optimum stability, with upright end posts carried by the footings, and the posts provided with slotted openings to receive locking projections of shelf supported brackets, the brackets in turn being constructed for firm supporting engagement with shelves.

This invention is an improvement on my previous inventions relating to bookstacks entitled Base Bracket for Shelves, U.S. Pat. No. 3,157,252 granted Nov. 17, 1964, and Library Post Structure, U.S. Pat. No. 3,325,017, granted June 13, 1967.

An object of this present improvement invention is to provide a novel and improved base and shelving construction, in which there are a number of base and shelving components constructed and arranged for being cooperatively interfitted to form a complete stacking array, and said base being provided with leveling means to compensate for irregularities in the supporting floor.

Another object of the invention is to provide a novel and improved base and shelving construction in which there are a number of upright main support posts engageable with stable interfitting base members, there being a number of shelves extending in the same or in opposite directions from the main posts, and engageable at various elevations therewith.

A further object of the invention is to provide a novel and improved shelving and shelving construction, in which all the parts are formed for quick assembly to make up the finished shelving array, and in which the parts can be made of sheet materials and by mass production methods.

Still another object of the invention is to provide a novel and improved base and shelving construction, in which all the parts can be shipped to the site for erection, in knocked-down packaging, and quickly assembled and erected by relatively unskilled labor, or by the purchasers of the shelving, so as to minimize the ultimate cost of the units, and the cost of shipping the storage.

Still a further object of the invention is to provide a novel and improved base and shelving construction which is usable for schools, libraries, and other places, for supporting books, files, catalogues, and other items, or in stores, for exhibiting merchandise, and in which the elevation of the shelves is individually adjustable, and wherein a top counter wall may be mounted on the upright posts to serve as a table level counter.

The above and other objects and advantages of the invention will become apparent from the description of a preferred embodiment thereof, as illustrated in the accompanying drawings, forming a part hereof. In the drawings:

FIG. 1 is a perspective exploded view of a shelving construction according to the invention, the upright post and shelves being shown in fragment.

FIG. 2 is a side elevational view of a shelving array in erected installed form, the view being in fragment.

FIG. 3 is a right end elevational view of the shelving array shown in FIG. 2.

FIG. 4 is a fragmentary perspective detail view of a modified form of the invention showing a different type leveling screw or glide.

FIG. 5 is a detail of FIG. 1 showing particularly the configuration of anchor means 26 and 28 and base means 10.

In connection with the manufacture and use of shelving, various problems have arisen, which it is the intent of the present invention to solve. Thus, the shelving must not be unduly massive or bulky, especially for shipping and where the installation is for temporary use. Further, it should be capable of being quickly and simply installed and erected. In addition, it should be relatively free standing, so that if desired, there will be no necessity for penetrating into the floor or walls or

ceiling for supporting the shelving. Such shelving should also be easily assembled and disassembled for storage or shipping, so as to avoid excessive costs in reaching the job site or in storage when not in use.

The present invention provides adequate shelving construction which meets these requirements. In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may be had to the drawings, in which like numerals denote similar parts throughout the several views.

As shown best in FIG. 1, there is a special stable base, "S" or "Z" member 10, with a web portion 12 interconnecting top and bottom flanges 14 and 16 formed integral therewith. Leveling screws 18 are threaded into holes 20 in the bottom flange 16, and are turnable by a pliers or wrench to maintain the base member 10 in horizontal position for optimum stability of the entire shelving array when assembled and installed, despite incidental unevenness or lack of level surface of the floor therebelow. In order to furnish support for the upright posts 22, anchor support members 24 are provided as seen best in FIG. 1, which are engaged with the base member 10, and then engaged with the upright posts 22 as hereinafter described.

From FIG. 1, it is seen that the anchor support members 24 may be formed of two complementary plates 26 and 28, which may be secured to each other by any desired fastening means, such as by spot welding 30, or other means. It can be seen that plate 26 has two flanges 32 and 34, while plate 28 has two flanges 36 and 38. As also seen in FIG. 1, the flanges 32 and 34 of plate 26 are cut away or notched out at 40, so that the edge 40 rests upon the flange 14 of the main base 10, the remainder of the lower portion of the plate 26 lying against the web 12 of the base 10. The remaining two flanges 36 and 38 of the plate 28 have their lower ends 42 resting upon the flange 16 of the base 10.

Bolts or rivets 44 extend through matching openings 46 formed through the plates 26, 28 and web 12, to hold the anchor support members 24 firmly to the base member 10. The upper ends of the anchor support members 24 may be rounded off as shown in FIG. 1, for easy assembly with the upright posts 22. As seen in FIG. 1, the upright posts 22 are formed of sheet material, such as sheet iron, steel or aluminum of suitable strength, with four walls 50, 52, 54 and 56, to define a hollow central area or passage 58 which is large enough in cross section to fit snugly over the upstanding anchor support member 24, with its lower edges 60 resting upon the base flanges 14 of the base member 10.

While the upright support posts 22 may be made by bending sheet iron or steel in a bending brake, they may also be made by other methods, such as by extrusion forming, especially where the posts are made of such metals as aluminum which lend themselves to such modes of forming. As seen in FIG. 1, slots 62 are formed in the walls of the support posts 22, for engagement with the shelf supporting brackets 64, the brackets 64 having projecting teeth 66 which extend into the slots 62 to hold the bracket 64 in place.

Shelves 68 extend between parallel shelf support brackets 64, and have reduced projections 70 extending into sockets 72 in the brackets 64, being secured therein by any suitable means, such as by pressure force, metal fasteners, or by forming an end flange on each shelf projection 70 which depends slightly over and below the opening of the sockets 72 when inserted therein, thus holding the shelf therein. The shelves 68 may be formed of relatively light weight sheet metal, with edge flanges 74 for increased strength without adding bulk. Safety spacers 76 may be carried on the shelf support brackets 64 to prevent swaying of individual sections and to reinforce each section by the adjacent sections.

It is thus apparent that as seen in FIG. 1, there are a number of substantially free standing upright support posts 22 carried by engagement with their related main base members 10 and the intervening anchor posts 24. Two such spaced support posts 22 and members 10 and 24 can furnish the support array

for two or more shelves **68**, extending on opposite sides of posts **22**, and vertically spaced shelves **68**, to any height, depending on the height of posts **22**.

In order to further secure the adjacent stack units together, there is provided interior rail channel **80**, which is formed of sheet metal with edge flanges **82**, and which extend between the flanges **32** and **34** of the anchor members **24**. The rail channel may merely rest on flange **14** or may be extending through the slots **84** and holes **86** in these members. The interior rail channels **80** thus interconnect adjacent pairs of anchor members **24**, or may if desired, connect directly to the related posts **22** by forming suitable holes and flanges for this purpose.

Adjacent pairs of base members **10** (see FIG. **1**) are secured together by end rails or base enclosure **88***a*, formed of sheet metal with top and bottom flanges **90** and **92**, and end flanges **94**; the flanges **94** having slots **96** for adjustability and engagement by means of screws or bolts **98** with openings **100** in web **12** of base "S" member **10**.

As mentioned before, adjustable screws **18**, operating through apertures **110** in flange **16**, serve to level the entire assembly.

FIG. **4** shows a modified form of the invention. In this form, the bottom flange **92** of end rails **88***a* are formed as in FIG. **1**. However, instead of the bottom flanges of adjacent stacks abutting each other, and the flange of the second stack underlying the leveling screw **18** of the first stack for example whereby additional rigidity is imparted to each stack, the end section **92***b* of flange **92***a* is cut off or bent out of the way so that flange **16** may rest directly on the carpet. Screw **112** has a tapered end **114** for penetrating carpeting, linoleum, or other underlayments so as to contact and be supported on a permanently solid concrete or other supporting surface. This construction permits better alignment and leveling of the stack array with the floor and ability to maintain every one of the posts in a vertical position.

The rail members **80** and **88***a* secure the base members in a good strong stable base array for the stacking thereabove of the shelves. The shelves are secured in place to the upright posts **22** as shown and as described in my prior U.S. Pat. No. 3,157,252 and 3,325,017. At the tops of the posts **22** there are either lateral and longitudinal rails **102** secured to the upper ends of the posts **22**, or a roof ceiling, or wall forming a closure at the top of the assembled shelving stacks for strength and rigidity. In any events, the posts **22** are thus secured firmly against sidewise dislodgment or displacement from the vertical. Where the height of the stack array is only about table or counter height, then **102** may be of suitable material such as plywood or plastic with an attractive upper surface, to act as a counter above the books or merchandise on the shelves therebelow.

Although a preferred embodiment of the invention has been described and illustrated in specific terms, it is understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

From the above it is clearly apparent that my invention has the following advantages.

1. The unit can be quickly and easily assembled and disassembled without the use of special tools.
2. It adds rigidity to the unit by inserting interlocking members into the lower portion of the upright. This stiffens the upright and also provides a strong stiff member to connect to the footing.
3. The ends of the footings are provided with screw adjustment for leveling and plumbing. Because of the footing design these screw adjustments are at the maximum distance from the centerline of the upright, which in turn provides maximum stability.
4. The base enclosure **88***a* is attached to the foot (see FIG. **1**) by means of a bolt **98** elongated slot **96**. This slot permits the base enclosure **88***a* to be adjusted to enclose the space between the bottom shelf **68** and the floor. The end of the adjusting screw **18**, rests on the bottom flange **92** of the base enclosure **88***a* of the next unit which distributes the bookstack load over a large area to minimize floor load at a single point.
5. In the modification illustrated in FIG. **4**, the end section **92***b* of bottom flange **92***a* may be bent out of the way or cut off when carpet glide **112** (operating through aperture **110**) is substituted for adjustment screw **18**.
6. This design permits easy adaptability of the bookstack to stationary or to sliding bookstacks known as compact stacks, i.e., stacks mounted on sliding platforms which roll of wheels. The sturdiness of this platform meets the design requirements for compact stacks.

I claim:

1. A shelving device comprising main base means, said base means being substantially "S" shaped, shelf support post means, anchor member means being notched carried by said main base means and contacting said main base means throughout its entire width and being constructed and arranged for supportingly engaging said shelf support post means, and shelf means engaging said shelf support post means for being supported thereby, said base means comprising web means of substantially horizontal length, lower ground engaging flange means carried by said web means and constructed and arranged for forming a stable spread footing for said main base means, upper flange means carried by said web means to form a generally "S" shaped configuration, and constructed and arranged for supporting engagement with a cutout portion of said anchor member means, and wherein said shelf support post means comprises at least one shelf support post member and having walls with shelf supporting slots formed therein, said shelf means being constructed and arranged for engagement with said shelf supporting slots for being supported thereby, and wherein said anchor member means comprises a pair of plate wall members, a pair of first flanges carried by one of said pair of plate wall members and extending perpendicularly thereto, a pair of second flanges carried by the other of said pair of plate wall members and extending oppositely perpendicularly thereto so that said pairs of flanges extend in opposite directions, and wherein said first pair of flanges is notched out and reduced in extent to rest upon said upper flange means of said main base means, while said pair of second flanges extends downwardly to and rests upon said lower ground engaging flange means of said main base means.

2. The construction according to claim **1** wherein said shelf support post member is constructed so that its walls define a hollow passageway therebetween, and constructed and arranged for the reception therein of said anchor member means whereby said shelf support post member is supported by said anchor member means, and wherein said shelf support post member is of substantial vertical length for providing support for a plurality of vertically spaced shelves.

3. The construction according to claim **2** wherein said shelves supported by said shelf support post member are constructed and arranged to extend in opposite directions so as to counterbalance each other, and thus to avoid bending stress distorting said shelf support post member from the vertical.

4. The construction according to claim **2** wherein there is a plurality of substantially equally spaced said main base means and said shelf support post means and said anchor means, intermediate rail means connecting related main base means, and end connecting rail means connecting ends of said main base means whereby a stable array base is formed of at least two said main base means in spaced array.

5. The construction according to claim **4**, and upper longitudinal rails forming a roof closure means interconnecting upper ends of said shelf support post means.

6, A shelving device according to claim **4** wherein said lower flange is provided with an aperture, and adjustable means pass through said apertured flange whereby to compensate for any irregularities and level the entire device.

7. A shelving device according to claim 6 wherein said adjustable means are screw threaded and are provided with a cone shaped point whereby to cut through extraneous covering to rest solidly on a firm supporting surface.

8. A shelving device comprising main base means, said main base means being substantially "S" shaped, shelf support post means, anchor means being notched and comprising two flanged members, the flanges on one of said members being shorter than the flanges on the other of said members, the flanges on both members extending perpendicular to the end portions of said substantially "S" shaped base member whereby the end of one of said flanged members will abut against one of the end portions of said substantially "S" shaped members, and the other flanged member will abut against the other end portion of said substantially "S" shaped member.

9. The construction according to claim 8 wherein said shelf means comprises at least two shelf support brackets, toothed projections carried by said shelf support brackets for engaging said shelf supporting slots in said shelf support post member, and at least one shelf member engaging said shelf support brackets and constructed and arranged for supporting books, merchandise and the like thereon.

10. A shelving device according to claim 8 wherein said main base means comprises web means of substantial horizontal length, lower support engaging flange means carried by said web means and constructed and arranged for forming a stable spread footing for said main base means, and upper flange means carried by said web means extending in an opposite horizontal direction to said lower engaging flange means to form a substantial "S" shape whereby said upper flange will engage and support said anchor means.

11. A shelving device according to claim 8 wherein said shelf support post means comprises at least one shelf support post member and having walls with shelf supporting slots formed therein, said shelf means being constructed and arranged for engagement with said shelf supporting slots for being supported thereby, a reinforcing channel member having edge flanges extending between the anchor members, and a base enclosure removably attached to said main base means whereby to distribute the load over a large area and minimize the load at a single point.

12. A shelving device according to claim 8 wherein said main base means comprises web means of substantial horizontal length, lower ground engaging flange means carried by said web means and constructed and arranged for forming a stable spread footing for said main base means, upper flange means carried by said web means to form a generally "S" shaped configuration, and constructed and arranged for supporting engagement with a cutout portion of said anchor member means, and wherein said shelf support post means comprises at least one shelf support post member and having walls with shelf supporting slots formed therein, said shelf means being constructed and arranged for engagement with said shelf supporting slots for being supported thereby.

13. A shelving device according to claim 10 wherein said device rests on a basic firm supporting surface, and said lower flange is provided with an aperture, and adjustable means passing through said apertured flange whereby to compensate for any irregularities in said supporting surface and thereby the entire device.

14. A shelving device according to claim 13 wherein said adjustable means are screw threaded and are provided with a cone shaped point whereby to cut through any extraneous covering over said supporting surface whereby to rest solidly on a firm supporting surface.