ABSTRACT OF THE DISCLOSURE

A furniture module locking and stacking arrangement wherein is provided an interdigitable bead and groove for locking a pair of stacked modules in a vertical alignment whereby said bead and groove is adapted to prevent horizontal movement either in the width direction or in the depth direction.

The present invention relates to furniture and more particularly to an improved arrangement for supporting stacked modules of modular furniture on one another and for locking them against horizontal movement relative to one another.

Background of the invention

Certain furniture, for instance bookcases, bookcases, hutches, highboys, sideboards, chiffoniers and the like are often made as a plurality of modules which are merely stacked one on another. Accordingly, they can be more easily packed for shipment, more easily transported when moving, more easily moved about in re-arranging furniture, and can in some instances be assembled in varying number and order according to the taste of the owner.

In some such arrangements, the modules are merely stacked on one another and the stability of the stack relied on to prevent the furniture from tumbling over. This is sometimes satisfactory where the area of contact, in a horizontal plane, of vertically adjacent modules is relatively great, for instance where a chiffonier is composed of two substantially rectangular drawer-containing cases. However, such an arrangement is not satisfactory where due to the nature of the furniture article, the area of inter-modular contact is necessarily relatively small.

In these instances, if some means for locking the modules against relative horizontal shifting is not provided, accidental jostling of the furniture or uneven loading thereof, could bring upper modules tumbling down on the lower. For this reason, some stackable modular furniture includes elaborate latching and locking means such as interfitting pegs and sockets which may be unsightly, expensive relative to their usefulness and hard to activate and deactivate especially after several years in an activated or deactivated condition. Other static, locking arrangements such as rectilinear interlocking beads and grooves which must extend around at least three if not all four sides of the facing surfaces of the modules in order to be effective against relative movement in a horizontal plane are limited to being used on modules which have at least three extensive sides at the interface which has heretofore imposed a significant restriction on the kind of furniture which could be made in a modular manner.

Summary of the invention

Accordingly, it is an object of the present invention to provide means for supporting furniture modules on one another while restraining the modules against relative horizontal movement both in a side to side and a front to back sense, which means are attractive, do not detract from the appearance of the furniture, function well throughout the life of the furniture and which can be used as legs for individual modules.

It is a specific object of the invention to provide supporting and restraining means of the type described which comprise a bead on one module and a groove on an adjacent module, the bead being configured to fit in the groove, each proceeding generally horizontally then obliquely from the horizontal, again horizontally, obliquely toward the plane of the first mentioned horizontal extent, then horizontally again.

A further object of the present invention is the provision of beads and grooves of the type described on two opposite sides of each of at least two vertically adjacent furniture modules.

The new furniture module locking and stacking arrangement includes a first furniture module having at least one pair of opposed sidewalls; a second furniture module having at least one pair of opposed sidewalls; said second furniture module being stackable on said first furniture module so that respective of said pairs of opposed sidewalls of the first and second modules are substantially vertically aligned and the upper ends of the first module pair of opposed sidewalls are contiguous over a substantial portion of their extent in the horizontal depth direction with the respective lower ends of the second module pair of opposed sidewalls; and means on said upper ends and lower ends for preventing relative movement of said first and second modules in a horizontal plane with respect to one another while stacked, the last-mentioned means comprising an interdigitable bead and groove between each respective upper end and lower end on the contiguous portions thereof proceeding from the front of said first and second modules toward the rear thereof each bead and each groove first extending generally horizontally in the horizontal depth direction, then progressing generally vertically in a first sense, next extending in a horizontal depth direction for a substantial distance, then progressing generally vertically in the opposite sense from said first sense, and then extending generally horizontally in the horizontal depth direction.

These and other objects of the present invention, as well as the principles and scope of applicability thereof will become more clearly apparent during the course of the following detailed discussion which relates to the exemplary embodiments shown in the annexed drawings.

In the drawings:

FIGURE 1 is a perspective view of a modular combined bookcase and cabinet having stacking and locking means provided in accordance with the present invention;

FIGURE 2 is a fragmentary exploded perspective view to an expanded scale of one inter-modular stacking and locking arrangement of the combined bookcase and cabinet of FIGURE 1;

FIGURE 3 is a fragmentary cross-sectional view to an expanded scale taken substantially along line 3—3 of FIGURE 1;

FIGURES 4 and 5 are cross-sectional views similar to FIGURE 3 of modified arrangements; and

FIGURE 6 is a fragmentary side elevation view of an inter-modular region showing a further stacking and locking arrangement modification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The exemplary modular combined bookcase and cabinet 10 shown in FIGURE 1 includes a base cabinet 12 which has sides 14 a front 16 with doors 18 and a top 20 extending horizontally between the two sides 14 near their upper extent. The cabinet 12 may also include conventional features such as a back (not shown), interior
shelves (not shown) and the like. The base cabinet 12 is noteworthy in the present instance because of the provision of a pair of upwardly facing beads 22 proceeding along the upper edges of sides 14 of the cabinet. As seen best in FIGURES 2 and 3, each bead 22 is convex upwardly at 24 centrally of its own longitudinal axis and is completed at its lateral margins by flats 26, 28 which proceed radially from the opposite arcuate margins of the portions 24 to intersection with the exterior and interior faces 30, 32 of the cabinet respective sides 14. Considering the longitudinal centerline of each bead portion 24 and also considering the plane containing the flats 26, 28, proceeding from the front of the cabinet 12 toward the back radially from the opposed arcuate margins at 34, then cant rearwardly and upwardly in an oblique-to-the-horizontal manner at 36, next level off and extend horizontally at 38 then cant rearwardly and downwardly in an oblique-to-the-horizontal manner at 40 to achieve the same vertical height as at 34 and finally level off and extend horizontally at 42 to the rear of the cabinet.

As seen in FIGURE 1, the cabinet 12 is surmounted by a first bookcase module 44 which includes parallel, vertically extending sides 46 that are substantially co-planar with the respective cabinet sides 14, and a pair of vertically spaced, generally horizontal shelf planes which are spaced at their opposite ends 50 to the sides 46. The shelves 48 may number more or less than two without departing from the present invention and they may be fixedly or adjustably, movably secured to the sides 46 by conventional means.

It should now be noticed, with reference to FIGURES 1, 2 and 3, that the lower end of each side 46 is provided with a groove 52 which is concave downwardly at 54 centrally of its own longitudinal axis and is completed at its lateral margins by flats 56, 58 which proceed generally radially from the opposite arcuate margins of the portions 54 to intersection with the exterior and interior faces 60, 62 of the bookcase respective sides 46. The grooves 52 are substantially complementarily curved with respect to the respective beads 22 throughout their common extent as best seen in FIGURE 3, so that the bead longitudinally central convex regions 24 are received in the groove longitudinally central concave regions 54, the flats 26 about the respective flats 56 in surface-to-surface engagement throughout their common extent and the flats 28 abut the respective flats 58 in surface-to-surface engagement throughout their common extent.

The first bookcase module 44 can be removably mounted on and locked with respect to the cabinet module 12 merely by setting the first bookcase module down on the cabinet in the direction of the arrow 64 in FIGURE 2.

It should now be apparent that when the first bookcase module 44 is in place on the cabinet 12 as shown in FIGURE 1, relative movement of the elements 44 and 12 with respect to the horizontal X-axis labeled in FIGURE 1 is prevented by the interlocking convex-concave bead and groove 22, 52. Relative movement with respect to the horizontal Y-axis, also labeled, is prevented by the intermediate vertical displacement and return 36, 38, 40 of the bead and groove longitudinal centerlines. At this juncture it should be recognized that the reversal 36, 40, rather than coplanarity of the portions 34, 42 acts to restrain relative movement in the Y direction. Accordingly, the portions 34 and 42 could proceed at somewhat different horizontal levels from one another. Relative movement in the Z direction can be accomplished only by overcoming gravity.

In the preferred embodiment of FIGURES 1–3, the provision of flats 26, 56, 58 of substantial width ensures that a substantial portion of the bookcase weight will be supported on the cabinet at normally to the cabinet surfaces 26, 28 thus minimizing shear stress on the lower ends of the sides of first bookcase module. In addition, this provision eliminates feather edges and thin sections that could be damaged while modules were being assembled and disassembled or while upper modules, for instance the first bookcase module 44, were being alternatively used as floor supported units. This latter use can be effected by latching the bookcase module 44 from the cabinet in the Z direction and setting it on the floor, so that the region 66 (FIGURE 2) function as feet.

In the exemplary modular combined bookcase and cabinet of FIGURE 1, the first bookcase module 44 sides 46 terminate at their upper ends in beads 22 which are the same in essential respects to the beads 22. The module 44 is shown removably surmounted by a second bookcase module 44' which is identical to the first bookcase module 44 and is therefore similarly numerated for better understanding of its parts. The module 44' is mounted and demounted with respect to the module 44 in the same manner that the module 44 is mounted and demounted with respect to the cabinet 12.

The combined bookcase and cabinet 10 of FIGURE 1 is completed by a bookcase top module 68 which is similar to the modules 44 and 44' in that it has sides 46', a shelf 48 and grooves 52 at the lower ends of the sides 46'. The module 68 differs from the modules 44 and 44' by having a bookcase roof or lid 70 mounted on the sides 46' at their upper extent. In the embodiment shown, the sides 46' in plan view, and 72 on which a flat case roof or lid 70 is mounted. A valance 74 is shown secured to the roof or lid 70 at its front edge in a depending fashion, and secured at its opposite ends 76 to the sides 46' near their upper extent. The valance 74 is basically decorative although in some instances it can be employed to impart greater structural integrity to the bookcase top module by improving torsional resistance.

It should be apparent that the structure 10 including the modules 12, 44, 44' and 68 can be sold as a unit with transport made easy by the separability of the modules. In addition because of the unique intermodular joint 22 the modules can be assembled in various combinations than that illustrated in FIGURE 1. For instance, the module 44 can be placed on the floor as a separate unit and the module 68 placed on the module 44' in turn placed on the base cabinet 12. Similarly, the modules 68, 44' and 44 can be stacked as shown, but placed on the floor so that the cabinet 12 stands alone. As can be seen from FIGURE 2, such a mode would not be unattractive, in view of the graceful curvature of the beads 22.

Various further embodiments of the invention which adhere to its principles are illustrated in FIGURES 4, 5 and 6.

FIGURE 4 represents a cross-section taken at the same plane as FIGURE 3 of a modification wherein the bead 122 is of generally upwardly convex shape throughout its entire thickness instead of having horizontal flats near its edges. Similarly, the groove 152 is of generally downwardly concave shape throughout its entire thickness the bead 122 being coextensively received in the groove 152 throughout their common length. The bead 122 and groove 152 are convoluted in side elevation according to the principles of the invention as illustrated in FIGURES 1 or 6. The shape shown in FIGURE 4 is less desirable in some instances than that of FIGURE 3 because thin sections are left at 78 which with certain woods might too easily split or become abraded in use, especially if the wood is veneered and the upper module of FIGURE 4 is placed on a floor and dragged sideways. Where split resistant materials are used, the shape shown in FIGURE 4 could be used.

In FIGURE 5, an inversion structure is shown wherein the convex bead 222 is on the lower edge of the sideways of the upper module and faces downwardly and the concave channel 252 is on the upper edge of the lower module and faces upwardly.

Otherwise, the bead and groove of FIGURE 5 is substantially the same as those in FIGURES 1–3 or 6.

In FIGURE 6, an alternative bead, channel vertical
convolution is shown wherein proceeding from the front 80 of the modules the bead and groove longitudinal centerlines and flats plane first extend horizontally at 82, then cant rearwardly and downwardly in an oblique-to-the-horizontal manner at 84, next level off and extend horizontally at 86, then cant rearwardly and upwardly in an oblique-to-the-horizontal manner at 88 to achieve the same vertical height as at 82, and finally level off and extend horizontally at 90 to the rear of the modules. Similar to the construction shown in FIGURES 1-3, the interfitting convex bead and concave groove prevent relative movement of the modules of FIGURES 6 in the X direction (FIGURE 2); the central inverted hump 84, 86, 88 prevents relative movement in the Y direction and gravity retains the vertical positioning as shown. The modules of FIGURE 6 can be lifted apart in the Z direction with ease as can all of the embodiments, FIGURES 1-5. One disadvantage of the construction shown in FIGURE 6 is the problem that would be encountered in supporting the upper module as a free standing module on the floor. This difficulty could be overcome by providing two inverted humps 84, 86, 88 spaced from one another in the Y direction at each module interface.

It should now be apparent that the embodiments of the invention described herein efficiently accomplish each of the invention's objects in a novel manner and clearly illustrate the invention's principles. Because the various embodiments can be further modified without departing from the principles, the invention should be understood as accomplishing all such modifications as are within the spirit and scope of the following claims.

We claim:

1. In combination: a first furniture module having at least one pair of opposed sidewalls; a second furniture module having at least one pair of opposed sidewalls; said second furniture module being stackable on said first furniture module so that respective of said pairs of opposed sidewalls of the first and second modules are substantially vertically aligned and the upper ends of the first module pair of opposed sidewalls are contiguous over a substantial portion of their extent in the horizontal depth direction with the respective lower ends of the second module pair of opposed sidewalls; and means on said upper ends and lower ends for preventing relative movement of said first and second modules in a horizontal plane in the width direction as well as in the depth direction; and second modules stacked, the last-mentioned means comprising an interdigitable bead and groove in each narrow region between the top of said first module and the bottom of said second module on the contiguous portions thereof, said bead and groove being interdigitable in the width direction of the modules; proceeding from the front of said first and second modules toward the rear thereof each bead and each groove first extending generally horizontally in the horizontal depth direction, then progressing generally vertically in a first sense next extending in a horizontal depth direction for a substantial distance, then progressing generally vertically in the opposite sense from said first sense, and then extending generally horizontally in the horizontal depth direction, said bead and groove being interdigitable in the width direction of the modules.

2. The combination of claim 1 wherein said first sense is up.

3. The combination of claim 1 wherein said first furniture module is a cabinet and said second furniture module is a bookcase.

4. The combination of claim 1 wherein each bead is on said first furniture module and wherein each groove is on said second furniture module.

5. The combination of claim 1 wherein each bead, as seen in vertical transverse cross-section, is concave centrally and generally planar, horizontally adjacent and leading to the oppositely lateral extremes thereof.

6. The combination of claim 5 wherein each groove, as seen in vertical transverse cross-section, is concave centrally and generally planar horizontally adjacent and leading to the oppositely lateral extremes thereof whereby when the first and second modules are stacked, the bead convex portions interdigitate with respective groove concave portions and the bead generally planar horizontal portions engage respective groove generally planar horizontal portion.

7. The combination of claim 6 wherein the bead convex portions face upwardly and the groove concave portions face downwardly.

8. In combination: a first furniture module having a front, a rear, a pair of opposite sides, a top and a bottom; a second furniture module having a front, a rear, a pair of opposite sides, a top and a bottom; said second furniture module being stackable on said first furniture module so that respective of said pairs of opposite sides are substantially vertically aligned and top of said first module is contiguous with the bottom of said second module over a substantial portion of their extent in the horizontal depth direction at least in a narrow region adjacent said pairs of opposite sides, two of such narrow regions being thereby defined; and means on said first and second modules in said two narrow regions for preventing relative movement of said first and second modules in a horizontal plane in the width direction as well as in depth direction; and second modules stacked, the last-mentioned means comprising an interdigitable bead and groove in each narrow region between the top of said first module and the bottom of said second module on the contiguous portions thereof, said bead and groove being interdigitable in the width direction of the modules; proceeding from the front of said first and second modules toward the rear thereof each bead and each groove first extending generally horizontally in the horizontal depth direction, then progressing generally vertically in a first sense next extending in a horizontal depth direction for a substantial distance, then progressing generally vertically in the opposite sense from said first sense, and then extending generally horizontally in the horizontal depth direction.

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BOBBY R. GAY, Primary Examiner.

DAVID J. WILLIAMOWSKY, Examiner.

J. L. KOHNEN, Assistant Examiner.