WALL SYSTEM

The Field of the Invention

One embodiment relates to a system for assembling a self-contained room for indoor or outdoor use, including ceiling, roof, flooring, door(s) and with integrated systems such as electrical points and lighting, ventilation and fire protection systems. The room system can be dismantled, relocated, re-installed, repurposed and reconfigured with minimum labour with no damage to the product and components. The system is able to be fully stand-alone and independent. It does not require support from adjacent ceiling, walls or floor. Nevertheless, if it is a user requirement, the system is also able to be integrated and attached to existing walls and ceilings. The system can also be disassembled for flat-pack storage and shipping. The system does not disrupt the structural foundation of the site eliminating the need for re-instatement costs and is also aesthetically pleasing.

Background

Offices and businesses commonly reconfigure office space by using walls and partitions to divide large areas into individual offices, open plan work areas, conference / meeting rooms and booths for phone conversations and meeting purposes. Homes, retail businesses, restaurants and cafes often require re-configuration, including the construction of outdoor stand-alone structures to increase floor space.

Modular walls, partitions and panels that are available in the market are usually free-standing or attached to permanent walls, ceiling (including suspended ceiling) or floors in the desired configuration. Various forms of connectors or hardware can be used to connect

the walls or panels. Typically, once the room is configured, it is not possible to dismantle or re-configure or re-install or re-locate the room and/or the wall, and ceiling components. Furthermore, damage may occur to the permanent walls or floors to which the structure was attached. Walls or panels may not be re-usable or re-purposed due to damage caused by the earlier installation methods.

Brief Summary of the Invention

One embodiment is a modular hanging system consisting of a structure of a strong material, which can be steel or other metal, rods, a variety of wall/ceiling panels and fittings, hanging profiles, hollow section connectors and uprights with carpentry. One embodiment includes a swing, sliding and a slide-and-park door. Another embodiment includes one or more glass wall panels achieving single or double glazed panels. A further embodiment includes electrical and/or light fittings. Another embodiment includes roof panels and/or ceiling panels with a magnetic connector for a pitched roof coupled with a sealed capping on the top of the structure to keep the internal cube connectors dry for outdoor use.

This embodiment may be used to create indoor and outdoor spaces which are easily and quickly installed and dismantled. Parts and components may be pre-engineered and pre-fabricated in order to reduce time spent in the process of fitting-out a

space as components are very quickly deployed. The present invention may consequently utilize a minimised and low-skilled labour force in its assembly and disassembly.

This embodiment is easily dismantled, re-usable, re-locatable and can be easily disassembled for flat-pack storage and shipping. The assembly requires a minimum number of different components. Components are put together and taken apart with only

a Hex key. The components of the present invention are 99% recyclable. The reconfigurable components of the present invention and the open-ended system extend the product lifecycle as they can be repurposed to suit the changing needs of the user, for example, by adding on an adjacent wall panel to extend the overall space. Importantly, the present invention is cost effective as it does not disrupt or cause any damage to the building such as wall, floor and ceiling. hereby eliminating the need for any reinstatement costs.

Brief Description of the Drawings

The drawings appended more particularly describe the present invention but only depict typical embodiments and are not to be considered as limiting the scope of the invention.

Figure 1 A illustrates an exploded perspective view on the assembly of the structure of the present invention;

Figure 1B illustrates a completed perspective view of the modular assembly of Figure 1A;

Figure 2A illustrates a perspective view of a hollow rod with a square profile featuring the cube connectors utilized in forming the structure of the present invention;

Figure 2B is an opposite view of a hollow rod having a cube connector inserted therein;

Figure 2C shows three hollow rods with different cube connectors;

Figure 3A illustrates the cube connector and square connector with the drilled holes in the hollow tubes of structure frame for fitting the suspended hooking rods;

Figure 3B shows as perspective view of panels hung on rods;

Figure 3C shows the connection between rods and cube connectors;

Figure 4 illustrates the circuit / wiring running within the cavity between the two sandwiched wall panels linking the external electrical source to the electrical socket(s) installed on the room wall(s), this avoids having to thread wires through other components;

Figure 5A illustrates the cube connector at the end of the hollow tube of Figure 2A with the hollow square connector bracket attached to the hollow section in accordance with the implantation of the present invention;

Figure 5B is a view of the cube connector coupled to the hollow tube;

Figure 5C is a view of multiple tubes joined together with the cube connector;

Figure 5D is a close up view of the cube connector coupled to the hollow tube;

Figure 6A illustrates the hanging profile cut to include a hook profile;

Figure 6B illustrates the hanging profile coupled to the wall panels;

Figure 6C illustrates the hanging profile fastened to the wall panel;

Figure 6D illustrates the suspended hook-and-hang rods inserted into the drilled holes in the hollow rods of the structure frame fitted with the hanging profiles fastened with the wall panels;

Figure 6E illustrates the hanging profile with the wall panel secured to the suspended hook-and-hang rods;

Figure 7A is a view of another connector;

Figure 7B is a line drawing of the cube connector;

Figure 7C is a view of the connector coupled to different frames;

Figure 8A is a view of the magnetic connector; and

Figure 8B is another view of the magnetic connector.

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Detailed Description of the Preferred Embodiments

In the example, Figure 1A illustrates a modular assembly of a room or pod 101 of one embodiment of the present invention, including the structural frame 102 comprising hollow sections (with a square profile) 103, with drilled holes 104 at specified intervals, with each end of the hollow section tube 103 encompassing a cube connector 105. The structural frame 102 is constructed by utilizing a square connector with hollow sections 106. The structural frame 102 then utilizes a hanging system 107 comprising bars such as substantially horizontally extending bars. There are also non-glass panels 108 made of a strong material, which can be made of any suitable material including steel, fitted with hanging profile 109 hooked onto suspended hook-and hang rods 110 and/or mechanically fastened glass panels 111, to form room walls 112 or partitions. (See Figure 1B). Hanging profile 109 comprises an L-shaped plate having notches. This structure is configured to support a ceiling panel 115. The design of this structure is such that it is a self-supporting structure which does not need any additional supports.

Figure 1B illustrates the completed modular assembly featuring uprights with carpentry 113 with a sliding door 114 and ceiling panel(s) 115. In this embodiment, the panels such as panels 108 (See Figure 1A) which form walls 112 or partitions extend substantially vertically from a floor region to a ceiling region such as to ceiling panels 115 which are also supported by a structural frame 102. The modular assembly 113 is configured as shelving having multiple levels of shelving. Thus, with this design there is a

room formed which is substantially rectangular shaped and which is configured to have an opening formed from the sliding door.

Figure 2A show other embodiments, wherein the hollow sections have a 30 degree or 45 degree or 60 degree cut edge to fit a cube connector cut in a matching 30 degree or 45 degree or 60 degree profile as required by the embodiment. Figure 2A illustrates the hollow sections forming beams or supports having square profiles 103 featuring the cube connectors 105. These cube connectors 105 are situated at both ends. For example, as shown in Figure 2B, there is shown a 45 degree connector 124 for a 45 degree profile 124.1 in a square profile connector 103. In addition, there is also shown a 60 degree connector or profile 125 which has holes 125.1 and 125.2 and also screws 125.3 and 125.4 which are used to secure this connector 125 to an adjacent square profile connector 103 (See Figure 2C).

Figure 3A illustrates this embodiment which will enable the installer to interconnect steel panels on a structural frame 102 (See Figure 3C) by means of connecting the hollow tubes with a square profile 103 at right angles from the first room wall 112a of the structure of the desired height and length according to the design of the room. The cube connectors 105 (See Figure 4) are then connected to a second room wall 112b of the desired height and length at right angles to the first wall by means of a square connector 106. A third room wall 112 may thereafter be connected to the second room wall 112b in the same manner to form a semi-enclosed space. The regularly spaced drilled holes 104 (Figure 3B) in/through which the suspended hook -and-hang rods 110 will be securely inserted will enable the steel panels 108 fitted with hanging profiles 109 to be attached to form the room walls 112.

Additionally, Figure 4 illustrates electrical wiring from an external electrical source run through the hollow tube(s) 103 to exit through a drilled hole 104. This will enable power points 201 and/or lighting fixtures with light switches to be installed in the modular assembly as desired.

In another implementation, shown in Figure 1B a fourth room wall structure 112 may be connected to the first and third walls to enclose the space on four sides to form a room or pod structure 101 (See Figure 1B). In this implementation, a sliding door 114 or optional swing door may be attached to a door opening in the fourth room structure. Additionally, a glass panel 110 (See Figure 3B) may be attached to the fourth wall structure to form a fixed window. Uprights with carpentry may be affixed to the structure to form shelving and/or cupboard.

In another implementation, a ceiling panel 115 (See Figure 1B) may be affixed to the room or pod structure to completely enclose the room on all sides and from above. Optionally, the ceiling may also rest on top of the room or pod structure.

In a further implementation, the room structure may consist of one or more mechanically affixed walls of glass panels 111(See Figure 1A).

In any implementation, the wall panels and ceiling panels may feature various cladding options, including laminate, fabric, biophilic, metal, whiteboard, acoustic, louver and veneer.

As mentioned above, Figure 5A illustrates the cube connector 105 at the end of the hollow metal rod 103 of Figure 3C. The cube connector 105 consists of four (4) holes 301a-d drilled on each face of the hollow rod 103 at the four corners of the square formed at the end of the hollow tube 103 at an optimum distance from each edge. The end face of the

cube connector 105 that will not be connected to a hollow rod 103 has four (4) holes drilled in a cross formation 301a-d around a center hole 302. This type of cube connector allows for different beams to be connected crosswise so that they can form a cross or X pattern.

The hollow square connector bracket 106 (See Figure 2C) fits exactly over the end of the hollow tube 103, with two (2) holes drilled on each side 303a-b. The end face of the square connector bracket 304 has four (4) holes 304a-d drilled in each corner of the square to line up with the four (4) drilled holes 301a-d of the cube connector 105. The square connector bracket 106 mechanically fastens to the cube connector 105 with screws through the drilled holes 301a-b lined up with the drilled holes 304a-d (See Figure 5D). Hollow tube 103 may be connected to the square connector bracket 106 by pre-drilling two (2) holes 305a-b on each face. Numbers 305a-b are positioned in Figure 5C to line up exactly with the holes 303a-b in the faces of the square connector bracket.

Figure 6A illustrates the hanging profile 109 with the first hook- shaped cut-out 401a facing a second hooked-shape cut-out 401b. The hanging profile 109 can be made of strong material that may be cut and bent, for example, metal sheets. The double hooked cut-out shape is designed to fit around the suspended hook rod 110 such that the suspended hook rod 110 can be easily slotted through the first hook of the hanging profile 401a and rest securely on the second hook of the hanging profile 401b.

Figure 6B illustrates the hanging profile 109 mechanically fastened to the steel panel 108. One or more hanging profiles 109 may be fastened to the steel panel according to the desired design.

Figure 6C illustrates the hanging system 107 having suspended hook rods or a hanging profile 109. The hanging profile 109 has cut outs 401 configured to receive hooking rods 110. These hooking rods are inserted into the drilled holes in the hollow tube

103 of the structure frame 102. This frame includes a hollow tube 103, cube connector 105 (forming the structural frame). There are also panels 108 coupled to the hanging profiles 109.

Figure 6E illustrates the hanging profile 109 which is connectable with a hanging system 107 or hooking rods 110 having substantially horizontal rods. The hanging profile is coupled with the steel panel 108 secured to the suspended hooking rods 110 to form a room wall 112.

Figures 7A and 7B illustrates the magnetic connector 501 used on the pitched roof. The magnetic connector body 501 is made of strong material, for example cast aluminum, in a cuboid shape with four or more sides 502, depending on the number of rafter beams 503 in the design. Each side features a centralized recess 504 with magnetic bush plates 505 (See Figure 7C). Figure 7C illustrates the magnetic connector attachment with the ceiling beam structure.

As shown in Figures 8A and 8B, the rafter beams 503 used to form the pitch have end magnets 506. Magnets 506 are configured to insert into the manet body and use magnetic forces to connect the beams together. The rafter beams are then connected to the magnetic connector body 501 by the end magnets 506 coupled to the rafter beams 503, with the structure being held together by magnetic pull between the rafter beams 503 and the connector body 501.

The description and/or the diagrams/illustrations and/or the combination thereto of the embodiments described herein are intended to provide a general understanding of the structure and composition of the various and embodiments and are not intended to be a comprehensive and/or exhaustive description of all of the elements and features

described herein. In particular, certain features that are described herein as separate embodiments may be combined in a single embodiment and vice versa. The disclosure is therefore to be regarded as illustrative rather than restrictive and should not be interpreted as a limitation of the scope or applicability of the teachings. All technical and scientific terms used in the description and diagrams/illustrations have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The materials, methods and examples are illustrative only and should not be regarded as limiting and to the extent that specific materials and processing acts are not described, such details may include conventional approaches found in reference books and other sources in the industry.

List of Elements

101 modular assembly of a room or pod structure

102 structural frame

103 hollow section with square profile

104 drilled holes

105 cube connector

106 square connector

107 hanging system

108 non-glass panel

109 hanging profile

110 suspended hook-and-hang rods

111 glass panel

112 room wall

113 upright with carpentry

114 sliding door

115 ceiling panel

201 electrical power point

301 drilled holes of face of cube connector (for connecting)

302 drilled holes of face of cube connector (for running of cables)

303 drilled holes of face of square connector (for running of cables)

304 drilled holes of face of square connector (for connecting)

305 drilled holes on the hollow section profile

401 hook-shaped cut-out of hanging profile 109

501 magnetic connector body

502 magnetic connector side

503 rafter beam

504 magnetic connector side recess / bush

505 magnetic bush plates

506 end magnet of rafter beam 503

CLAIMS

What is claimed is:

1. A modular wall system comprising:

a frame comprising a plurality of substantially vertical members and a plurality of substantially horizontal members;

a plurality of walls coupled to the frame, the plurality of walls being fastened to the frame; and a connector, said connector for connecting at least two of the members of the frame together.

2. The modular wall system as in claim 1, wherein the members are beams.

3. The modular wall system as in claim 2, wherein the connector is a substantially square connector for connecting the beams together.

4. The modular wall system as in claim 2, wherein the connector is a substantially cubic connector for connecting the beams together.

5. The modular wall system as in claim 2, wherein the connector is connector for connecting two different beams with an angle of intersection being between 25 degrees and 65 degrees.

6. The modular wall system as in claim 2, wherein the connector is a magnetic connector for connecting the beams together using magnetic force.

7. The modular wall system as in claim 1, wherein the magnetic connector has magnetic plates.

8. The modular wall system as in claim 7, wherein the magnetic connector further comprises a magnetic body and wherein the magnetic plates are coupled between the magnetic body and at least one of the members.

9. The modular wall system as in claim 1, wherein the magnetic connector comprises a magnetic body and magnetic insets configured to insert into the magnetic body, the magnetic inserts extending out from the magnetic body and being coupled to at least one beam.

10. The modular wall system as in claim 8, wherein the magnetic plates are bush plates.

11. The modular wall system as in claim 1, further comprising a hanging system for hanging at least one wall of said plurality of walls on the frame.

12. The modular wall system as in claim 11, wherein the hanging system further comprises at least two bars.

13. The modular wall system as in claim 12, wherein said at least one bar is a substantially horizontal bar.

14. The modular wall system as in claim 13, further comprising a hanging profile.

15. The modular wall system as in claim 14, wherein the hanging profile further comprises at least one hook shaped cut out.

16. The modular wall system as in claim 15, wherein the at least one bar comprises at least two substantially horizontal bars and wherein the hanging profile comprises at least two hook shaped cut outs for hooking onto each of said at least two substantially horizontal bars.

17. The modular wall system as in claim 1, wherein said connector is connected to at least two members using a fastener.

18. The modular wall system as in claim 17, wherein said fastener comprises a screw.

19. A method for coupling a wall system together according to claim 1, wherein the connector is at least one magnetic connector the method comprising the steps of:

fastening a plurality of members together via the at least one magnetic connector; and

coupling a hanging system to at least one member.

20. The method as in claim 19, wherein the hanging system further comprises at least one substantially horizontal bar and a hanging profile, wherein at least one wall is coupled to the hanging profile, and wherein the method further comprises the step of hanging the wall using the hanging profile on the substantially horizontal bar.