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Killam

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[54] **MODULAR SHELF CONSTRUCTION**

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[52] **U.S. Cl.** ..... **108/109;** 52/36; 52/496; 108/111; 211/148; 211/182; 312/257 SK

[51] **Int. Cl.** **A47b 47/02;** A47b 57/16

[58] **Field of Search** ..... 108/109, 111, 114; 248/247, 248; 211/148, 177, 182; 52/242, 710, 496, 720, 731, 732, 738, 36, 753 K, 760; 312/257 R, 257 SK

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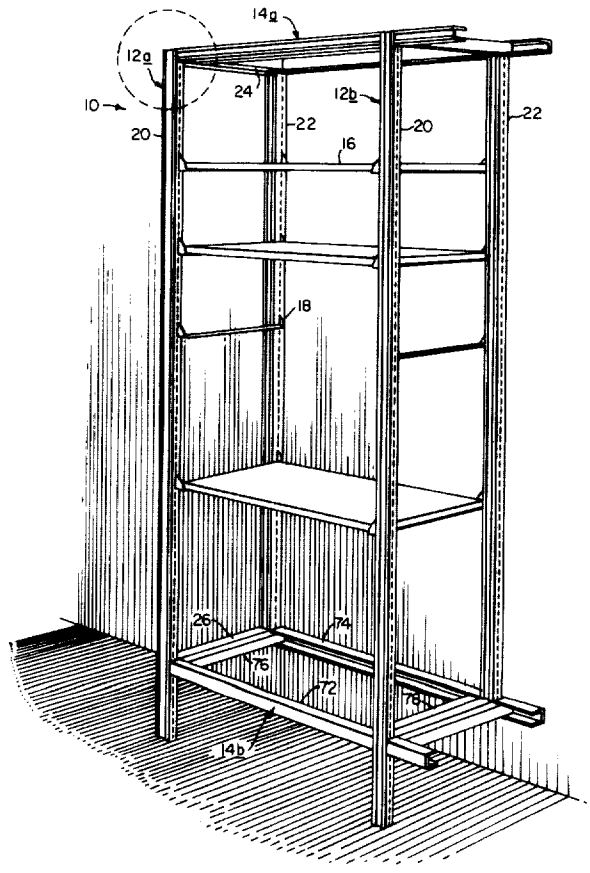
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Attorney, Agent, or Firm—Morse, Altman, Oates & Bello

[57] **ABSTRACT**

Shelves for books and the like are constructed from extruded framing pieces which support adjustable shelves. Three basic extrusion framing pieces may be cut to various lengths in order to fabricate different size shelf units of strong, rigid construction. At least some of the extrusions are provided with replaceable facia strips which, not only conceal connecting screws, but provide a decorative appearance. The sides of the shelf may be closed in by panels held in position by a resilient locking extrusion strip extending about the inner faces of the framing members and adapted to seat into a groove formed about the edges of the panels. Some of the framing pieces are formed with internal longitudinal passages adapted to receive connecting screws from perpendicularly extending other framing members. Adjustable shelf supports are provided by a one-piece bracket extending underneath each end of the horizontal shelving and is provided with upward extending ears adapted to lock in cooperating sockets formed in the vertical framing members. The bracket is moved from one set of sockets to another by pivoting the bracket outwardly.

3 Claims, 5 Drawing Figures



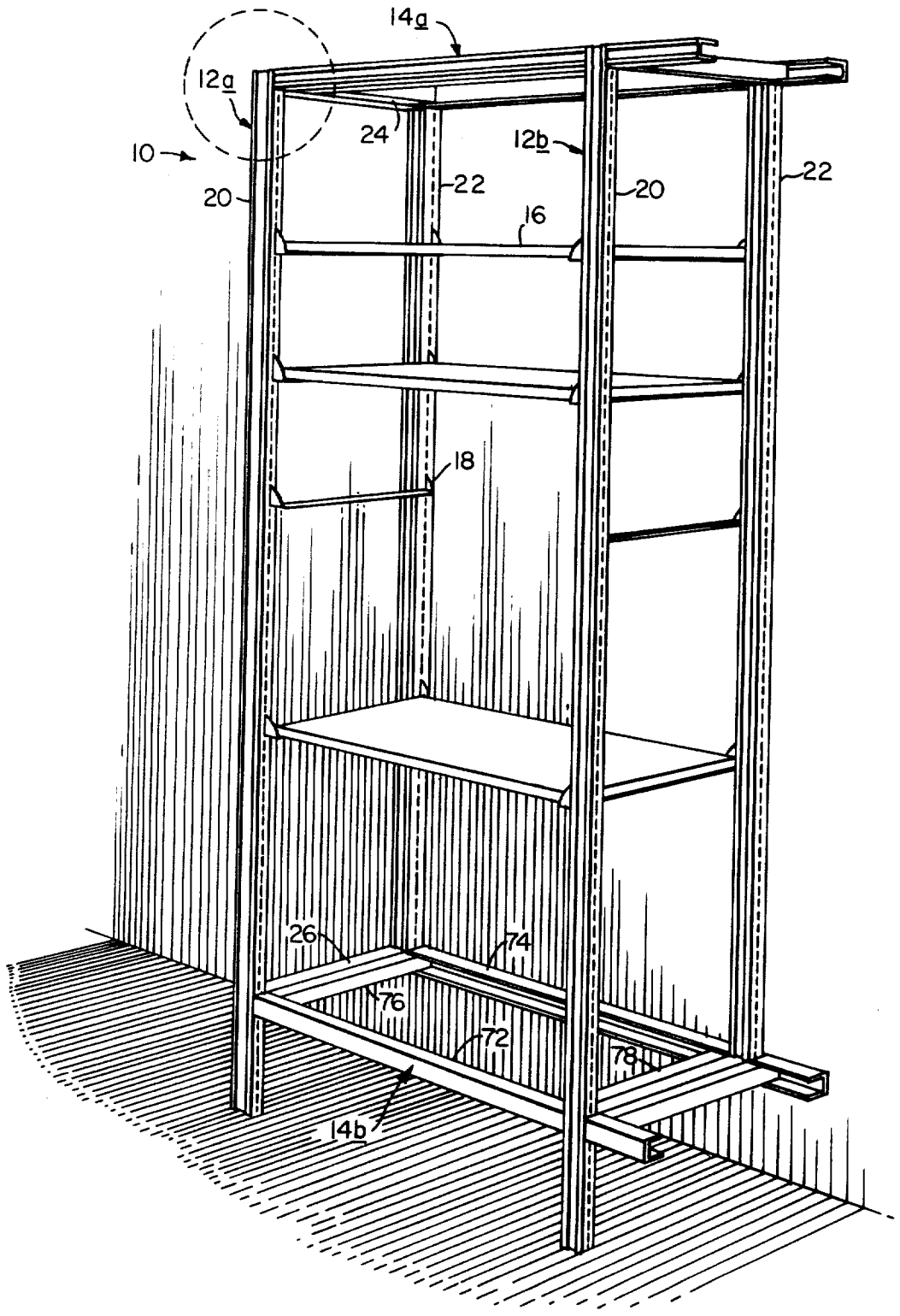


FIG. 1

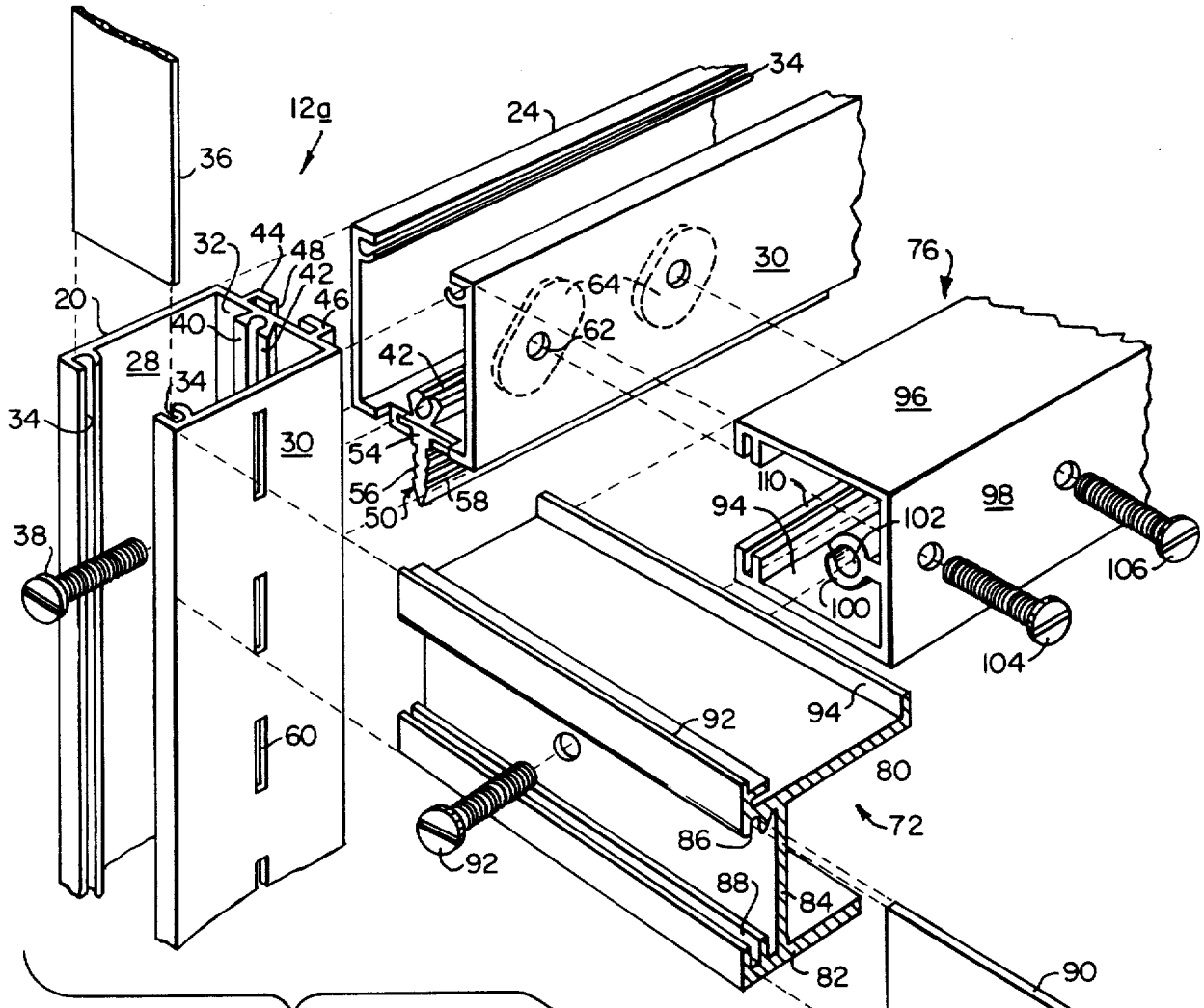


FIG. 2

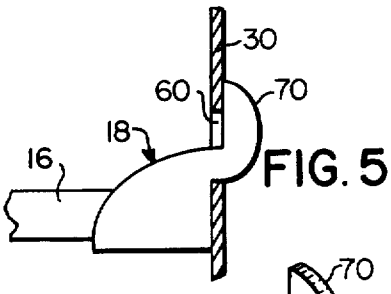


FIG. 5

FIG. 3

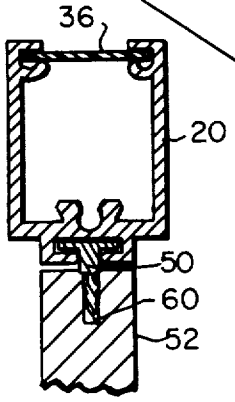


FIG. 4

MODULAR SHELF CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to shelf construction and more particularly is directed towards a new and improved modular shelf construction fabricated from a minimum number of extruded framing parts which are easily assembled to form a rigid support for adjustable horizontal shelves.

2. Description of the Prior Art

Conventional bookcases normally are made out of wood or metal using standard carpentry or metal working techniques. Wooden bookcases typically are made from wood planking cut and built in the usual manner while the metal ones employ reinforced sheet metal assembled by bolting or welding. Generally conventional bookcases have fixed shelves and are not particularly satisfactory from the standpoint of structural strength, rigidity and cost. Bookcases of all wood construction tend to be rather heavy and require periodic refinishing, particularly if heavily used. Most bookcases that are fabricated from sheet metal are also unsatisfactory for many applications since they often lack lateral rigidity unless heavily reinforced. Sheet metal bookcases also are quite heavy and require frequent refinishing to maintain a satisfactory appearance. Further, sheet metal type bookcases are rather difficult to fabricate and normally require the use of a large metal brake and other heavy equipment and any change in the size of the bookcase being fabricated requires substantial changes in tooling.

Accordingly, it is an object of the present invention to provide improvements in shelf construction. Another object of this invention is to provide a shelf construction of modular configuration which is readily adapted to be fabricated in a variety of sizes using a minimum number of common components. A still further object of this invention is to provide a simple, light weight, shelf system characterized by high strength and rigidity.

SUMMARY OF THE INVENTION

This invention features a modular shelf system, comprising upright, rectangular end frames connected to and supporting rectangular top and bottom frames and a plurality of rectangular shelves supported by detachable brackets. The end frames are fabricated from elongated extrusions characterized by a U-shaped cross-section formed with opposing grooves near the outer ends thereof adapted to slidably receive decorative facia pieces disposed therein. The extrusion is also formed with an interior elongated rib formed with a central passage adapted to receive locking screws for joining two perpendicular extrusions. The exterior of the base thereof is formed with another pair of grooves adapted to receive another extrusion of a T cross-section adapted to engage peripheral grooves formed about the edge of a side panel mounted in the center of the end frames. The top and bottom frames are assembled from two extrusions including front and rear extrusions having a generally H cross-section with a pair of oppositely facing grooves along the front face thereof adapted to receive a decorative facia insert. The top and bottom frames also include extrusions of U-shaped cross-section, the legs of which are formed with opposing ribs adapted to receive decorative facia strips and the interior thereof is formed with a longitudinal rib having elongated central passage adapted to receive connecting screws threaded therein from mutually perpendicular directions.

The upright side frames are formed with spaced slots and a shelf bracket, formed with a wide, U-shaped configuration and rearwardly and upwardly extending arcuate ears, is adapted to lockably engage the slots and support a shelf rested thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view in perspective of a modular shelf system made according to the invention,

FIG. **2** is a detailed exploded perspective view of the encircled portion of FIG. **1**,

FIG. **3** is a perspective view of a shelf support bracket,

FIG. **4** is a detail sectional view showing a panel and frame assembly, and,

FIG. **5** is a detail sectional view showing the bracket connection.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the reference character **10** generally indicates a modular shelf unit for use as a bookcase or the like fabricated from rectangular side frames **12***a*, **12***b*, etc., and rectangular horizontal frames **14***a*, 14*b*, etc., connected to the top and bottom portions of the side frames in the manner shown in FIG. **1.** Rectangular shelves **16** are supported between pairs of side frames **12***a* and **12***b*, etc., by means of movable brackets **18** which are adjustable to various vertical positions.

The shelf units may be fabricated in single units comprised of a pair of side frames **12***a* and **12***b* and top and bottom horizontal frames **14***a* and **14***b* with whatever shelves are needed or any number of shelving units may be assembled in end-to-end modular relation using the side frames **12** as a common side for adjacent shelf units. Any number of shelves may be constructed in this fashion so that an entire whole wall of shelves may be readily assembled.

Referring now more particularly to FIG. **2,** the construction of the framing members will be described in detail. First, with respect to the side frames **12,** each side frame is fabricated from a single side frame extrusion cut and assembled to form front and rear vertical frame members **20** and **22,** respectively connected at their upper and lower ends by top and bottom cross members **24** and **26,** respectively. In practice, the front frame member **20** may have its lower end extend beyond the rear frame member **22** as shown in FIG. **1** to form a front leg where the shelving is to be of permanent installation and the framing is attached to a support wall. This arrangement raises the rear lower edge of the shelf allowing it to clear any baseboard that may be present and permit the back of the shelf to be mounted flush against the wall.

The side frame extrusion, whether employed as the vertical or cross framing member, is a boxed channel piece generally having a rectilinear U-shaped cross-section as best shown in FIG., **2** with side walls **28** and **30** connected by an end wall **32.** The outer ends of the side walls **28** and **30** are each formed with a pair of longitudinal ribs defining oppositely facing grooves **34** adapted to receive a facia piece **36** inserted therein.

The facia piece **36** preferably is an elongated strip of rigid decorative material such as formica or the like which serves to close the extrusion to form a fully boxed member. In the assembly of the frame members, screws **38** are driven through the wall **32** without the facia piece **36** in place. The opening opposite the wall **32** is employed for access by a tool to drive the screw **38** into position. Once the screws have all been connected, the facia piece **36** is slipped into the grooves **34** thereby hiding the screw heads as well as the interior of the extrusion and providing a neat, decorative, finished appearance to the frames.

Extending lengthwise along the inner face of the wall **32** is a rib **40** having a longitudinal groove **42** of arcuate cross-section formed therein. The groove **42** is employed to threadably engage a screw **38** driven perpendicularly through the groove **42** of the member **20,** for example, into the groove **42** of the member **24** as suggested in FIG. **2.**

The outer face of the wall **32** is formed with a pair of parallel L-shaped ribs **44** and **46** defining a slot groove **48** lengthwise along the outer face of the wall **32** adapted to mount a tongue connector **50** therein. The function of the tongue connector is to mount side panels **52** as suggested in FIG. **4** for closing the ends of the book shelves to prevent books or other objects on the shelf **16** from falling off the ends, particularly where the side frame is the last of a series of connected shelf units. The tongue connector **50** is generally T-shaped in cross-section and preferably is extruded from relatively stiff plastic material to provide a good locking connection with the panel **52.** The tongue member **50** is formed with a cross head **54** which fits into the groove **48** and is formed with a leg **56** having longitudinal barbs **58** extending along both sides thereof. The leg is somewhat tapered so that it is easily inserted into a groove **60** formed along the edge of the panel **52** and is wedged into place to firmly mount the panel to the side frames. In practice, the tongue connectors **50** are mounted to all of the side frame members so that the panel **52** will be firmly supported along all four edges.

The front and rear vertical frame members **20** are virtually identical to the top and bottom cross members **24** and **26** with the exception that the front and rear vertical members are formed with spaced slots **60** formed in the walls **28** and **30** to receive the shelf brackets **18.** No slots are needed in the top and bottom cross members **24** and **26** although the members **24** and **26** are formed with screw holes **62** which may be reinforced with pads **64** in order to mount the frames **14***a* and *b*.

The bracket **18,** as best shown in FIG. **3,** is of one-piece construction formed with a straight center portion **66** which extends under the lower edge of the shelf **16** and is formed with upturned ends **66** and **68,** the forward upper portions of which are rounded and terminating in rearwardly and upwardly extending ears **70** and **72,** the rear edges of which are arcuate. The bracket is mounted to the upright frame members by holding the bracket tipped so that the ears are generally horizontal and inserting the ears into the slots **60.** The bracket is then released and drops to a vertical position with the ears in locking engagement with the rear of the wall **30** as best shown in FIG. **5.** The bracket is readily released by tipping the bracket upwardly and withdrawing the ears from the slots. In this fashion the height of the shelf **16** may be readily adjusted.

The horizontal frames **14***a* and **14***b*, etc., are fabricated from two different extrusions namely front and rear members **72** and **74,** respectively, of matching configuration and end members **76** and **78** respectively of matching configuration. The frame members **72** and **74,** as best shown in FIG. **2,** are generally H-shaped in cross-section each formed with upper and lower walls **80** and **82** connected by a central wall **84.** The walls **80** and **82** are formed at their outer ends with oppositely facing grooves **86** and **88** adapted to receive a facia piece **90** inserted therein to provide a decorative finish and to hide the edge of connecting screws **92** driven through the wall **84** thereof. The wall **80** is also formed with upwardly extending lips **92** and **94** which may serve as supports for a shelf rested thereon, if desired.

The end frame members **76** are of a rectilinear, U-shaped cross-section similar to the extrusions **20** and **24.** Each member **76** is formed with side walls **94** and **96** connected by an end wall **98** having a somewhat Y-shaped central rib **100** extending along the center thereof and formed with a central passage **102** adapted to receive the threaded end of the screw **92** driven through the wall **84** of the member **72** when the parts are perpendicularly connected. In assembling the frames **14** to the side frames **12,** machine bolts **104** and **106** are driven perpendicularly into the rib **100** through the pre-drilled holes **62** of the member **24.** The extrusion **76** is also formed with oppositely facing grooves **108** and **110** in the outer ends of the walls **94** and **96** to receive a facia strip, if desired.

The frames **14***a* and *b* may be fabricated in any length so that the same extrusions may be employed to assemble into any size book shelf, counter or desk. The facia pieces may be made up in any color or grain so that the trim finish will match other furniture trim or blend in with the overall decorative scheme. Likewise, the side panels **52** may be fabricated in various colors or other decorative appearance, as desired. The resulting frame work is extremely strong and rigid and, by virtue of its modular construction, is readily adapted to assemble in any number of units so as to be particularly suitable for installation in libraries and the like.

Having thus described the invention what I claim and desire to obtain by Letters Patent of the United States is:

1. A bookcase or the like of modular construction, comprising

a. at least a pair of rectangular vertical side frames,

b. at least a pair of rectangular horizontal top and bottom frames rigidly connected at their opposite ends to a pair of said side frames at their upper and lower portions to form a rectangular frame assembly in which the side frames are mounted in spaced parallel relation by said top and bottom frames,

c. shelf support means mounted to said side frames, and,

d. a shelf mounted horizontally on said support means,

e. each of said side frames being fabricated from a plurality of extrusion members each of a U-shaped cross-section and including spaced parallel side walls and a connecting transverse base wall, said side walls being formed with a pair of oppositely facing longitudinal grooves along the free edges thereof and a longitudinal rib formed along the centerline of the inner face of said base wall, said rib being formed with a longitudinal passage

therein of C-shaped cross-section to engage screws connecting adjacent members, said rib being further formed with a longitudinal slot opening facing the open side of said extrusion member,

f. a substantially flat facia strip mounted in said grooves,

g. each of said members being formed with a second pair of oppositely facing grooves in the outer face of said base wall,

h. a connecting tongue of a T-shaped cross-section mounted with the head thereof in said second pair of grooves, and,

i. an edge grooved panel mounted within said side frames, the leg of said tongue extending into the grooved edges of said panel.

2. A bookcase according to claim **1** wherein said support means includes a bracket formed with a horizontal flat section and perpendicular end sections at each end thereof, each end section being formed with rearwardly and upwardly extending ears having arcuate rear edges and vertically straight forward edges, said forward edges being substantially aligned with the rear edge of said flat section, said side frames being formed with vertically spaced pairs of slots adapted to receive said ears in locking engagement.

3. A bookcase according to claim **1** wherein each of said top and bottom frames includes matching front and back extrusion members and matching side extrusion members connecting said front and back members, said front and back members being formed with an H-shaped cross-section defining a pair of oppositely facing outer grooves and a facia strip mounted in said grooves.

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