

April 11, 1944.

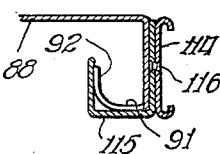
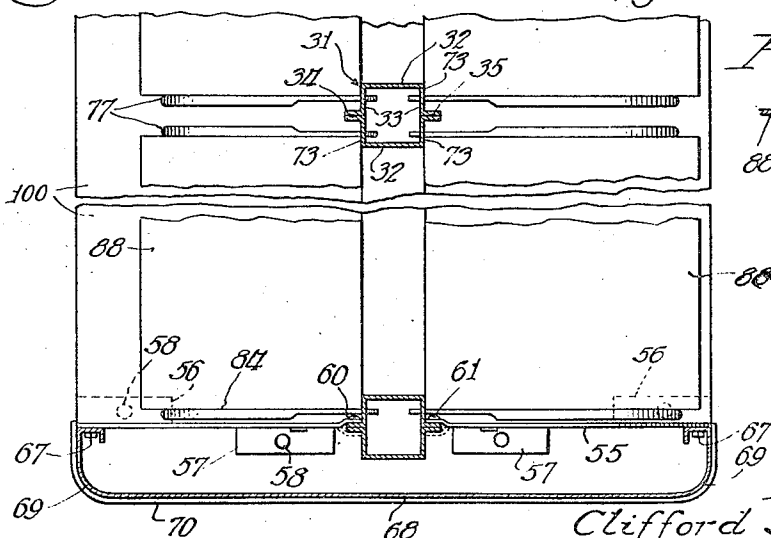
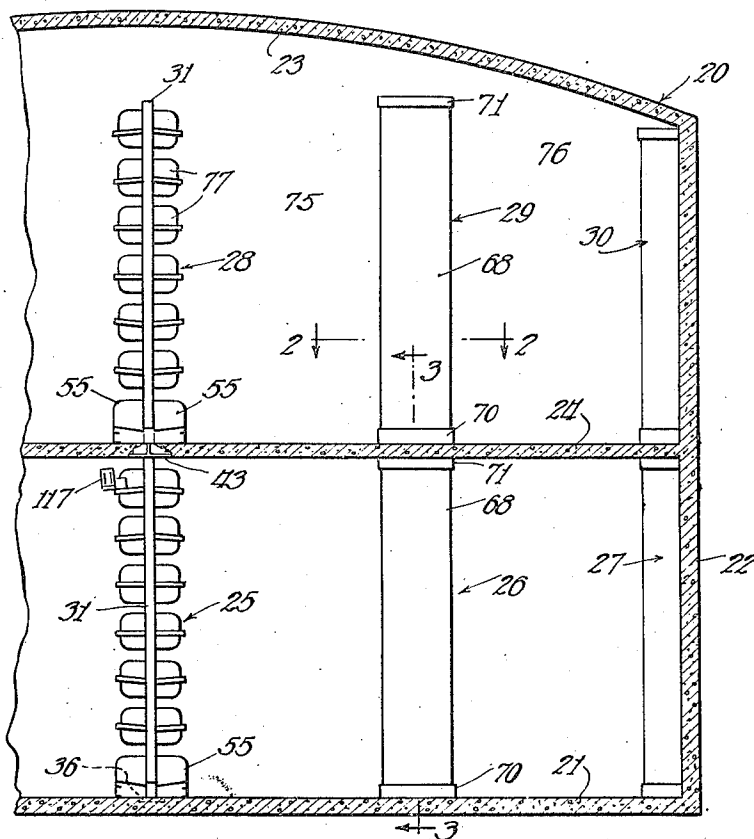
C. S. BROWN

2,346,150

LIBRARY BOOK STACK OR THE LIKE

Filed Aug. 26, 1941

5 Sheets-Sheet 1



Inventor:
Clifford S. Brown
By: A. Trevor Jones

April 11, 1944.

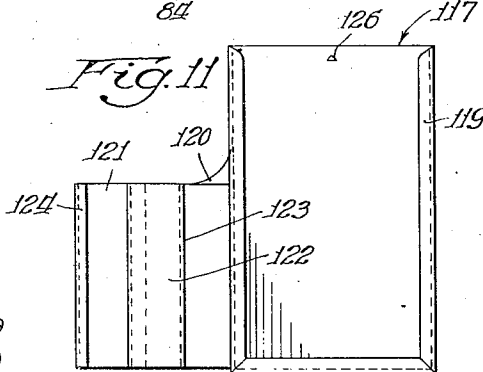
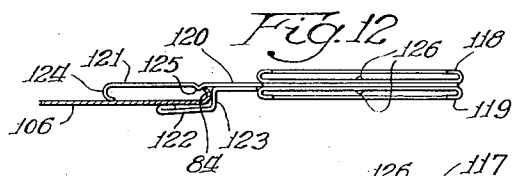
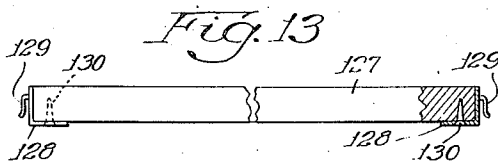
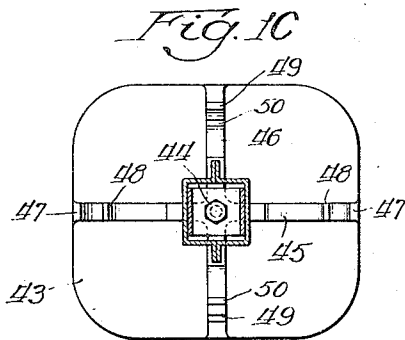
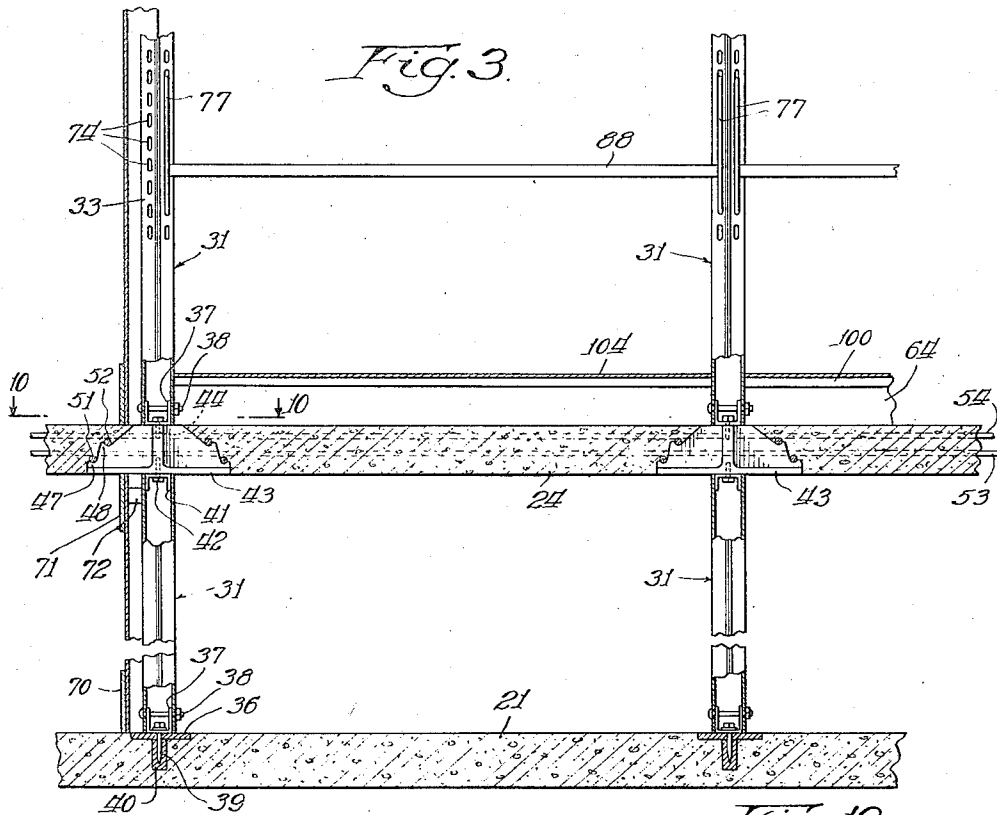
C. S. BROWN

2,346,150

LIBRARY BOOK STACK OR THE LIKE

Filed Aug. 26, 1941

5 Sheets-Sheet 2



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C. S. BROWN

2,346,150

LIBRARY BOOK STACK OR THE LIKE

Filed Aug. 26, 1941

5 Sheets-Sheet 3

Fig. 4

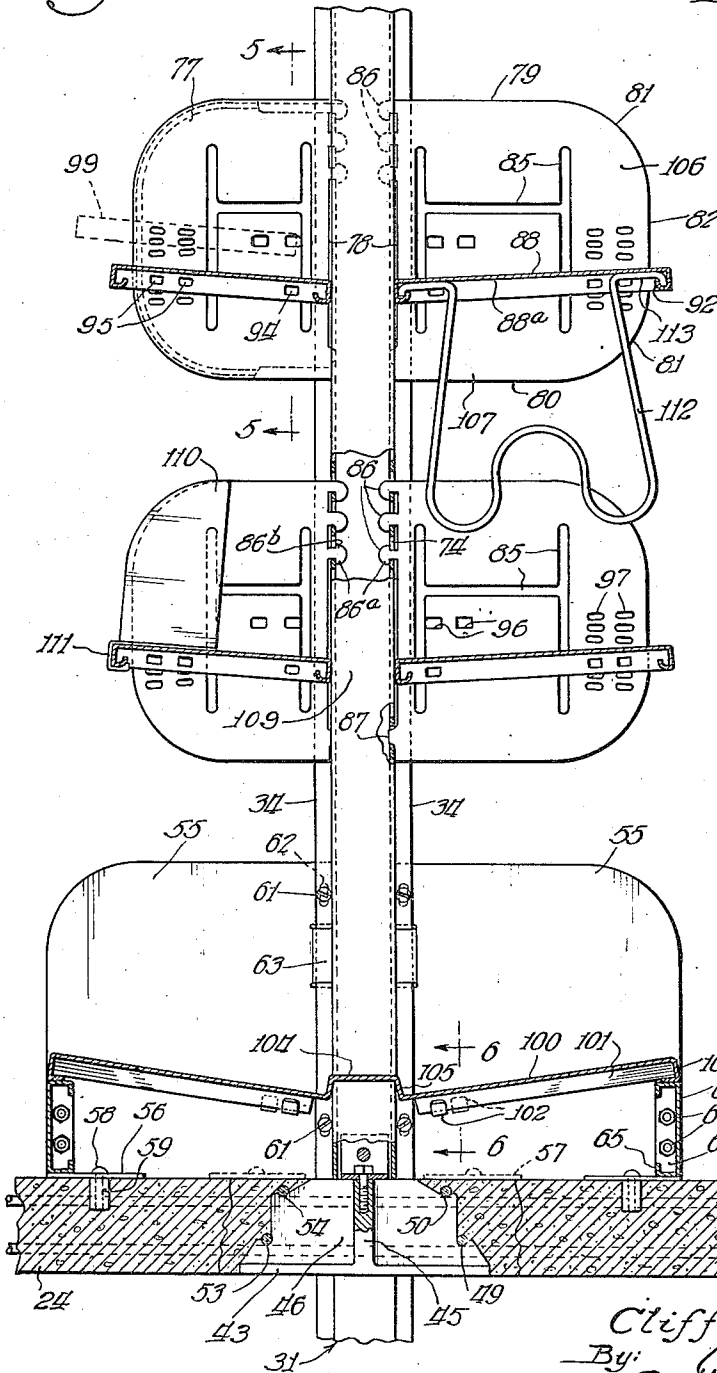


Fig. 5

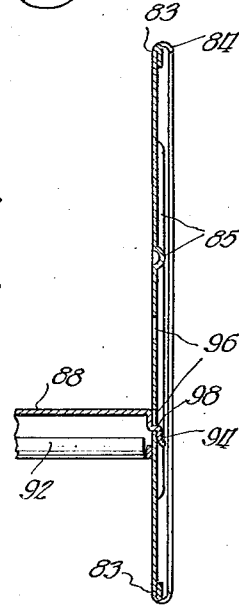
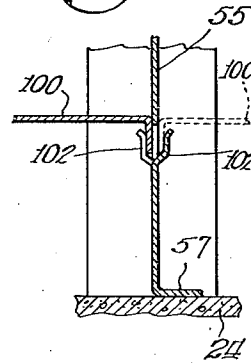


Fig. 6



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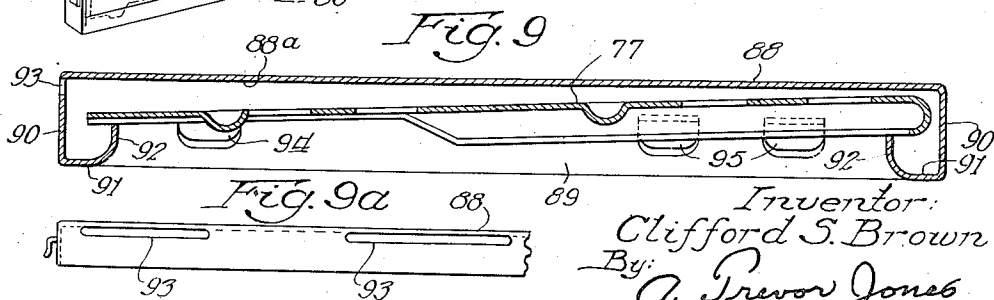
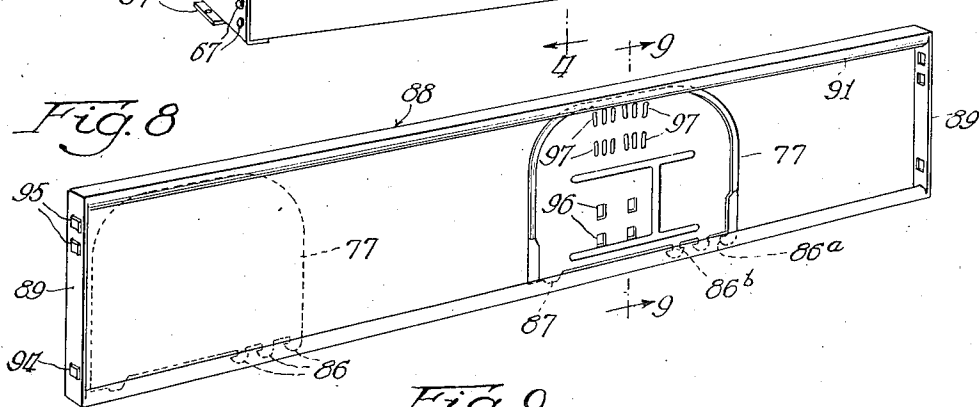
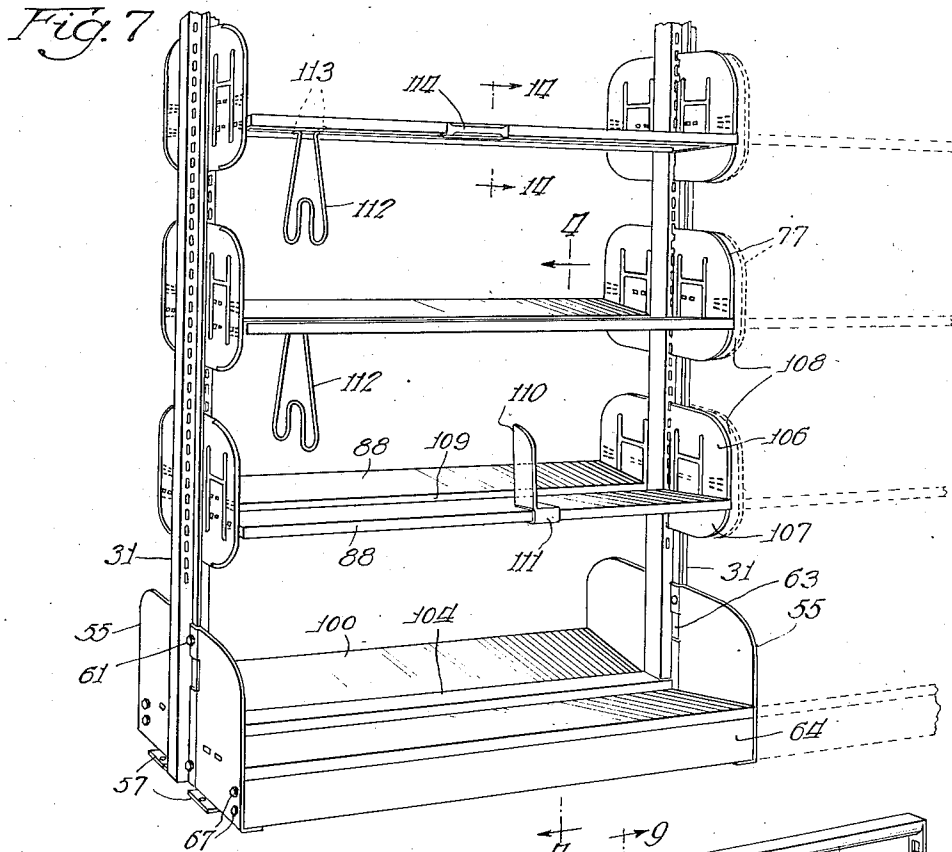
C. S. BROWN

2,346,150

LIBRARY BOOK STACK OR THE LIKE

Filed Aug. 26, 1941

5 Sheets-Sheet 4



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2,346,150

LIBRARY BOOK STACK OR THE LIKE

Filed Aug. 26, 1941

5 Sheets-Sheet 5

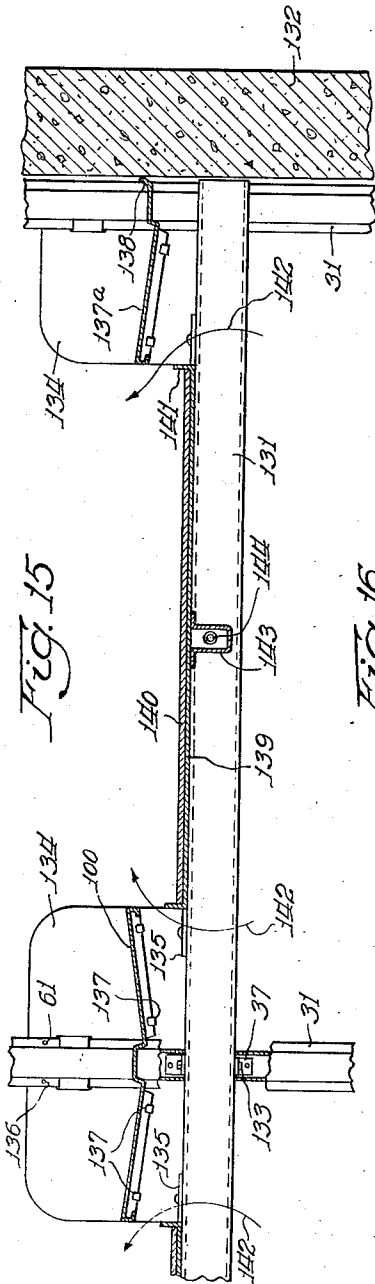


Fig. 15

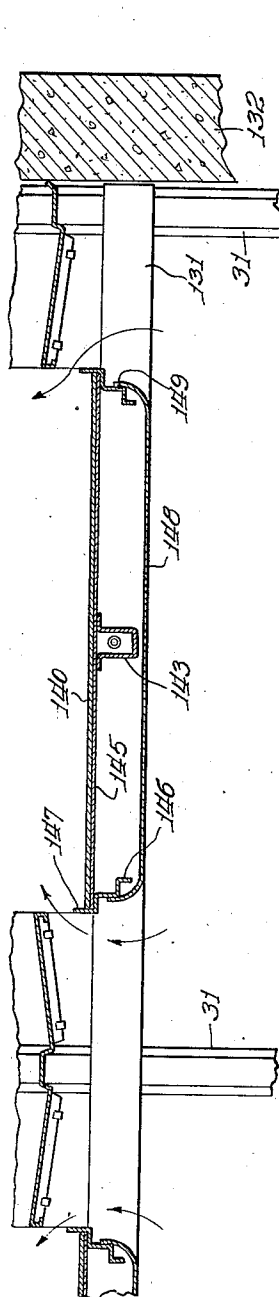
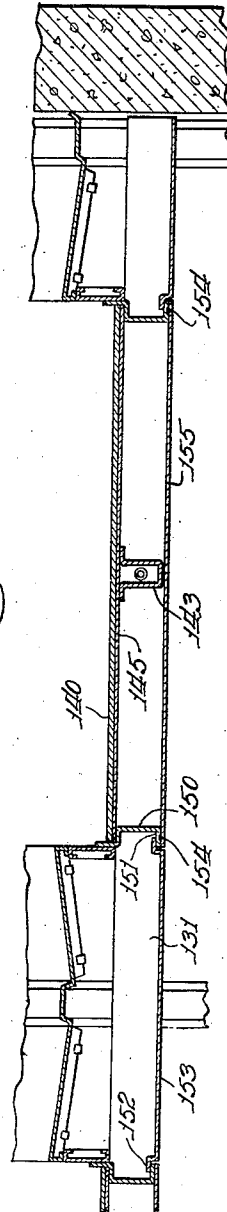


Fig. 16



UNITED STATES PATENT OFFICE

2,346,150

LIBRARY BOOK STACK OR THE LIKE

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Application August 26, 1941, Serial No. 408,344

19 Claims. (Cl. 211—136)

This invention relates to library book stacks or the like and is especially applicable to book stacks in which much of the structure is of sheet metal for lightness, compactness, and adaptability, but in which combinations of wood and metal are possible.

Among other objects, the present invention aims to provide a structure of this type having enhanced flexibility and adjustability, for utilizing to a maximum a limited library space, while at the same time facilitating the location and examination of the book titles, with a minimum of effort on the part of the persons using the library, together with protection to the person and clothing of the user.

Furthermore, the present invention aims to afford maximum protection to the library books themselves or other reading material against wear, dust, mildew and insects, etc., by permitting enhanced air circulation about the books, combined with improved support for the volumes even where the latter are of greatly varying sizes.

In one aspect, the invention also contemplates its inclusion as an integral part of the building construction of the library, simplifying the arrangement of the upper tiers or decks within a library building, while contributing to the greater flexibility, compactness, and protection already mentioned.

Other objects and advantages will be apparent from the following description, taken together with the accompanying drawings, in which—

Figure 1 is a fragmentary elevational view, partially in section, showing the present invention associated with a library building construction;

Figure 2 is an enlarged partial plan section taken on the line 2—2 of Fig. 1;

Figure 3 is a partial enlarged cross-section taken on the line 3—3 of Fig. 1;

Figure 4 is a further enlarged cross-section taken at right angles to the section of Fig. 3 and being a section taken on the line 4—4 of Fig. 7;

Figure 5 is a further enlarged fragmentary section taken on the line 5—5 of Fig. 4;

Figure 6 is a similar fragmentary section taken on the line 6—6 of Fig. 4;

Figure 7 is a reduced perspective view of parts shown in the other figures, and more particularly Fig. 4;

Figure 8 is a separated perspective view of a steel shelf and shelf bracket in relation for storage purposes;

Figure 9 is an enlarged cross-section taken on the line 9—9 of Fig. 8;

Figure 9a is a partial side elevational view of a shelf shown in Fig. 8;

Figure 10 is an enlarged plan view of a deck casting shown in Fig. 3 and being a section taken on the line 10—10 of that figure with parts omitted;

Figure 11 is an elevational view of a subject finder in separated relation from the parts with which it is shown associated in Fig. 1;

Figure 12 is a plan view of the subject finder of Fig. 11 shown clamped to an associated part, the latter being in section;

Figure 13 is a side view of a wood shelf with which the invention may be employed;

Figure 14 is an index clip shown in Fig. 7 and a partial section of a steel shelf with which it is associated;

Figure 15 is a fragmentary elevational view partially in section of an alternative form of library construction to which the present invention is adapted;

Figure 16 is a view similar to Fig. 15 showing a further modified form; and

Figure 17 shows a still further modification.

Referring in detail to an illustrative construction, as shown in Fig. 1 that which is enumerated 20 may represent part of a wing of a library building with which the present invention is associated, this wing having a ground floor 21, side wall 22, roof 23, and upper tier or deck 24. The book stacks enumerated generally as 25, 26 and 27 support the deck 24, as presently more particularly described, and the book stacks enumerated 28, 29 and 30 are free standing, supported by the deck 24 and by the book stacks 25, 26 and 27. It will be understood that there may be a stairway (not shown) giving access from the ground floor 21 to the upper level or deck 24. The stacks 25 and 28 are shown with open ends and face both ways, that is, into two adjacent aisles. The stacks 26 and 29 are shown with closed or paneled ends and also face both ways. The stacks 27 and 30 are half the size of stacks 25, 28 and 26, 29 and face but one way, that is, into the one adjacent aisle, the wall 22 being at their back. Aisles may be represented by the numerals 75, 76, for example.

The main component of the book stacks here described is a hollow column 31 which is advantageously formed of a pair of steel channel members 32 having their flanges 33 flared or flanged as at 34 and welded together as at 35 to form an integral ridge on each flange of the column. The columns 31 are spaced apart longitudinally of the book stacks and may be anchored to the ground

floor 21 through the intermediation of a base plate 36. As best shown in Fig. 3, the column has secured in its open end a metal web piece 37 by means of a cross bolt 38 and the web of the web piece is apertured for the passage of a screw-bolt 39 which is embedded in the concrete of the floor 21, for example, after passing through the base plate 36, and thus fastening the web piece 37 to the base plate. A lead filler or the like 40 may be compacted about the screw bolt 39 as is well known in the art.

At the deck 24, the upper end of the column 31 of the stack 25, for example, may carry a web piece 41 similar to the web piece 37 but inverted with respect thereto, and secured, for instance, as by welding to the column 31. A screw-bolt 42 may pass upwardly through an aperture in the web of the web piece 41 and into a central tapped hole in the deck casting 43, which is thus supported by the column 31 of the stack 25. The column 31 of the stack 28 is then supported on the deck casting 43, a screw 44 clamping another web piece 37 for the upper column to the deck casting.

The deck casting 43, as shown in Figs. 3, 4 and 10, is somewhat square in plan but pyramidal in elevation, having transverse vanes 45 and 46 which cross at the center of the casting and into tapped holes in the juncture of which the bolts 42 and 44 are screwed. Concrete for the deck 24 may be poured around the deck casting 43, so that the latter is embedded therein, the concrete flowing (directed by the usual temporary mold boards, not shown) between the vanes and thus preventing rotation of the casting when in place. To strengthen the deck 24, reinforcing rods may be laid therein supported by the deck castings 43. For this purpose the vane 45 has at each outer end a pair of notched shoulders 47 and 48, and similarly, the vane 46 at each end has a pair of notched shoulders 49 and 50. As seen in Fig. 3, reinforcing rods 51 and 52 rest on the shoulders 47 and 48 respectively, and, as seen from Fig. 4, the reinforcing rods 53 and 54 rest on the shoulders 49 and 50, respectively. These various shoulders are staggered vertically in the order thus, 47, 49, 48 and 50, so as to permit the reinforcing rods 51 and 52 to extend transversely to the reinforcing rods 53 and 54 without the necessity of bending them for that purpose.

More particularly in accordance with the present invention, at each level each of the columns 31 has associated therewith a base bracket 55, and, in the case of the stacks away from the wall and which face both ways as do the stacks 25, 26, 28 and 29, each column has two such oppositely directed base brackets 55 which give the stacks transverse stability. To this end, as best shown in Figs. 2, 4 and 7, the base bracket has horizontal flanges 56 and 57 turned in opposite directions and which may be fastened to the ground floor 21 or deck 24, as the case may be, by screws 58 passing through holes in these horizontal flanges, and into a threaded sleeve 59, for example, impacted into a suitable opening drilled into the concrete as is well known in the art. At its proximal vertical edge 60 the bracket 55 engages the ridge 34 of the column 31. For this purpose and in order to align the base bracket substantially with the ridge 34, the edge 60 of the base bracket is offset as shown in Fig. 2 to pass to one side of the ridge 34, to which it may be secured with screws 61 passing through vertically elongated apertures 62 in the base bracket edge 63 and into tapped holes in the ridge 34. Inter-

mediate of the apertures 62, a cut-out lug part 63 in the edge 60 is bent in the opposite direction to resiliently take over the other side of the ridge 34. By this arrangement the base bracket 55 is permitted limited vertical adjustment on the column 31 as, for example, to accommodate irregularities in floor or deck surface, while still firmly bracing the column.

Connecting the base brackets 55 longitudinally of the stack is a kick-plate 64, which is advantageously of somewhat box-like formation as at 65 (Fig. 4) for strengthening purposes, and having turned in ends 66 through which may pass bolts 67 securing the base brackets thereto. With regard to the closed or paneled end stacks 26 and 29, and as best shown in Fig. 2, these same bolts 67 may also secure to the end of the stack the ornamental interiorly troughed panel 68, which has the rounded corners 69 and the emplaced foot 70 and capital 71 for improved appearance. At its upper end a web piece 72 (Fig. 3) may suitably secure the panel 68 to the column 31. The panel thus serves to receive the flanges 57 and the column 31, somewhat as a housing therefor, serving further to protect the books and the persons using the library, as well as for improved appearance.

In the flanges 33 of the columns 31, that is, on each side of each of the ridges 34 as at 73 and on the sides of the column on which the ridges 34 occur, are located a vertically arranged series of perforations 74, these perforations giving into the hollow interior of the column and being desirably slightly elongated vertically and being located on centers spaced vertically, say, one inch apart. These perforations thus face toward the aisles of the library, as for example, toward an aisle 75 or 76 (Fig. 1) and are adapted to have interengaged therewith the vertically adjustable shelf brackets 77.

Each of the shelf brackets 77 is, as here shown, preferably plate-like and formed of a steel stamping having a straight vertical rear edge 78, horizontal upper and lower edges 79 and 80, merging, as by rounded corners 81, into a straight vertical outer edge 82. As best shown in Figs. 4 and 5, the horizontal edges 79 and 80 are closely folded upon themselves as at 83 adjacent the rear edges 78, but farther away from the rear edges are less closely bent over, as at 84, to form a somewhat cylindrical bead about the remainder of the horizontal edges 79 and 80 and the outer vertical edge 82 including the rounded corners 81, both for strengthening purposes and to avoid sharp edges. For further stiffening, an H-shape rib 85 may be pressed into the otherwise flat body of the shelf bracket. At the upper end of the rear edge 78 are one or more, in this instance three, hook-shaped teeth 86 which take into the perforations 74, being also spaced vertically apart on one inch centers. Adjacent the lower end of the edge 78 may be a plain tooth 87 which enters one of the perforations 74, but without hooking therein. Each of the teeth 86 has a hooking shoulder 86a on its lower edge to hook into a perforation 74 and one of the teeth 86, in this instance the lower tooth 86, has a hooking shoulder 86b on its upper edge as well, which further prevents accidental dislodging of the bracket. As best seen in Figs. 2 and 7, one column 31 may support a plurality of shelf brackets, vertically arranged, for carrying shelves at different elevations, as presently more particularly described, and also at a given com-

mon elevation one column may support four of the shelf brackets.

Desirably following this invention, a sheet metal steel shelf 88 for use with the present invention may, as best shown in Fig. 8, have its under face of somewhat box shape as at 88a by reason of the turned down ends 89 and the turned down sides 90. Furthermore, the turned down sides 90 are desirably continued inwardly as at 91 and then again upwardly as at 92 forming a box in which the shelf brackets 77, two for a given shelf, may be stored when the shelf and brackets are not in use. As indicated in dotted lines in Fig. 8, the teeth 86 and 87 of the shelf bracket may first protrude through slits 93 in one end of the down turned rear side 90 of the shelf until the edge 82 of the shelf bracket is forced into the box 88a of the shelf 88 past the upturn 92 at the side opposite the slits 93. Thereupon, the shelf bracket may be slid away from the slits 93 to a position as shown in full lines in Fig. 8 and in cross-section in Fig. 9, in which position the shelf bracket is retained in the shelf until it is desired to be removed, when it may be again slid into the dotted line position in Fig. 8, where the teeth of the shelf bracket may be again manipulated into the slits 93 and the opposite edge of the shelf bracket manipulated past the upturn 92 to remove the shelf bracket.

Each of the down-turned shelf ends 89 has tongues 94 and 95 struck out therefrom for hanging the shelf on a pair of the shelf brackets 77, and the shelf brackets 77 may have corresponding slots 96 and 97 therein for receiving the tongues as best shown in Fig. 5, the tongues desirably having an intermediate shoulder 98 which thus somewhat locks a shelf and a pair of shelf brackets together into a structural unit. When, as shown in full lines in Fig. 4, a shelf and a pair of brackets are so interconnected, the shelf tongue 94 engages one of the pivot slots 96, say, an inner one, and the shelf tongues 95 engage two of the radial slots 97, an inner one and an outer one. If, however, it is desired to have the shelf extend farther out into the aisle, say to accommodate volumes of greater depth, the tongue 94 may be located in an outer pivot slot 96, and then one of the tongues 95 will engage one of the outer radial slots 97 and the other of the tongues 95 will be unused, as illustrated in dotted lines at 99, Fig. 4. As so constructed and arranged and as shown in the drawings, there is a slot 96 representing a pivotally disposed element and at least three slots 97 representing radially disposed elements for each of the slots 96, each radially disposed element being extended in the direction of a radius from said pivotally disposed element and the radially disposed elements being angular one to the other.

It will be seen, moreover, that each shelf bracket contains two pair of the pivot slots 96 one above the other on, say, one and a half inch vertically spaced centers. Also, opposite each of the pairs of pivot slots 96 is a radial system of slots 97, constituting a pair of such systems, again vertically spaced one above the other. In this instance, each system of slots 97 comprises a pair of middle slots horizontally aligned with the centers of a pair of the slots 96, a pair on a downwardly slanting radius, and a pair on an upwardly slanting radius. These slants or non-parallel relationships are preferably of the order of five degrees from the horizontal, so that as indicated in Fig. 1, the lower shelves of the stack may be directed upwardly toward the eye of the

person using the library while the upper shelves are similarly directed downwardly, the intermediate shelves being advantageously horizontal. This makes the titles of the books carried by the shelves more readily visible, being aimed, so to speak, toward the average eye level.

It will be seen from the drawings that there is a slot system 97 comprising at least three slots arranged fan-like in a vertical plane on radii centering at one of the slots 96. It might be said that there are at least four such slot systems 96-97, that is, each including a pivot slot 96 and at least three of the slots 97 for each pivot slot 96 and radiating therefrom in a vertical plane so that a shelf may have these four different centering or pivot points all on one bracket, that is, an inner and an outer centering point for its tongue 94 on a lower slot level, and again an inner and an outer centering point for its tongue 94 on an upper slot level of the bracket, and in each case the shelf may have three angular adjustments, that is, either horizontal or sloping upwardly or sloping downwardly.

By reason of the pairs of vertically spaced apart slots 96 and the pairs of slot systems 97, a so-called vernier adjustment of the placement of shelves is made possible. For example, if it be desired to decrease the vertical distance between two shelves by one-half inch, the lower of the two shelves say may be raised on its brackets so that its tongues 94 and 95 engage an upper one of the slots 96 and an upper one of the slot systems 97, and the shelf brackets for this given shelf may be lowered by one of the perforations 74 in the column, giving a net elevation of the shelf of one-half inch, that is, one and a half-inch (the distance between the centers of the upper and lower slots 96) minus one inch (the distance between the centers of the perforations 74).

As will be now readily understood, the shelf brackets 77 may be of different sizes to suit different widths of shelves. For example, as shown in Fig. 4, the shelf brackets and shelves at the left-hand side of the figure are narrower than the shelf brackets and corresponding shelves at the right hand side of the figure, but the vertical distances between the lower and upper slots 96 and between the upper and lower slot systems 97, and also the vertical distances between the teeth 86 are the same in each case. Furthermore, as already referred to, and as indicated in dotted lines at 99, an increased effective shelf width may be obtained with the smaller shelf brackets and smaller shelf, intermediate in width between the width of the smaller shelves and the width of the wider shelves, by locating the narrower shelf in the outer slots 96 and 97 of the smaller shelf brackets. While the shelf brackets 77 are locked against accidental displacement from the columns 31, as already alluded to, the teeth 86 and 87 preferably have some lateral play in the perforations 74 so that the shelf brackets 77 may have a slight motion longitudinally of the stack to provide erection tolerances in the distance between the columns 31. The brackets 77 are desirably made left and right hand for each shelf, so that a shelf always engages a smooth or unbeaded side of a bracket, the side against which the books rest.

At the base brackets 55, the base shelves 100 may have downturned ends 101 which hook onto ears 102 struck out from the base brackets. There may be two of such ears struck out from each base bracket adjacent the column 31 and projected in opposite directions longitudinally of the stack so

that each base bracket may support two base shelves 100 aligned longitudinally of the stack. At their outer edges the base shelves 100 may have their margins turned downwardly and inwardly as at 103 to rest on the upper side of the kick-plate 64. The base shelves 100 are desirably uniformly inclined upwardly so as to tilt the books carried thereon into position most advantageous to the eye of the user. The upward inclination of the base shelves 100 is desirably, say, of the order of eight degrees or somewhat greater than the maximum inclination for the shelves 88. Furthermore, the base shelves 100 are preferably integral transversely of the stack, where, as in the case of the stacks 25, 26, 28 and 29, the latter face both ways, that is, toward two aisles, for example 75 and 76, as in the case of the stack 29. Where the base shelves are thus integral they may, as shown, have a connecting portion 104 of inverted groove shape. The vertical portion 105 of the base shelves connecting portion 104 serves as a stop to limit backward downward movement of the volumes carried thereon.

As will be seen, each shelf bracket 77 has a triple function, first of supporting a shelf 88, second, of limiting (by its upper part 106) endwise movement of the volumes carried on that particular shelf; and, third (by its lower part 107 which extends below the shelf), of limiting endwise movement of volumes carried on the shelf next below. In other words, each shelf bracket extends both above and below the shelf which it supports. At the same time, while protecting the end books on the shelves, the shelf brackets do not immediately adjoin but leave a space 108 between two breastwise aligned shelf brackets, and also the shelves 88 do not contact transversely of the stack but leave a space 109 therebetween, which spaces facilitate circulation of air which counteracts the action of vermin and decay. Furthermore, a marked reduction of horizontal surfaces, here effected, minimizes dust accumulation.

Where a shelf is not completely filled with books, an intermediate book support, adjustable longitudinally of a shelf, is provided as here shown by a book rest device 110 comprising, in one instance, an angle plate having a shelf embracing portion 111, as shown in Figs. 4 and 7, by which the rest device may be slid along the shelf to accommodate the length of the row of books thereon. Where it is desired to provide another adjustable rest member, in this case extending downwardly from the shelf above, a bent wire device 112 may be employed, as indicated in Figs. 4 and 7, having spring ends 113 which are curled over the shelf side upturns 92 in the inverted box underface 88a of the shelf 88. The device 112 may be rotated toward the horizontal to be manipulated for insertion or removal when desired, and as next described. While the devices 110 and 112 are adjustable longitudinally of the shelf, a slight cant given to the rest device 110 by the books leaning thereagainst will prevent the volumes from themselves moving this rest device, and the wire rest device 112 may be inserted in the interior 88a of the shelf in opposition to its inherent resilience, thus effecting a spring action which frictionally holds the device against movement except when the spring ends 113 are manually squeezed together.

Label holders such as 114 (Fig. 7) may be arranged to be slid along the front edge of a shelf, as for instance to carry the name of the author of a given group of books. As will be seen from Fig. 14, the label holder may have a clip 115 se-

cured to its back as by rivet 116, which clip takes frictionally under the inturned-upturned margin 91-92 of the shelf. The label holder is thus carried by the shelf while being readily removed therefrom or moved longitudinally therealong as desired.

For indicating subject-matter of the volumes carried, say, by a particular book stack, a card holder 117 may be employed, as shown in Fig. 1 projected somewhat into the aisle so as to be readily perceived by the user. As indicated in Figs. 11 and 12, the card holder 117 may comprise a pair of frames 118 and 119 mounted on a clamp 120 which takes over the upper portion 106 of a shelf bracket 77. For this purpose, the clamp 120 may comprise a pair of opposed spring fingers 121 and 122 between which the outer edge 82 of the shelf bracket may be received, the spring finger 122 being offset as at 123 to yieldingly accommodate the bead 84, and the spring finger 121 being bent as at 124 to form a bead of approximately the cross-sectional dimension of the bead 84. A nub 125 struck inwardly of the spring finger 121 springs over the rib 84. The card holder 117 may receive a subject-index card in each of the frames 118 and 119, the frames being open at the top for this purpose, and nibs 126 serving to hold the cards therein from accidental displacement. The card holder thus clasps the shelf bracket to face in two directions, facilitating the finding of the subject-matter desired.

The invention is readily adapted for shelves of wood, if desired, for variety, or when steel is limited in availability. With this in view, as indicated in Fig. 13, a wood shelf 127 may have fastened to each of its ends an adapter in the form of a metal angle strip 128 provided with struck-out tongues 129 of a form and function similar to the integral tongues 94, 95 of the steel shelves 88. The angle strips 128 may be secured to the wood shelf as by screws 130 in their lower flanges passing upwardly into the wood of the shelf.

In library buildings which are already partially constructed, or where it is desired to eliminate the use of concrete in the construction of the upper deck or decks, the alternative form of construction shown in Fig. 15 may be employed. In this adaptation, the columns 31 support a channel beam 131 independently of the wall 132 of the building, the web pieces 37 being secured to the channel beams 131 as by bolts 133. The channel beams may carry the base brackets 134 as by having the horizontal flanges 135 of the base brackets 134 bolted directly thereto and the base brackets may be fastened also to the columns 31 as at 136 similarly to the fastenings 61. Here, the kick-plate 64 may be omitted and each of the base brackets 134 may have a pair of ears 137 adjacent their inner and outer edges to support the base shelf 100. Immediately adjacent the wall 132, only one base bracket 134 is called for, since this stack faces only one way and a base shelf 137a may be employed therewith of approximately half the transverse dimension of the integral double base shelves 100. The inner margin of the half-depth base shelf 137a is advantageously upturned as at 138 to meet the wall 132.

To form the aisle between the stacks, in this instance, the channel beams 131 are shown carrying a deck plate 139, covered preferably with linoleum or other suitable tread material 140, the deck plates being upturned as at 141 to protect the edges of the floor covering and also to serve as abbreviated kick-plates.

In this alternative construction, free circulation of air is enhanced, even between one deck

and another, air passages for travel of air as indicated by the arrows 142 being provided, it being borne in mind that the space between the channel beams 131 is open. Between the channels, a conduit 143 is shown depending from the deck plate 139 for an electric wiring cable 144. This construction might be called an open panel type.

A further modified construction is shown in Fig. 16, which might be called a flush ceiling type for aisles only. In this case, the deck plates 145 are flat and are bordered by a stepped runner 146, the upper part of which provides an abbreviated kick-plate portion and flooring protector 147. The depending lower edges of the runners 146 for a given aisle are stepped toward each other to provide a hanger for a troughed aisle ceiling panel 148, the upturned margins of which may be welded as at 149 to the runner 146. It will be noted that this construction also permits a free circulation of air as in Fig. 15 and the paneling of the ceiling over the aisle flush with the channel beam 131 does not interfere with the conduit 143 being here carried by the deck plate 145 in the space between this deck plate and the aisle ceiling panel 148.

Figure 17 shows a still further modified construction, which might be called an all-flush ceiling type. Here is shown a slightly differently bent runner 150 which has a hanger part 151 at its lower edge turned toward the adjacent column 31 and which supports the upwardly offset margin 152 of a stack ceiling plate 153 disposed directly over the book stack, flush with the channel beam 131. The under face of the hanger part 151 may have welded thereto as at 154 the aisle ceiling plate 155 also flush with the channel beam 131 and the previously mentioned stack ceiling plate 153. This construction still provides space for the conduit 143 but sacrifices for uniformity of ceiling appearance the enhanced free circulation of air effected by the constructions of Figs. 15 and 16.

So constructed and arranged, the invention minimizes the number of different parts required, while increasing the adaptability of the parts and particularly the flexibility of the book stacks themselves, reducing the seriousness of what might otherwise be errors in the selection of shelf arrangements in a given number of different widths and heights. In accordance with the present invention, the shelves need not be and desirably are not arranged uniformly in a given stack but are each placed at the most advantageous position for economy of space and effort, thus subordinating the appearance of the shelves to that of the books themselves, which is the more important and noticeable factor in a library. At the same time, the number of books which may be accommodated in a given stack is increased and the life of the book bindings is safe-guarded and enhanced.

It is to be understood that the invention is not intended to be limited to details of construction here shown for illustrative purposes. For example, the shelves when made either of metal or wood may be of the now well known bar type which need not be here specifically shown. Other modifications will suggest themselves to those skilled in the art and having the benefit of the present disclosure. Furthermore, it is not intended that it be understood that all features of the present disclosure must be used conjointly, since it will be apparent to workers in the art that various combinations or sub-combina-

tions may at times be advantageously employed.

Having described my invention, I claim:

1. In a structure of the class described, the combination of a pair of columns, a pair of shelf brackets, interengaging means on the columns and shelf brackets for vertical adjustment of the brackets on the columns, a shelf supported by the brackets, means disposed fan-like in the brackets for arranging the shelf to slope upwardly or downwardly or to lie horizontally, selectively, and means on the brackets providing alternative positions for the shelf on the brackets laterally inwardly and outwardly.

2. In a structure of the class described, the combination of a pair of columns, a pair of shelf brackets, interengaging means on the columns and shelf brackets for vertical adjustment of the brackets on the columns, a shelf supported by the brackets, means disposed fan-like in the brackets for arranging the shelf to slope upwardly or downwardly or to lie horizontally, selectively, means for vertical adjustment of the shelf on the brackets while maintaining the said selective arrangement, and means for also adjusting the shelf laterally inwardly and outwardly while maintaining the said selective arrangement.

3. In a structure of the class described, the combination of a pair of flanged channel members secured together to form a hollow column with ridges at each side, a pair of base brackets secured to the ridges at each side of the column, a kick-plate secured to each bracket, and an end panel secured to the base brackets by the same securing means which secure the kick-plate and troughed to receive the column.

4. In a structure of the class described, the combination of a sheet metal shelf body formed with a box-like underface, adapted to receive a pair of shelf brackets when not in use, of a pair of shelf sheet metal brackets each having a width less than its height and said width being slightly less than the width of the shelf body, and means including a slit in the side of said body at one end thereof for restricted entry of the brackets into the shelf whereby after entry the brackets may be slid into the other end of the body to retain them against accidental removal.

5. In a structure of the class described, the combination of a pair of flanged channel members secured together to form a hollow column with a ridge at at least one side, a base bracket secured to the ridge at the side of the column, a kick-plate secured to the bracket, and an end panel secured to the base bracket by the same securing means which secures the kick-plate and troughed to receive the column.

6. In a structure of the class described, the combination of a sheet metal shelf body formed with a box-like underface, adapted to receive a pair of shelf brackets when not in use, of a pair of shelf sheet metal brackets each having a width less than its height and said width being slightly less than the width of the shelf body, spaced apart teeth along the longer edge of the bracket and means including spaced apart slits in the side of said body at one end thereof for restricted entry of the brackets into the shelf by initially receiving said teeth therein whereby after entry of the brackets into the body the teeth may be manipulated out of said slits and the brackets may be slid into the other end of the body to retain them against accidental removal.

7. In a structure of the class described, the combination of a pair of columns, a pair of shelf brackets, interengaging means including perforations in the column and teeth on the shelf brackets for vertical adjustment of the brackets on the columns, said perforations being on one inch centers apart, a shelf supported by the brackets, means including a system of slots disposed fan-like in the shelf brackets and tongues on the shelf for arranging the shelf to slope upwardly or downwardly or to lie horizontally, selectively, and means including another spaced apart system of slots disposed fan-like in the shelf brackets for vertical adjustment of the shelf on the brackets while maintaining the said selective arrangement, the centers of the said slot systems being spaced an inch and a half apart whereby to provide a vernier adjustment of shelf placement.

8. In a book stack structure, a plate-like sheet metal shelf bracket having a fan-like system of elongated slots therein for receiving tongues on a shelf end to support the latter wherein the slots are arranged in a system comprising a pivot slot adjacent the inner vertical edge of the bracket and three non-parallel radial slots radiating from the pivot slot in a vertical plane adjacent the outer vertical edge of the bracket, the middle one of said three non-parallel slots being aligned horizontally with said pivot slot and the other radial slots being angular to the said middle slot and to each other.

9. In a book stack structure, a plate-like sheet metal shelf bracket having a fan-like system of elongated slots therein for receiving tongues on a shelf end to support the latter wherein the slots are arranged in a system comprising a pivot slot and three non-parallel radial slots radiating from the pivot slot in a vertical plane and wherein there are two such systems spaced apart vertically in said bracket, whereby a predetermined variation in the height of the shelf is provided while permitting the shelf to slope upwardly or downwardly or to lie horizontally in either said height variation thereof.

10. In a structure of the class described, a plate-like sheet metal shelf bracket having slots therein for receiving tongues on a shelf end to support the latter wherein the slots are arranged in a system, each system comprising a pivot slot and three radial slots radiating from the pivot slot in a vertical plane and wherein there are four such systems comprising an inner and an outer system at one level of said bracket and another inner and outer system at another level of said bracket, the said levels being vertically spaced apart.

11. In a structure of the class described embodying a pair of columns having vertically spaced apart perforations therein to support adjustable shelving, that improvement therein comprising a pair of plate-like sheet metal shelf brackets, each bracket having slots therein for receiving tongues on a shelf end to support the latter wherein the slots are arranged in systems, each system comprising a pivot slot and three radial slots radiating from the pivot slot in a vertical plane and wherein there are four such systems in each bracket comprising an inner and an outer system at one level of said bracket and another inner and outer system at another level of said bracket, the said levels being vertically spaced apart, said bracket having a vertical rear edge carrying teeth for engagement in said perforations of the columns and having a straight

outer edge merging into an upper and lower edge by rounded corners, said upper and lower and outer edge being integrally beaded to minimize a sharp edge on the bracket and enhance its strength.

12. In a structure of the class described, the combination of a pair of flanged channel members secured together to form a hollow column with ridges at each side, a vertically arranged series of perforations at each side of each ridge, a pair of base brackets secured to the ridges at each side of the column, a kick-plate secured to each bracket, a pair of series of vertically spaced shelf brackets disposed on said column having teeth engaging perforations on the same side of each ridge as the kick-plate, and shelves each having one end carried by one of said shelf brackets.

13. In a book stack, the combination of a pair of flanged channel members secured together to form a hollow column with ridges at each side, a vertically arranged series of perforations at each side of each ridge, a pair of base brackets secured to the ridges at each side of the column, a kick-plate secured to each base bracket, an end panel secured to the base brackets and troughed to receive the column, a pair of series of vertically spaced shelf brackets disposed on said column having teeth engaging perforations on the opposite side of each ridge from said panel, and shelves each having one end carried by one of said shelf brackets, said end panel extending transversely of the book stack beyond the said shelf brackets and secured to the base brackets by the same securing means which secures the kick-plate thereto.

14. In a book stack, the combination of a pair of flanged channel members secured together to form a hollow column with a ridge at at least one side, a vertically arranged series of perforations at each side of said ridge, a base bracket secured to the ridge at the side of the column, a kick-plate secured to the base bracket, an end panel secured to the base bracket and troughed to receive the column, a series of vertically spaced shelf brackets disposed on said column having teeth engaging perforations on the opposite side of said ridge from said panel, and shelves each having one end carried by one of said shelf brackets, said panel extending transversely of the book stack beyond the said shelf brackets and being secured to the base bracket by the same means which secures the kick-plate thereto.

15. In a structure of the class described, the combination of a pair of flanged channel members secured together to form a hollow column with a ridge at at least one side, a vertically arranged series of perforations at each side of said ridge, a base bracket secured to the ridge at the side of the column, a kick-plate secured to the bracket, a series of vertically spaced shelf brackets disposed on said column having teeth engaging perforations on the same side of said ridge as the kick-plate, and shelves each having one end carried by one of said shelf brackets.

16. In a structure of the class described, the combination of a hollow column, four series of vertically arranged perforations in said column, two series facing in one direction and two series facing in the opposite direction, at least four vertically adjustable shelf brackets disposed on each column and each bracket having means engaging the perforations of a different one of said series whereby the brackets may be arranged abreast, shelves each having tongues at each end

carried by one of said shelf brackets, the bracket extending both above and below the shelf carried thereon, and means disposed fan-like in the brackets and arranged intermedially of the vertical height of the shelf brackets for selectively receiving the tongues on the shelf for adjusting the shelf on the bracket to slope upwardly or downwardly.

17. In a structure of the class described, the combination of a hollow column, two series of vertically arranged perforations in said column facing in the same direction, at least two vertically adjustable shelf brackets disposed on each column and each bracket having means engaging the perforations of a different one of said series whereby the brackets may be arranged abreast, shelves each having tongues at each end carried by one of said shelf brackets, the bracket extending both above and below the shelf carried thereon, and means disposed fan-like in the brackets and arranged intermedially of the vertical height of the shelf brackets for selectively receiving the tongues on the shelf for adjusting the shelf on the bracket to slope upwardly or downwardly.

18. In a structure of the class described, the combination with an adjustable at least partially metal shelf having margins providing downturned

and then inturned and upturned surfaces, a removable member slidable thereon having one portion engaging over inturned and upturned parts of said margin whereby to slide on two of said surfaces, and another portion of said member carried by the first mentioned portion offset extending laterally from the first mentioned portion in a direction extending outwardly of the shelf.

19. In a built-up stack structure of the class described, a plate-like shelf bracket member having a fan-like system of formations therein for receiving interengaging formations on a shelf member to support the latter, wherein the bracket formations are arranged in a system comprising a pivot formation adjacent the inner vertical edge of the bracket member and three non-parallel radial formations radiating from the pivot formation in a vertical plane adjacent the outer vertical edge of the bracket member, the middle one of said three non-parallel formations being aligned horizontally with said pivot formation and the other two radial formations being angular to the said middle formation and to each other, said formations comprising elongated slots on one of said members and interengaging tongues on the other of said members.

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