United States Patent [19]

Schild

[11] **3,770,135**

[45] **Nov. 6, 1973**

[54] **SHELVING CONSTRUCTION**

[75] Inventor: **Edwin F. Schild,** Inverness, Ill.

[73] Assignee: **Airways Products Corporation,** Schiller Park, Ill.

[22] Filed: **Oct. 1, 1971**

[21] Appl. No.: **185,797**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 822,239, May 6, 1969, Pat. No. 3,626,870.

[52] **U.S. Cl.** **211/148,** 108/108, 234/242

[51] **Int. Cl.** **A47b 57/06,** A47f 5/10

[58] **Field of Search** 211/148, 150, 177; 248/242, 243; 108/107, 108, 111

[56] **References Cited**

UNITED STATES PATENTS

3,346,226	10/1967	Shell	248/242
1,059,464	4/1913	Hine	108/107
2,909,353	10/1959	McLean	248/243
2,936,147	5/1960	Stewart	248/243
2,956,688	10/1960	Galassi	108/108
2,958,427	11/1960	Bianchi	211/148
3,010,585	11/1961	Slikkers	108/107 X
3,044,632	7/1962	Schild	108/108 X
3,182,945	5/1965	Sedo	248/242
3,209,709	10/1965	Shoffner	108/108 X
3,626,870	12/1971	Schild	211/148 X

FOREIGN PATENTS OR APPLICATIONS

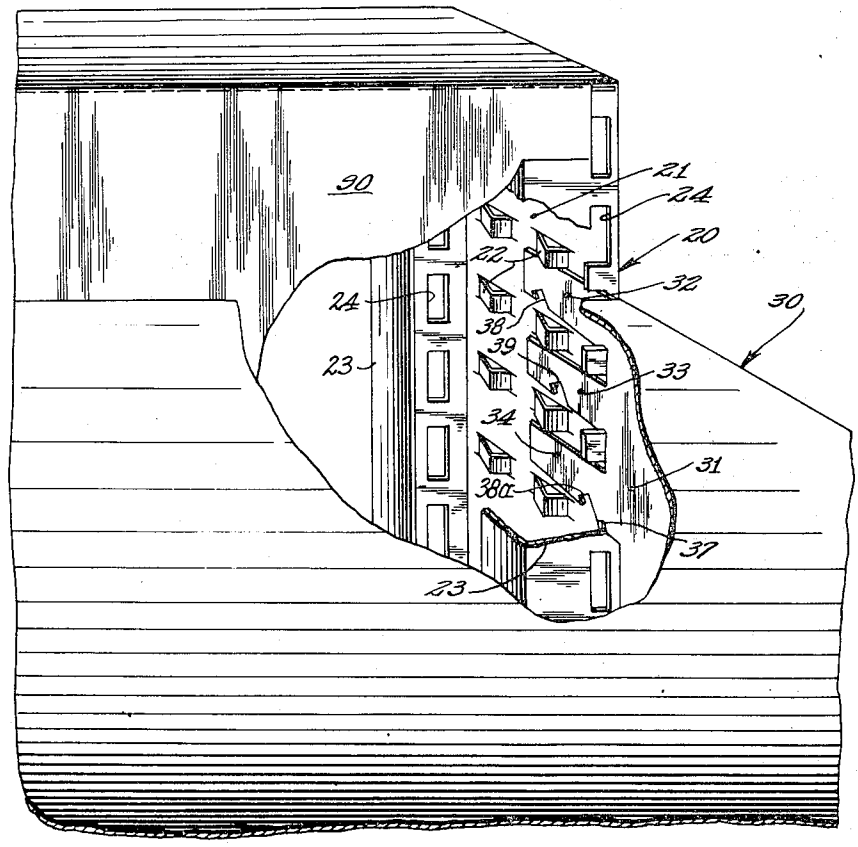
1,191,323	4/1959	France	211/148

Primary Examiner—Ramon S. Britts
Attorney—Carlton Hill et al.

[57] **ABSTRACT**

A shelving construction of the type wherein long rows of shelving are assembled from shelving units connected end-to-end. The shelving construction is provided with apparatus for connecting shelves to upright columns wherein the shelf supporting brackets are provided with extended lever arms and the columns are provided with embossments or lances for bearing against the extended lever arms for increasing the permissible moment of the shelf. The shelving unit is also provided with apparatus for securing and supporting the upright columns of the shelving units for connection on an end-to-end basis wherein the lower ends of the upright columns are provided with stiffening plates for increasing the rigidity thereof and the transverse supporting gussets are provided with members for aligning the end columns of adjacent shelving units and for supporting the aligned columns.

3 Claims, 9 Drawing Figures



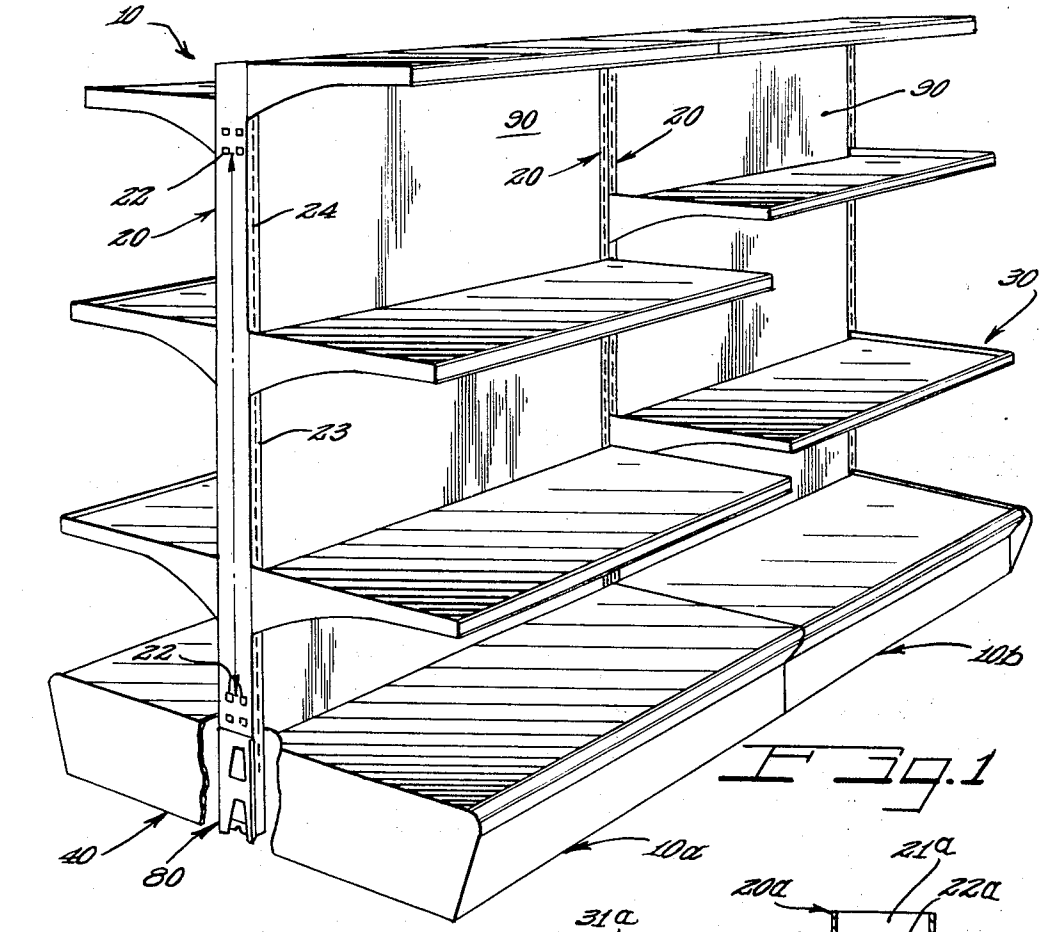


Fig. 1

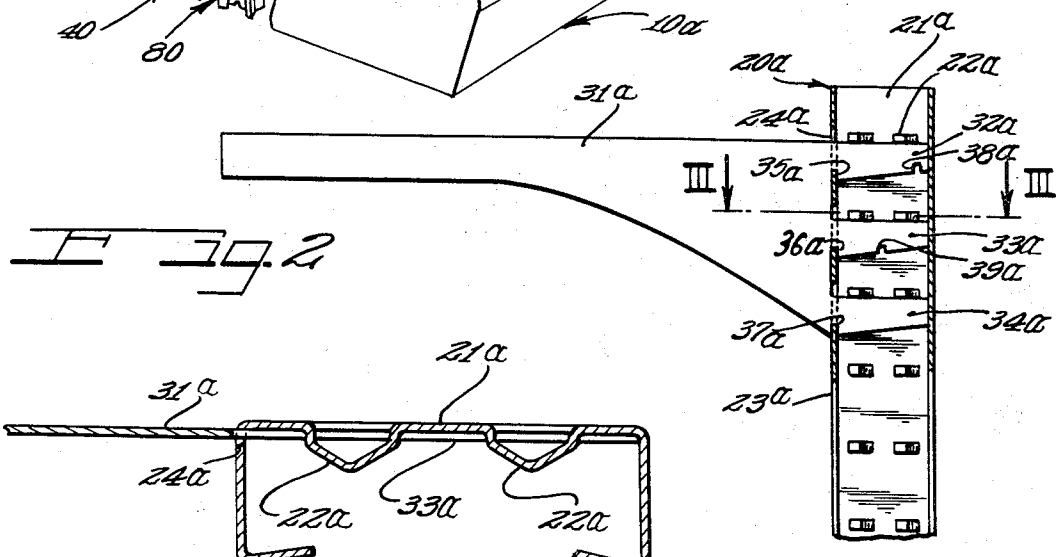


Fig. 2

Fig. 3

FIG. 4

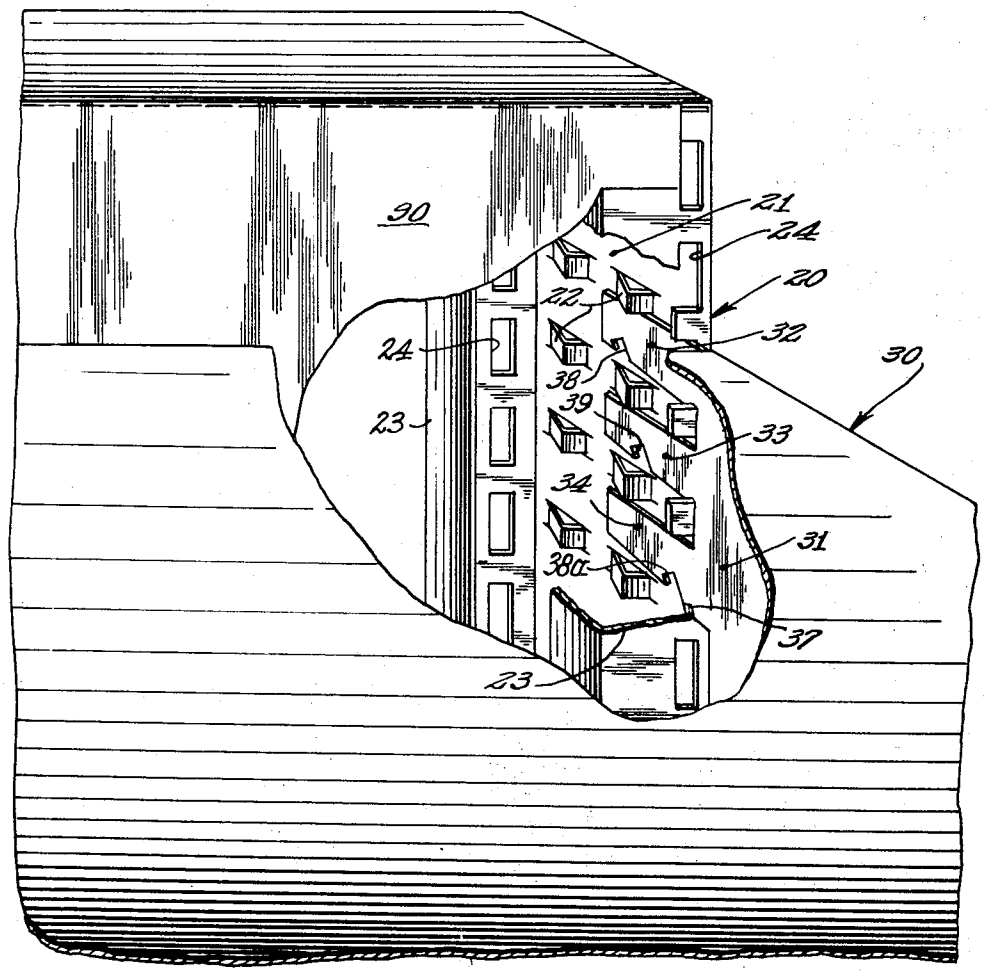


Fig. 5

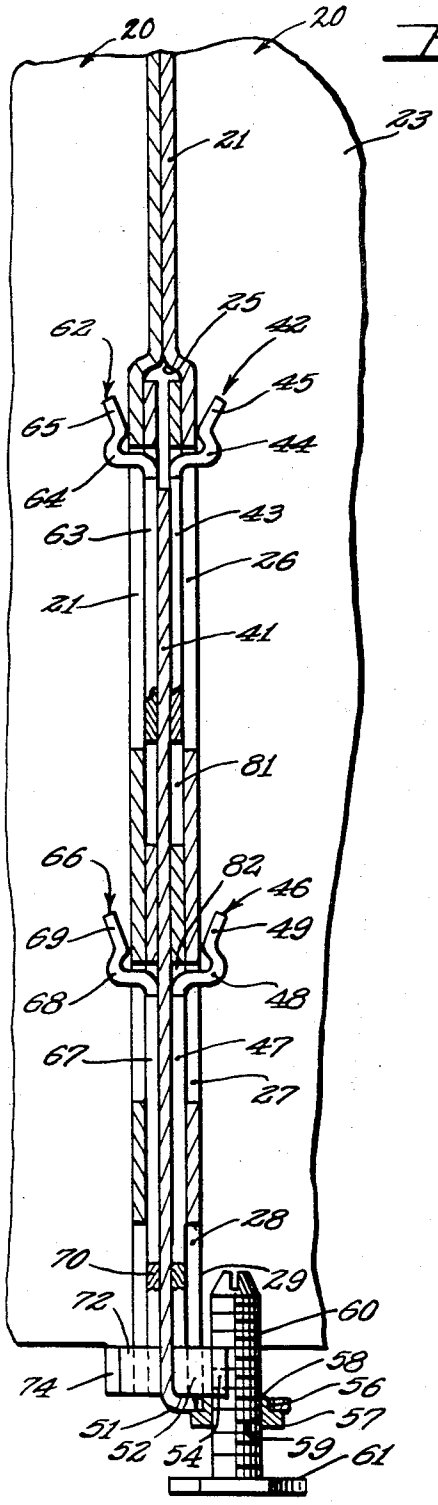

20
20
21
23
62
25
42
45
65
44
64
43
63
26
21
41
81
66
82
46
69
49
68
48
67
47
27
28
70
29
72
60
74
58
56
51
57
52
54
59
61

Fig. 6

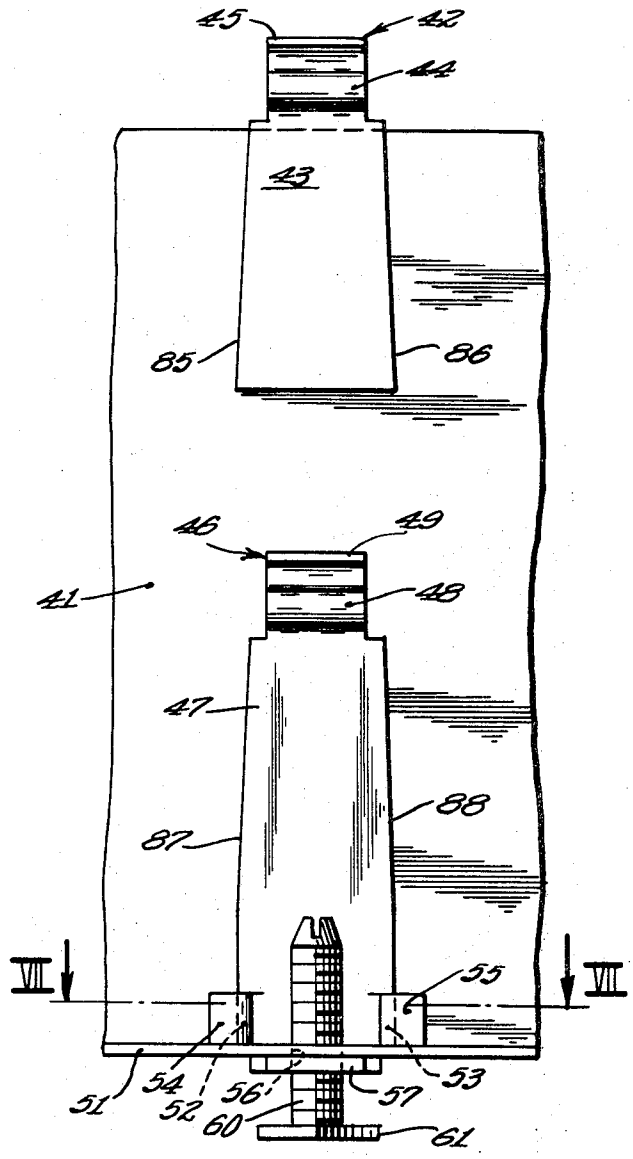

45
42
44
43
85
86
46
49
41
48
47
88
87
VII
VII
55
51
54
52
56
60
57
53
61

Fig. 8

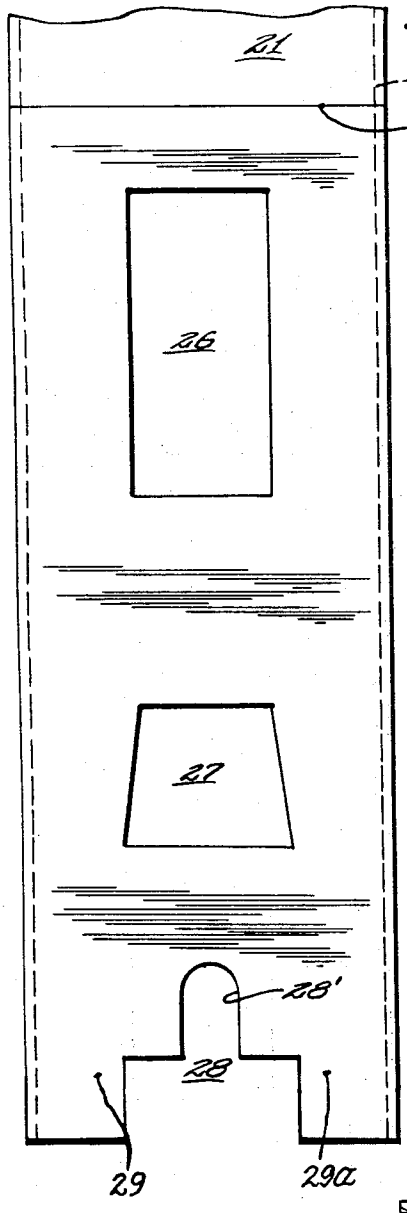
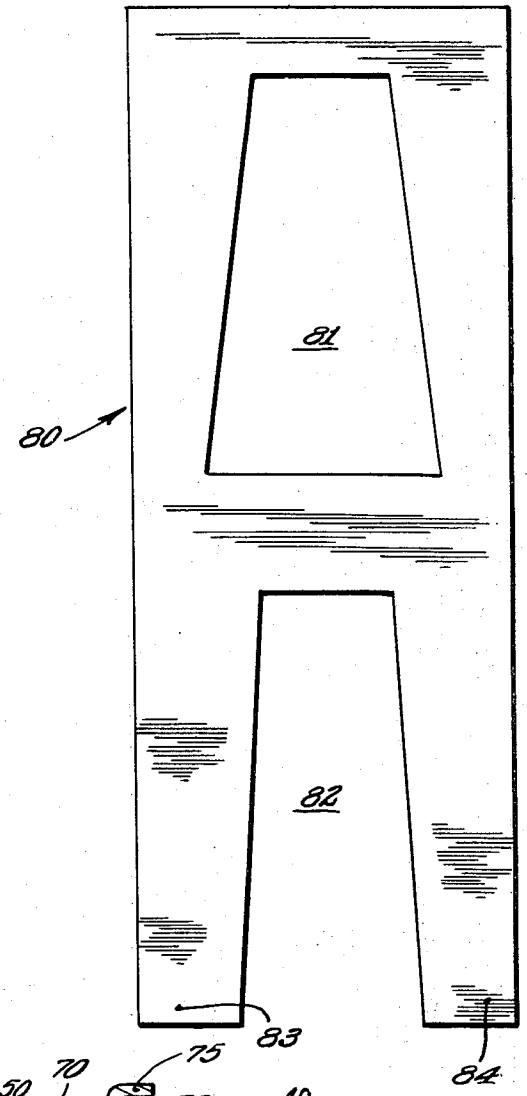


Fig. 9



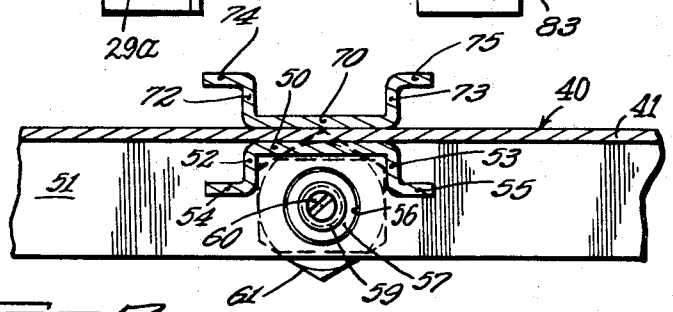


Fig. 7

SHELVING CONSTRUCTION

RELATED APPLICATION

This application is a continuation-in-part of my co-pending application entitled "SHELVING CONSTRUCTION," Ser. No. 822,239, filed May 6, 1969, now Pat. No. 3,626,870.

BACKGROUND OF THE INVENTION

This invention relates to shelving assemblies and is particularly concerned with shelving assemblies formed from parts which are shipped unassembled and assembled as shelving units on an end-to-end connected basis to form continuous shelving of the type generally used in self-service stores.

Shelving assemblies for installations in self-service type of stores are generally known and widely used in the field of retail sales. Generally such shelving assemblies are manufactured and shipped in an unassembled form for assembly on a unit basis. Attachment of the units end-to-end forms the desired length of continuous shelving. It is also known in the art to provide such shelving with shelf brackets which may be releasably secured to upright columns of the shelving assemblies at any desired elevation in order to accommodate various heights of products to be carried on the shelf.

It is most desirable from material handling, manufacturing, transportation and assembly standpoints to provide the shelving apparatus from material that is as light a gauge as possible while maintaining sufficient structural rigidity to carry the desired type of merchandise. Invariably, however, such constructions are misused in that the user is generally concerned with shelf space rather than product weight. For various reasons the shelves are overloaded to the extent that, not only do the sructures become distorted, but may also suffer shear. These reasons stem from basic proven marketing principles which say, in effect, that increased sales result from displaying as much of a product as possible in a pleasing manner and as far forward on the shelf as possible so that the product is within easy reach of the customer. Accordingly, one reason for these adversities lies in the desire for a complete and pleasing display of a product which is heavier than the type originally considered. The total moment of shelf and product may exceed design specifications. This condition is aggravated in installations wherein the shelves are adjustable in height permitting the display of taller, and consequently heavier, products which increases the total moment of the shelf.

It is accordingly desirable, and a primary object of the present invention to provide shelving of the foregoing character in which the strength and rigidity of the apparatus is improved so that an increased product weight may be carried by the shelves without increasing the dimensions, material and gauge of the supporting structure.

Another object of the invention is to provide an improved shelving construction wherein increased product weight may be carried by the shelves and increased total weight may be carried by the shelf-supporting structure.

Briefly, according to the invention there is provided an increased lever arm for shelf supporting brackets which are adjustably positioned at desired levels in slots of a supporting column. The supporting column includes means for engaging the lever arm to provide an

opposing moment to the moment established by the weight of the shelf combined with the weight of the product carried by the shelf. The upright columns at the end of each shelving unit are connected together and supported by a transverse gusset including apparatus which releasably engages the columns and attached stiffening plates which add rigidity to the lower ends of the columns. This apparatus is also effective to guide the columns into desired positions during assembly and to support the weight of the shelving construction and the products carried on the shelves.

The foregoing and other objects and features of the invention, its organization and construction, will be best understood from the following detailed description of an exemplary embodiment thereof taken in conjunction with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of shelving under construction being formed in an assembly of individual shelf units in accordance with the principles of the present invention;

FIG. 2 is a fragmentary view, shown partially in cross-section, illustrating one form of the assembled relationship between the shelf brackets and the vertically upstanding shelf-supporting columns;

FIG. 3 is a cross-section view taken along the line III—III of FIG. 2 showing the above assembled relationship in greater detail, in particular illustrating the extended lever arms of the shelf bracket tabs and the cooperable lances of the end columns;

FIG. 4 is a fragmentary isometric sectional view of a shelf and a supporting column illustrating the mated relationship therebetween and showing a preferred form of the invention;

FIG. 5 is a fragmentary view, shown partially in cross-section, illustrating the assembled relationship between two upstanding shelf-supporting columns at the point of attachment to a transverse base supporting gusset;

FIG. 6 is an elevation of a fragmentary portion of the transverse supporting gusset illustrating the column supporting members and the apparatus for varying the elevation of the transverse gusset above the floor for leveling the assembled construction;

FIG. 7 is a cross-section view of a portion of the column supporting apparatus and the elevation varying or leveling apparatus taken along the line VII—VII of FIG. 6; and

FIGS. 8 and 9 are elevational views of cooperating portions of the column and a stiffening member for adding rigidity to the column in the area of its attachment to the transverse base gusset, FIG. 8 specifically illustrating an inwardly off-set portion of the column for receiving the rigidity member of FIG. 9 and for receiving a portion of the thickness of the transverse base gusset so that the opposed facing surfaces of adjacent columns may be intimately or very closely disposed for the remainder of the vertically upward extent thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 an assembled shelving construction is shown generally at 10 formed by connecting shelving units 10a and 10b together on an end-to-end basis. Each unit generally comprises a plurality of vertically standing columns 20 for mounting a plurality of shelf assemblies 30. The columns 20 are disposed in a

spaced-apart relation and have surface plates 90 secured therebetween to form shelving back members. The shelving back members are connected together and supported to form a free standing or gondola shelving construction by a plurality of transverse supporting base gussets 40.

The arrangement of FIG. 1 illustrates a gondola construction where shelves project from both sides of the columns 20. This arrangement is shown in detail in FIG. 4. FIGS. 2 and 3 illustrate a special form of arrangement wherein shelves project from one side only of the column 20*a* and the tabs 32*a*, 33*a* and 34*a* are of a length so that they extend beneath two lances 22*a*. In FIG. 4 the tabs 32, 33 and 34 extend beneath only one lance, and shelves from the other side of the column 20 extend beneath the other of each pair of horizontally spaced lances 22. The arrangement of FIGS. 2 and 3 would be used for a column 20 and its surface plates 90 are bolted against a wall so that shelves project outwardly from the wall. In the arrangement of FIGS. 1 and 4, shelves must project in both directions, and the shelf brackets can be located opposite each other. In FIGS. 2 and 3 the bracket 31*a* has tabs 32*a*, 33*a* and 34*a* extending beneath the pairs of lances, each numbered 22*a*. The tabs extend through slots 24*a* in the column 20*a* and rest at the base of the slots 24*a* and are provided with notches 35*a*, 36*a* and 37*a* for aiding in holding the bracket in position. The column 20*a* has a base portion 21*a* and a front leg portion 23*a* in which the slots are placed. A back leg portion 23*b* does not require slots but slots may be contained therein for reversibility of parts.

In the arrangement of FIGS. 1 and 4, each column is generally U-shaped and the construction is basically the same as that shown in FIG. 3 except that slots are provided in both legs and the tabs of the brackets extend beneath only one of the lances. In FIG. 4, each column 20 includes a base portion 21 and the leg portions 23. The base portion 21 includes a plurality of lances 22 which are formed by horizontal cuts in the metal base portion 21 with the material between the cuts forced inwardly. The lances are arranged in pairs so as to serve brackets from each side of the shelving unit and the lances are vertically located so that the shelving will be positioned horizontal when the tabs of each bracket are inserted into the slots. The leg portions 23 have a plurality of vertically spaced slots 24. In the position of the bracket shown in FIG. 4, the tabs 32, 33 and 34 of the shelf bracket 31 project into the slots and their upper edges are in edge-to-edge engagement with the lower edges of the lances 22.

Inasmuch as it is well known in the art that the end mounting brackets may be either integral with the shelves, or may be affixed to, or in any other manner supporting the shelves, reference will only be made hereinafter to the brackets, it being understood that the term may also include a shelf or an entire shelf assembly.

For assembly of the bracket of FIG. 4, tabs 32, 33 and 34 are inserted into desired slots 24 at a slight downwardly directed angle and then the bracket is dropped to a horizontal position. The planar areas between slots 24 are in face-to-face engagement with the sides of the tabs. As the upper edge of bracket 31 is positioned at a level whereat its tabs 32, 33 and 34 are accordingly positioned so as to be under and in contact with the lower edge of corresponding ones of lances 22, an extended lever arm is provided at each of the contacting tabs and lances for resisting downward movement of the extended end of shelf bracket 31. The base of the tabs rests on the base of the slots 24, held there by the notches 35, 36 and 37.

Products carried on the upper shelves of a construction may be more fully displayed if the shelf is lowered at its forward end and secured at an angle to the horizontal. Therefore, to orient the shelf bracket 31 at a downwardly extending angle from horizontal, tabs 32, 33 and 34 are provided with notches 39, 38 and 38*a* respectively. Insertion of the tabs is performed in a similar manner; however, the bracket 31 is, in this instance, supported by tabs 32, 33 and 34 in the areas of notches 38*a*, 38 and 39 instead of notches 35, 36 and 37.

The shelving construction illustrated in FIG. 1 is shown incomplete in that the construction may be extended by the connection of additional shelving units, or it may be capped by finishing strips as is well known in the art.

When the shelf is in a horizontal position, normally it carries a heavier load than when it is in a downward sloping position. Therefore, it is important to have enough strength built into the shelf to handle this heavier load. This is done by using both the slots at the front edge of the upright and the lances at the center of the upright.

Attention is now invited to FIGS. 5–9 which illustrate the apparatus for supporting the columns 20 in an upright position. Reference numeral 40 generally indicates the transverse supporting base gusset, the base gusset being particularly illustrated in detail in the area of attachment of the columns. It will be appreciated that the lower end of each column is off-set inwardly, as particularly illustrated in FIGS. 5 and 8, the off-set being given the reference numeral 25 and being of sufficient dimension to accommodate the thickness of the rigid member 80 (FIG. 9) and a portion of the thickness of the vertical web 41 of the base gusset 40 so that adjacent columns 20 may be supported by the base gussets so as to be as near to one another as possible over substantially their entire length.

Each of the base gussets 40 includes a vertically disposed web or plate 41 which has a pair of supporting members 42, 46 and 62, 66 attached on each side thereof by any suitable technique, such as riveting or welding. These supporting members, releasably engage and support columns 20. For example, supporting member 42 includes base portion 43 secured to web 41, a cup-shaped portion 44 for receiving the portion 21 of column 20 and associate rigid plate 80, and an outwardly directed portion 45 for guiding the column into the cup-shaped portion 44. Together with supporting member 62, member 42 forms a clamp for adjacent columns. The same is also true for members 46 and 66.

To better understand the relationship between the elements for securing the columns to the gusset, consider the rigid plate 80 of FIG. 9 to be welded to the outside of the base portion 21 of a column 20 below the off-set 25 illustrated in FIG. 8 so that the trapezoidal aperture 81 provides access to the rectangular aperture 26 and the trapezoidal-shaped slot 82 provides access to the corresponding aperture 27 and a formed slot 28 of column 20. In order to secure the columns as closely together as possible and maintain the off-set 25 at a minimum, aperture 81 and slot 82 are given the partic-

ular trapezoidal shape which corresponds to the trapezoidal shape of the corresponding supporting members, for example member **42**. Of course, other shapes could be employed; however, the shape of the aperture and slot in rigid plate **80** should, of course, be such to accommodate and receive the supporting members, and it is preferred that the supporting members, and accordingly the apertures and slots in the rigid plate, have lateral edges which define individual points of convergence thereabove. Therefore, the edges of the apertures and slots of plate **80** may embrace the corresponding edges (e.g. edges **85–88** of FIG. **6**) of the supporting members as the former are moved downwardly during assembly so that the support members do not support the column at the upper edge defined by, for example, aperture **26** and aperture **81**, but that the supporting members guide the columns during assembly, and preferably a component of the weight of the column is distributed along the lateral edges of the individual clamp members.

In FIGS. **5, 8** and **9**, the column is illustrated as having a pair of feet **29** and **29***a* and the rigid plate **80** as having a corresponding pair of feet **83** and **84** as defined by the slots **28** and **82**, respectively. Slot **28** includes an open space **28'** to accommodate and pass the threaded portion **60** of an elevational adjusting screw during assembly. The notched portions **28***a* and **28***b* may rest on extended fingers **52, 53, 54, 55** and fingers **72, 73, 74, 75** are attached to the other side of the web **41**. The feet **83** and **84**, and **29** and **29***a* are clamped by the fingers.

The sides of the plates **43** and **47** engage the sides of the openings **81** and **82** (FIG. **9**) for holding the posts vertical.

FIGS. **5** and **9** illustrate the relationships between the column **20** and the rigid plate **80**. The feet **83** and **84** of rigid plate **80** are even at the bottom with feet **29** and **29***a* which are behind fingers **54** and **55**. Both feet **29, 29***a* and **83,84** may touch or set upon the flange **51**.

Gusset **40** includes a horizontally disposed portion **51** which is integral with the web portion **41** and which has an aperture **56** therein in the area of the feet supporting member **50**. A member **57** including a threaded aperture **59** is secured to the bottom of gusset portion **51** and extends through aperture **56**. The threaded member **57** engages an elevational adjusting or leveling screw having a threaded portion **60** and a head portion **61**. The shelf unit may therefore be leveled by adjusting screw heads **61** which also serve as supporting feet for the assembled shelving units. As previously noted, the threaded screw portion **60** is prevented from interfering with the column **20** during assembly by the provision of slot **28'** in the lower edge of the column.

Generally then there has been described a shelving construction of the type wherein shelving units are assembled and the units are then connected together on an end-to-end basis to form continuous shelving of a desired length. The shelf supporting brackets are structurally improved over similar shelving constructions in that greater weight may be carried by the shelves due to the provision of greater moment opposition through an extended lever arm and a greater lever arm bearing than heretofore known. Further, the construction is provided with added strength and rigidity without a change of material or material characteristics and the increase in the product weight carrying capability is accounted for by the provision of increased strength and rigidity in the supporting structure.

It is to be noted that a strength of support is obtained for the shelf brackets which is substantially greater than that obtainable with structures heretofore available. By providing an edge-to-edge engagement between the top edge of the tabs and the lower edge of the lances, a strength relationship is achieved which is superior. The brackets will take extreme loads far in excess of those required by ordinary usage. The extremely strong short moment arm provided by each of the individual lances is such that strength failure is almost impossible. That is, each lance provides two arms extending outwardly joined at their centers which are in edgewise engagement with the top of the tab, and the strength of each of these arms is such that the tab would almost fail in shear before it could be bent upwardly. In addition to this edge-to-edge engagement, the inner end of the tabs are in edge-to-edge engagement with the base of the slot. With a plurality of tabs on each bracket, and the tabs lying in face-to-face engagement with the base of the end column means, as shown in FIG. **3**, it will be seen that the tab gains lateral support from the base of the end column and with its edge-to-edge engagement to provide its cantilever support, tremendous loads will have to be encountered before the tabs fail in shear or by buckling. Further, the shelves obtain the same strong non-bending, non-yielding support in each position that they can be placed.

Many other changes and modifications of my invention may become apparent to those versed in the art without departing from the spirit and scope of my invention as defined in the appended claims.

I claim:

1. In a shelving construction having a vertical upright back with a front surface and a rear surface, the improvement comprising:

end columns at the ends of the back each being of one piece and having a general U-shape with a straight flat planar vertical wall portion forming the base of the U with edges turned in extending parallel to the front and rear surfaces of the back and forming the sides of the U;

vertically arranged uniformly spaced slots in each of the turned in edges for receiving tabs of shelf brackets with the slots positioned immediately adjacent to said base so that said tabs will extend in surface to surface engagement with the inner surface of the flat base and so that the lower supporting edge of each slot is immediately adjacent said base;

a plurality of shelf brackets each having a plurality of tabs spaced in accordance with slots for selective insertion into the slots;

and two vertical rows or lance members each formed by a pair of horizontal cuts with said lance members projecting inwardly of said base and spaced in accordance with the slots for simultaneous engagement of a plurality of the lower edges thereof by the plural tabs of each of the shelf brackets, the lower edge of each lance member being horizontally aligned with an upper portion of one of said slots and with the upper edge of the tab within the slot.

2. In a shelving construction having a vertical upright back with a front surface and a rear surface constructed in accordance with claim **1** wherein:

each of the tabs has a notch in its lower edge adjacent the shelf bracket for lockingly seating over the base of the slot.

3. In a shelving construction having a vertical upright back with a front surface and a rear surface constructed in accordance with claim 1 wherein:

said plurality of tabs are substantially uniformly spaced over the height of the bracket.

* * * * *