Furniture and room components which can readily be assembled in various combinations to form any of a wide variety of furniture units or room partition units, with the units easily disassembled when desired. The components include vertical support members, vertical and horizontal edge members, corner members and panel members. The panel members can include sliding doors, vertically hinged doors and horizontally hinged doors.

9 Claims, 39 Drawing Figures
FURNITURE AND ROOM PARTITION COMPONENTS

The present invention pertains to furniture and room partition construction. More particularly, the present invention pertains to components which can be readily assembled to form a wide variety of furniture units or room partition units with the units readily disassembled when desired.

The majority of furniture units available are preassembled in a fixed configuration. This to a degree limits their adaptability to different locations. Often, a person has a particular location in which he desires to have a particular type of furniture unit, only to find that there are no furniture units of the desired type available which would fit the location or that only a very limited number of satisfactory furniture units are available with little selection of style. It also frequently occurs that a furniture unit is obtained for a particular location in a person's home, but that subsequently the person moves to a different home having no location suitable for the particular furniture unit. Consequently, in such situations it is necessary for the person to dispose of the furniture unit and obtain a new one suitable for the new location. This difficulty can occur even when the person has not moved to a new home, for example, should he choose to rearrange the furniture in his home. Many furniture units having the same function have different designs to provide a variety of sizes and styles. If the furniture units are provided as finished items, this variety necessitates a laborious and costly manufacturing process. Furniture components have been provided from which a plurality of furniture items can be assembled and disassembled as desired. These furniture components, however, have had little strength, and so the resulting furniture items have been unable to support more than a nominal load.

Likewise, room partitions are frequently desired to divide or rearrange the layout of a room. Often it is desired to have such partitions relatively readily movable so that the room partitioning or layout can be rearranged rapidly with only small effort.

The present invention is an arrangement of components adapted for ready assembly in a variety of combinations to provide a variety of furniture units and a variety of room partition units. The units can be readily disassembled and reassembled to permit alteration of the designs and to permit easy moving of the units from one location to another. Since the wide variety of units are assembled from a relatively limited number of fixed components, the components can be produced in large quantity, thus reducing the manufacturing cost. In accordance with the present invention, units are assembled from a plurality of vertical support members, a plurality of vertical and horizontal edge members, a plurality of corner members, and, if desired, hinged members and panel members. The vertical support members are adapted to support a considerable weight so that the resulting units are capable of supporting a reasonable load such as a quantity of books or dishes. The vertical and horizontal edge members can be provided in a variety of types to provide units with a variety of styles.

These and other aspects and advantages of the present invention are more apparent in the following detailed description and claims, particularly when considered in conjunction with the accompanying drawings in which like parts bear like reference numerals. In the drawings:

FIG. 1 is a perspective view illustrating one example of a furniture unit assembled from components in accordance with the present invention;
FIGS. 2A and 2B are an exploded view and an assembled view of a first type of corner assembly suitable for use in units in accordance with the present invention, and illustrate area 2 of FIG. 1;
FIG. 3 is a fragmentary sectional view taken along line 3—3 of FIG. 1;
FIGS. 3A and 3B are exploded views of other corner assemblies and illustrate areas A and B of FIG. 3, respectively;
FIGS. 4 and 5 are sectional views taken respectively along line 4—4 and along line 5—5 of FIG. 1;
FIGS. 6, 7 and 8 illustrate alternative forms of edge members suitable for use in units in accordance with the present invention;
FIG. 9 is an exploded view of another type of corner assembly suitable for use in units in accordance with the present invention and illustrates area 9 of FIG. 1;
FIGS. 10A and 10B are respectively an exploded view and an assembled view of a first type of hinge member suitable for use in units in accordance with the present invention and illustrate area 10 of FIG. 1;
FIGS. 11A, 11B and 11C depict another type of hinge member suitable for use in units in accordance with the present invention and illustrate area 11 of FIG. 1;
FIGS. 12, 13 and 14 illustrate an alternative form of corner assembly suitable for use in units in accordance with the present invention, with FIG. 13 taken along line 13—13 of FIG. 12, and with FIG. 14 taken along line 14—14 of FIG. 13;
FIGS. 15, 16, 17 and 18 illustrate alternative forms of vertical edge members suitable for incorporation into units in accordance with the present invention, with FIG. 18 taken along line 18—18 of FIG. 17;
FIG. 19 is a perspective view of an alternative form of horizontal edge members;
FIG. 20 is an enlarged fragmentary plan view of area 20 on FIG. 19;
FIG. 21 is a sectional view taken along line 21—21 of FIG. 20;
FIG. 22 is a broken, partially sectional side elevation view of a portion of a unit including horizontal edge members of FIG. 19;
FIGS. 23A, 23B and 23C illustrate different types of horizontal edge members in accordance with FIG. 19;
FIG. 24 is a sectional view illustrating the manner of assembling a continuous horizontal surface of indefinite length using the horizontal edge members of FIGS. 23A, 23B and 23C, with the three portions of FIG. 24 being views taken respectively along lines 24A—24A, 24B—24B and 24C—24C on FIGS. 23A, 23B and 23C, respectively;
FIG. 25 illustrates a variation of the horizontal edge member of FIG. 19;
FIG. 26 illustrates a slightly modified form of horizontal edge member;
FIG. 27 illustrates an alternative form of horizontal support member incorporated into a unit in accordance with the present invention;
FIG. 28A depicts a further alternative form of horizontal support member, and FIG. 28B illustrates a unit made therefrom.

FIG. 29 illustrates yet another form of horizontal support member, and FIG. 30 depicts a connector in accordance with the present invention.

FIG. 1 illustrates a cabinet which is representative of furniture units that can be assembled from components in accordance with the present invention. Cabinet 30 includes several sections which further illustrate the different types of furniture which can be assembled from components in accordance with the present invention. Section 31 comprises a cabinet section having vertically hinged door panels 32. Cabinet section 33 comprises upper and lower horizontal panels 34 suitable for holding books, records, dishes, etc. Cabinet sections 35 are sections having horizontal sliding door panels 36. Section 37 comprises a cabinet having a horizontal hinged door panel 38. The several cabinet sections include vertical edge members 39, horizontal edge members 40, corner assemblies 42, vertical side panels 44 and horizontal panels 46.

FIG. 2A is an exploded figure of a corner assembly 42 which is made up of first and second connector portions 50, each having a head portion 52 and a shank portion 54. A hole 56 passes through each head portion 52. As seen in FIG. 2A, each horizontal edge member 40 is a hollow tube having a substantially square cross section of a size to fit snugly over the shank portion 54 of a connector portion 50. The head portion 52 of each connector portion 50 has a thickness slightly greater than one-half the thickness of the shank portion 54 so that when the two head portions 52 are placed in juxtaposition, with the holes 56 aligned, and horizontal edge members 40 are in place over the shank portions 54, the resulting corner assembly has a substantially uniform thickness, as seen in FIG. 2B. Preferably, also one or more tapped openings 58 are provided in each shank portion 54 and a like number of openings 60 are provided in horizontal edge members 40 so that when the horizontal edge members are positioned over shank portions 54, bolts 62 can be inserted through openings 60 into tapped openings 58 to secure the horizontal edge members in place. Bolt 64 is provided to pass through openings 56 in head portions 52 and to mate with internally threaded pipe or vertical support member 66. Vertical edge member 39 fits over vertical support member 66 to provide a finished appearance. In the illustrative example depicted in FIGS. 1 and 2B, vertical edge member 39 has a substantially square cross section to match horizontal edge member 40. If desired, of course, edge members 39 and 40 could have circular or other cross sections. FIG. 2B thus shows the assembled corner member 32.

FIG. 3 is a sectional view illustrating assembly of a vertical support member and horizontal and vertical edge members and is illustrative of that seen along line 3—3 on FIG. 1. On the upper portion of the vertical support a corner assembly 42 is provided including connector portions 50 and vertical support member 66 which are secured together by means of bolt 64. Vertical edge member 39 is positioned over vertical support member 66 to provide a finished appearance. A through bolt or double-ended bolt 68 is threaded into the lower end of vertical support member 66. FIG. 3A is an exploded view showing the components of the upper intermediate junction at area A of FIG. 3. A connector portion 50 is provided to support a horizontal edge member 40. Connector portion 50 mates with a double-ended connector portion 70 which includes a head portion 72 and two shank portions 74 extending in opposite directions from head portion 72. Thus, connector portion 50 and connector portion 70 mate to form a T joint. A horizontal edge member 40 is provided for each shank portion of the joint.

The horizontal edge members 40 include support flanges for the vertical and horizontal panels 44 and 46 and for the sliding door panels 36. Thus, as seen in FIG. 3A, horizontal edge member 40a is provided with a pair of upwardly extending flanges 86 to form a single channel which supports vertical side panel 44 of cabinet section 35, a pair of downwardly extending flanges 88 which form a single channel to support vertical side panel 44 of cabinet section 31 and a flange 90 extending from each side of horizontal edge member 40a to support the horizontal panels 46 of cabinet sections 31 and 33. Similarly, horizontal edge member 40b includes three upwardly extending flanges 92 which form two channels to support sliding door panels 36 of cabinet section 35. Horizontal edge members 40b and 40c each include a flange 94 extending from one side to support horizontal panels 46 of cabinet sections 31 and 33. The horizontal edge members 40 can be provided with a variety of combinations of flanges to permit assembly of any combination of components.

Double ended bolt 68 has one of its threaded ends threaded into the lower end of the upper vertical support member 66. Bolt 68 passes through opening 56 in head portion 52 and through opening 76 in head portion 72 and has its second end threaded into lower vertical support member 66. That vertical support member is likewise within a vertical edge member 39. FIG. 3B is an exploded view of the components of the lower intermediate junction at area B of FIG. 3. As seen in FIGS. 3 and 3B, a second double-ended bolt 68 is threaded into the bottom end of the lower vertical support member 66 and passes through connector portions 50 and 70 of a lower T joint and into a foot or lower support member 78. Preferably, foot 78 includes a rigid upper portion 80 having an internally threaded opening 82 to receive bolt 68 and a somewhat resilient lower portion 84 to rest on the floor or other supporting surface.

FIG. 4 illustrates horizontal edge member 40a supporting vertical side panels 44 and horizontal panels 46 and 96 of cabinet sections 31, 33 and 35. FIG. 5 illustrates another form of horizontal edge member 40 supporting sliding door panels 36, vertically hinged door 32 and lower shelf panel 96 within cabinet section 35. Since shelf panel 96 is intended to support items within cabinet section 35, it preferably has a greater thickness than does horizontal panel 36. Accordingly, flanges 98 which support shelf panel 96 are positioned to mate with the thicker shelf panel.

FIG. 6 illustrates an alternative form of horizontal edge member 100 in which channels 102 are formed in recesses in the surfaces of the edge member to support vertical panels, and in which a flange 104 is formed integrally with the side of the horizontal edge member to support a horizontal panel. The channels 102 extend into tube 100 and a plurality of flanges 106 are provided within tube 100 to define a zone 108 which will
3,835,354

accept the shank 54 or 74 of a corner connector portion 50 or 70. FIG. 7 depicts another alternative form of horizontal edge member 110 in which each surface incorporates a V groove 112 adapted to receive an insert or tongue. FIG. 8 illustrates several types of inserts for use with horizontal edge member 110. Thus, insert 116 provides double channels to accommodate sliding door panels. Insert 118 provides a single channel to support a vertical side panel. Insert 120 provides a flange to support a horizontal panel and insert 122 provides a flat surface to be flush with the outer surface of edge member 110. The inserts depicted in FIG. 8 are only illustrative of the several types which might be provided for use with horizontal edge member 110, and utilizing such inserts a single design of horizontal edge member can be utilized to provide a wide variety of capabilities.

FIG. 9 illustrates the forming of a corner by means of two double-ended corner members 70, a double-ended bolt 68 and two internally threaded vertical support members 66. Such a corner might be provided at the junction of cabinet units 31, 33, 35, and 37, at area 9 of FIG. 1.

FIGS. 10A and 10B illustrate components for forming a vertical hinge such as provided for door panels 32. An insert 124 is provided with an opening 126 to fit about vertical support member 66. Finger 128 extends from the horizontal surface of insert 124 and fits in a corner between vertical edge member 39 and vertical support member 66 to prevent rotation of insert 124. Hinge pin 130 extends from insert 124 to fit within recess 132 in vertically hinged door panel 32.

FIGS. 11A, 11B and 11C illustrate the hinges for the horizontally hinged door panel 38. The vertical edge member 39 associated with horizontally hinged door panel 38 includes two flanges 134 to provide a channel within which spacer block 136 is positioned. Hinge pin 138 extends from door 38 into that same channel. Spacer block 136 has a length sufficient to prevent door panel 38 from binding as it is opened. In place the hinge assemblies of FIGS. 10A, 10B, 11A, 11B and 11C, the hinge disclosed in copending U.S. Patent application Ser. No. 237,146, filed Mar. 22, 1972, could be utilized.

FIGS. 12, 13 and 14 illustrate an alternative form of corner assembly 140. Corner assembly block 140 has a V groove 142 in each of its faces. In addition, a hole 144 is provided through corner assembly block 140 of a size to permit passage therethrough of a bolt 64 or a bolt 68. Support member 146 includes tongue 148 to mate with a groove 142. An opening 150 extends into support member 146 from end 152 opposite tongue 148. A threaded opening 154 passes through tongue 148 to opening 150. When corner support member 146 is in place in corner assembly block 140, bolt 156 is threaded through opening 154 to engage recess 158 on the interior surface of V groove 142, thus securely fastening support member 146 to corner assembly block 140. Horizontal edge member 40 fits over support member 146. If no corner support member 146 is to be attached to a side of corner assembly block 140, an insert 122 can be utilized to provide a finished appearance. Support member 146 could have a cross section other than the illustrated square cross section, if desired.

FIGS. 15, 16, 17 and 18 depict alternative forms of vertical edge members illustrative of those which can be utilized to provide various styles in accordance with the present invention. Vertical edge member 160 of FIG. 15 is a smooth, tapered, contemporary design. Vertical edge member 162 of FIG. 18 is a more ornate design. Vertical edge member 164, shown in FIGS. 17 and 18, includes vertical grooves. Each vertical edge member 160, 162 and 164 has a central opening 166 therethrough for passage of a vertical support member 66. Vertical edge members 160, 162, and 164 might be made of wood. It is thus seen that by use of such vertical edge members, a variety of styles of furniture or of room partitions can be provided in accordance with the present invention.

FIG. 19 depicts an alternative form of horizontal edge member 168, which for example can likewise be manufactured of wood. Horizontal edge member 168 is essentially a rectangular frame having grooves in its horizontal surfaces. As seen in FIGS. 20 and 21, a groove 170 is provided along one side of a horizontal surface of edge member 168 to receive a vertical panel, and a pair of grooves 172 are provided along a second side of member 168 to receive sliding door panels. The horizontal edge members 168 can be provided with a variety of combinations of grooves 170 and 172 adjacent the various edges of the upper and lower horizontal surfaces to accommodate a variety of combinations of panels, as desired. A hole 174 passes through each corner of member 168 to permit passage of bolts 64 or 68, as depicted in FIG. 22. In the upper surface of member 168 a recess 176 is provided to receive a horizontal panel 46, as seen in FIG. 21. The horizontal edge member 168 can be installed in units to any desired height as illustrated in FIG. 22.

FIGS. 23A, 23B and 23C show three forms of a slightly varied horizontal edge member. Horizontal edge member 178 in FIG. 23A has a recess 180 along one edge of its lower surface. Horizontal edge member 182, shown in FIG. 23B, has a recess 184 along one edge of its upper surface and a recess 186 along the opposite edge of its lower surface. Horizontal edge member 188 of FIG. 23C has a recess 190 along one edge of its upper surface. As seen in FIG. 24, the recesses 180, 184, 186 and 190 permit joining of these horizontal edge members to provide surfaces of any desired horizontal dimension. FIG. 25 illustrates the use of a single type of horizontal edge member 182, with recesses 184 and 186, together with blocks 192 which are adapted to fit into the recesses 184 and 186, permitting conversion of the horizontal edge member 182 into any one of the other styles shown as horizontal edge members 168, 178 or 188. As illustrated in FIG. 26, horizontal edge members of this type can also be provided with designs along the vertical edges to provide additional styles. If desired, only one type of horizontal edge member 182 need be provided and having two grooves such as groove 172. In such instance, blocks 192 can be used as needed, and door panels can be inserted in the two grooves 172 or vertical side panels can be inserted in the outer groove 172, hiding the inner groove. By this means, production can be simplified since only one type of horizontal edge member need be produced. In addition, if desired the horizontal edge members can be made as full shelves, with or without recesses 180, 184, 186 and 190, and omitting the central opening and recess 176.

FIG. 27 illustrates a horizontal edge member 196 having notches 198 on opposite faces at the opposite
ends thereof to permit mating of two members 196, either at right angles as depicted in FIG. 27 or aligned, and having threaded holes 200 therethrough. Bolts 64 and 68 and vertical support members 66 can be utilized with members 196 to form furniture or room units. If desired, each vertical support member 66 can have a hole 67 passing therethrough for insertion of a pin or bar to aid in tightening the vertical support member and bolt 64 or 68. This, of course, can likewise be done with vertical support members 66 of FIGS. 2 and 3. For room units, a pin 202 can be inserted into hole 200 from the upper side and a bolt 204 threaded into hole 200 from the lower side. Then with the lowest vertical support member 66 resting on the floor, pin 202 contacts the ceiling, and as bolt 204 is threaded into hole 200, it moves pin 202 out to bear against the ceiling, thus stably supporting the room unit between the floor and ceiling.

If a horizontal shelf is desired intermediate the ends of vertical support members 66, a ring 206 is placed over each vertical support member and is secured at the desired location by means such as a set screw 208. Horizontal shelf frame 210 is then supported on rings 206. Frame 210 could be a horizontal support member 168 as in FIG. 19 or it could be formed as a combination of members 196.

FIG. 28A depicts a horizontal edge member 212 having a notch 214 in one surface at each end and one or more notches 216 in the opposite surface intermediate the ends. As illustrated in FIG. 28B, a plurality of members 212 can be combined, with bolts 64 and vertical support members 66 to form furniture or room units. If desired, some of the bolts 64 and vertical support members 66, for example those in the end notches 214, could be replaced by pins 202 and bolts 204 to permit installation of the unit of FIG. 28B between a floor and a ceiling.

FIG. 29 depicts another form of horizontal edge member 218 having a substantially cross-shaped cross section including a central portion 220 and four outer portions 222, one extending in each direction from central portion 220. Each horizontal surface has a V groove 224 therein. Likewise, the outer vertical surfaces of outer portions 222 have V grooves 224 therein. V grooves 224 support horizontal and vertical panels 226 which can include tongue portions to mate with V grooves 224, if desired. In addition, if desired, a vertical panel 228 can be provided with a tongue 230 on one side thereof to support such panel 228 on horizontal support member 218. Preferably, hole 232 is provided through horizontal edge member 218 for passage of a bolt 64 or 66 to permit attachment to a vertical support member 66.

FIG. 30 illustrates a substantially cross-shaped connector 234 having a plurality of holes 236 in each arm of the cross to accommodate bolts 64 or 68 which fasten support members thereto to permit extension of a unit incorporating such connector.

It is thus seen that in accordance with the present invention, furniture units can be assembled in a variety of styles from a relatively limited quantity of components. Although the present invention has been described with reference to preferred embodiments, numerous modifications and rearrangements could be made and still the result would be within the scope of the invention.

What is claimed is:

1. Components capable of assembly into furniture and units comprising:
   - vertical support members;
   - vertical edge members, each having a longitudinal opening therethrough for passage of a vertical support member, and at least some of said vertical edge members including first panel support means for supporting a vertically disposed panel;
   - a plurality of rectangular horizontal frame members, each having an opening at each corner thereof for passage therethrough of a vertical support member, having at least one groove therein to form a second panel support means for supporting a vertically disposed panel, and having a recess in a horizontal surface thereof to form a third panel support means for supporting a horizontally disposed panel;
   - a plurality of bolts adapted to pass through said rectangular frame members corner openings and to attach to said vertical support members to permit assembly of a corner unit; and
   - panel members engageable in said first, second, and third panel support means to provide furniture and room units.

2. Components as claimed in claim 1 in which said one of said some of said rectangular frame members has a recess along one edge thereof.

3. Components as claimed in claim 2 in which, at least some of said rectangular frame members have a recess along two opposite edges thereof.

4. Components as claimed in claim 1 in which, at least some of said rectangular frame members have a recess along two opposite edges thereof.

5. Components as claimed in claim 4 further comprising a plurality of elongated block members adapted to mate with said rectangular frame members in the edge recesses thereof.

6. Components as claimed in claim 1 in which at least some of said rectangular frame members have a recess along at least one side thereof adapted to mate with a recess along one side of another rectangular frame member to form a horizontal surface of any desired length.

7. Components capable of assembly into furniture and room units comprising:
   - vertical support members;
   - vertical edge members, each having a longitudinal opening therethrough for passage of a vertical support member, and at least some of said vertical edge members including first panel support means for supporting a vertically disposed panel;
   - horizontal edge members, at least some of said horizontal edge members having notches on opposite faces of the ends thereof and at least some of said horizontal edge members having threaded openings therethrough intermediate the notches; and
   - corner assembly means adapted for attachment to said horizontal edge members and said vertical support members to permit assembly of a unit corner; and
   - panel members engageable in said first, second, and third panel support means to provide furniture and room units;
   - a plurality of bolts adapted to mate with said threaded openings; and
   - a plurality of pins adapted for insertion into said threaded openings and cooperating with said bolts
3,835,354

and said vertical support members, whereby with a pin inserted into a threaded opening upper end to engage a ceiling surface and with said vertical support members engaging a floor surface, as a bolt is threadedly engaged with the threaded opening lower end, the cooperating pin is moved out from the threaded opening upper end to secure a unit made from said components as a divider between the ceiling surface and the floor surface.

8. Components as claimed in claim 7 further comprising a plurality of ring members adapted for sliding attachment to said vertical support members, and screw means for securing said ring members at any desired point on said vertical support members to support a horizontal member thereon.

9. Components capable of assembly into furniture and room units comprising:
vertical support members;
vertical edge members, each having a longitudinal opening therethrough for passage of a vertical support member, and at least some of said vertical edge members including first panel support means for supporting a vertically disposed panel;
horizontal edge members, at least some of said horizontal edge members including second panel support means for supporting a vertically disposed panel, and at least some of said horizontal edge members including third panel support means for supporting a horizontally disposed panel;
corner assembly means adapted for attachment to said horizontal edge members and said vertical support members to permit assembly of a unit corner;
panel members engageable in said first, second, and third panel support means to provide furniture and room units;
ring members adapted for sliding attachment to said vertical support members; and
screw means for securing said ring members at any desired point on said vertical support members to support a horizontal member thereon.

* * * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION


Inventor(s) ENRIQUE TORRES-PENA

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

IN THE CLAIMS:

Column 8, claim 1, line 2, after "and"
insert --room--.

Signed and sealed this 8th day of April 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks