United States Patent

Overby

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[54] MODULAR CABINET CONSTRUCTION

[72] Inventor: **Robert R. Overby**, 4721 Clinton St., Los Angeles, Calif. 90004

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[52] **U.S. Cl.** **312/107**, 312/111, 312/257

[51] **Int. Cl.** **A47b 87/02**

[58] **Field of Search** ..... 312/107 R, 108, 157, 111, 157 SK

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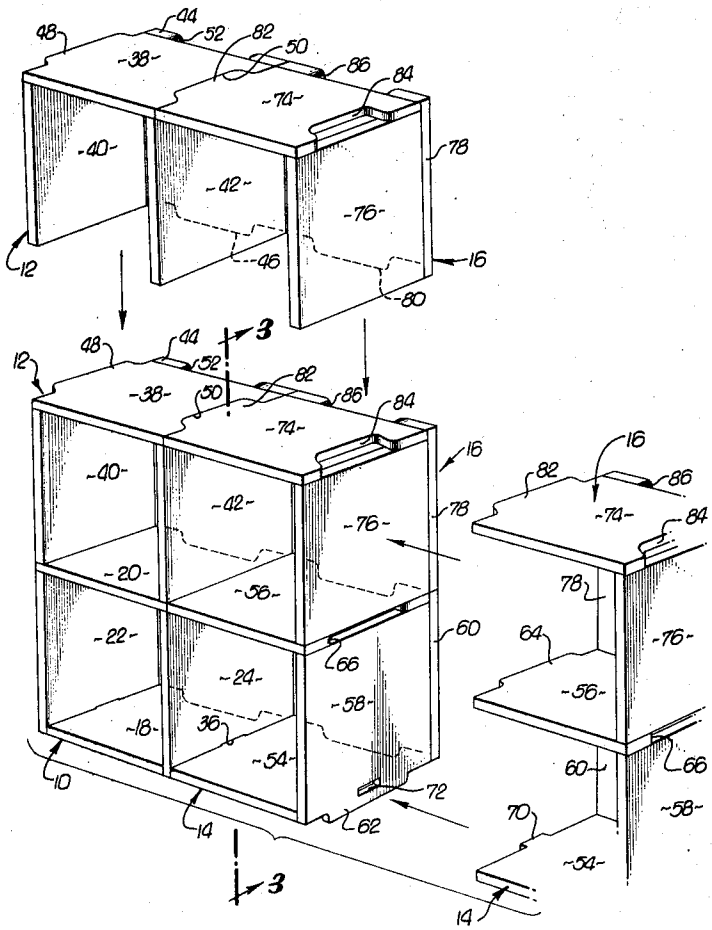
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Primary Examiner—James T. McCall
Attorney—Albert L. Gabriel

[57] **ABSTRACT**

Modular cabinet assembly wherein the modules are vertically stacked and horizontally sequenced, being in wall sharing, interlocked relationship. The modules in each vertical stack share horizontal walls, each having a top wall that serves as the bottom wall of the next module above; while the modules in each horizontal sequence share vertical walls, each having an outer sidewall that serves as the inner sidewall for the next added module in the sequence.

14 Claims, 7 Drawing Figures



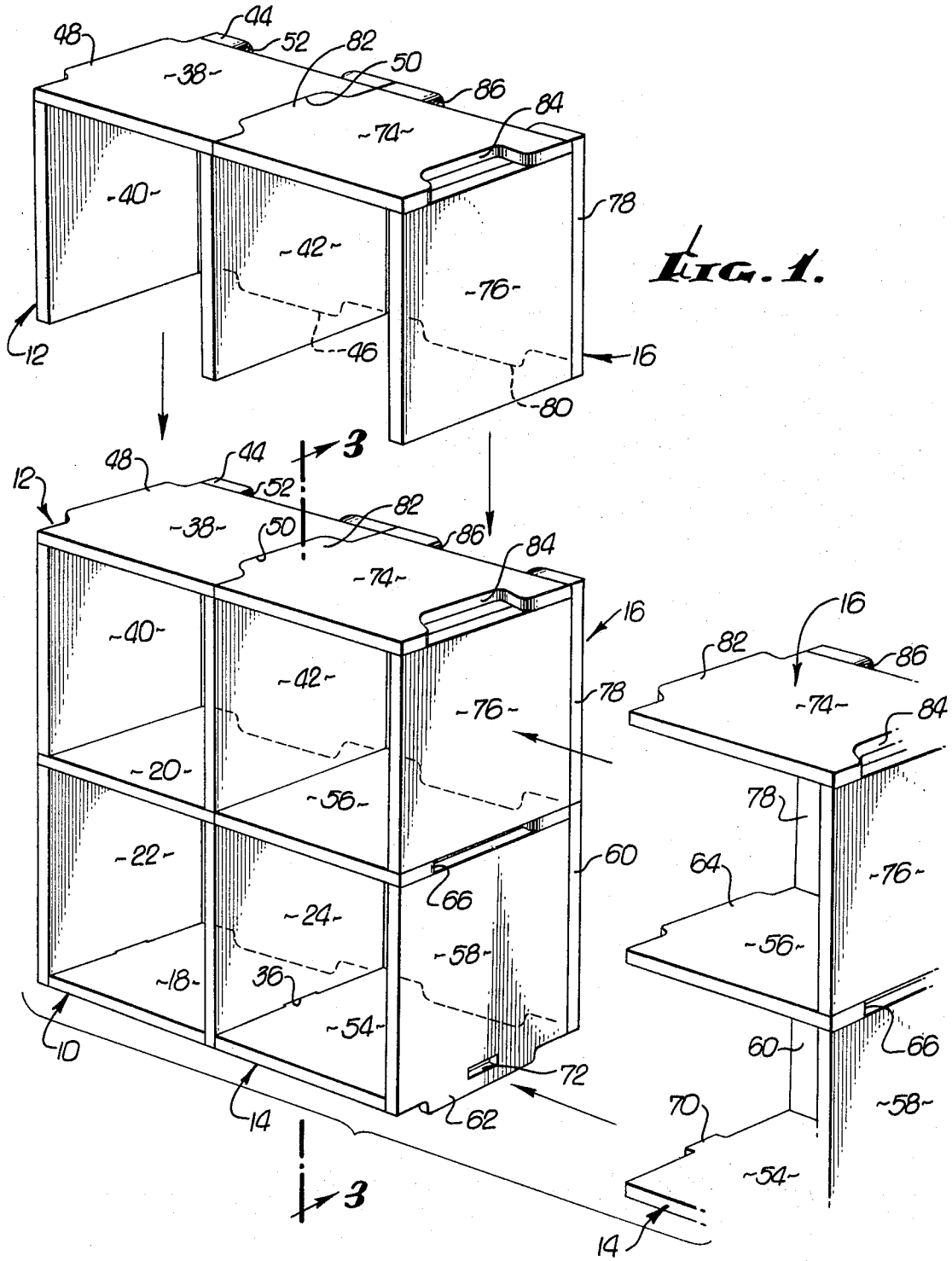


FIG. 1.

INVENTOR.
ROBERT R. OVERBY
BY Albert F. Gabriel
ATTORNEY

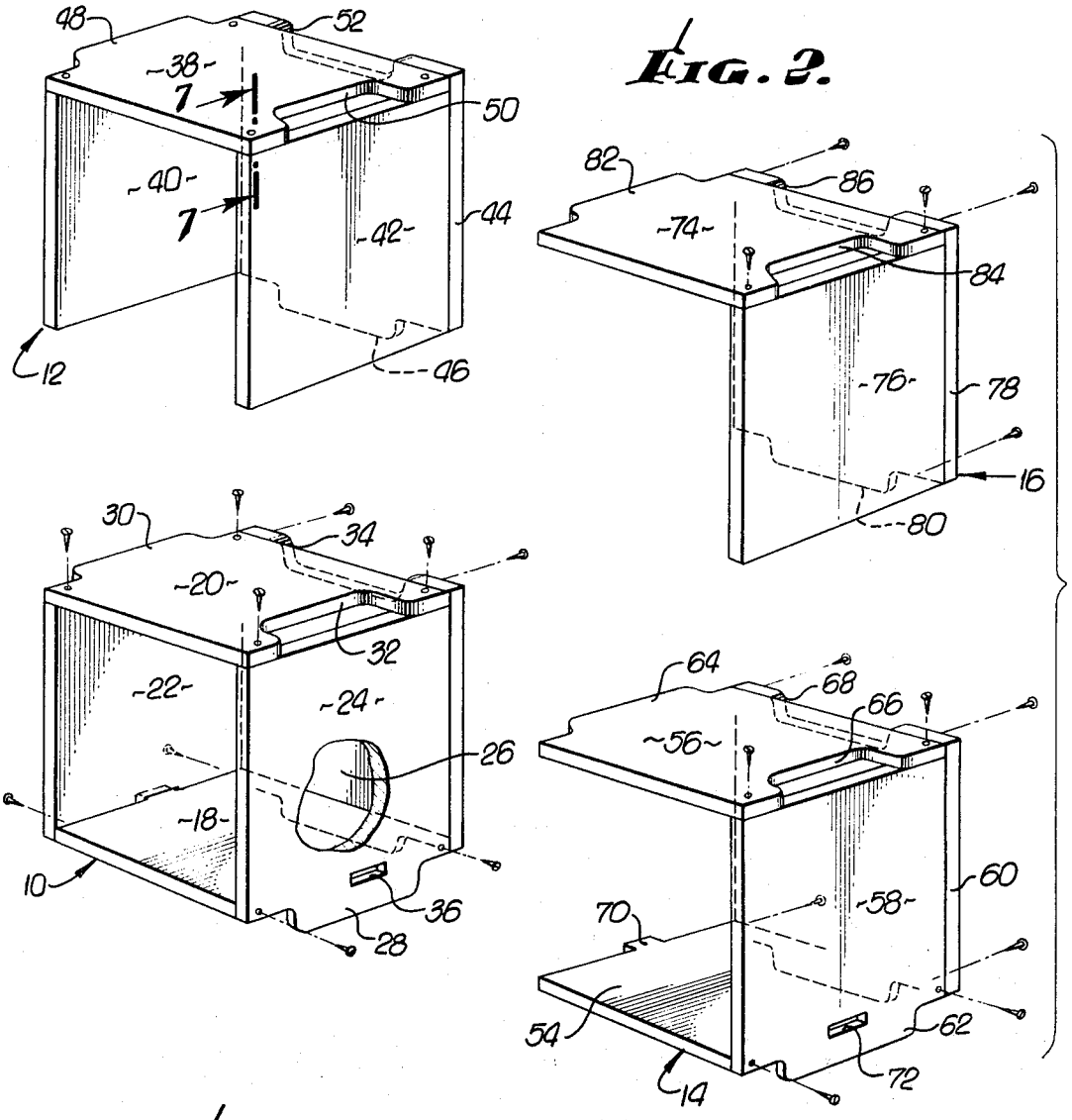


FIG. 2.

FIG. 6.

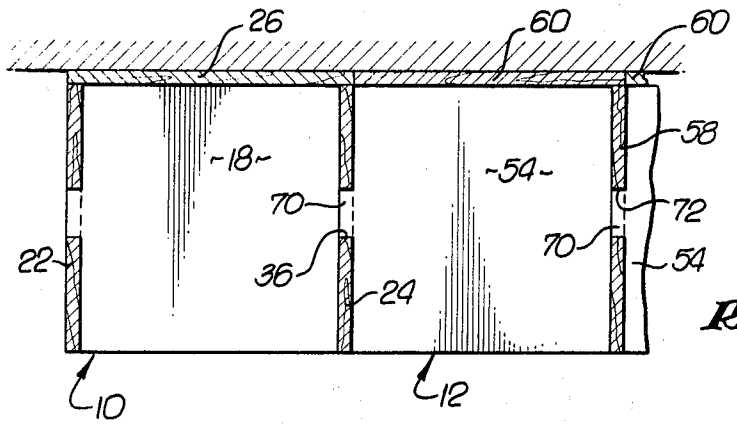
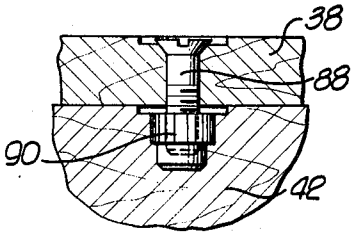


FIG. 7



INVENTOR.
ROBERT R. OVERBY
BY Albert L. Jahiel
ATTORNEY

FIG. 3.

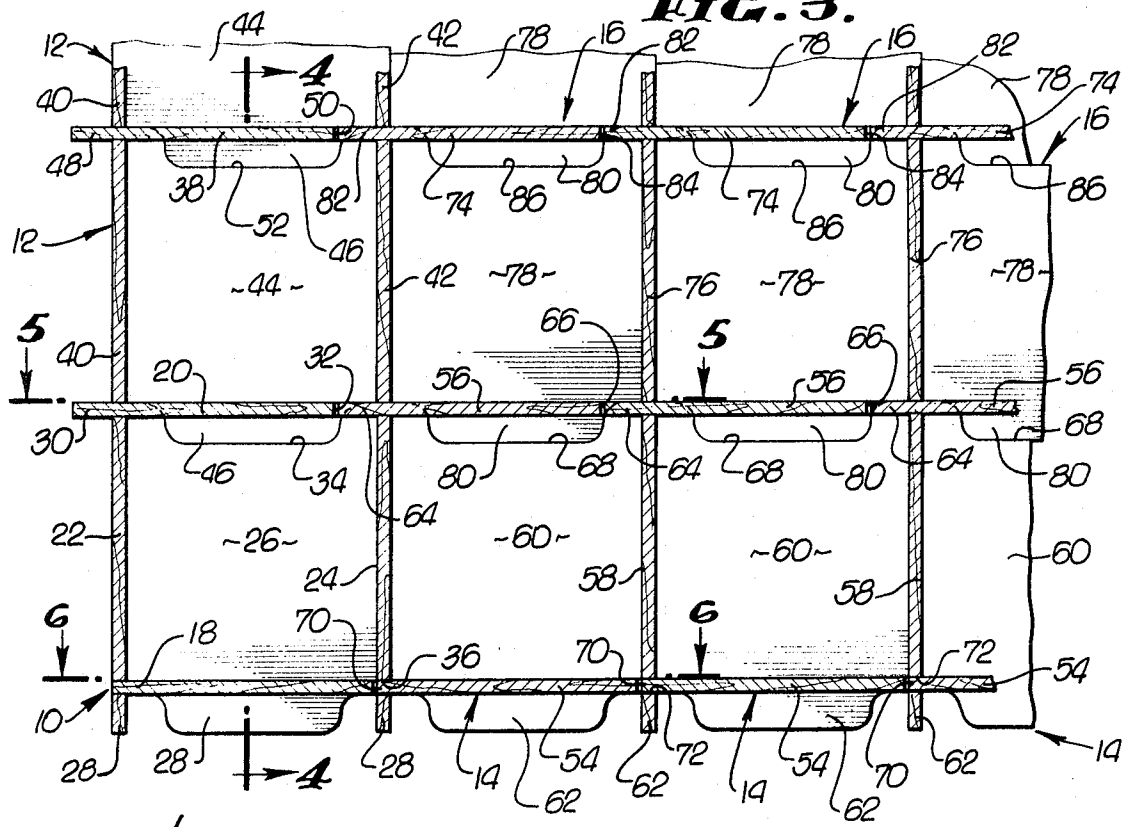


FIG. 4.

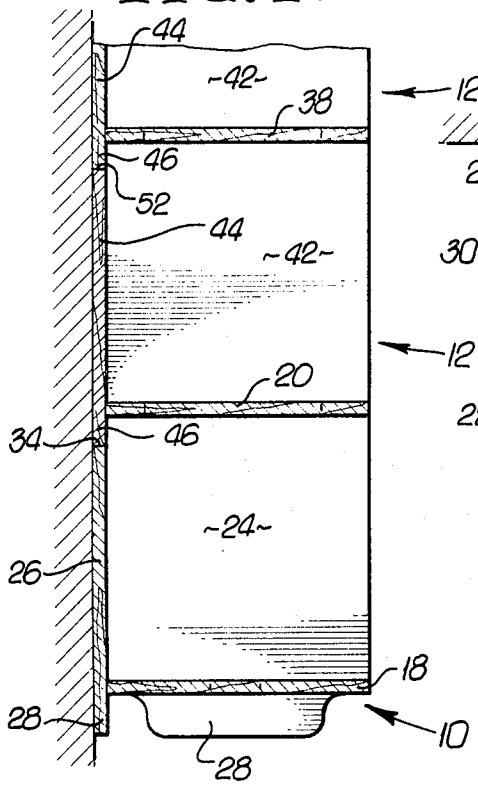
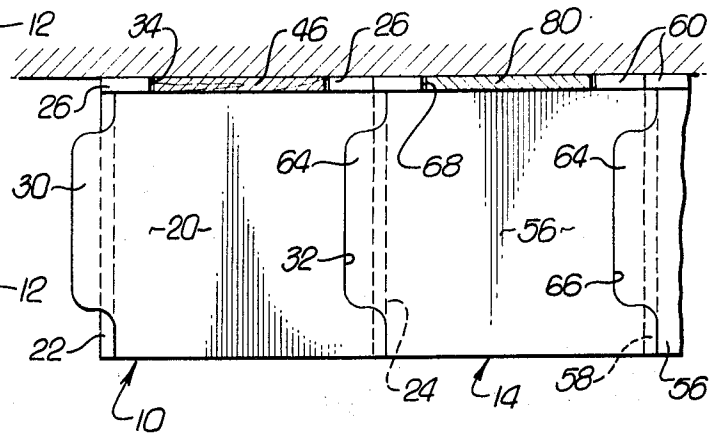


FIG. 5.



INVENTOR.
ROBERT R. OVERBY
By Albert L. Gabriel
ATTORNEY

MODULAR CABINET CONSTRUCTION

BACKGROUND OF THE INVENTION

While modular construction has heretofore been employed for such things as file cabinets, bookcases, merchandise containers, and the like, the individual modules employed in such prior art structures conventionally have two sidewalls, and most such prior modules also each include both a top wall and a bottom wall.

The provision of single or individual vertical stacks of a plurality of such conventional modules having two sidewalls generally provides a relatively stable and satisfactory cabinet structure of single module width. However, prior art modular cabinet arrangements employing such conventional modules in both vertically stacked and horizontally sequenced arrangements had several serious disadvantages making them generally unsatisfactory for most purposes. One such disadvantage was that each vertical stack of such conventional modules was structurally independent of the other vertical stacks, and variations in the base upon which the stacks were resting tended to cause the stacks to become seriously misaligned, requiring that adjacent modules in the stacks be secured together by some added fastening means, as for example, by screws, bolts, straps, or the like. This caused assembly to become more difficult and complicated, and generally resulted in the presence of unsightly fastening means.

Another disadvantage of the use of such conventional modules in cabinet assemblies of both vertically stacked and horizontally sequenced modules was that in the assembled relationship horizontally adjacent modules had two sidewalls therebetween, and in many such arrangements the vertically adjacent modules also had two walls therebetween, both a top wall and a bottom wall. This not only resulted in undesirable expense and weight, but seriously detracted from the appearance of the combination.

SUMMARY OF THE INVENTION

In view of these and other problems in the art, it is an object of the present invention to provide a novel modular furniture assembly of both vertically stacked and horizontally sequenced modules, wherein the vertically adjacent modules in each stack share horizontal walls, each module having a top wall that serves as the bottom wall of the next module above, and wherein the adjacent modules in each horizontal layer or sequence share vertical walls, with each module in the sequence having an outer sidewall that serves as the inner sidewall for the next added module in the sequence. In this manner a modular furniture assembly that includes any desired number of vertically stacked and horizontally sequenced modules has only a single wall between adjacent modules in both the vertical direction and the horizontal direction.

Another object of the invention is to provide a modular furniture structure of the character described wherein the vertical stack of modules located at one end of the structure is self-supporting or independent, comprising modules that each include two sidewalls to provide the required stability, while each succeeding module in each horizontal layer thereof has only an outer sidewall but no inner sidewall and depends upon the outer sidewall of the previous module in the sequence, starting with the module in said self-supporting stack, for part of its structure and stability.

A tonguelike projection from the inner or free side edge of the top wall of each dependent module engages in a complementary recess in the top wall of the preceding module in the sequence, overlapping the upper edge of the outer sidewall of the preceding module, whereby the weight of each dependent module tends to secure it in interlocking relationship to the preceding module upon which it depends for part of its support. Thus, each dependent module in effect leans back against the preceding module in its horizontal sequence until the structurally independent, self-supporting first module in the sequence is reached.

The interlocking relationship of all of the modules in the assembly is completed by provision of horizontal locating means engageable between vertically adjacent modules in each vertical stack of the sequence. This horizontal locating means is preferably in the form of a depending tongue projecting from the bottom of a rear wall of each module which engages in a complementary upwardly facing recess in the rear wall of the next module below in the stack.

Not only does the weight of the dependent modules thus tend to close the gaps between the modules and securely interlock them, but the added weight of objects contained in any or all of the dependent modules in the assembly will further assist the interlock. The net result is that the modules can be simply stacked and sequenced together without further keying, and in particular without requiring the use of separate fastening devices, such as screws, bolts, straps, clamps, or the like, which are not only aesthetically objectionable but which would undesirably complicate the manufacture and assembly of the modules.

Modular furniture made in accordance with the present invention may be employed for a variety of purposes, including but not limited to bookcases, record cabinets, file cabinets, buffets, tool storage racks, merchandise containers, and the like.

Further objects and advantages of this invention will appear during the course of the following part of this specification, wherein the details of construction and mode of operation of a presently preferred embodiment are described with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view illustrating four modules in assembled relationship, comprising one each of the four different module structures employed in the presently preferred form of the present invention; with additional modules spaced from the assembled modules and positioned preparatory to both vertical stacking and horizontal sequencing to build upon the assembled modules.

FIG. 2 is an exploded perspective view, with a portion broken away, illustrating the four different module structures of FIG. 1 in spaced relationship.

FIG. 3 is a transverse vertical section taken on the line 3—3 in FIG. 1 with the illustrated modules in fully assembled relationship.

FIG. 4 is a vertical section taken on the line 4—4 in FIG. 3.

FIG. 5 is a fragmentary horizontal section taken on the line 5—5 in FIG. 3.

FIG. 6 is a fragmentary horizontal section taken on the line 6—6 in FIG. 3.

FIG. 7 is an enlarged, fragmentary horizontal section, partly in elevation, illustrating presently preferred bolt means for joining the individual panels of a module together.

DETAILED DESCRIPTION

Referring to the drawings, the embodiment of the invention illustrated therein has the self-supporting, independent stack of modules at the left-hand end of the modular assembly, with the dependent modules added on in sequence to the right thereof. However, it is to be understood that alternatively, with a simple reversal of parts, the self-supporting, independent vertical stack of modules may be disposed at the right-hand end of the modular assembly, with the dependent modules built out sequentially to the left thereof.

The form of the invention that is illustrated in the drawings includes four different module structures which are best illustrated in detail in spaced array in FIG. 2. These include two types of independent or self-supporting modules adapted to form parts of the independent module stack, a left-hand bottom unit **10** which preferably has five walls, and is adapted to rest on the floor or other supporting base surface, and a left-hand upper unit **12** which preferably has four walls. Any number of the left-hand upper units **12** may be stacked in sequence above the bottom unit **10**.

There are two different types of dependent module structures, one type being bottom dependent unit **14** preferably having four walls, and any number of which can be built out sequentially to the right of the left-hand bottom unit **10**, the units **14** each being supported in part on the floor or other base structure and in part by the preceding unit immediately to its left. The other type of dependent module structure is upper dependent unit **16**, which preferably has only three sides, and which is adapted to be stacked in any number above each of the bottom dependent units **14** and to extend in a horizontal sequence to the right from each of the left-hand upper units **12**. The upper dependent module units **16** are each supported in part at its lower right-hand edge on a module immediately therebeneath, and in part proximate its upper left-hand edge upon the next preceding module in the same horizontal succession.

Referring now to the preferred details of construction of the left-hand bottom unit **10**, only one of which is employed in the assembly, this unit includes a generally rectangular, horizontal bottom wall **18**, a generally rectangular, horizontal top wall **20**, generally rectangular left- and right-hand sidewalls **22** and **24**, respectively, which extend between the said bottom and top walls, and a generally rectangular rear wall **26** which connects with the bottom wall, top wall, and both sidewalls, to provide a generally closed rear end of the module.

The sidewalls **22** and **24** of module **10** each include a depending tongue **28**, the tongues **28** having generally straight lower edges and serving as legs or feet causing the bottom wall **18** to be spaced upwardly from the floor or other supporting surface, and of particular importance causing the module **10** to be fully self-supporting and independent. Such support may be further assisted by a similar depending tongue **28** extending downwardly from the rear wall **26**, and also serving as a leg or foot. A similar tongue **30** projects to the left from the left-hand edge of top wall **20**, and may serve as a spacer to hold the module outwardly from a wall to the left thereof if the module **10** is disposed in a corner of a room. A complementary recess **32** is disposed in the right-hand edge of top wall **20**, and a similar recess **34** is disposed in the upper edge of the rear wall **26**. A small rectangular aperture **36** is disposed through the right-hand sidewall **24** at the level of the bottom wall **18**.

Referring now to the left-hand upper unit **12**, as best shown in FIG. **2**, this unit includes a generally horizontal top wall **38**, a pair of parallel, generally vertical left- and right-hand sidewalls **40** and **42**, respectively, and a rear wall **44**. The side walls **40** and **42** of module **12** are preferably rectangular, with straight vertical and horizontal edges, while the rear wall **44** has a depending tongue **46** projecting downwardly therefrom and adapted to locate in the complementary upwardly facing recess **34** in the rear wall **26** of the bottom unit **10**. Top wall **38** of upper unit **12** has a tongue **48** projecting from its left-hand edge similar in location and purpose to the corresponding tongue **30** on the top wall **20** of the lower unit, and the top wall **38** of the upper unit also has a recess **50** formed in its right-hand edge which is similar in size and location to the corresponding recess **32** in the right-hand edge of the top wall **20** of the lower unit. The rear wall **44** of the upper unit **12** has an upwardly facing recess **52** in its upper edge that is similar in size and location to the corresponding recess **34** in the upper edge of the rear wall **26** of the bottom unit **10**.

When the left-hand upper unit **12** is stacked on the left-hand bottom unit **10**, the lower edges of sidewalls **40** and **42** of the upper unit rest upon the flat upwardly facing surface of the top wall **20** of the lower unit so that the upper unit **12** is independently self-supported upon the lower unit **10**. The depending tongue **46** on the upper unit **12** locates in the upwardly facing recess **34** in the lower unit **10** to secure the upper unit **12** against either lateral or forward movement relative to the lower unit **10**. Since the top wall **38** of upper unit **12** is substantially the same as top wall **20** of lower unit **10**, it will be apparent that units **12** can be stacked not only upon a unit **10**, but upon each other to any desired height.

Turning now to the dependent bottom unit **14**, as best illustrated in FIG. **2**, such unit includes a generally horizontal bottom wall **54**, a generally horizontal top wall **56**, a generally vertical right-hand sidewall **58** extending between the bottom and top walls **54** and **56**, respectively, and a generally vertical rear wall **60** connected to the rear edges of the bottom and top walls **54** and **56**, respectively, and the sidewall **58**. Sidewall **58** has a depending tongue **62** similar to the tongues **28** on the unit **10**, and the rear wall **60** also preferably has a similar depending tongue **62**, the tongues **62** serving as legs or feet.

The top wall **56** of module **14** is similar in construction to the top walls **20** and **38** of the respective modules **10** and **12**, having a tongue **64** projecting from its left-hand edge, and a complementary recess **66** in its right-hand edge. The rear wall **60** of the module **14** is similar to the rear walls **26** and **44** of the respective modules **10** and **12**, having an upwardly facing recess **68** in its upper edge. The bottom wall **54** of the module **14** is similar to the bottom wall **18** of the module **10**, and has a generally rectangular projection **70** extending from its left-hand edge that is adapted to engage in the complementary aperture **36** in the right-hand wall **24** of the module **10**. Finally, the sidewall **58** of the module **14** has a rectangular aperture **72** therein corresponding in size and position to the aperture **36** in the sidewall **24** of module **10**.

The dependent bottom unit **14** is assembled with the independent bottom unit **10** by simply engaging the tongue **64** and projection **70** of unit **14** in the respective complementary recesses **52** and **36** of the unit **10**. Further dependent units **14** can be assembled to the right of the first unit **14** in sequence by simply engaging the tongue **64** and projection **70** of each unit **14** in the respective complementary recesses **66** and **72** in the preceding unit **14**. It will be apparent that each of the dependent units **14** will, because of its own weight and any weight which may be placed thereon, tend to tilt to the left and thereby tend to remain securely interlocked with the unit **10** and other units **14**, since there is no leg or foot at the left-hand side of any of the units **14**.

Referring now to one of the upper dependent units **16**, as best shown in detail in FIG. **2**, each of these units includes a generally horizontal top wall **74**, and generally vertical side and rear walls **76** and **78**, respectively. The rear wall **78** is similar to the rear walls **26**, **44** and **60** of the other three types of units, and has a depending tongue **80** projecting downwardly from its lower edge. The top wall **74** is similar to the top walls **20**, **38**, and **56** of the other three types of units, having a tongue **82** projecting from its left-hand edge and having a complementary recess **84** in its right-hand edge. The rear wall **78**, like the rear walls of the other types of units, has an upwardly facing recess **86** in its upper edge.

The single, right-hand sidewall **76** of the upper dependent unit **16** is similar to the sidewalls **40** and **42** of the independent upper unit **12**, having generally straight vertical and horizontal edges, and the lower edge of this sidewall **76** is adapted to rest upon the flat upwardly facing surface of the top wall **56** of dependent bottom unit **14**. The tongue **82** at the left-hand edge of top wall **74** engages in the complementary recess **50** in the independent upper unit **12**, overlapping and resting upon the upper edge of the right-hand sidewall **42** of the independent upper unit **12**. The depending tongue **80** on the rear wall **78** of unit **16** locates in the complementary upwardly facing recess **68** in the rear wall of the bottom unit **14**.

In this manner one of the dependent upper units **16** may be quickly and simply assembled and interengaged with a dependent bottom unit **14** and an independent upper unit **12**, with the top wall **56** of the bottom unit **14** serving as the bottom wall of the dependent unit **16**, and with the right-hand sidewall **42** of the independent upper unit **12** serving as the left-hand wall of the unit **16**. The weight of the unit **16**, and any additional weight thereon from other units or from objects disposed thereon, will tend to tighten the interlocking relationship.

It will be apparent that any number of dependent upper units **16** may be stacked one upon the other, according to the number of independent upper units **16** that are stacked above the unit **10**, each of the vertically stacked units **16** being in-

terengaged in a respective vertically stacked unit **12** adjacent thereto. It will also be apparent that a succession of any number of the dependent upper units **16** may extend to the right of the independent upper unit **12** on any level, provided there is a vertically registering unit **14** or **16** therebelow.

The present invention not only provides a modular furniture construction wherein the modules can readily and easily be assembled and interfitted without the requirement of additional fastening means, and wherein the weight of the modules and any articles stored therein tends to improve the interlocking relationship between the modules, but additionally the modules of the present invention uniquely lend themselves to a simplified construction and assembly of the individual modules, as is best illustrated in FIGS. **2** and **7**. Thus, in the preferred form of the invention the individual walls of each module are separately fabricated, preferably of wood, and then these panels are suitably predrilled and adapted for conventional furniture fasteners for quick and easy assembly of the separate panels into the modules.

Although any suitable type fasteners may be employed, a particularly satisfactory type is illustrated in FIG. **7**, comprising a bushed Phillips head stove bolt **88** with countersunk head, and a mating insert pallet nut **90**.

This type of construction for the individual modules permits them to be stored and shipped in disassembled form, with the individual panels thereof stacked flat against each other, and then assembled either by the retailer or the ultimate purchaser. This type of module construction has a further and very important advantage, in that only a few different wall panel configurations are required despite the fact that there are four separate types of modules, one of which has five wall panels (the module **10**), two of which have four wall panels (the modules **12** and **14**), and the other of which has three wall panels (the module **16**). Thus, for any rectangular configuration of the modules, the bottom walls **18** and **54** of the respective modules **10** and **14** may be of identical configuration, and thereby manufactured with the use of the same tooling. Other wall panels of identical configuration are the two sidewall panels **22** and **24** of module **10** and the sidewall panel **58** of module **14**; the two sidewall panels **40** and **42** of module **12** and the sidewall panels **76** of module **16**; the top wall panels of all four of the modules; and the rear wall panels of all four of the modules.

Furthermore, in the preferred configuration of the invention wherein the modules are substantially cubical in assembled relationship, the rear wall panels of all four of the modules may be identical in configuration to the top wall panels of the modules, in which case there are only four separate types of wall panels required for the invention. In a minimum assemblage of only the four modules illustrated in FIG. **2**, half of the wall panels will all be the same, namely, the four top wall panels and the four rear wall panels. In an assemblage of more of the modules, wherein an increased number of the upper dependent modules **16** are employed, the majority of the wall panels will be of this type.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore not to be limited to the details disclosed herein.

I claim:

1. Modular furniture structure which comprises a first vertical stack of a plurality of self-supporting independent modules each having a top wall and a pair of sidewalls, and a second vertical stack of modules disposed adjacent to one side of said first stack with each module of said second stack disposed alongside a respective module of said first stack at substantially the same level, at least one module of said second stack being in wall sharing, dependent relation to the adjacent module of said first stack, having a top wall and an outer sidewall, said top wall of the dependent module being engaged with said adjacent module proximate the top wall of the latter.

2. Structure as defined in claim **1**, wherein the top wall of each but the uppermost module in each of said vertical stacks serves as the bottom wall of the module immediately thereabove.

3. Structure as defined in claim **1**, wherein each module of said second stack is in said wall sharing, dependent relation to the respective adjacent module of said first stack.

4. Structure as defined in claim **3**, wherein a plurality of said second stacks extend in sequence from said first stack, each module of each but the first of said second stacks being in wall sharing, dependent relation with the respective module of the preceding second stack, each having an outer sidewall that serves as the inner sidewall for the next added module in the sequence.

5. Structure as defined in claim **1**, wherein said engagement of the top wall of the dependent module with said adjacent module is effected by means of a tongue projecting from the free side edge of such top wall and a generally complementary recess in the adjacent side edge of the top wall of said adjacent module, said tongue being engaged in said recess so as to overlap the upper edge of the shared sidewall of said adjacent module.

6. Structure as defined in claim **1**, wherein each of said modules has a rear wall connected to its top and sidewalls.

7. Structure as defined in claim **6**, wherein said rear walls of at least the modules above the lowermost module in each stack each have a tongue projecting downwardly from its lower edge, and said rear walls of at least the modules below the uppermost module in each stack each have a complementary recess in its upper edge, such tongue of each but the lowermost module in each stack being engaged in such recess of the module immediately therebelow.

8. Apparatus as defined in claim **1**, wherein the lowermost module of each stack also includes a bottom wall.

9. Structure as defined in claim **1**, wherein each module of said second stack is in said wall sharing, dependent relation to the respective adjacent module of said first stack, and wherein the top walls of all of the modules are of substantially the same configuration, each having a tongue projecting from one side edge thereof and a complementary recess in the other side edge thereof, said tongue of the top wall of each dependent module being engaged in said recess of the top wall of the respective adjacent independent module so as to overlap the upper edge of the shared sidewall of said adjacent module, and said recesses in the top walls of the dependent modules being adapted to receive the tongues of additional dependent modules extending in sequence therewith.

10. Structure as defined in claim **9**, wherein each of the modules has a rear wall connected to its top and sidewalls, each of said rear walls having a tongue projecting downwardly from its lower edge and a complementary recess in its upper edge, such tongue of each but the lowermost module in each stack being engaged in such recess of the module immediately therebelow, the rear walls of all of the modules having substantially the same configuration as the top walls.

11. Structure as defined in claim **10**, wherein the sidewalls of at least all but the lowermost module in each stack are of substantially the same configuration.

12. Structure as defined in claim **11**, wherein said sidewalls of the lowermost modules in said stacks are all of substantially the same configuration.

13. Structure as defined in claim **12**, wherein the lowermost module of each stack includes a bottom wall, said bottom walls being of substantially the same configuration.

14. Structure as defined in claim **13**, wherein the walls of each module are formed as separate, generally flat panels, and fastening means for securing the wall panels of each module together in assembled relationship.

* * * * *