

[54] MODULAR STRUCTURE

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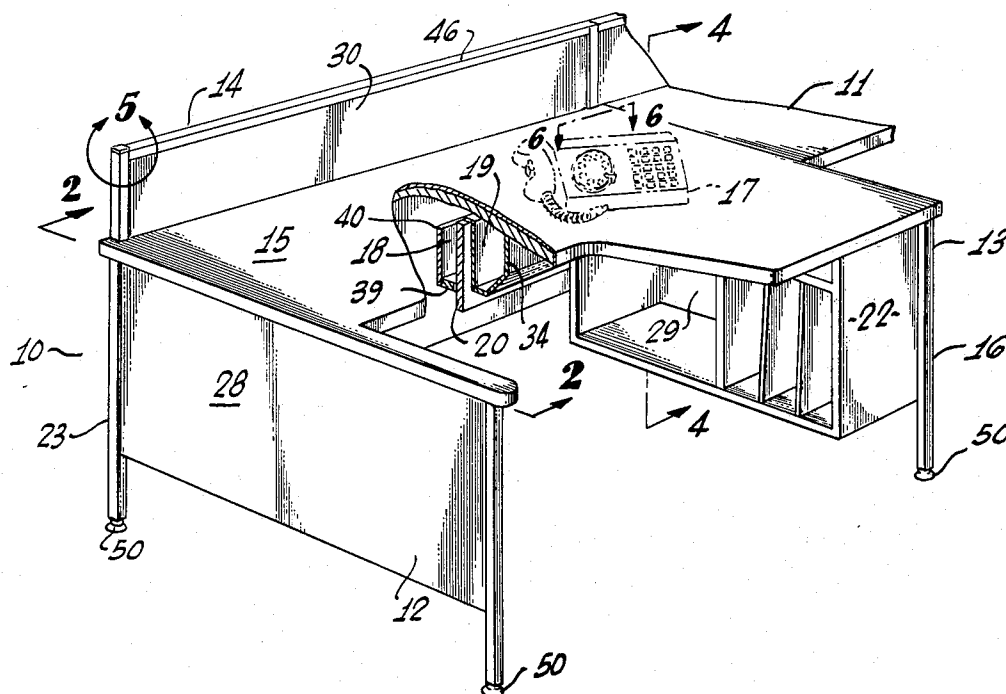
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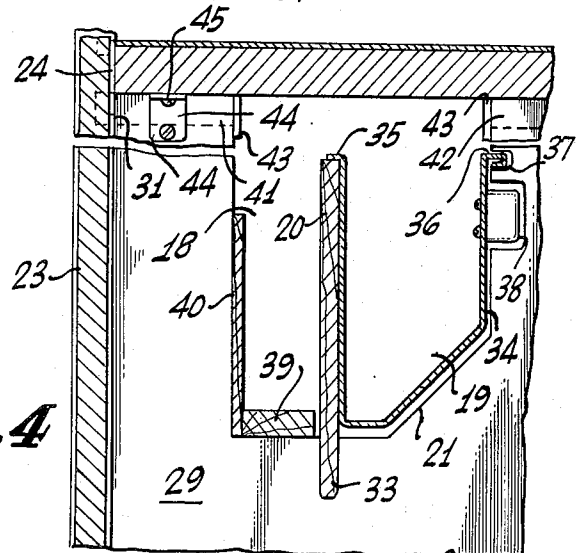
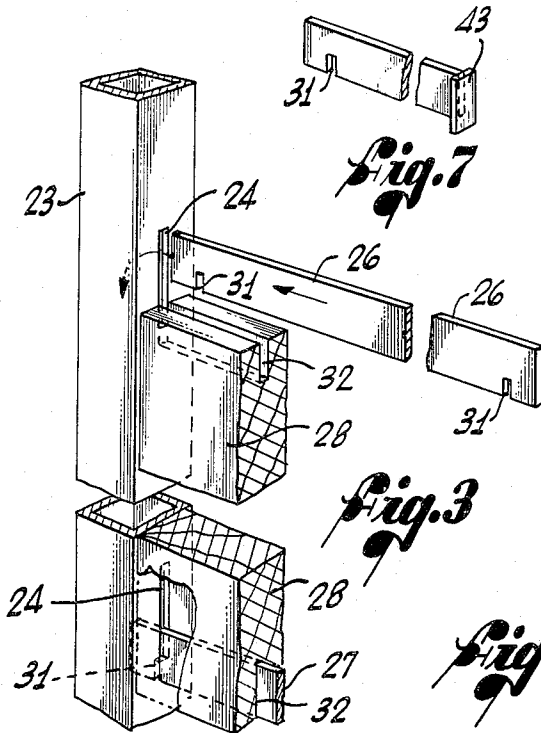
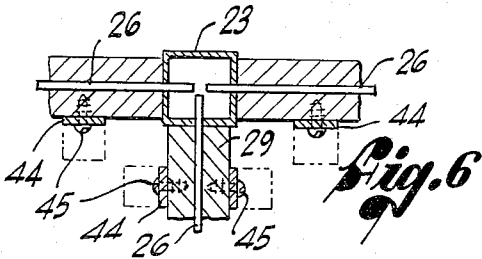
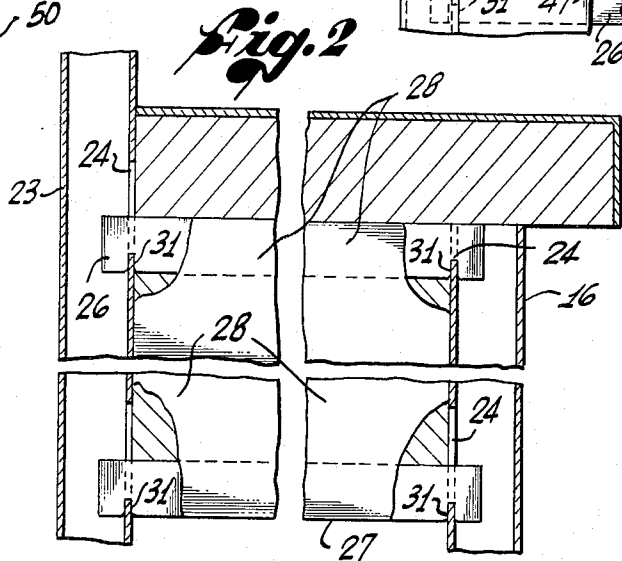
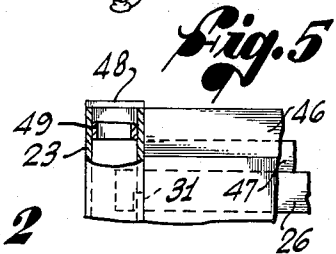
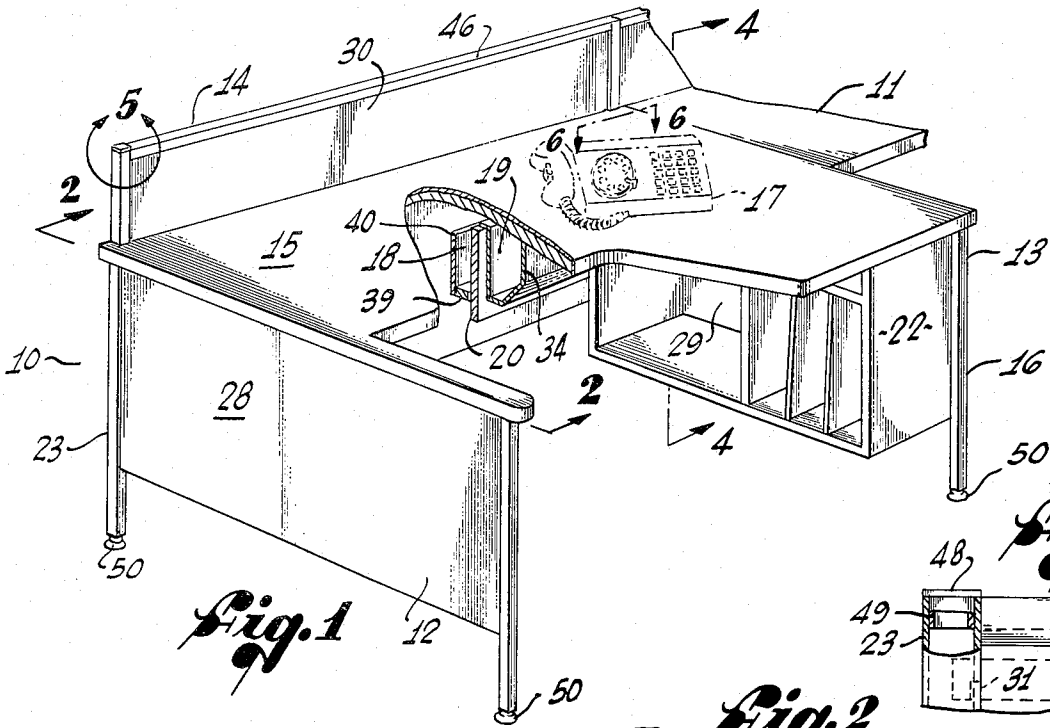
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[57]

ABSTRACT

A modular structure which is easily assembled and disassembled is disclosed. The basic section consists of a pair of support posts, the opposing faces of which are provided with elongated slots for receiving the ends of lateral support members which extend between the support posts. A panel member is carried and supported by the lateral support members. The sections are assembled in modular structures which are self-supporting or tandemly arranged. Provision is made for easy installation of electrical or telephone cables by raceways which are readily accessible yet concealed when the modules are assembled.

3 Claims, 7 Drawing Figures



MODULAR STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates to modular structures and more particularly to modular structures for use as furniture.

In the modern office emphasis is placed on office equipment and furniture that is attractive, easily moved, versatile and adaptable for use with other types of office equipment such as desk computer consoles and sophisticated telephone equipment. Many office operations lend themselves to tandem arrangement of desks which are often electrically interconnected and provided with various electrical outlets.

Conventional office furniture is bulky and difficult to ship or move and in many instances conventional furniture arrives at the new location in a damaged condition. Likewise, the electrical interconnection of tandem desks or work stations normally requires the laying of electrical wiring under the floor and opening the floor at each work station to lead in wiring to the desk or other structure at the work station. Telephone and electrical outlets are fixed on the floor and maintenance of the wiring is expensive and difficult because much of the wiring is hidden under the floor. Likewise, once in position, it is difficult to rearrange a tandem arrangement of work stations because of the work involved in the electrical and telephone outlets.

Other problems connected with conventional business furniture construction are encountered in new construction or renovation of an office site. Normally, the office furniture is the last item to be delivered to the construction site. However, in those cases where substantial electrical and telephone work is involved, the wiring cannot be fully tested until the furniture for the work station is in place so that the hookup can be completed. This often delays the start up of operations while last minute electrical repairs are made, resulting in costly loss of time.

Thus, conventional business furniture often does not meet the requirements of the modern business office, particularly where electrical interconnection between work stations is involved. With high labor costs and high shipping costs to be considered, construction and relocation costs can be inflated by the use of conventional business furniture.

The foregoing problems are also encountered in other types of installations, particularly school and industrial sites where tandemly arranged laboratory and work benches, stoves, ovens, sewing machines and the like are required.

The present invention overcomes the above problems by utilization of modular construction allowing for rapid and simple assembly and disassembly of the modular structures at the work side. The units are designed so that access to electrical wiring is convenient and fast and the electrical work can be completed at the jobsite without the necessity of having the furniture present. The modules can be prewired and, by the provision of conventional connection means, easily connected to power and are substantially ready for service when assembled. Telephone and electrical wiring of the modules when assembled in a tandem arrangement need not be hidden under the floor and provision is made in the modular structure for receiving and carrying electrical and telephone wiring.

SUMMARY OF THE INVENTION

The present invention is concerned with modular structures which are easily and rapidly assembled into self-supporting single units or into tandem units to provide a work station which is both attractive and functional. When employed in a tandem configuration, wiring raceways can be provided for carrying cables, wires, telephone lines and the like so as to electrically interconnect the work stations in the tandem set.

The working surface of the module is easily removed for access to the raceways and wiring installation is accomplished by forming a wiring bundle above floor and simply placing the bundle in the raceway. Connectors and individual lead in wires to receptacles at the work station are provided on the module for hookup of the module to the wiring bundle. In the fully assembled condition, the module is decorative and difficult to distinguish from conventional furniture. The raceways are concealed but are readily accessible for maintenance or wiring changes.

A module comprises an assembly of module sections which consist of at least two upstanding support posts having slotted faces for receiving a slotted edge of a lateral support member. At least two lateral support members, an upper and lower lateral support member, are carried between the two upstanding support posts.

When assembled, the ends of the lateral support members extend through the slotted face of the upstanding support post so that the open end of the lateral member slot is aligned with the slot in the upstanding post and the upper edge of the lateral member slot is carried by the lower edge of the upstanding post slot. In this manner the lateral support members are substantially locked into and rigidly carried by the upstanding support posts yet the lateral support members are easily assembled and disassembled.

Panel members are removably positioned between the support posts by the lateral support members. Each panel member is slotted along the upper and lower edges for receiving the lateral support members and for being supported thereby.

The panels are proportioned so that the side edges are substantially contiguous with the upstanding support posts thereby concealing the lateral support members when the module is assembled.

The sections are assembled into modular units of a variety of configurations. Normally the modules are cuboid configuration and with the front section open so that a person can stand or be seated at the module. The side and rear sections have common support posts and in tandem arrangement, adjacent modules have common side sections.

A working surface is provided by a horizontal top panel which encloses the module.

Other features of the invention reside in the provision of raceways for cables, prewiring and easy electrical connection, cabinet units for drawer space and provision for tandem arrangement of individual modules. As fully assembled the modules of the invention are sturdy and have the appearance of conventional furniture.

Although the invention is illustrated and described as a desk console it should be clear that the configuration of the module is highly flexible. The invention is readily modified for use as a work bench, a kitchen unit carrying stoves and ovens, a laboratory bench and the like.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a module with portions cut away to show a raceway.

FIG. 2 is a sectional view in enlarged scale taken along line 2—2 of FIG. 1 with portions cut away for compactness of illustration.

FIG. 3 is an enlarged scale perspective view, partially exploded and partially cut away for compactness of illustration showing the assembly of a portion of the module.

FIG. 4 is an enlarged scale sectional view, partially cut away for compactness of illustration, taken through line 4—4 of FIG. 1.

FIG. 5 is an enlarged scale sectional view taken through arc 5 of FIG. 1.

FIG. 6 is an enlarged scale plan view, partially cut away, of a section taken through line 6—6 of FIG. 1.

FIG. 7 is a perspective view of a lateral support member partially cut away for compactness of illustration designed for use for supporting a side panel between adjacent tandem modules.

DESCRIPTION OF THE INVENTION

The modular structure of this invention, designated generally as 10, is illustrated as a desk console assembly which is generally associated with an adjacent module 11. The module 10 comprises side sections 12 and 13 and a rear section 14. Each section comprises a panel supported between a pair of upstanding support posts by an upper and lower lateral support member removably carried by the support posts.

A work surface is formed by upper panel 15 which is carried by the upper edges of side panel members 12 and 13 and the upper ends of front support posts 16. The forward section of the module 10 is left open and a portion of the upper panel 15 is cut away to provide ready access to a telephone console 17 by a person seated at the module 10.

Raceways 18 and 19 extend across the module 10 adjacent the rear section 14 and a divider member 20 separates the raceways 18 and 19 from each other. The raceways 18 and 19 extend through the module 10 into adjacent module 11 through a cut out section 21 in the side section 13.

A cabinet unit 22 is attached to the under surface of the top panel 15 and the inner surface of the side section 13 for the convenient storage of books and other documents required at the work station.

As is more specifically shown in FIGs. 2 and 3, side section 12 comprises the front support post 16 and a rear support post 23 which are tubular elements, preferably of rectangular cross sectional configuration. Opposing faces of the front support post 16 and the rear support post 23 are provided with elongated slots 24 for receiving the ends of an upper lateral support member 26 and a lower lateral support member 27. The slots 24 are provided on opposing faces of the support members between which the upper lateral support member and the lower lateral support member is to extend and the slots 24 are aligned with the slots 24 on the opposing post. When assembled the upper lateral support member 26 and the lower lateral support member 27 extend substantially perpendicular to the axes of the rear support post 23 and the front support post 16. The length of the slot 24 is longer than the width of the upper lateral support member 26 and the lower lateral support member 27 for ease in assembly and disassem-

bly. Likewise, the width of the slot 24 is such as to allow easy insertion and removal of the end of a lateral support member.

The upper lateral support members 26 and the lower lateral support members 27 are carried between the front support post 16 and the rear support post 23 to support a side panel 28 and between the rear support posts 23 to support a rear panel 30. The opposing ends of the upper lateral support member 26 and the lower lateral support member 27 are inserted in the elongated slots 24 on the opposing faces of the support posts and are carried by the bottom edge of the slots 24. A notch 31 is provided in the lower edge of the lateral support members adjacent the ends of the lateral support members for removably locking the ends of the members into the slots 24.

The side panels 28 and 29 and the rear panel 30 are provided with a longitudinally running slot 32 along the upper and lower edges of the panel member which extend the entire length of the panel member. The slots 32 are of sufficient depth to receive the entire width of the lateral support members for support by these members. The side panel members 28 and 29 are dimensioned so that the front and rear edges abut against the opposing faces of the front support post 16 and the rear support post 23. Likewise, the rear panel member 30 abuts against the opposing faces of the rear support posts 23.

In practice, the module 10 is first framed by assembling the lower lateral support member 27 between the front support post 16 and the rear post 23 of the side sections 12 and 13 and between the rear support posts 23 of the rear section 14. The side panels 28 and 29 and the rear panel 30 are then positioned on the lower lateral support members 27 with the lower support member 27 being carried in the slot 32 provided in the lower edge of each of the panels. The upper lateral support members 26 are then positioned between their respective support posts and are received in the slot 32 in the upper edge of each of the panel members. The lower lateral support members 27 carry the weight of the side panel members 28 and 29 and the rear panel member 30 and the upper lateral support member 26 provides rigidity and prevents lateral movement of the panel members. The side sections 12 and 13 are preferably preassembled and only assembly of the rear section 14 is required at the site.

In the tandem arrangement, the modules 10 and 11 have a common side section 13 and thus are supported by common front support posts 16 and rear support posts 23. As more specifically shown in FIG. 4, the rear support post 23 between adjacent modules is provided with the slots 24 on three interior faces and carries the upper lateral support member 26, the lower lateral support member 27 and the rear panel 30 of the adjacent module 11 as well as the common side panel member 29.

The side panel member 29 between adjacent modules 10 and 11, is adapted for carrying raceways which communicate between adjacent modules and which are designed for containing cable bundles for electrically interconnecting adjacent modules. Likewise, the raceways may be adapted for carrying gas and water lines, and the like.

As is more clearly shown in FIG. 4, the side panel member 29 is provided with the cut out section 21 for the extension of the raceways 18 and 19 into the adjacent module 11. The cut out section 21 is positioned

adjacent the rear panel member 30 and as illustrated is of trough shaped configuration, although the configuration of the cut out section 21 may vary widely depending on the nature of the desired shape and number of raceways.

The bottom edge of the cut out section 21 is provided with a slot 33 for receiving and carrying the lower edge of the divider 20. When assembled in tandem, the end portion of the divider 20 is inserted into the slot 33 but the end of the divider 20 extends only partially across the bottom of the slot so that room remains in the slot 33 for receiving the edge of an adjacent divider.

Raceway 19 is defined by a shaped member 34 which conforms generally to the configuration of the cut out section 21 and the divider 20. The top edges of the member 34 extend normally outwardly to form carrying members 35 and 36. The carrying member 35 is adapted to be carried by the top edge of the divider 20 and the carrying member 36 is provided with an inwardly curving portion which is carried in a locking groove 37 provided in the side panel member 29 adjacent to and communicating with the cut out section 21. The shaped member 34 may be formed of any suitable material such as plastic or sheet metal.

Attached to and running along the forward face of the raceway 19 is a conduit 38 for carrying electrical utility lines. The utility lines are preinstalled in the conduit 38 and electrical outlets, not shown, are provided in the outer face of the conduit 38. Conventional connectors are employed to connect the lines in the conduit 38 to a source of power.

Raceway 18 is defined by the rear face of the divider 20, a bottom member 39 and a rear wall member 40. As with the divider 20, and the shaped member 34, the bottom member 39 and the rear wall member 40 run substantially the width of the module and their ends are carried in the cut out section 21 of the side panel 29 which also carries the abutting edges of the components for defining raceway 18 and raceway 19 in the adjacent module.

Side panel member 28, as an end panel, is not provided with the cut out section 21. The inner face of the side panel member 28 is provided with a milled recess, not shown, of substantially the same configuration as the cut out section 21 of the side panel member 29. The milled recess is aligned with the cut out section 21 when the module is assembled and carries the terminal ends of the shaped member 34, the divider 20, the bottom member 39, and the rear wall member 40. The side panel member at the opposite end of the tandem assembly is likewise provided with a recessed area on its inner face for carrying the ends of the raceway components.

As mentioned above, one of the features of this invention resides in the provision of raceways which are fully exposed during assembly of the modules for receiving preassembled wiring bundles. It can be seen, however, that normally the upper lateral support member 26 extends across the upper edge of a side panel member and, consequently, if utilized in the side panel member 29 access to the raceways 18 and 19 would be obstructed and placement of the wiring bundles into the raceways would be considerably more difficult. As a result, the side panel member 29 is supported along its upper edge in a slightly different manner to allow access to the interior of the raceway 18 and the raceway 19.

As more specifically shown in FIGS. 4 and 7, the side panel member 29 is supported along its upper edge of a rear upper lateral support member 41 and a forward upper lateral support member 42, each of which are cut to length so as to avoid obstruction of the opening to the raceway 18 and the raceway 19 as provided by the cut out section 21.

The rear upper lateral support member 41 is provided with the notch 31 at one end for locking engagement with the lower edge of the slot 24 provided in the face of the rear support post 23. The rear upper lateral support member 41 is of such a length as to be coterminus with the rear edge of the cut out section 21. A downwardly depending locking bracket 43 is attached along the inner end of the rear lateral support member 41 for engagement against the rear edge of the cut out section 21 to firmly support the upper rear portion of the side panel member 29. The inner end of the forward lateral support member 42 likewise is coterminus with the forward edge of the cut out section 21 and the downward depending locking bracket 43 is attached for locking engagement with the forward edge of the cut out section 21. The outer end of the forward lateral support member 42 (not shown) is notched for locking engagement with the lower edge of the slot of the forward support post.

This arrangement of rear upper lateral support members 41 and forward upper lateral support members 42 is utilized for the common walls of a tandem arrangement. However, it should be clear that at any point the tandem arrangement can be broken, a side panel member 28 substituted for the side panel member 29 with the cut out section 21 and an unitary upper lateral support member 26 inserted. In this manner, tandem assemblies can be modified and individual modules taken out or inserted in the tandem assembly.

Assembly of the module 10 is completed by the placement of the upper panel 15. The upper panel 15 is attached by suitable means, such as inverted L-shaped brackets 44 which are attached by screws 45, to the inner surfaces of the side panel members 28 and 29 and the rear panel member 30 and to the under surface of the top panel 15. Suitable openings, not shown, are provided in the top panel 15 for the running of telephone cables and to the telephone unit 17 and for the connecting lines of other equipment to be positioned at that work station.

As more specifically shown in FIG. 5, the ends of the rear support posts 23 extend above the top edge of the rear panel member 30. For decorative purposes, a strip member 46, provided with an extending longitudinally running spline 47, is positioned between the inner faces of the extending portion of the rear support posts 23. The slot 32 in the upper edge of the rear panel 30 is cut sufficiently deep so as to receive both the upper lateral support member 26 and the spline 47. The ends of the strip member 46 abut against the opposing faces of the rear support posts 23.

The open ends of the rear support posts 23 are covered by a cap 48 which is provided with outwardly biased downwardly extending legs 49 which are forced inwardly when the cap is inserted in the open ends of the rear support posts 23 and which urge against the inner surfaces of the rear support posts 23 to lock the cap 48 in place.

The lower ends of the front support posts 16 and the rear support posts 23 are provided leg levelers 50 for adjustment of the level of the modules.

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The cabinet unit 22 is carried by the inner face of the side panel member 29 by conventional means, not shown, and is further anchored to the under surface of the top panel 15 for additional strength and stability.

The side panel members 28 and 29 and the rear panel member 30 are preferably provided with a wood grain outer finish. The front support posts 16 and the rear support posts 23 are preferably chrome plated and the top panel 15 is provided with a decorative hard plastic finish so that the module 10 has the attractive appearance of fine furniture. It should be clear, however, that the materials of construction and the finish is not critical and, depending on the function of the modular structure of this invention, the materials of construction and the finish can be modified to conform with the function of the modular structure.

I claim:

1. In a modular structure comprising at least two adjacent modular sections, each of said modular sections including forward and rear support posts, upper and lower lateral support members extending between opposing faces of said forward and rear support posts and a panel carried between each of said upper and lower lateral support members, at least one of said panels defining a common side between said adjacent modular sections, the improvement comprising:

said panel defining said common side being provided with a cut out portion extending downwardly from the upper edge of said panel, whereby the upper edge thereof is interrupted;

said upper lateral support member for said panel defining said common side consisting of a pair of sec-

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tions each of said sections having one end adapted for locking engagement with said support posts and an opposite end for engagement with said panel adjacent the edges defined by said cut out portion, and

an upwardly opening channel contained within said cut out portion and communicating between said adjacent modular sections thereby to define a continuous open topped raceway extending through said modular structure, and access to the raceway interior through the top thereof being unimpeded along its entire length.

2. The structure of claim 1 wherein said cut out section is generally trough shaped and extends to said upper edge of said common side panel member to define a rear edge and a forward edge of said cut out section whereby access to said raceway interior through the top thereof is maintained across adjacent modules.

3. The structure of claim 2 wherein said common side panel is supported by a rear upper lateral support member carried at its outer end by said rear support post and extending therefrom, the inner end thereof terminating at the rear edge of said cut out section and adapted for locking engagement with said rear edge, and a forward upper lateral support member carried by and extending from said forward support post, the inner end thereof terminating at the front edge of said cut out section and adapted for locking engagement with said forward edge, whereby said side panel member is supported and access to the interior of said raceway is maintained.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. 3,922,045

DATED November 25, 1975

INVENTOR(S) : Lawrence F. Meyer

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

Column 6, line 2, "of" should be changed
to read -- by --.

Signed and Sealed this

Fourteenth **Day of** September 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks