

[54] **SHELF SUPPORT STRUCTURE**

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108/106; 248/188.8; 248/242; 248/244

[51] Int. Cl.² **A47F 5/12**

[58] Field of Search 108/6, 8, 65, 69, 90, 96,
108/106-110, 144; 248/242-246

[56] **References Cited**

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Primary Examiner—James C. Mitchell

Attorney, Agent, or Firm—Howard C. Miskin

[57] **ABSTRACT**

A modular self supporting shelf type display device in-

cludes a pair of adjustable laterally spaced foot pieces having sockets separably receiving H-column standards having cross webs provided with vertically spaced locking openings. Two or more shelves are supported between the standards and are adjustable between inclined and horizontal positions. A coupling member is formed at each side edge of each shelf and rockably and slidably engages a respective standard. Each coupling member includes a vertical base plate, V-shaped inner positioning webs whose opposite sections converge to a central throat engaging the standard cross web, V-shaped outer positioning webs spaced from and parallel to the inner webs and engaging the edges of the standard side webs and downwardly open hook elements projecting from the ends of the inner positioning webs. When the shelf is in a selected horizontal or inclined position, a respective pair of opposite inner and outer positioning web sections engage the standard cross and side webs and a pair of hook elements engage cross web opening bottom edges. The positioning webs may be multiple convolute shape.

15 Claims, 16 Drawing Figures

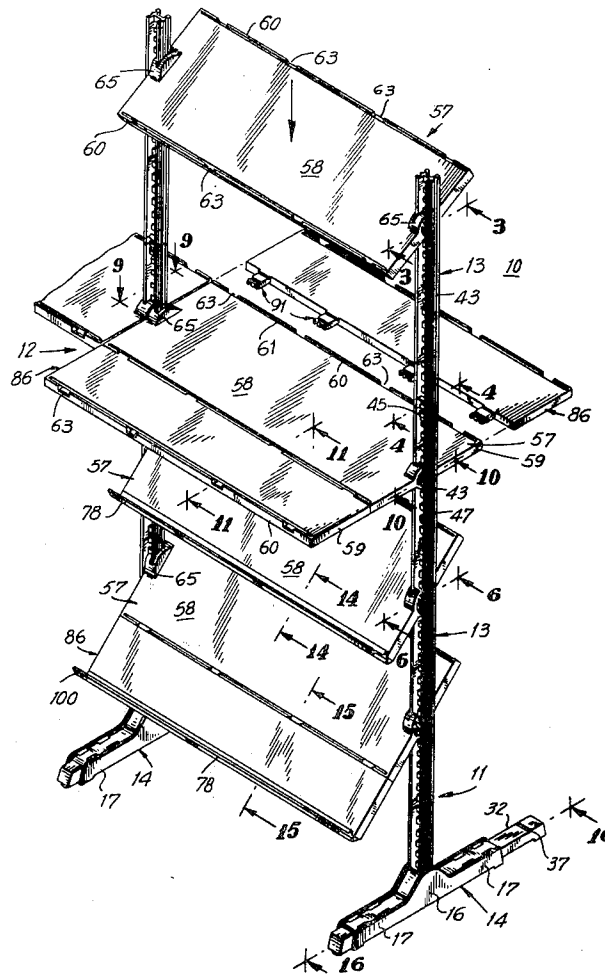


FIG. 1

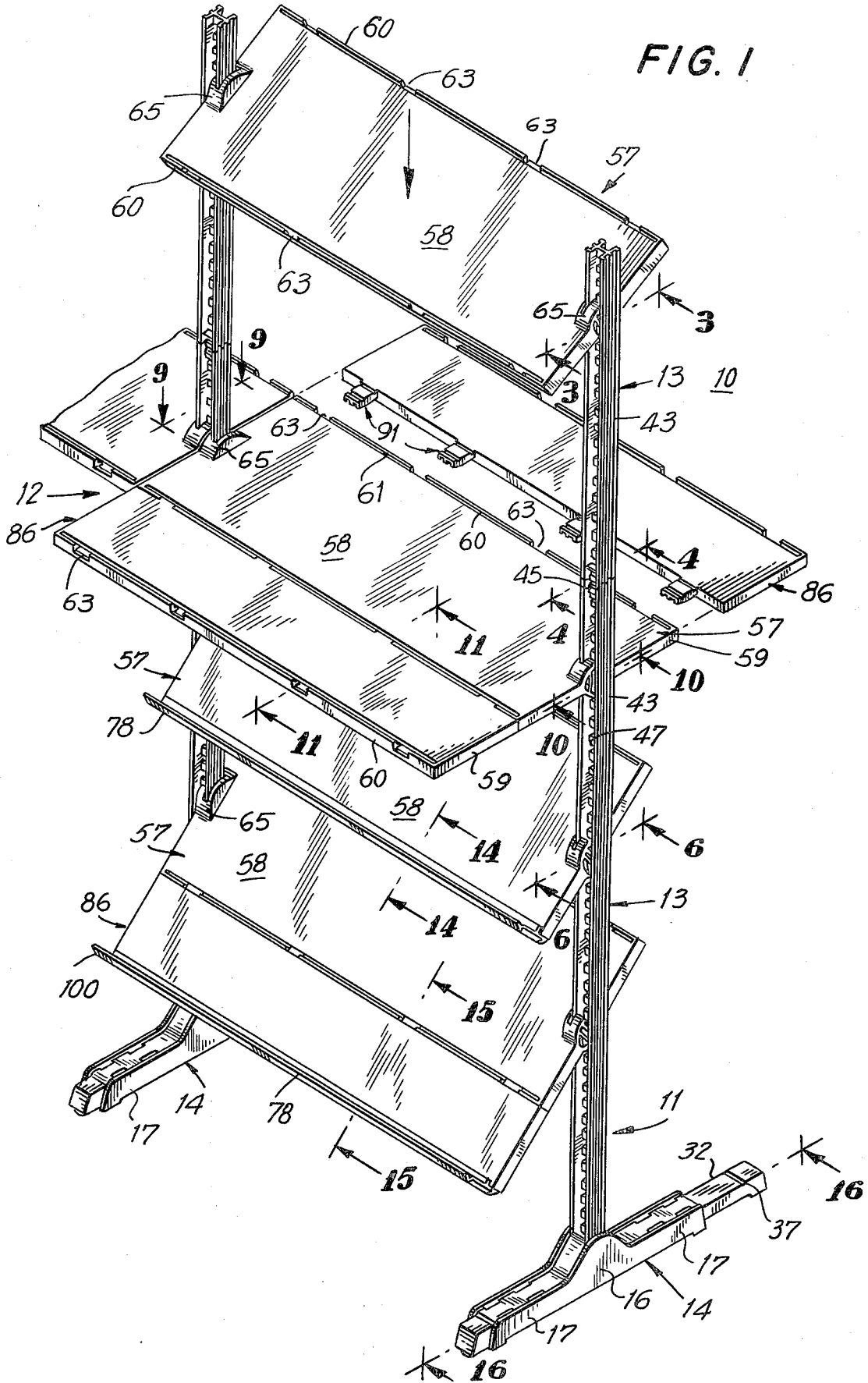


FIG. 2

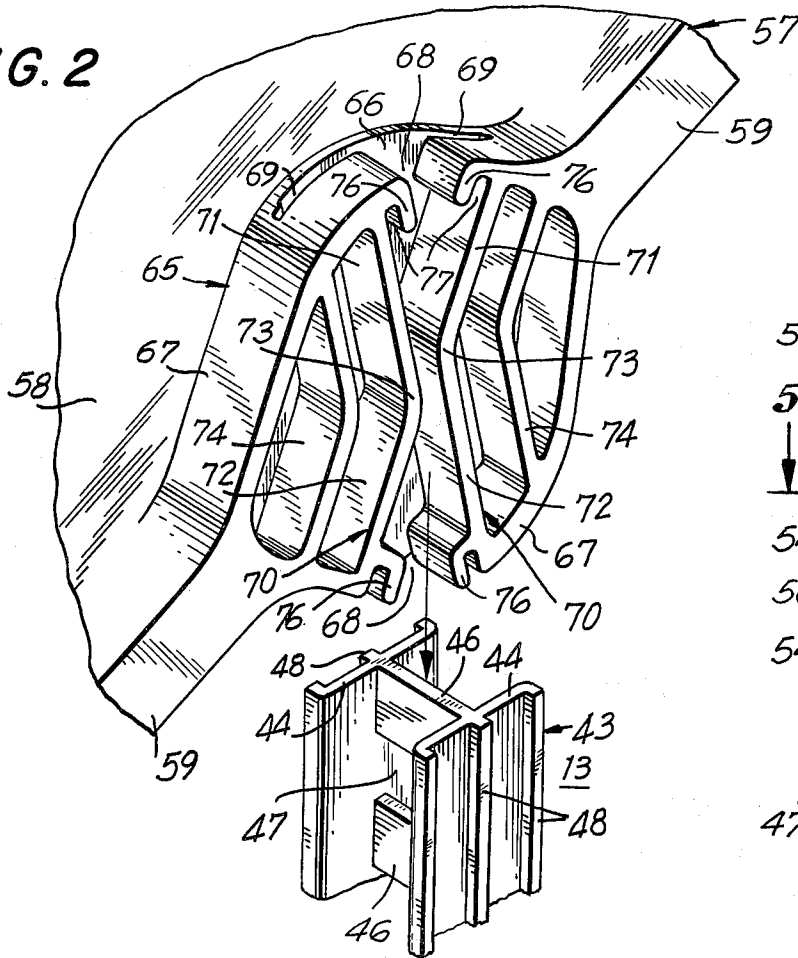


FIG. 4

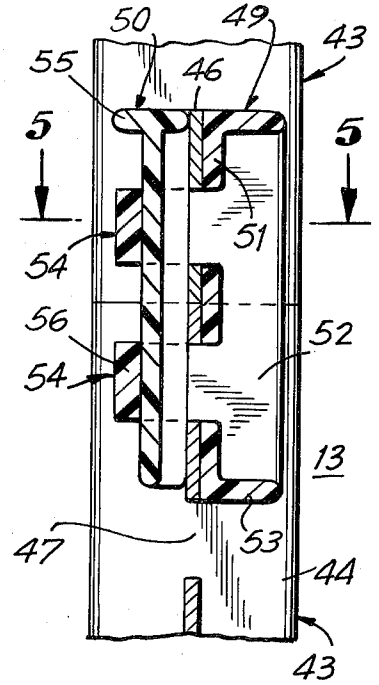


FIG. 3

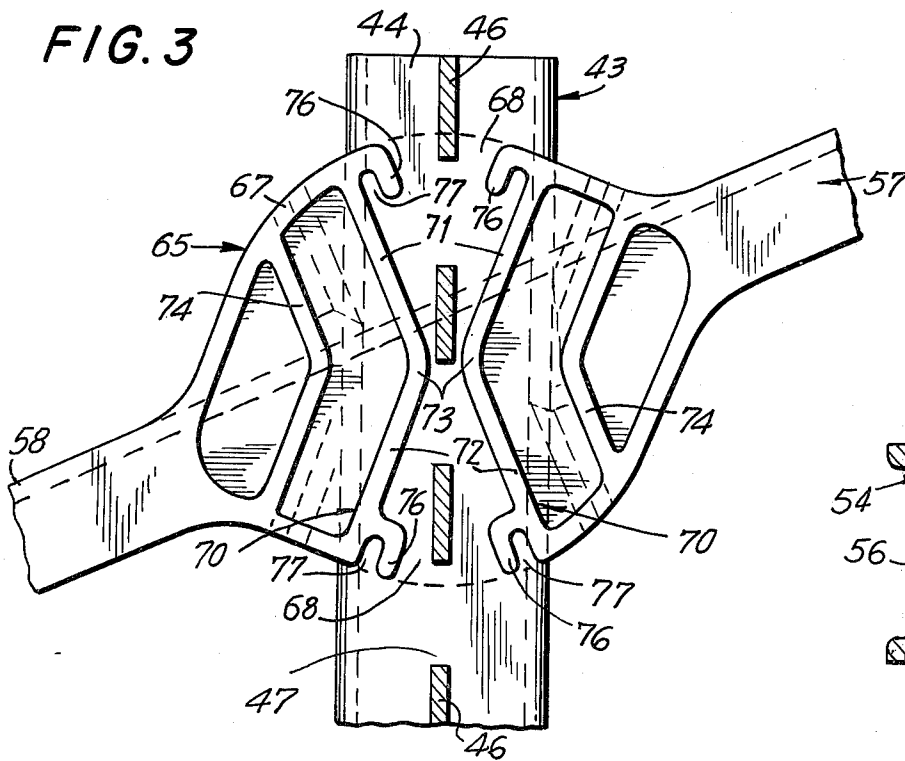


FIG. 5

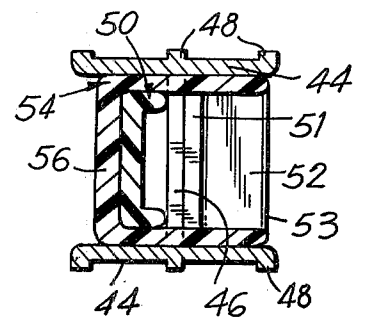


FIG. 6

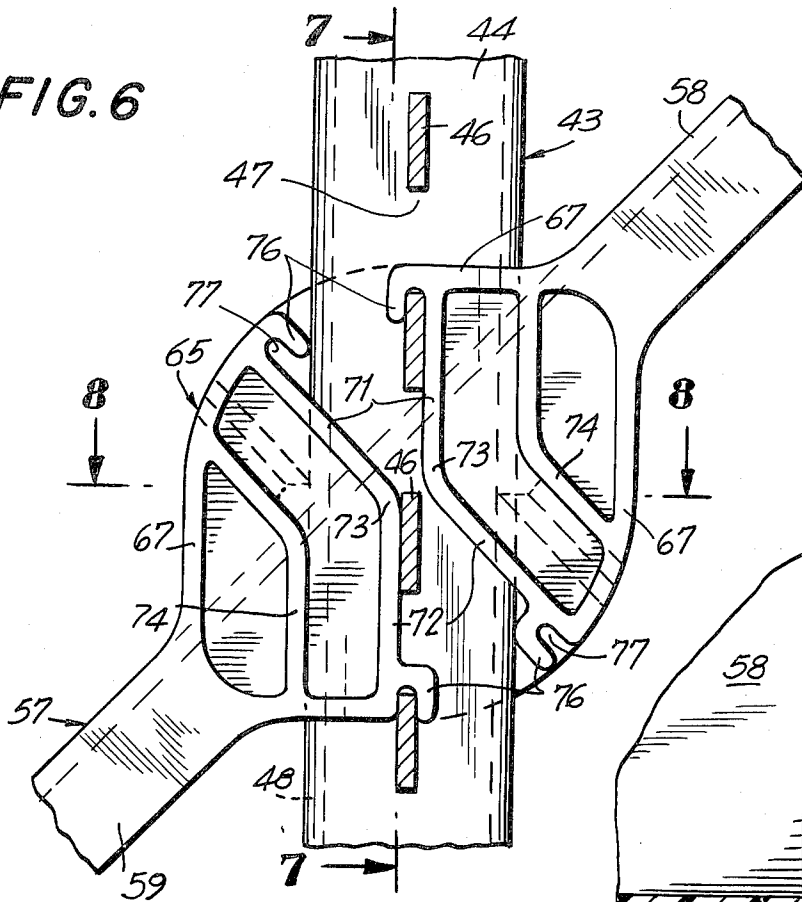


FIG. 7

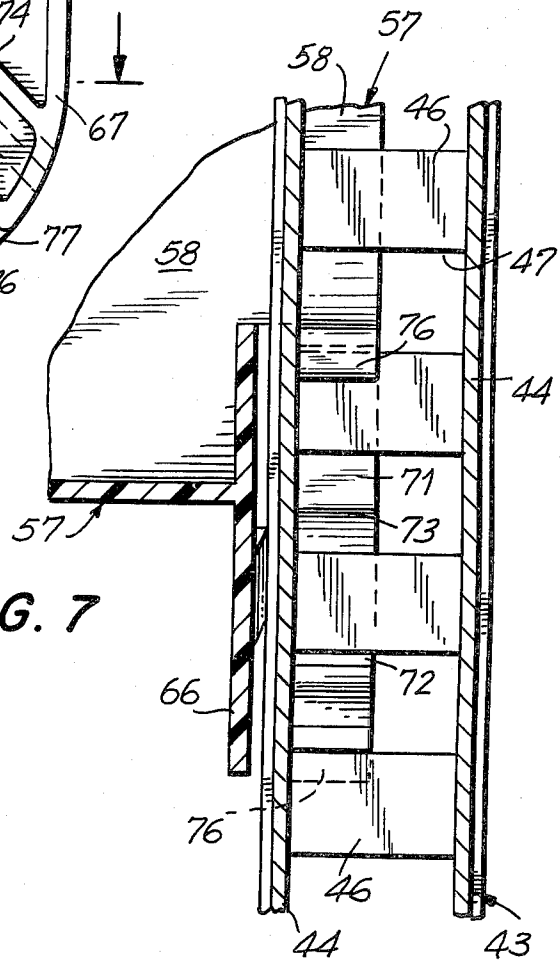


FIG. 8

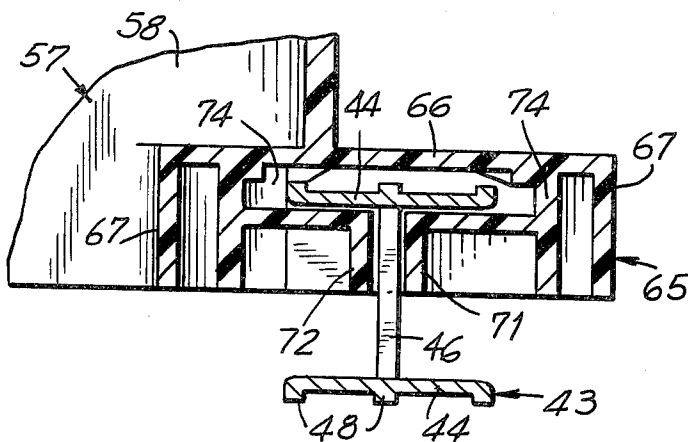


FIG. 9

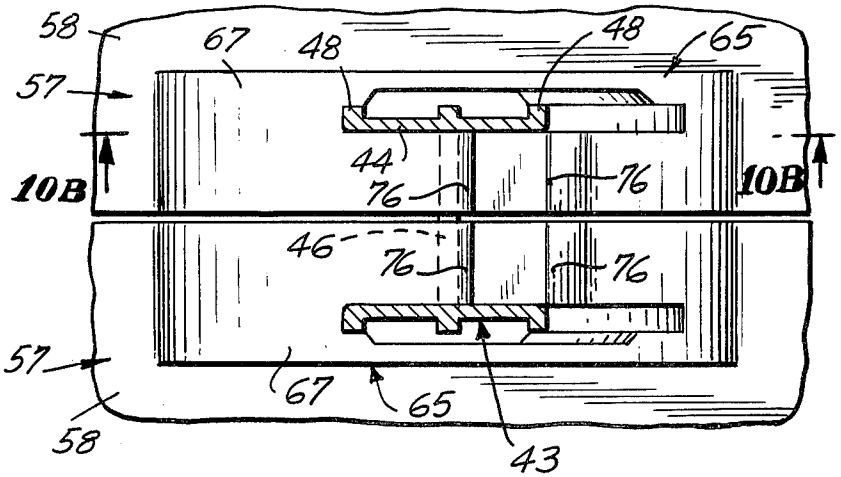


FIG. 10A

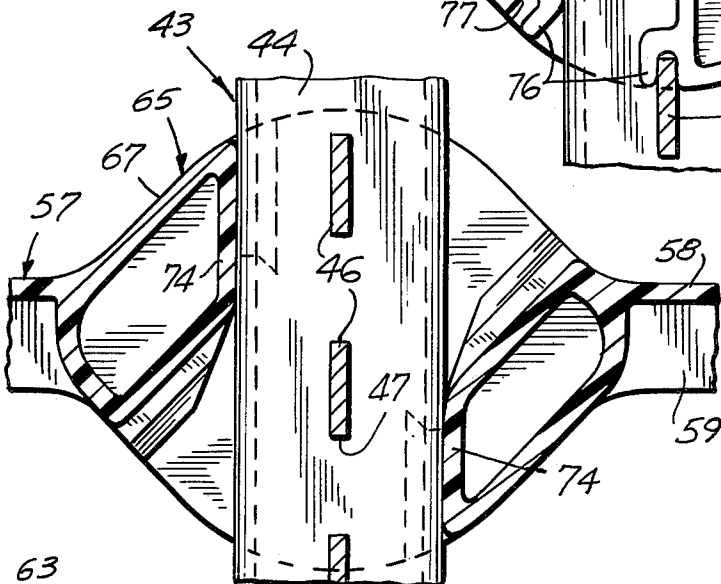
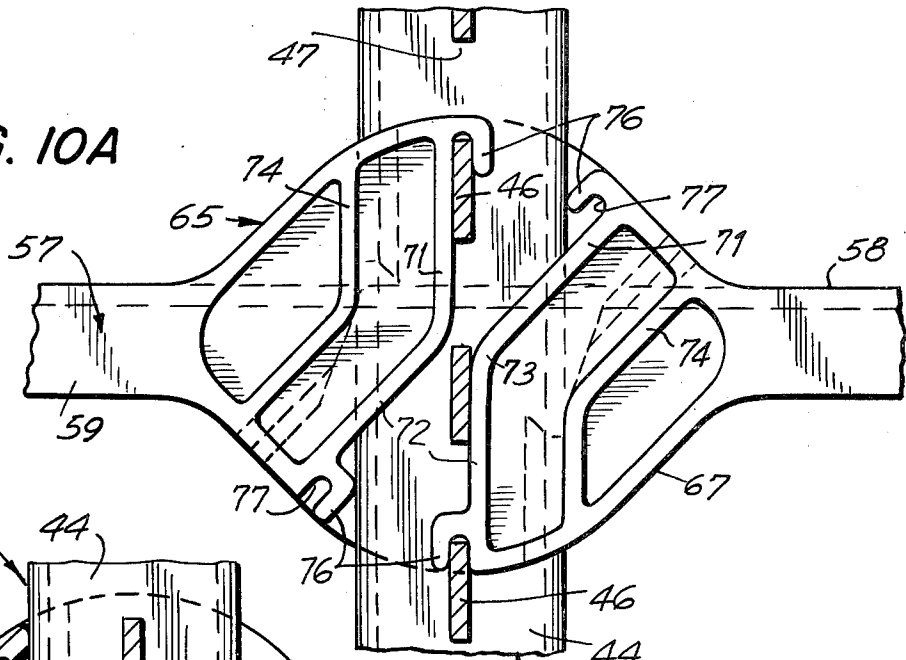


FIG. 10B

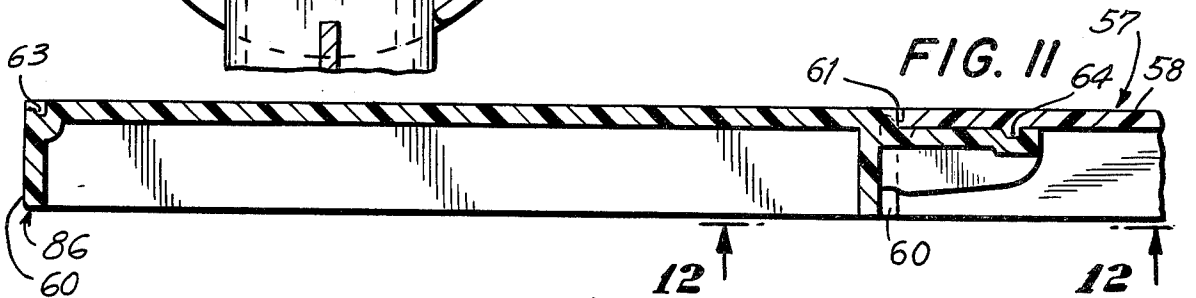


FIG. 11

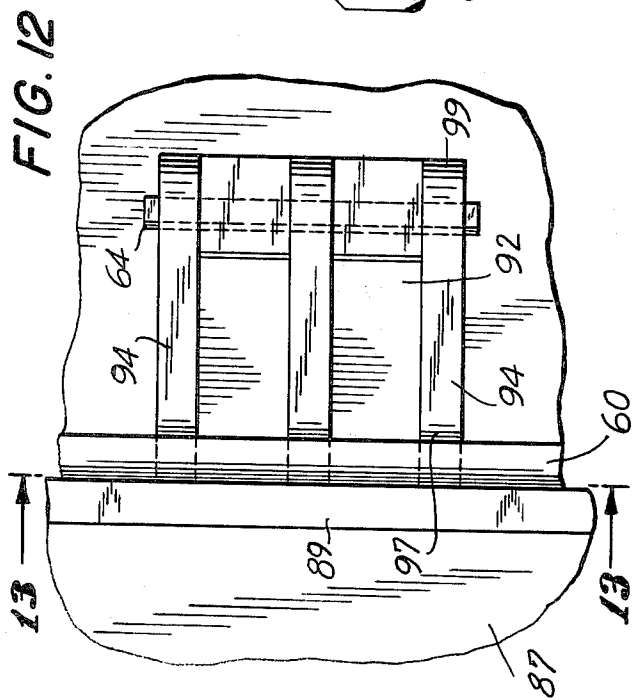


FIG. 14

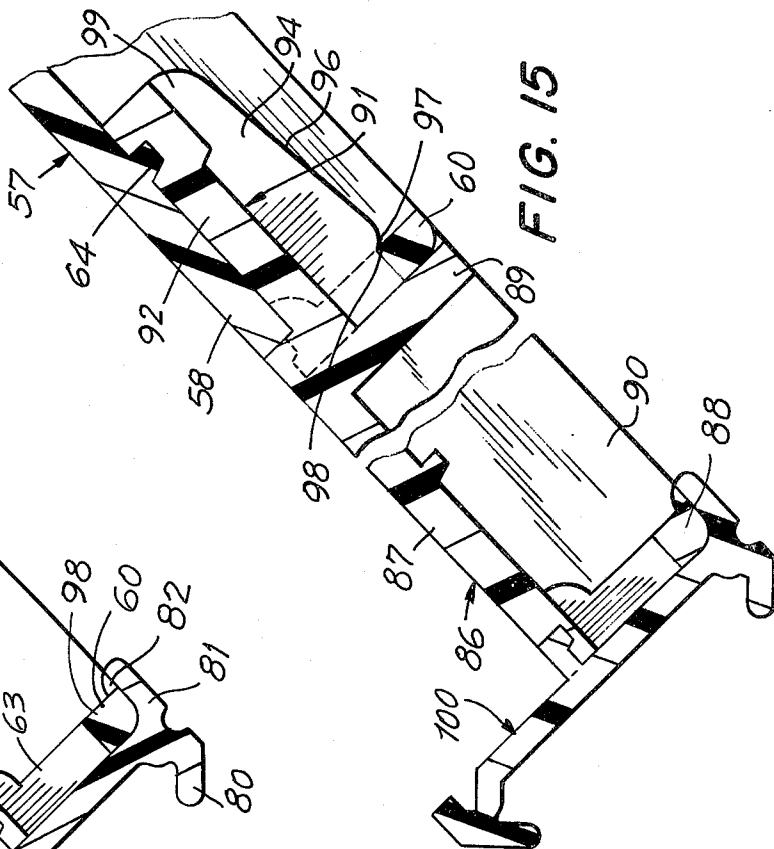
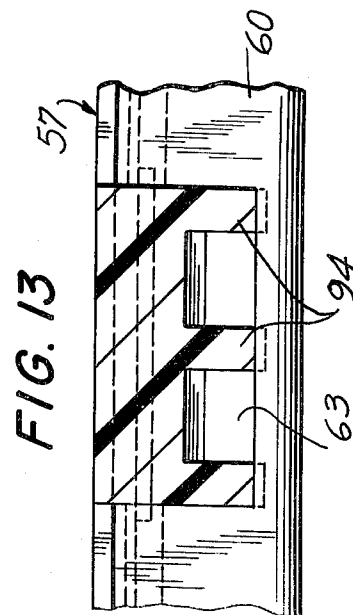
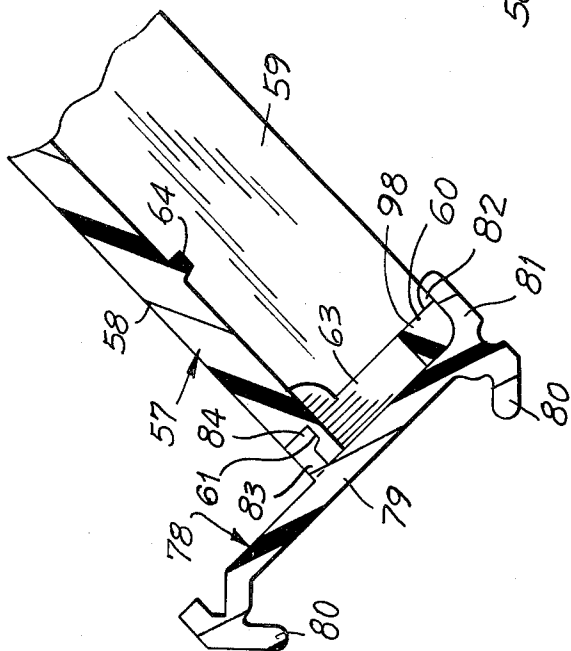


FIG. 16

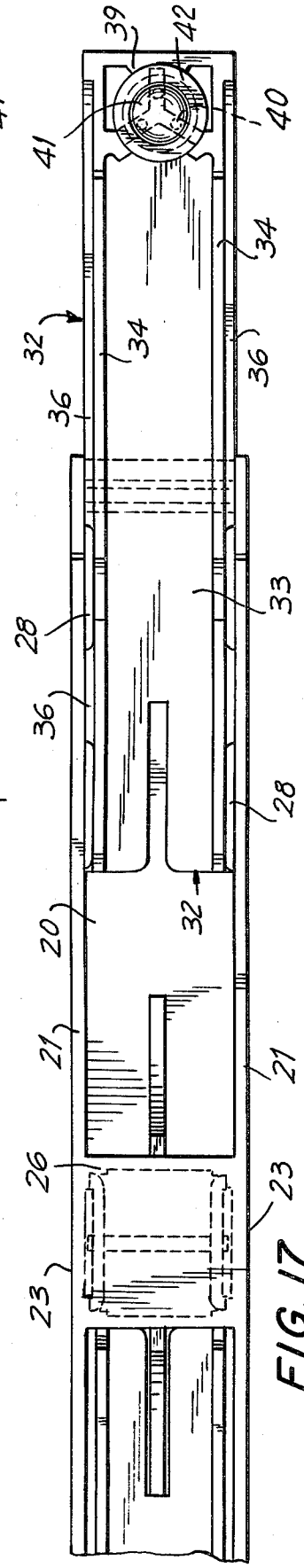
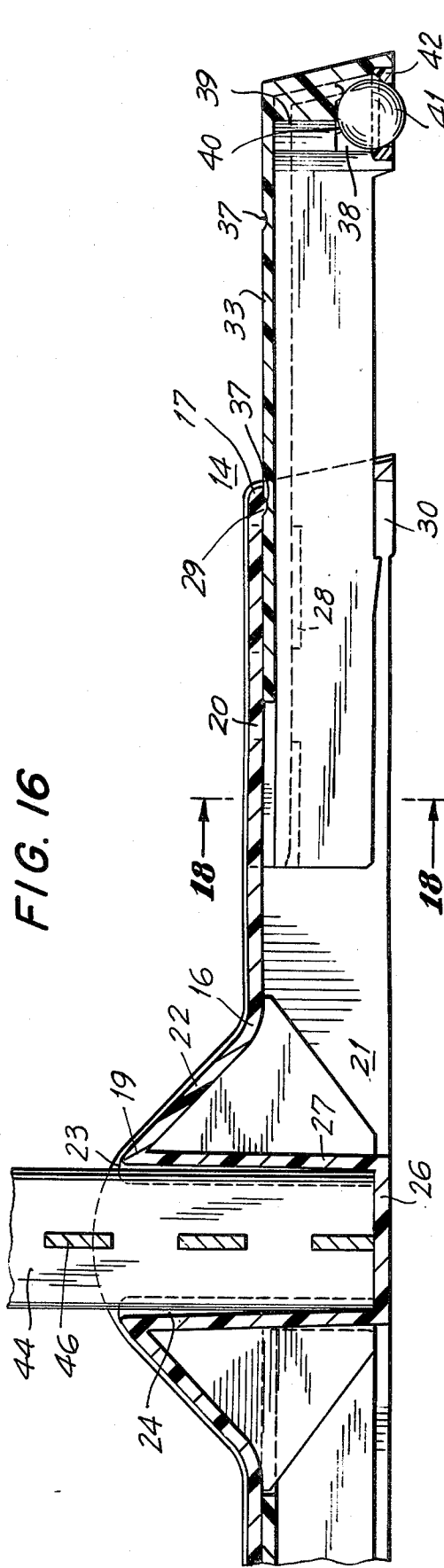


FIG. 17

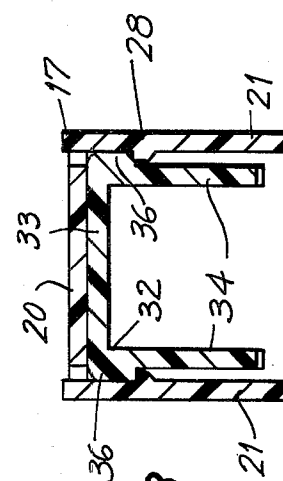


FIG. 18

SHELF SUPPORT STRUCTURE

BACKGROUND OF THE INVENTION

The present invention relates generally to improvements in display or storage devices and it relates more particularly to an improved adjustable shelf and standard structure of modular construction which may be rapidly assembled or collapsed and in which the shelves are angularly and vertically adjustable.

There are numerous applications for easily assembled and collapsed, simple lightweight shelf structures which possess a wide range of adjustment and variation in height, width and shelf arrangement, size and inclination. The structures heretofore proposed and available possess numerous drawbacks and disadvantages. They are expensive and bulky structures often of unattractive appearance. Ordinarily, the shelves are supported from the rear and side, so as to restrict accessibility and are of little versatility and adaptability and otherwise leave much to be desired.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide an improved display device.

Another object of the present invention is to provide an improved adjustable shelf structure.

Still another object of the present invention is to provide an improved adjustable shelf structure of modular construction in which the overall size of the structure and the arrangement and orientation of the shelves as well as their sizes may be easily varied and adjusted.

A further object of the present invention is to provide an improved adjustable shelf structure, which is efficient in design and economical in material, but yet is strong and desirable.

A still further object of the present invention is to provide a structure of the above nature characterized by its reliability, attractive appearance, ease and convenience of rapid assembly, erection, collapse and adjustment, its ruggedness, low cost and high versatility and adaptability.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawings, which illustrate preferred embodiments thereof.

In a sense, the present invention contemplates the provision of an improved modular, shelf type display device comprising at least one vertical standard, a laterally extending shelf member and a coupling member located on the shelf member and vertically slidably engaging the standard and limiting the swinging of the shelf about a laterally extending axis between predetermined angles and including means responsive to the positioning of the shelf member at one of the predetermined angles for releasably locking the shelf member in its set position.

According to the preferred embodiment two or more laterally spaced standards are provided, each standard having its lower end separably nested in a medial socket formed in an adjustable transversely extending foot piece. Each standard is formed of one or more columns of H-shaped transverse cross section interconnected end to end and having vertically aligned rectangular shaped positioning openings formed in the standard crossweb, which extends laterally. Each shelf member has a medially disposed integrally formed cou-

pling member at each end engaging a corresponding standard, each coupling member including an inner transverse base plate. Laterally outwardly projecting symmetrically disposed positioning webs or strips are located on each base plate, the webs being of shallow V-shape and including a pair of inner first positioning webs whose apices are directed toward each other and delineate a narrow throat and whose inner edges are spaced from the base plate to define slots which engage the standard's side walls. A second pair of positioning webs are disposed radially outwardly of and are parallel to the first positioning web. A hook element having a radially inwardly directed opening is located at an end of each of the first positioning webs. When the shelf is between its predetermined angles the shelf is freely slidably along the standards. However, when the shelf is at a predetermined position and angle, one of the end sections of each of the positioning webs firmly engages the standard cross web or side wall and the hook elements engage the lower edges of corresponding positioning openings.

The improved display device is rugged, reliable, of great versatility and adaptability, of attractive appearance, strong, inexpensive and easy and convenient to assemble, erect, adjust and collapse.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view, partially fragmented, of an assembled display device embodying various aspects of the present invention;

FIG. 2 is an enlarged, fragmentary perspective view of the shelf coupling and support standard in a separated condition;

FIG. 3 is an enlarged sectional view taken along line 3—3 in FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 in FIG. 1;

FIG. 5 is a sectional view taken along line 5—5 in FIG. 4;

FIG. 6 is a sectional view taken along line 6—6 in FIG. 1;

FIG. 7 is a sectional view taken along line 7—7 in FIG. 6;

FIG. 8 is a sectional view taken along line 8—8 in FIG. 6;

FIG. 9 is a sectional view taken along line 9—9 in FIG. 1;

FIG. 10A is a sectional view taken along line 10—10 in FIG. 1;

FIG. 10B is a sectional view taken along line 10B—10B in FIG. 9;

FIG. 11 is a sectional view taken along line 11—11 in FIG. 1;

FIG. 12 is a fragmentary view taken along line 12—12 in FIG. 11;

FIG. 13 is a sectional view taken along line 13—13 in FIG. 12;

FIG. 14 is a sectional view taken along line 14—14 in FIG. 1;

FIG. 15 is a sectional view taken along line 15—15 in FIG. 1;

FIG. 16 is a sectional view taken along line 16—16 in FIG. 1;

FIG. 17 is a bottom plan view of the foot piece shown in FIG. 16; and

FIG. 18 is a sectional view taken along line 18—18 in FIG. 16.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings which illustrate a preferred embodiment of the present invention, the reference numeral 10 generally designates the improved display device, which includes two or more standard assemblies 11 and a plurality of shelves 12 which are individually adjustable in size, position and orientation. While only two standard assemblies 11 are shown, it should be understood that more such assemblies may be employed and they are regularly laterally spaced as determined by the lengths of the shelves 12, which are equal to each other. The intermediate standards 11 are common to adjoining pairs of shelves. The number and arrangement of the shelves may likewise be modified. The various components of the display device may be formed of any suitable material in the conventional manner, for example, extruded aluminum or they are advantageously formed of a synthetic organic polymeric resin, such as polystyrene, polypropylene, acrylonitrile-butadiene-styrene (ABS) and the like.

FIG. 1 illustrates various positions and forms of the shelves 12 on standard assemblies 11. Referring to the various shelves in FIG. 1 from top to bottom, the top-most shelf is in sliding position to locate it anywhere along standard members 13. The second shelf from the top illustrates the shelf in horizontal position which one shelf extender on and the rear extender in exploded position and an adjoining fragmentary shelf shown. The next lower shelf is in 45° position with a front edge guard shown. This position allows positive feed of merchandise placed on the shelf when the frontmost item is removed. The bottom shelf is also at a 45° angle with an extender and edge guard mounted.

The standard assemblies 11 each include one or more standard members 13 separably connected end to end and a foot member 14, as best seen in FIGS. 1 and 16-18. The foot member 14 as seen best in FIGS. 16-18, comprises a transversely extending body member 16 including transversely aligned oppositely projecting channel shaped legs 17 medially joined by a vertically upwardly enlarged midsection 19. Each of the legs 17 includes a horizontal top wall 20 and depending side walls 21, the top walls 20 joining upwardly inwardly inclined top walls 22 of midsection 19 and the side walls 21 being joined by the vertical side walls 23 of midsection 19. A medial vertically oriented coupling well 24 of square horizontal cross section is formed in midsection 19 and is delineated by a bottom wall 26 at the base of midsection 19, slightly downwardly converging front and rear walls 27 and the midsection side walls 23. Extending longitudinally along the inside faces of side walls 21 shortly below the top walls 20 are ribs 28 having coplanar top shoulders and a transverse rib 29 depends from the underface of top wall 20 proximate its outer end. The side walls 21 terminate at the free ends in short depending foot sections 30.

Slidably telescoping each of the channel legs 17 is a nesting open bottom channel shaped extension leg 32 which projects beyond the end of the corresponding body leg 17 and is selectively slidable between extended and retracted positions. Each of the extension legs 32 includes a top wall 33 underlying the corresponding top wall 20 of leg 17 and depending side walls 34 provided along their tops with outwardly directed projections 36 slidably engaging tracks defined by the top wall 20 of legs 17 and ribs 28. Longitudinally

spaced, laterally extending grooves 37 are formed in the top face of channel top wall 33 and are releasably engagable by rib 29 of top wall 20 to lock the extension leg 32 in a prescribed position.

A downwardly open well 38 is formed at the end of each extension leg 32 and is provided at its base with three angularly related depending vertical panels 39 provided at their underfaces with bosses 40. A ball roller 41 nests in the wall 38 and engages the bosses 40 and projects below the well 38, the ball 41 being rotatably retained in the well 38 by a suitably shaped annulus or washer 42 secured in the open end of well 38.

Referring now to FIGS. 1-5, each of the standard members 13 includes a single column unit 43 of generally "H"-shaped transverse cross section or two or more axially aligned H-column units separably connected end to end by suitable fasteners. Each column unit 43 includes laterally spaced transverse side walls 44 connected by a medial cross web 46 having formed therein regularly vertically spaced rectangular positioning openings 47, which extend for the full width of the cross web 46. Formed on the outside faces of the column side walls 44 along their vertical edges and medial axes, are parallel vertical ribs 48. The bottom section of each standard member 13 nests and is slightly wedged in a corresponding coupling well 24 of a foot member 14 and is separable therefrom, the column side walls 44 being transverse and the webs 46 extending laterally.

When the standard member 13 includes two or more end to end column units 43, as shown best in FIGS. 4 and 5, the column units are separably joined by a connector 45 including first and second coupling members 49 and 50 respectively. The first coupling member 49 comprises a rectangular vertical base plate 51, which overlies one face of the end to end webs 46 at their juncture and is provided with outwardly directed side walls 52 which overlie the inside faces of the column side walls 44 and top and bottom horizontal walls 53. Integrally formed with the base plate 51 and projecting through web openings 47 adjacent to the juncture of column units 43 are rectangular vertically aligned loops 54 having lateral end legs 56. The second coupling member 50 extends through the loops 54 and is wedged between the loop end legs 56 and the cross web 46, the coupling member 50 being channel shaped and the nesting within the loops 54 and being provided at its top with a finger piece 55.

As shown best in FIGS. 1, 11-15, each of the shelf assemblies or shelves 12 comprises a main shelf member 57 of rectangular configuration including a rectangular top panel 58 with depending side end flanges 59 and front and rear flanges 60. Formed in the front and rear borders of each panel 58 and extending for slightly less than the full length thereof is a groove 61 and formed in each flange are regularly laterally spaced rectangular openings 63 providing access to the underface of the panel 58. In alignment with and shortly inwardly of each opening 63 is a depending coupling ridge 64.

Integrally formed with each main shelf member 57, as best seen in FIGS. 2 and 3, along the medial side edge flange 59 thereof is a pair of opposite laterally aligned coupling members 65, each of which includes a base plate 66 extending transversely and being in a plane perpendicular to the panel 58 and inwardly of the proximate end flange 59. The opposite edges of base plate 66 are curved and a peripheral wall 67 projects laterally outwardly from the curved edges and are interrupted by diametrically opposed openings 68, whose

medial axes are disposed at angles of $22\frac{1}{2}^\circ$ to the perpendicular of panel 58. Peripheral extending slots 69 are formed at the bases of walls 67, proximate base plate 66, in the sections of walls 67 proximate the openings 68, the distance between the remote ends of adjacent slots 69 is greater than the width of column wall 44 and the width of the slots 69 is slightly greater than the column side wall maximum thickness.

A pair of opposing shallow V-shaped similar inner guide walls 70 are integrally formed with the peripheral wall 67 and have inner edges spaced from the base plate 66 a distance equal to the width of slot 69, the lateral outer edges of walls 70 being coplanar with those of peripheral wall 67. The guide walls 70 are symmetrical with the medial $22\frac{1}{2}^\circ$ axis of openings 68 and each guide wall 70 includes upper and lower legs 71 and 72 respectively, extending from peripheral wall 67 at points inwardly of openings 68 and joined by a curved apex 73, the adjacent leg of opposite guide walls being 45° to each other. The distance between the planes of the inside faces of upper legs 71 and correspondingly opposite lower legs 72 is about equal to the thickness of column cross web 46 and the distance between apices 73 is somewhat greater than such distance.

A symmetrical pair of similar outer V-shaped guide walls 74 are equally spaced outwardly of guide walls 70 and are integrally formed with base plate 66 and peripheral wall 67. The distance between the apices of guide walls 74 is greater than the width of column side wall 44 and the distance between the planes of the inside faces of opposite top and bottom legs of guide walls 74 is about equal to such width. Projecting inwardly from each end of peripheral wall 67 adjacent opening 68 are fingers 76 which form with their adjacent corresponding guide wall legs 71 and 72 respectively coupling hooks 77.

In the assembled condition of the standards 13 and the shelf member 57, the opposite coupling members 65 engage a corresponding laterally spaced column unit 43, with the column side walls 44 received within and engaging the slots 69 and the column cross webs 46 extending through openings 68 and between opposing apices 73. When the shelf members 57 is inclined at a $22\frac{1}{2}^\circ$ angle as shown in FIG. 3, it is freely vertically movable along the column unit 43. However, when the shelf member is swung either to a horizontal position or to a 45° inclination, one pair of opposite guide legs 71 and 72 tightly engage the cross web 46 and the corresponding aligned legs of guide wall 74 engage the respective edges of column side wall 44. In addition, a corresponding pair of hooks 77 engage the lower edges of respective positioning openings 47.

As seen in FIGS. 1 and 14, the front and rear edges of the shelf member 57 may be provided with upwardly directed retainer wall 78 separably connected to one or both lateral edges of the shelf member 57 and extending for the full lengths thereof. Each retainer wall 78 includes a laterally extending panel 79 abutting the shelf flange 60 and provided along its top and bottom edges with forwardly converging laterally extending lips 80. Projecting rearwardly from the bottom edge of web 79 is a flange 81 engaging the underface of flange 60 and terminating in an upwardly directed lip 82 engaging the underface of flange 60. Also directed rearwardly from the rear face of web 79 between the top and bottom therefrom is a flange 83 terminating in a depending lip 84 matingly engaging the groove 61 along the full length thereof. The retainer wall 78 may

be applied or separated from the shelf member 57 by respectively snapping or unsnapping the lip 84 from groove 61 and lip 82 from flange 60.

Referring now to FIGS. 1, 11-13 and 15, extension shelves 86 may be attached to or detached from the main shelf members 57, and includes a top panel 87 having depending from its front edge a flange 88 corresponding in construction to flange 60, a depending rear flange 89 and side end flanges 90. In the attached condition of self member 86 the rear flange 89 abuts a shelf front flange 60 and coupling members 91 extend rearwardly from the flange 89 through corresponding openings 63 in adjacent flange 60.

Each of the coupling members 91 includes a top plate 92 abutting the underface of the shelf panel 58 and reinforced by a plurality of laterally spaced depending thin integrally formed similar panels 94. The panels 94 are provided with upwardly inwardly inclines bottom edges 96 terminating at its front end in a rounded shoulder 97 releasably engaging the bottom inner edge or corner 98 of a respective opening 63 and terminating at its rear in a rounded end 99. The inner free end of plate 92 is enlarged in thickness and is provided in its top face in a laterally extending groove releasably engaging a respective rib 64. The coupling members snap fit into the openings 63 with the ribs 64 releasably lockable engaging the mating grooves in the coupling plates 92 and the opening corners 98 and rounded shoulders 97 releasably engaging. The extension shelf 86 may be pulled from the main shelf 57 by applying sufficient force. A retainer wall 100 similar to retainer wall 78 may be applied to the outer edge of the extension shelf 86.

The shelf assembly may be erected or disassembled in a manner which is clear from the above. Any desired arrangement of the shelves may be achieved by applying the main shelf member 57 to the foot piece supported column units 43, coupling additional column units to the lower units by means of the connector members 49 and 50 and adding additional shelves. The shelf coupling sections 65 are less than half the width of the column cross webs 46 permitting the coupling of two coupling members 65, side by side, in a common column unit 43. Accordingly, more than two regularly spaced standard members 13 and associated foot members may be provided, with adjacent standard members joined by bridging shelf members 57. The shelf members 57 may be individually adjusted to their horizontal and inclined positions and vertically adjusted and provided with any desired shelf extension and retainer wall.

While the coupling members 65 were shown to be integral with the shelf 57, they could be separate, such as a bracket and shelf mounted on a pair of brackets.

Maximum strength of this device 10 is achieved by reason of the "H" shape of the standard and the interaction of the coupling member. The coupling member fully enclose one vertical leg of the "H" in two planar dimensions to provide maximum surface contact. This large bearing surface of the bracket against each standard produces a strong unit per unit of weight. If each leg of the standard is about an inch deep from the center and the coupling section is about 3 inches long, there are 3 square inches of surface contact on both sides of the H standard plus the surface contact of the web and edge, about $\frac{1}{8}$ inch. Also, the various slots or openings of coupling member 65 have different tapers for different purposes. To move freely the shelves along

the standards, the central two-thirds of the slotted passageway, opening 68 and between apices 73, as shown in FIG. 3, is widest to move the shelves quickly. Once at the selected vertical position, the shelves are swung clockwise or counter clockwise to lock them into a 45° (FIG. 6) or 180° (FIG. 10A) position respectively, and corresponding coupling hooks 77 and corresponding legs 71 and 72 are wedged against the cross webs 46 and guide walls 74 abut column side walls 44. The slots formed by these cooperative members are tapered both horizontally and vertically to lock the shelves into selected position along the standards.

While there has been described and illustrated a preferred embodiment of the present invention, it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof. For example, the guide walls 74 may be omitted and the V-shaped guide walls may be replaced by curved guide walls which advantageously are of spiral convolutions or otherwise and of varying radius of curvature.

What is claimed is:

1. A display device comprising a vertical standard, a coupling member vertically slidably engaging said standard, and a laterally extending shelf member supported by and cooperating with said coupling member, said coupling member limiting the swinging of said shelf member about a laterally extending axis between first and second predetermined angles and including means responsive to the positioning of said shelf member in one of said predetermined angles for releasably locking said shelf member to said standard against the lowering of said shelf member along said standard.

2. The display device of claim 1 comprising a pair of said vertical standards which are laterally spaced, said shelf member having a pair of side edges and one of said coupling members located proximate each of said side edges and engaging a corresponding standard.

3. The display device of claim 2 including a transversely extending foot piece located at the base of and separably engaging and supporting each of said standards.

4. The display device of claim 1 wherein said vertical standard includes a vertical first web lying in a transverse plane to the axis of said shelf and a vertical lateral second web extending transversely from said first web between the vertical opposite edges of said first web.

5. The display device of claim 4 wherein said coupling member includes a pair of opposing track sections lying along converging lines and terminating at their proximate ends in a throat, said track sections slidably engaging respective opposite vertical sides of said standard first web and the bases of said track sections alternatively engaging respective side edges of said first web when said shelf is at corresponding predetermined angles.

6. The display device of claim 4 wherein said coupling member includes a base plate positioned at a side end of and lying in a plane perpendicular to the plane of said shelf member and a pair of angular guide walls perpendicular to said base plate and converging to a throat engaging said standard second web alternate pairs of portions of said guide wall engaging said standard second web when said shelf member is at a respective one of said predetermined angles.

7. The display device of claim 6 wherein said guide walls have longitudinal slots formed therein adjacent to said base plate and slidably engaging said standard first webs.

8. The display device of claim 7 wherein said standard second web has vertically spaced openings formed therein and a locking element projecting inwardly from each of said guide walls and alternatively releasably engaging selected ones of said openings when said shelf is at a respective of said predetermined angles.

9. A display device comprising a pair of laterally spaced vertical H-column standards, each including transverse side first webs and a laterally extending medial second cross web, a laterally extending shelf member positioned between said standards and swingable about a laterally extending axis between alternative horizontal and inclined positions and similar coupling members located at the side ends of said shelf and rockably and slidably engaging respective standards and being releasably lockable in a predetermined position thereon, each of said coupling members including a base plate having perpendicular to the plane of said shelf member and positioned in a side edge thereof and a pair of outwardly directed first positioning walls perpendicular to said base plate and outwardly spaced therefrom by corresponding slots, said positioning walls converging to and then diverging from a restricted throat of greater thickness than said standard second web, alternative opposing sections of said positioning walls engaging opposite faces of said standard second web when said shelf is in corresponding horizontal or inclined positions and the adjacent standard first web slidably engaging said coupling member slots.

10. The display device of claim 9 wherein said standard second web has vertically spaced locking openings formed therein and including locking elements projecting from the opposite sections of each of said first positioning walls and releasably engaging corresponding standard web openings when said shelf is one of its alternative positions.

11. The display device of claim 10 wherein said locking elements consist of downwardly open hooks releasably engaging the lower edges of respective standard web openings.

12. The display device of claim 9 wherein each coupling member includes second positioning walls positioned in the respective base plate outwardly of and parallel to said first positioning walls, opposite sections of each of said second positioning walls engaging the respective opposite side edges of the standard first web.

13. The display device of claim 12 wherein each of said positioning walls is of V-shaped configuration.

14. The display device of claim 12 wherein each of said positioning walls is of curved configuration with the radius of curvature increasing from one end to the opposite end thereof and the portions of the first positioning walls of least radius of curvature being diametrically opposed.

15. The display device of claim 12 wherein the shelf member has openings along a longitudinal edge, said shelf lower surface having a boss extending therefrom parallel to and spaced from the longitudinal edge from said openings, and an extension shelf having projecting fingers for receipt in said openings and a groove to matingly lock with said boss.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,921,539
DATED : November 25, 1975
INVENTOR(S) : Barry David Berger

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Change Assignee from: "Thomson-Leeds, Company, Inc.,
New York, N.Y.

to read: -- Brown & Williamson Tobacco Corporation
Louisville, Ky.

Signed and Sealed this

first Day of *June* 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks