

[54] **STRUCTURAL COMPONENTS FOR THE COMPOSITION OF DISASSEMBLABLE PIECES OF FURNITURE**

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Related U.S. Application Data

[62] Division of Ser. No. 164,592, July 21, 1971, Pat. No. 3,722,704.

[52] U.S. Cl. **211/148, 52/582, 312/108**

[51] Int. Cl. **A47f 5/00**

[58] **Field of Search** 211/148, 177, 183; 52/582, 52/586, 585, 463, 753 D, 753 R, 753 K, 753 Y, 753 T, 594, 284; 312/108, 111, 257 R

[56] **References Cited**

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[57] **ABSTRACT**

Structural components (pieces of furniture) comprising a plurality of panels, angle members and closing plates, wherein the panels have longitudinal edges including a first coupling formation and a complementary coupling formation extending along the longitudinal edges, the first coupling formation of each panel being interfitted with the second coupling formation of another panel designed to be slidably interlocked with the former panel whereby two panels can be interlocked at a right angle. Angle members, designed to stiffen the connection between two panels and to prevent sliding movements parallel to their longitudinal edges, are provided with means for fixing them to the panels. The closing plates are each constituted to a board or sheet provided with means adapted to be engaged in the holes provided in the angle members.

10 Claims, 8 Drawing Figures

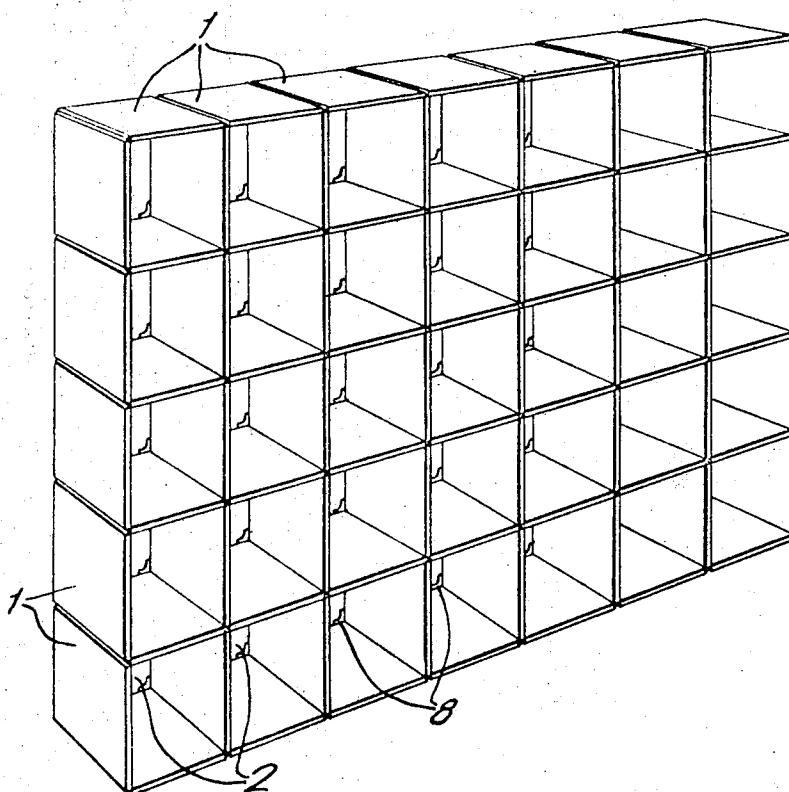


FIG. 1.

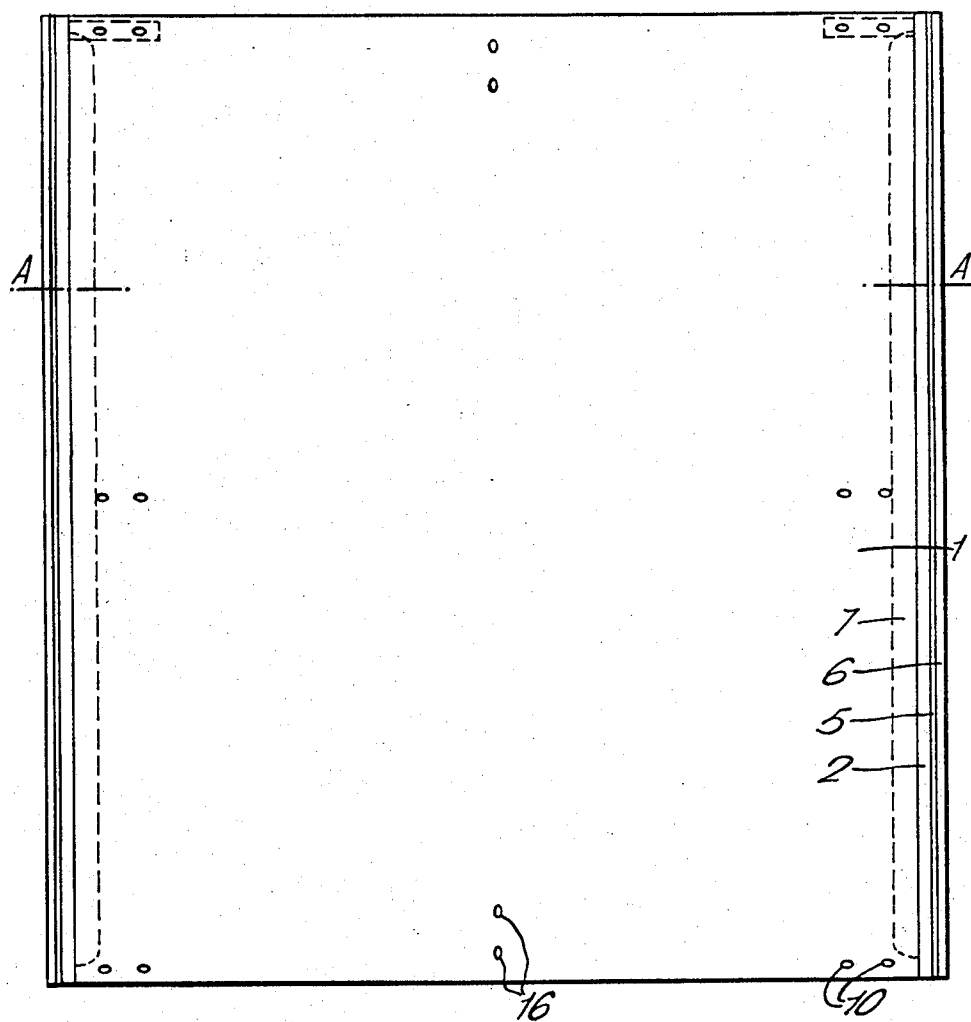


FIG. 2.

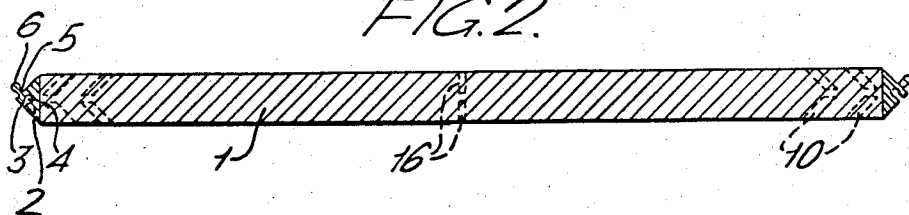


FIG. 3.

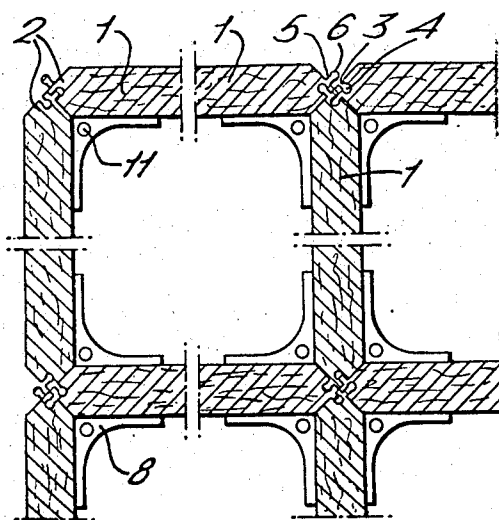
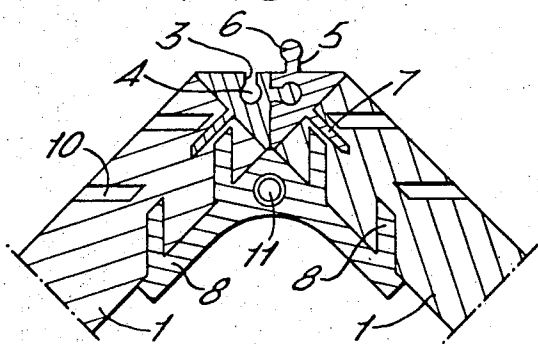


FIG. 4.



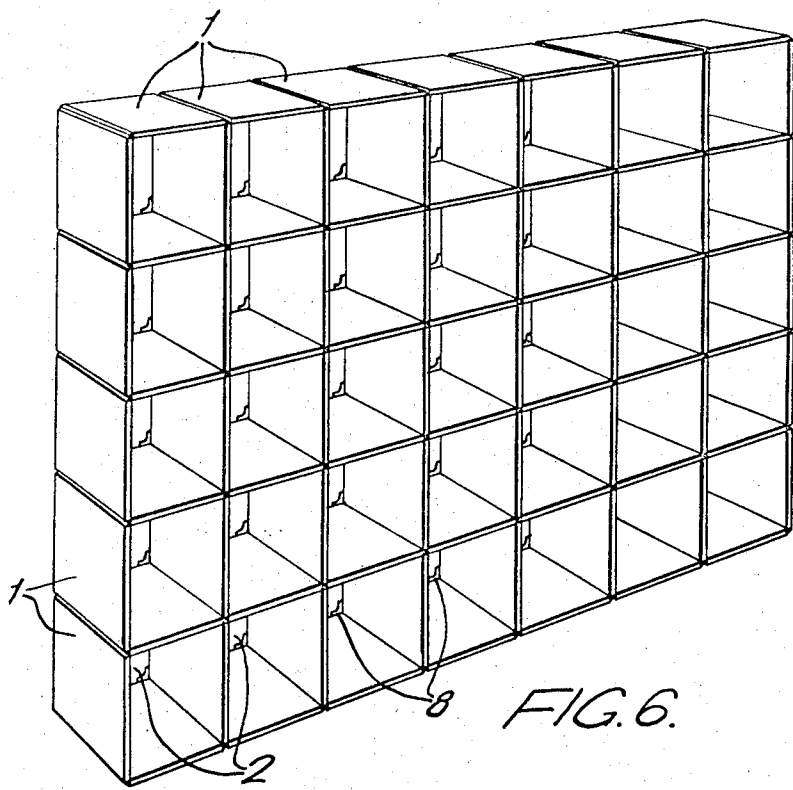
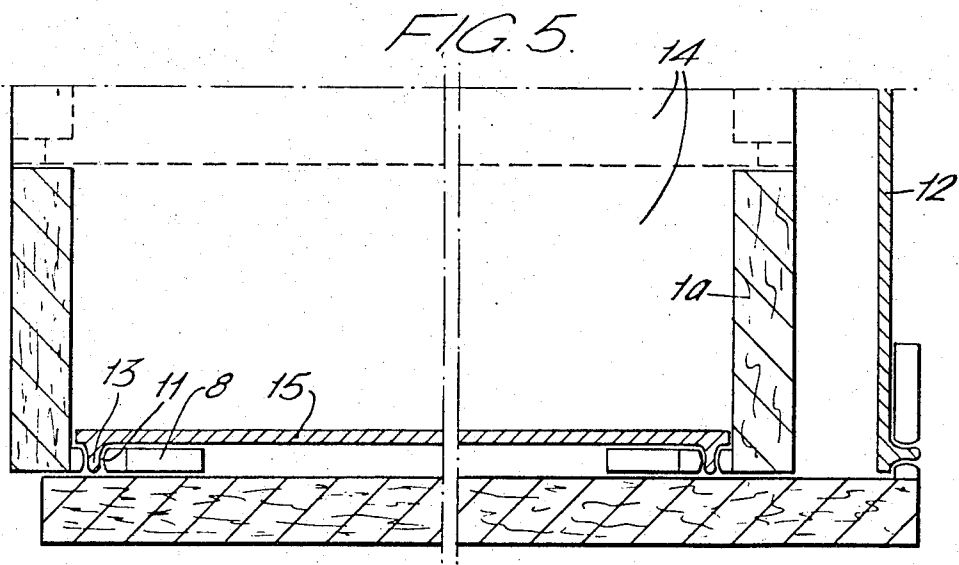


FIG. 7.

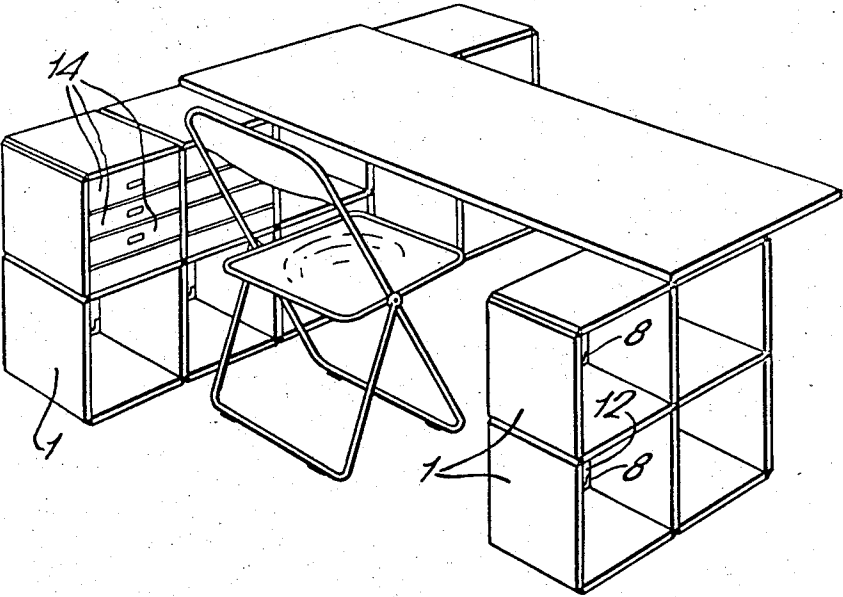
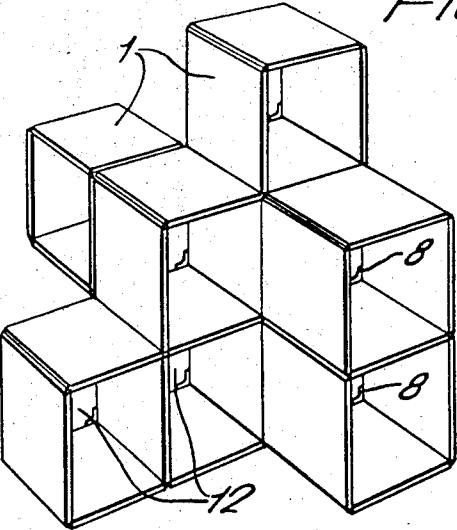


FIG. 8.



STRUCTURAL COMPONENTS FOR THE COMPOSITION OF DISASSEMBLABLE PIECES OF FURNITURE

CROSS-REFERENCE TO COPENDING APPLICATION

This application is a division of my application Ser. No. 164,592 filed July 21, 1971 (now U.S. Pat. No. 3,722,704).

FIELD OF THE INVENTION

The present invention relates to structural components which can be slidably interfitted and fixedly locked together so as to form pieces of furniture, such as wardrobes, bookshelves, writing-desks with drawers, which can be assembled without requiring the use of tools, screws or the like, and, more particularly to such structures or pieces of furniture which, after being assembled, can be also readily disassembled.

SUMMARY OF THE INVENTION

The structural components of this invention comprise, as main components, a plurality of panels. Each panel along at least one of its longitudinal edges is provided with a profile comprising a first coupling formation and a complementary second coupling formation extending along lines parallel to said edge. The panels have in general a standard width, while they can have any length. The panels can be obtained from a strip having a length which is a multiple of a modular value, the panels of any desired length being cut off from the strip. All the panels are similar and can be mutually interlocked by slidably interfitting the male element or rib of one panel and the female element or groove of another panel (i.e., the first and second coupling formations respectively of the two panels) to cause the panels to be interlocked together. Owing to the particular operative position of the coupling formations, which act in planes at right angles to one another and at an angle of 45° to the longitudinal center (median) plane of the panel, two interfitting panels can be interconnected at an angle of 90° with respect to one another. Three panels can be interconnected together so as to form a T-junction and four panels can be cross-connected to each other. The panels, so interengaged with one another, form a plurality of modular box-like elements defining compartments which are rectangular in cross-section, and which can be superposed and/or juxtaposed along at least one of the three directions. The box-like modular elements can be set at right angles to one another, and parallel to the corners of a panel, the compartments having at least two closed sides formed by these panels.

Two interfitting panels are fastened together by removable angle members provided with means engageable with the panel bodies near the junction corner.

Further the structural components comprise plates which close one of the open ends of one or more adjacent modular elements. These plates are designed to constitute the roofing (top), and/or the bottom and/or the rear wall of one or more compartments, and are provided with gripping means or the like receivable in seats arranged in said angle members.

Using the aforescribed structural components, pieces of furniture can be made with inner compartments which have at least one open side. Drawers for

said pieces of furniture can also be constructed according to the same principle. The side walls of the drawer are formed by such panels, while the bottom can be one means of the aforesaid plates. The drawer, alternately, can be constituted of a crystal (transparent) sheet or the like which is supported by looking devices inserted in the seats of the angle members, or by conventional means.

By using the structural components of this invention, pieces of furniture of various designs can be made, wherein the panels constitute the support structure, while the angle members serve to stiffen the junctions between two interfitting panels and, at the same time, prevent any sliding movement of one panel relative to another in the direction along which the first and second coupling formations extend. The covering plates act as closing members as well as bracing means for the support structure because of the gripping means engaged in the seats provided in the angle members.

A plurality of modular box-like elements can be arranged in rows and/or in columns with their open ends positioned as desired. Since the open ends are aligned in a common vertical plane, a wardrobe or a shelf structure can be erected. The presence of drawers is optional and depends on the intended use of the piece of furniture.

The sets of modular elements arranged in columns spaced apart from one another and associated with an upper board or plate form a writing-desk, optionally provided with drawers. Several modular elements connected selectively to one another along one or more of directions of the three Cartesian coordinate axes and having their open ends in coplanar alignment with two of these three directions and arranged in one or more levels, from a book-case or a shelf structure. Of course, the pieces of furniture described are given merely examples of some of the most common practical embodiments of the invention.

DESCRIPTION OF THE DRAWING

This invention is hereinafter described in a more detailed manner with reference to the accompanying drawing, in which:

FIG. 1 is a plan view of a panel provided with first and second coupling formations along both the longitudinal edges;

FIG. 2 is a cross section taken along line A—A of FIG. 1;

FIG. 3 is a cross section taken perpendicularly to the inter-fitting edges of a member of panels forming interconnected modular elements;

FIG. 4 is a cross-sectional detail, in an enlarged scale, of an angle junction of the structure shown in FIG. 3;

FIG. 5 is a partial vertical cross section of a modular element constituting a drawer, wherein the panels of this invention form the four side walls of said drawer, the section being taken along the plane passing through the axes of the pins projecting downwardly from the bottom plate and designed to be received in holes arranged in the stiffening angle members, the broken lines indicating optional superposed additional drawers; and

FIGS. 6 to 8 show diagrammatic perspective views of some different compositions.

SPECIFIC DESCRIPTION

With reference to the drawing it is to be that the main structural component pieces of furniture according to this invention are panels which are constituted of rectangular plates 1, the widths of which are of a standard value, while their length depends on that of the modular prismatic elements to be made. The panels 1 (FIGS. 1 and 2) are preferably made of plastic or other suitable lightly resilient material and each have two longitudinal edges shaped as to form a first coupling formation and a complementary second coupling formation, acting respectively in two directions at a right angle and at an angle of 45° to the longitudinal median plane of the respective panel. The coupling formations are preferably obtained by the use of an inserted metallic profile 2 shaped by an extrusion process and fixed to the panel body by suitable means 7 as hereinafter described.

each profile 2 (FIG. 4) has two mutually orthogonal float surfaces forming an angle of 45° with the longitudinal median plane of the panel to which the profile 2 is fixed so that the cross section forming an isosceles right-angle triangle where its hypotenuse is in contact with the edge of the panel 1 in which the profile 2 is inserted, (FIGS. 2, 4 and 5). Thus as two panels 1 are interengaged together one pair of the said flat surfaces are in contact with one another and lie along a plane of bisecting the dihedral angle defined by the facing (inner) surfaces of two interfitted panels, i.e., the plane of the junction between two interfitted panels coincides with the bisecting plane so that the coupling formations are able to act in a direction perpendicular to this plane. therefore the first coupling formation or male element 6 projects outwards from one of said flat surfaces of the profile 2 and the complementary second coupling formation or female element 9 is sunk into the other flat surface of the same profile 2. the

The male and female elements, which have complementary configurations, are so positioned that the male element or bead 6 of the profile 2 (integral with one panel 1) mates with the female element (or groove) 4 arranged in the profile 2 of the panel 1 designed to be interlocked with the former panel as they are slidably interfitted.

The coupling formations are so shaped (i.e., the bead has a head thicker than its web) the disconnection of the interfitted panels 1 under the effect of stresses substantially perpendicular to the direction along which the panels 1 are caused to slide (i.e., perpendicular to the bisecting plane) in order to attain their interfitted arrangement.

The female element is constituted by the groove 4 provided with a longitudinal, transversely restricted entrance opening 3, while the male element is constituted by a complementary longitudinal projecting rib 6 provided with a web of reduced thickness defining longitudinal side recesses 5 so as to be able to be slideably received in the groove 3, 4 of the panel 1 associated therewith.

The restricted portion defined by the recesses 5 inserted in the restricted orifice 4 prevents separation of one panel 1 from the interfitted panel 1. Thus by connecting to each other two, three or four panels 1 so as to meet in a common straight line at a corner (FIG. 4), a T-configuration and a cross configuration (FIG. 3) can be obtained. The panels 1 can only slide in the di-

rection of the longitudinal edges of the interengaged panels, i.e., parallel to the coupling formations provided in the profiles 2 fixed thereto.

In order to prevent this longitudinal movement, removable members are inserted near the corner where the panels 1 interfit with one another, the members being also provided to cooperate in stiffening the connection between interfitted panels 1.

Each of said members is constituted by an angle body 8 (FIG. 4) having two mutually orthogonal surfaces from which outwardly project cylindrical pins 9 having axes lying in planes perpendicular to both the mutually orthogonal surfaces, and at an angle of 45° with respect to the respective surface opening towards the corner at which the orthogonal surfaces meet.

At the zones of the panels 1, where two angle members 8 are to be secured to the panels 1, similarly inclined holes 10 are arranged in the panel 1 into which the pins 9 can be inserted with a light friction fit, as the angle member 8 is caused to approach the corner, formed by the two interfitted panels 1, direction perpendicular to said corner, while maintaining said angle member 8 equally spaced apart from the facing surfaces of the two interlocked panels 1 (FIGS. 3 and 4).

The angle members 8 are also provided with at least one hole 11, having an axis parallel to both the mutually orthogonal surfaces of the member 8 and designed to receive and resiliently lock a pin 13 (FIG. 5) outwardly projecting from a plate 12 designed to close one of the open ends of one or more modular elements constituted by two, three or four panels 1. The plate 12 near each of its corners or vertices has the said projecting pin 13. Of course, in the case wherein a single plate 12 is designed to close a plurality of interconnected modular elements, the plate 12 will have a greater length. Further in this case the plate 12 can be placed only outside of the elements so that it must have longer pins 13, enabling engagement in the holes 11. A plate 12 is used to close a side of a single modular element and can also be embedded between the walls of the panels 1 forming this modular element. The pins 13 are preferably shaped as double cones having a central restricted portion and the holes 11 have a substantially complementary form so that the pins 13 can enter through the holes 11 with a light deformation, owing to the fact that the plates 12, as well as the pins 13 are made of plastic material. Thus the pins 13 can be fixed into the holes 11 with a light friction (FIG. 5) and afterwards the plates 12 are stabilized.

As has hereinabove been stated, by the use of panels 1, modular elements of a rectangular cross section can be constructed which can in turn be variously combined so as to obtain a plurality of juxtaposed and/or superposed compartments so as to form pieces of furniture of different designs as, for instance, a wardrobe or shelf structure (FIG. 6), a writing-desk (FIG. 7) and a book-case (FIG. 8). All the open ends of all or of a number of compartments may face one of the directions of three axes parallel to the corners of the modular elements. In the case where the modular elements are formed with four panels 1, they may also constitute independent units which can be connected to each other by screws inserted in holes 16 (FIGS. 1 and 2) which can also have different positions, if staggered or angularly turned dispositions of the modular elements are desired.

By the use of the structural components of this invention, drawers 14 can be made; for such a purpose four interfitting panels 1a of a same height are used to form the side walls of the drawer 14, said walls being stiffened by the insertion of lower angle members 8, on which is placed a plate 12, the pins 13 of which will be engaged into the holes 11 of said members 8. Of course, said plate 12 could also be substituted with a sheet of crystal or any other suitable material, on which pins could be fixed similar to the pins 13; also other locking means, can be used.

I claim:

1. A structural unit comprising at least three substantially identical panels having parallel edges, a connecting member secured along each of said parallel edges, each connecting member having a pair of outwardly converging faces at substantially a right angle to one another and at angles of 45° to a median plane through the panel, one face of each of said members being formed with a longitudinally extending groove and the other face of each member being formed with a longitudinally extending rib substantially perpendicular to the respective other face and complementarily receivable in a said groove of another connecting member, said panels forming at least two right angles between them and being interconnected at angular junctions by said ribs and grooves, at least one angle reinforcement secured to the adjacent inner surfaces of said panels at each of said junctions having holes opening in a direction parallel to the ribs and grooves at the respective junction at least along one side of said panels, and a plate spanning said side and having pins extending in said direction and receivable in said holes whereby said plate is perpendicular to said panels.

2. The structural unit defined in claim 1 wherein each of said pins is of doubly-conical configuration with a

constricted region intermediate a pair of enlarged portions, said holes being of a configuration complementary to that of said pins.

3. The structural unit defined in claim 1 wherein said reinforcements are provided with pins extending at angles of 45° to the legs thereof and received in the panels of the respective corners.

4. The structural unit defined in claim 1 wherein said plate forms the bottom and said panels form the wall of a drawer.

5. The structural unit defined in claim 1 wherein said panels define four sides of a box and said plate closes an end of said box.

6. The structural unit defined in claim 5 wherein said plate is received within said box and said pins extend into said holes from the interior thereof.

7. The structural unit defined in claim 5, further comprising additional similar panels connected to at least some of the first-mentioned panels at the respective members whereby a plurality of boxes are formed in stacked relation, thereby producing a furniture module.

8. The structural unit defined in claim 7 wherein said two such modules are disposed in spaced-apart relation, further comprising a desk top seated on said modules.

9. The structural unit defined in claim 8 wherein at least one of said modules is formed with a drawer comprising panels interconnected along their edges by such members and a further such plate forming the body of the drawer.

10. The structural unit defined in claim 7 wherein said boxes are disposed in a horizontal array of adjacent rows of vertically stacked boxes.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,856,147 Dated Dec. 24, 1974

Inventor(s) Giancarlo Piretti

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

The term of this patent subsequent to March 27, 1990,
has been disclaimed.

Signed and Sealed this

Seventeenth Day of August 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks