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(54) **BOOKSHELF SYSTEM**

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(57) **ABSTRACT**

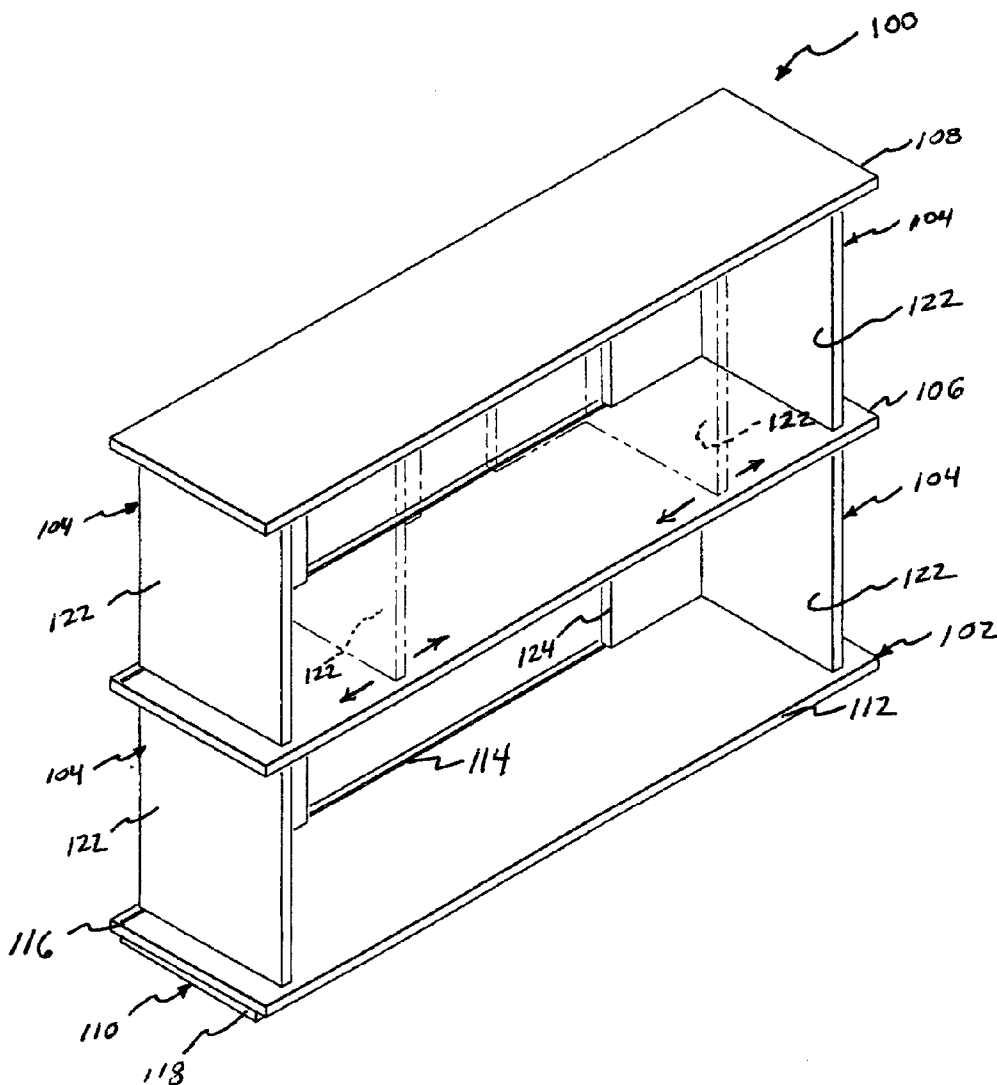
A modular bookshelf system is disclosed. The bookshelf system comprises a top shelf, at least one intermediate shelf, a base shelf, and a plurality of modular side walls. The plurality of side walls are slidingly supported and slidingly engaged between the base shelf and the at least one intermediate shelf and between the top shelf and the at least one intermediate shelf. Each of the plurality of side walls comprises a generally vertical end wall and back wall, and is configured to slidingly engage with and adjust along a plurality of lengthwise slots formed in each of the top shelf, bottom shelf, and at least one intermediate shelf.

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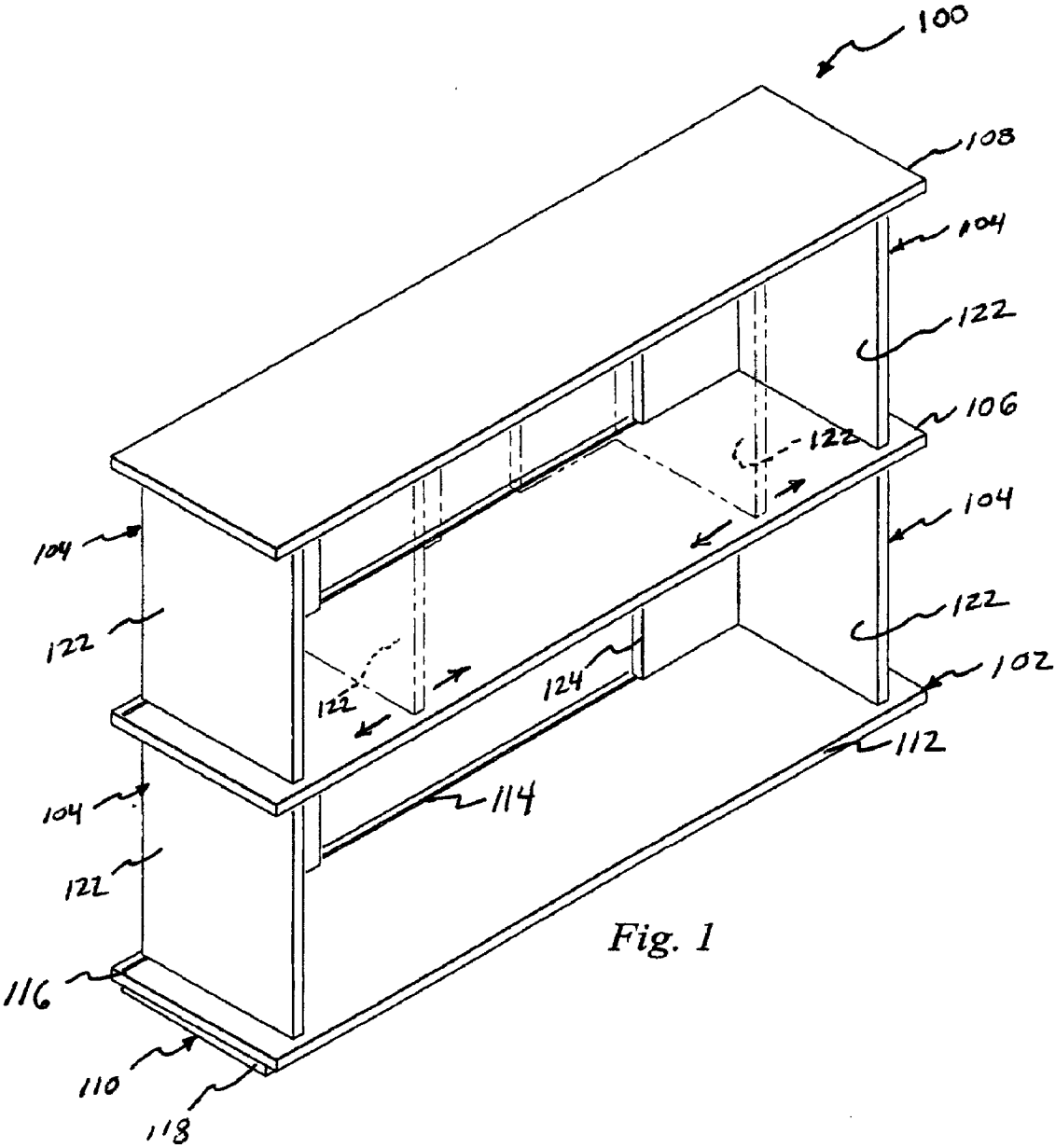
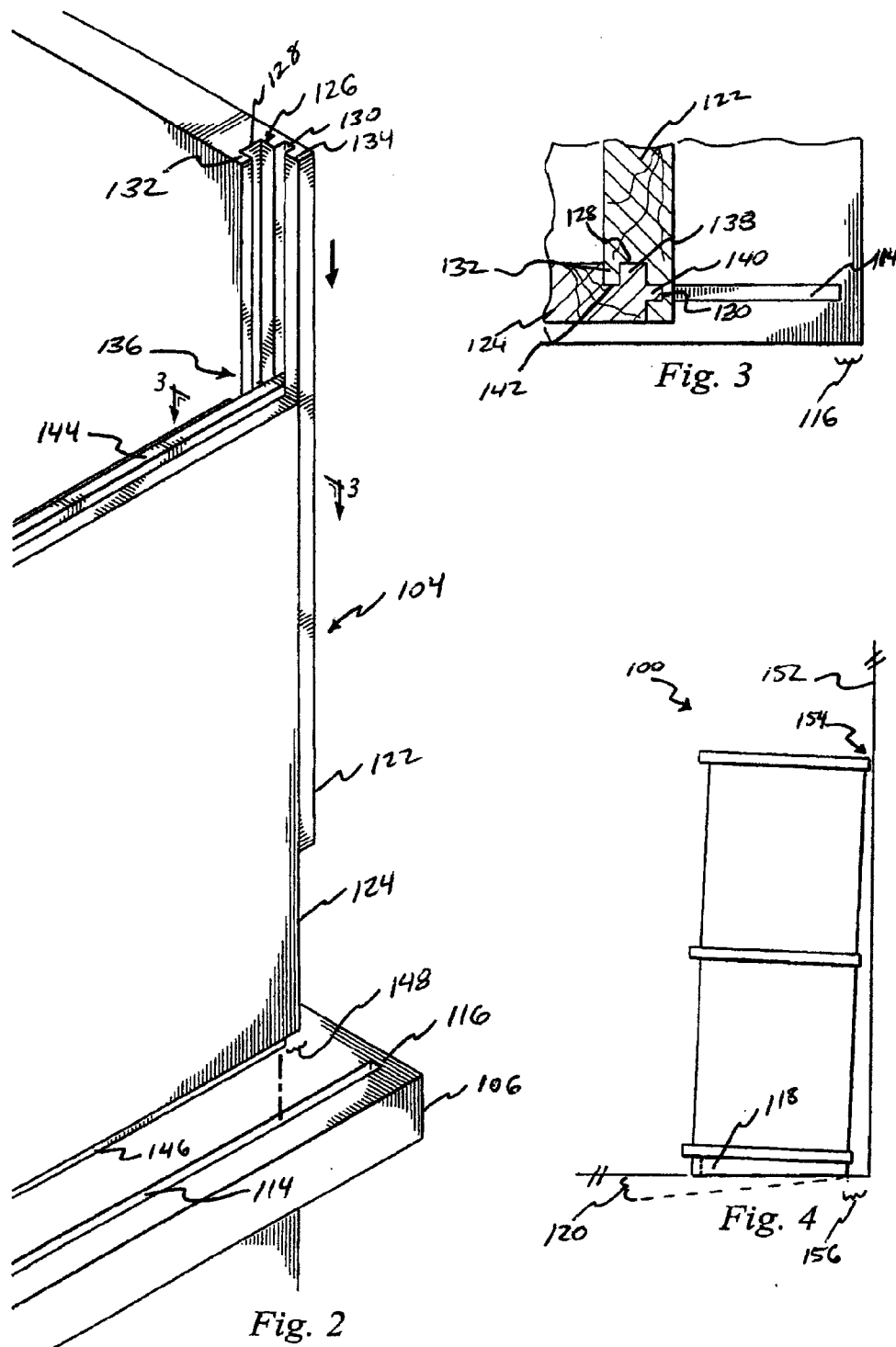


Fig. 1



BOOKSHELF SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Patent Application No. 60/939,237 filed May 21, 2007, the disclosure of which is incorporated herein by reference.

BACKGROUND

[0002] Bookshelf systems are typically purchased as pre-built units or do-it-yourself assembly kits. Pre-built bookshelves can be heavy to move and fixed in their configuration, although some bookshelves have shelves that are height-adjustable. Pre-built bookshelves may thus be limited to locations that are properly accessible and to static configurations and applications.

[0003] Bookshelf systems which require do-it-yourself assembly can be difficult to assemble, requiring numerous tools and specialized fasteners. Similar to pre-built bookshelves, user-assembled units, once erected, can be heavy to move and are typically fixed in their configuration. User-assembled bookshelves may be difficult to disassemble, and may lack the strength and stability of pre-built bookshelves. Thus, there is a need for bookshelf systems which are easy to assemble, re-configure, and disassemble, but which are also strong and stable.

SUMMARY

[0004] In one exemplary embodiment, a bookshelf system is disclosed comprising a base which is comprised of a base shelf and a pedestal. The base shelf has a first longitudinal slot formed along a rear portion and the pedestal comprises at least two lateral supports. The bookshelf system further comprises a first pair of risers. Each riser of the first pair comprises a back wall and a side wall. The back wall comprises a first longitudinal tab projecting downwardly along a bottom edge and a second longitudinal tab projecting upwardly along a top edge. The first tab is slidingly engaged in the first slot and the first pair of risers is slidingly supported by the base shelf. The bookshelf system further comprises a top shelf having a second longitudinal slot formed along a rear portion. The second slot slidingly receives the second tab of each of the first pair of risers and the top shelf is slidingly supported by the first pair of risers.

[0005] According to another exemplary embodiment, a modular bookshelf system is disclosed. The bookshelf system comprises a top shelf, at least one intermediate shelf, a base shelf, and a plurality of modular side walls. The plurality of side walls are slidingly supported and slidingly engaged between the base shelf and the at least one intermediate shelf and between the top shelf and the at least one intermediate shelf. Each of the plurality of side walls comprises a generally vertical end wall and back wall, and is configured to slidingly engage with and adjust along a plurality of lengthwise slots formed in each of the top shelf, bottom shelf, and at least one intermediate shelf.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Aspects of the present disclosure are best understood from the following detailed description when read with the accompanying figures. It is emphasized that, in accordance with the standard practice in the industry, various features are not drawn to scale. In fact, the dimensions of the various features may be arbitrarily increased or reduced for clarity of discussion.

[0007] FIG. 1 is a front isometric view of the bookshelf system according to an exemplary embodiment.

[0008] FIG. 2 is a partial rear isometric view of the bookshelf system according to an exemplary embodiment.

[0009] FIG. 3 is a partial cross-sectional view of the bookshelf system taken along line 3-3 in FIG. 2.

[0010] FIG. 4 is a side view of the bookshelf system according to an exemplary embodiment.

DETAILED DESCRIPTION

[0011] This disclosure describes a novel bookshelf system which allows for many different configurations due to its modular and adjustable design. In particular, the sides and back of the bookshelf are divided into risers that are inwardly and outwardly adjustable at each shelf level. Assembly can be accomplished without fasteners and disassembly is equally simplified. Other novel features are disclosed herein.

[0012] With reference to accompanying FIGS. 1-4, this invention provides a novel bookshelf system 100 comprised of a base 102, a plurality of risers 104, an optional intermediate shelf or shelves 106 and a top shelf 108.

[0013] The base 102 is comprised of a pedestal 110 and a base shelf 112.

[0014] The base shelf 112 has front and back sides and edges, left and right ends and edges, and top and bottom faces. The base shelf 112 has a thickness defined by the top and bottom faces, a depth defined by the front and back edges, and a length defined by the left and right edges. The top and bottom faces are generally parallel and smooth.

[0015] The top face of the base shelf 112 includes a tab slot 114 that extends generally parallel to the back edge and is located towards the back side of the base shelf. The tab slot 114 extends between the left and right ends and may or may not extend through the left and right edges. The tab slot 114 has a depth that may extend from the top face of the base shelf through the bottom face of the base shelf, or the tab slot depth may not extend through the bottom face of the base shelf. The tab slot 114 has an opening width that is substantially constant. On each left or right end where the tab slot 114 does not extend through the edge, a safety stop distance 116 is defined as the distance from the end of the tab slot 114 to the left or right edge.

[0016] The pedestal 110 includes at least two lateral supports 118 and optional rear and front supports (not shown). Each lateral support 118 has a front end, a back end, a top face, a bottom face, a front face, a back face, an inner face, and an outer face. The lateral support has a height defined by the top and bottom faces, a thickness defined by the inner and outer faces, and a length defined by the front and back faces. The top face is generally perpendicular to the inner face, outer face, front face and back face. The inner and outer faces are generally parallel to each other and perpendicular to the front and back faces.

[0017] Each lateral support 118 includes a bottom taper 120 that starts at the intersection of the front face and the bottom face and extends to the intersection of the back face and the bottom face. The taper 120 is generally smooth and linear, and effectively makes the height of the lateral support shorter at the back end than the front end. At least two lateral supports 118 are fixedly attached by their top faces to the bottom face of the base shelf. The lateral supports 118 are oriented generally parallel to each other and generally parallel to the left and right edges of the base shelf. The back ends of the lateral supports align towards the back side of the base shelf.

[0018] Optional front and rear supports (not shown) have dimensional features similar to the lateral supports but without lengthwise tapering. A rear support may be fixedly

attached by its top face to the bottom face of the base shelf and extend from the back end of one of the lateral supports to the back end of another lateral support. The height of the rear support may be equal to or less than the height of the lateral supports 118 as measured at the back ends.

[0019] A front support may be fixedly attached by its top face to the bottom face of the base shelf and extend from the front end of one of the lateral supports to the front end of another lateral support. The height of the front support may be equal to or less than the height of the lateral supports 118 as measured at the front ends.

[0020] Each of the plurality of risers 104 is comprised of a side piece 122 and a back piece 124.

[0021] The side piece 122 has a front end, a back end, a top face, a bottom face, a front face, a back face, an inner face, and an outer face. The side piece 122 has a height defined by the top and bottom faces, a thickness defined by the inner and outer faces, and a width defined by the front and back faces. The top face is generally perpendicular to the inner face, outer face, front face and back face. The inner and outer faces are generally parallel to each other and perpendicular to the front and back faces.

[0022] As shown in FIG. 2, the side piece 122 has a double-locking female joint 126 that extends from the top face to the bottom face through the intersection or corner formed by the back face and the inner face. The double-locking female joint 126 is formed by a primary groove 128 and a secondary groove 130 which are oriented substantially perpendicular to each other. The primary groove 128 extends substantially parallel with the inner face, while the secondary groove 130 extends substantially parallel with the back face. The primary and secondary grooves 128, 130 are each constrained on three sides. An inside constraining portion 132 has a thickness measured from an inside surface of the primary groove 128 to the inner face of the side piece 122. A back constraining portion 134 has a thickness measured from an inside surface of the secondary groove 130 to the back face of the side piece 122. The double-locking female joint 126 is designed to slidably mate with a double-locking male joint 136 described below.

[0023] The back piece 124 has a front end, a back end, a top face, a bottom face, a front face, a back face, an inner face, and an outer face. The back piece 124 has a height defined by the top and bottom faces, a thickness defined by the front and back faces, and a width defined by the inner and outer faces. The top face is generally perpendicular to the inner face, outer face, front face and back face. The front and back faces are generally parallel to each other and perpendicular to the inner and outer faces.

[0024] As shown in FIG. 3, the back piece 124 has a double-locking male joint 136 that extends from the top face to the bottom face through the intersection or corner formed by the front face and the outer face. The double-locking male joint 136 is formed by a primary tongue 138, a secondary tongue 140 and a primary tongue groove 142. The primary and secondary tongues 138, 140 are oriented substantially perpendicular to each other. The primary tongue 138 extends substantially parallel with the outer face, while the secondary tongue 140 extends substantially parallel with the front face. The primary tongue groove 142 extends along the side of the primary tongue 138 which is away from the outer face. The primary and secondary tongues 138, 140 each have three sides.

[0025] The back piece 124 has an upper tab 144 extending along the top face and a lower tab 146 extending along the bottom face. The upper and lower tabs 144, 146 have a height that is equal to or less than the depth of the tab slot 114 and the

upper and lower tabs 144, 146 have a width that is equal to or less than the width of the tab slot 114. The upper or lower tab 144, 146 may extend the entire width of the back piece or may not extend the entire width. The upper or lower tab 144, 146 may stop short of the outer face of the back piece 124 by a spacer distance 148 approximately equal to the safety stop distance 116.

[0026] As shown in FIGS. 2 and 3, the inside constraining portion 132 of the side piece primary groove 128 is designed to slidably mate with the primary tongue groove 142 of the back piece 124. The primary tongue 138 of the back piece 124 is designed to slidably mate with the primary groove 128 of the side piece 122 and the secondary tongue 140 of the back piece 124 is designed to slidably mate with the secondary groove 130 of the side piece 122. Thus the double-locking male joint 136 and double-locking female joint 126 are slidably mated together to form a riser 104. The back piece 124 and side piece 122, when slidably mated together are oriented substantially perpendicular to each other.

[0027] The riser 104 is slidably placed onto the base shelf 112 as shown in FIG. 2. In particular, the lower tab 146 of the back piece 124 is slidably inserted into the top face tab slot 114 of the base shelf 112. The back piece is oriented to substantially straddle the top face tab slot 114 and the side piece 122 is oriented so that its bottom face is unfixedly supported by the top face of the base shelf 112. At least two opposing risers 104 are used to form a bookshelf system 100. The risers may be positioned with the back pieces oriented towards each other or away from each other. In addition, the spacer distance 148 and safety stop distance 116 may be adjusted to limit the travel of the riser to not travel beyond a position where the outer face of the side piece and the left or right edge of the base shelf are substantially coplanar, or flush. Alternatively, the tab slot 114 may not extend continuously, but may be divided into a plurality of tab slots, such that each of the plurality of tab slots defines a limited range of slideable positioning for a particular riser.

[0028] In addition, the width of the side piece as compared to the width of the back piece may be limited to a ratio, such as, for example, two-to-one for purposes of stability or other functionality or ornamentation.

[0029] The intermediate shelf 106, as shown in FIG. 1, has front and back sides and edges, left and right ends and edges, and top and bottom faces. The intermediate shelf 106 has a thickness defined by the top and bottom faces, a depth defined by the front and back edges, and a length defined by the left and right edges. The top and bottom faces are generally parallel and smooth.

[0030] The top face of the intermediate shelf 106 includes a tab slot 114 that travels generally parallel to the back edge and is located towards the back side of the shelf. The tab slot 114 extends between the left and right ends of the intermediate shelf and may or may not extend through the edges. The tab slot 114 has a depth that may extend from the top face of the shelf through the bottom face of the shelf, or the tab slot depth may not extend through the bottom face of the shelf. The tab slot 114 has an opening width that is substantially constant. On each left or right end where the tab slot does not extend through the edge, a safety stop distance 116 is defined as the distance from the end of the tab slot to the left or right edge. The intermediate shelf 106 also has a bottom face tab slot that substantially mirrors the top face tab stop in design and functionality. The top face tab slot 114 and bottom face tab slot may extend through the shelf thickness to effectively merge with each other, or their respective depths may prevent such a merger.

[0031] The intermediate shelf 106 mates to at least two risers 104 which are previously slidably positioned on the base shelf 112. In particular, the upper tabs 144 of the back pieces of the risers are slidably inserted into the bottom face tab slot of the intermediate shelf 106. Two additional risers may be added to the top face of the intermediate shelf 106 in a manner as described above. The risers may be positioned with the back pieces oriented towards each other or away from each other. In addition, the spacer distances and safety stop distances may be adjusted to limit the travel of the risers to not travel beyond a position where the outer face of the side pieces and the left or right edge of the intermediate and/or base shelf are substantially coplanar, or flush. Alternatively, the tab slots may not extend continuously, but may be divided into a plurality of tab slots, such that each of the plurality of tab slots defines a limited range of slideable positioning for a particular riser.

[0032] The top shelf 108 has front and back sides and edges, left and right ends and edges, and top and bottom faces. The top shelf 108 has a thickness defined by the top and bottom faces, a depth defined by the front and back edges, and a length defined by the left and right edges. The top and bottom faces are generally parallel and smooth. The bottom face includes a tab slot that travels generally parallel to the back edge and is located towards the back side of the shelf. The bottom face tab slot of the top shelf extends between the left and right ends and may or may not extend through the edges. The tab slot has a depth that may extend from the bottom face of the shelf through the top face of the shelf, or the tab slot depth may not extend through the top face of the top shelf. The tab slot has an opening width that is substantially constant. On each left or right end where the tab slot does not extend through the edge, a safety stop distance is defined as the distance from the end of the slot to the left or right edge.

[0033] As shown in FIG. 1, the top shelf 108 mates to the at least two risers which are already slidably positioned on an intermediate shelf 106 or base shelf 112. In particular, the upper tabs of the back pieces of the risers are slidably inserted into the bottom face tab slot of the top shelf. The risers may be positioned with the back pieces oriented towards each other or away from each other. In addition, the spacer distances and safety stop distances may be adjusted to limit the travel of the risers to not travel beyond a position where the outer face of the side pieces and the left or right edge of the top shelf and/or intermediate shelf and/or base shelf are substantially coplanar, or flush. Alternatively, the tab slot may not extend continuously, but may be divided into a plurality of tab slots, such that each of the plurality of tab slots defines a limited range of slideable positioning for a particular riser.

[0034] Alternatives are herein disclosed as to varying shelf sizes and features. An optional screen or back plane may be added to the back of the system or between shelves. Additional risers or modified risers may be added to a particular shelf to act as bookends or to offer additional support. The system may be used with or without an intermediate shelf, or the system may include more than one intermediate shelf.

[0035] Benefits may be obvious to one skilled in the art but include a shelving system that can be assembled and disassembled without use of fasteners or bracing on the back. The absence of fasteners and ease of assembly and adjustment may make this system particularly desirable to users with limited assembly skill or limited physical strength. The absence of fastening hardware may make this system cheaper to produce and thereby more affordable to a larger market than traditional shelving. The bookshelf system 100 may be packed and shipped in a flat box requiring a minimum amount

of space. The system is easily expandable to include more shelves, risers, etc. The system is easily reconfigurable to allow for changing storage needs and tastes. For example, as shown in FIG. 1, the risers 104 can be closed together as shown by dotted lines and repositioning arrows. Moving the risers in towards the center of the bookshelf system may allow for storing lighter objects on the outer edges and heavier objects in the center. As a user's needs change, the risers could be spread to the maximum extents, for example, to store a set of heavy books. The risers can be taller to allow for storing taller objects and books or shorter for storing or presenting objects such as CD's or videos. In the latter example, the shelves may be deeper or narrower, or longer or shorter depending on the desired usage.

[0036] One particular novel and beneficial feature of the system is the bottom taper 120 of the pedestal lateral supports 118, as shown in FIG. 4. The purpose of the taper 120 is to allow the system to lean towards a supporting wall 152 as the height of the system increases by the addition of other shelves. In one arrangement, the taper 120 is at an angle such that the back edge of the top shelf of a six foot tall system is resting (see arrow 154) against a supporting wall 152 when the back edge of the base shelf is spaced a small distance 156 from the wall. Additionally, the bookshelf pedestal may include lateral supports 118 with zero degrees of taper such that the system may be freestanding, such as in the center of a room or behind a couch. Additionally, the taper angle may be in the range of about 1 to about 12 degrees. In another embodiment the base shelf is touching the supporting wall. In another embodiment safety hardware or devices may be added as needed to prevent accidental tip-over or accidental separation of the shelving unit.

[0037] Although embodiments of the present disclosure have been described in detail, those skilled in the art should understand that they may make various changes, substitutions and alterations herein without departing from the spirit and scope of the present disclosure. Accordingly, all such changes, substitutions and alterations are intended to be included within the scope of the present disclosure as defined in the following claims. In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents, but also equivalent structures.

1. A bookshelf system comprising:
 - a base comprising a base shelf and a pedestal, the base shelf having a first longitudinal slot formed along a rear portion and the pedestal comprising at least two lateral supports;
 - a first pair of risers, each riser of the first pair comprising a back wall and a side wall, the back wall comprising a first longitudinal tab projecting downwardly along a bottom edge and a second longitudinal tab projecting upwardly along a top edge, the first tab slidingly engaged in the first slot, the first pair of risers slidingly supported by the base shelf;
 - a top shelf having a second longitudinal slot formed along a rear portion, the second slot slidingly receiving the second tab of each of the first pair of risers, the top shelf slidingly supported by the first pair of risers.
2. The bookshelf system of claim 1 further comprising:
 - at least one intermediate shelf having a third longitudinal slot formed along an upper face towards a rear portion of the intermediate shelf and a fourth longitudinal slot formed along a lower face towards the rear portion of the intermediate shelf, the fourth slot slidingly receiving the

second tab of each of the first pair of risers, the intermediate shelf slidably supported by the first pair of risers; and

a second pair of risers, each riser of the second pair comprising a back wall and a side wall, the back wall comprising a third longitudinal tab projecting downwardly along a bottom edge and a fourth longitudinal tab projecting upwardly along a top edge, the third tab slidably engaged in the third slot, the second pair of risers slidably supported by the intermediate shelf, the top shelf second slot slidably receiving the fourth tab of each of the second pair of risers, the top shelf slidably supported by the second pair of risers.

3. The bookshelf system of claim 2 further comprising one or more additional intermediate shelves and one or more additional pairs of risers.

5. The bookshelf system of claim 1 wherein the base and top shelves each include a safety margin at either end of the first and second slots between the end of each first and second slot and a respective side edge of the base and top shelves.

6. The bookshelf system of claim 5 wherein the back wall of each riser includes a safety offset at an outside end of the first and second tabs between the end of each first and second tab and an outside edge of the back wall, the safety margins and safety offsets being approximately equal.

7. The bookshelf system of claim 1 wherein each riser side wall has a double-locking female joint aligned vertically along a rear edge and each riser back wall has a double-locking male joint aligned vertically along a rear edge, the double-locking male joint slidably engagable in the double-locking female joint.

8. The bookshelf system of claim 1 wherein each of the at least two lateral supports has a taper from a front side to a back side such that each lateral support is taller at the front side than at the back side.

9. The bookshelf system of claim 1 wherein the taper has an angle in the range of about 1 degree to about 12 degrees.

10. The bookshelf system of claim 1 wherein each of the first pair of risers is slidably adjustable from a first position with the side wall flush with an outer edge of the base shelf to a second position with an inside edge of the back wall generally aligned with a midpoint of the base shelf.

11. The bookshelf system of claim 10 wherein the second position is limited by a safety stop, the safety stop formed in the first or second slot to limit inward adjustability of each riser.

12. A modular bookshelf comprising:
a top shelf;
at least one intermediate shelf;
a base shelf;
a plurality of modular side walls slidably supported and slidably engaged between the base shelf and the at least one intermediate shelf and between the top shelf and the

at least one intermediate shelf, each of the plurality of side walls comprising a generally vertical end wall and back wall, and configured to slidably engage with and adjust along a plurality of lengthwise slots formed in each of the top shelf, bottom shelf, and at least one intermediate shelf.

13. The modular bookshelf of claim 1 wherein the bookshelf is assembled without fasteners.

14. The modular bookshelf of claim 12 further comprising an adjustable back stop to prevent objects from falling behind the bookshelf.

15. The modular bookshelf of claim 12 further comprising a plurality of lateral safety stops to prevent the plurality of side walls from adjusting beyond an outer edge of the bookshelf.

16. The modular bookshelf of claim 12 further comprising a plurality of safety components attached to the bookshelf to prevent accidental separation or accidental tip-over.

17. The modular bookshelf of claim 12 wherein each of the plurality of side walls comprises an end wall and back wall slidably coupled with a double-locking joint.

18. The modular bookshelf of claim 12 wherein the plurality of side walls are freely configurable between inside and outside positions.

19. The modular bookshelf of claim 12 wherein the plurality of side walls comprises a first pair of side walls having a first height and a second pair of side walls having a second height different than the first height.

20. The modular bookshelf of claim 12 further comprising at least first and second intermediate shelves, the first intermediate shelf having a first depth and the second intermediate shelf having a second depth different from the first depth.

21. The modular bookshelf of claim 12 wherein the base shelf comprises a tapered pedestal, the tapered pedestal having an angle such that a rear edge of the top shelf rests against a wall when the base shelf is about two inches from the wall with about six feet between the top shelf and the base shelf.

22. The modular bookshelf of claim 12 wherein the base shelf comprises a non-tapered pedestal allowing the bookshelf to be freestanding.

23. The modular bookshelf of claim 17 wherein the double-locking joint comprises a female portion having at least two retaining grooves and a male portion having at least two tongues.

24. The modular bookshelf of claim 23 wherein the double-locking joint prevents angular separation and permits sliding engagement.

25. The modular bookshelf of claim 24 wherein the end wall and back wall of each of the plurality of side walls are maintained in a perpendicular relationship to each other by the double-locking joint.

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