Abstract: A space-dividing wall panel system for office areas includes a system of horizontal and vertical frame rails which join together to define a wall panel frame. The vertical and horizontal rails have varying cross-sectional profiles which are adapted to support thin insert panels and also interconnect with adjacent frame structures such as a multi-way corner connector, a serially adjacent wall panel or another frame rail joined together in back-to-back relation. Additionally, the wall panel includes a belt-line raceway with hinged covers which allows for the storage of cabling and electrical components therein and also defines a horizontal cable passage along the bottom edge of the raceway for ingress and egress of cabling.

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THIN WALL PANEL SYSTEM

FIELD OF THE INVENTION

[0001] The invention relates to a space-dividing wall panel system for office spaces and more particularly, to a wall panel system with electrical raceways defined therein.

BACKGROUND OF THE INVENTION

[0002] Space-dividing wall panel systems are well known for use in sub-dividing large office spaces into smaller workstations such as in an office or business environment. Numerous wall panel systems have been developed.

[0003] Typically, such wall panel systems comprise upright, freestanding wall panels, which join together in end-to-end relation to define various configurations of workspaces. Such wall panels may be joined serially together in a straight line to define a long wall or may be joined at corner connections in two-way, right-angle connections, three-way angular or right-angle connections, and four-way connections. Such workstations may take the form of generally rectangular, substantially enclosed cubicles outfitted with work surfaces, wall-mounted storage cabinets and wall-mounted office accessories. Therefore, such wall panels not only are adapted to be connected together but also adapted to support such office furniture components thereon wherein the wall panels bear the load of these components on the floor surface upon which the wall panels are constructed.

[0004] Many conventional wall panel systems further have wire-management capabilities wherein horizontal and/or vertical raceways extend along and are defined within the open interiors of such wall panels. In particular, conventional wall panels include rectangular
frames which define open areas therebetween. Portions of these open areas may then be used to define the aforementioned raceways which raceways are adapted to receive power and/or data communication cables within the confines of the wall panel. Such raceways are in open communication with the raceways of serially-adjacent wall panels to define continuous raceways extending throughout the wall system for routing of power and communication cables to individual workstations.

[0005] Further these raceways have removable covers which allow access to the raceway, preferably from both sides of the wall panel. Such covers may be snap connect covers which are completely separable from the wall panel or may be hinged in place so as to remain connected to the wall panel when the raceway cover is opened.

[0006] Further with respect to the various types of wall panels, many such wall panels use demountable cover tiles which are removably mounted on the wall panel frames to enclose the hollow interiors thereof. Many such cover tiles are provided on the opposite side faces of the wall panels to permit access to the hollow interiors therefrom from either side of the wall panel.

[0007] In another type of wall panel, solid panels may be mounted to the panel frame to define a single-layer of panel material which thereby encloses the interior regions of the wall panel.

[0008] While numerous wall panel systems have been developed and are commercially available, additional wall panel systems are continuously under development to provide improved functional and aesthetic features and provide such features in both cost-effective, low priced systems or higher end systems. It is an object of the invention to provide a wall panel system having an improved combination of functional and aesthetic features.
More particularly, the invention relates to a wall panel system comprising individual wall panels having a frame construction which allows for the construction of horizontal and vertical raceways within the wall panels. The frame construction incorporates vertical and horizontal frame rails possessing different cross-sectional profiles which are combinable in various configurations to vary the ultimate configuration of each individual wall panel. Each wall panel preferably is provided with a horizontal raceway defined approximately at beltline height, i.e., a beltline raceway, which is defined in close proximity to and preferably above conventional work surface height. The horizontal raceway includes hinged covers to provide access to the raceway channels to allow for laying in of individual power and data cables therein and also to allow for mounting of outlets or receptacles to the hinged covers.

Additionally, the open interiors defined between the horizontal and vertical frame rails are enclosed by relatively thin insert panels which fit within perimeter grooves defined on the inside faces of the frame rails. An insert panel typically is disposed below the beltline raceway wherein a thin horizontal, intermediate frame rail cooperates with the upper edge of the insert panel directly below the bottom edge of the beltline raceway. A gap is defined between the intermediate rail and the lower edge of the hinge cover of the raceway which gap thereby allows for the passage of cabling into and out of the raceway, generally onto the work surface although such cabling may also pass downwardly to a floor area.

Furthermore, this system utilizes plastic splines to join frame rails in back-to-back relation, particularly when used as a vertical rail in a single wall panel which separates an insert panel from an
adjacent vertical raceway. Such connector splines also are used to join frame rails of one wall panel with adjacent corner connectors or serially-adjacent wall panels.

[0012] Other objects and purposes of the invention, and variations thereof, will be apparent upon reading the following specification and inspecting the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0013] Figure 1 is a perspective view of a first configuration of a wall panel system.
[0014] Figure 2 is an enlarged view of the wall panel system of Figure 1.
[0015] Figure 3 is a perspective view of a second configuration of the wall panel system.
[0016] Figure 4 is an enlarged perspective view illustrating raceway covers removed.
[0017] Figure 5 is a partial view of the configuration of Figure 4.
[0018] Figure 6 is a perspective view of the Figure 4 configuration as viewed in an upward direction.
[0019] Figure 7 is a perspective view of the Figure 4 configuration as viewed in a downward direction.
[0020] Figure 8 is a perspective view as viewed in the upward direction with a raceway cover removed therefrom.
[0021] Figure 9 is a perspective view of a third, deskling configuration of the wall panel system.
[0022] Figure 10 is an enlarged partial view of the third configuration.
[0023] Figure 11 is a plan view of a three-way corner connection.
[0024] Figure 12 is a side view of a top edge frame rail as taken along line 12-12 of Figure 3.
[0025] Figure 13 is a top view of the edge frame rail.
[0026] Figure 14 is an end view of the edge frame rail.
[0027] Figure 15 is an end view of a frame rail with an insert panel disposed therein.
[0028] Figure 16 is a side view of a vertical interior frame rail.
[0029] Figure 17 is a side view of a vertical, side frame rail.
[0030] Figure 18 is a top view as taken along line 18-18 of Figure 5 illustrating a trim rail mounted to the side frame rail.
[0031] Figure 19A is a top view of an interior frame rail assembly as taken along line 19A-19A of Figure 5.
[0032] Figure 19B is an end view of a connector spline.
[0033] Figure 20A is a front elevational view of an intermediate frame rail.
[0034] Figure 20B is a top view of the intermediate frame rail.
[0035] Figure 20C is an end view of the intermediate frame rail.
[0036] Figure 21 is a side view as taken along line 21-21 of Figure 3 of an intermediate frame rail joined to a raceway support tube.
[0037] Figure 22 is an end view of a seal strip.
[0038] Figure 23 is an end view of a beltline raceway assembly.
[0039] Figure 24 is a perspective view of a raceway end block.
[0040] Figure 25 is an inside side view of the raceway block.
[0041] Figure 26 is a side cross-sectional view of the raceway block.
[0042] Figure 27 is an outside side view of the raceway block.
[0043] Figure 28 is an end view of an intermediate frame rail illustrated in phantom outline with a gasket for a translucent insert panel.

[0044] Figure 29 is a partial end view of a four-way connector tube.

[0045] Figure 30 is a plan view of the connector tube.

[0046] Figure 31 is an exploded perspective view of a slidable mounting bracket.

[0047] Certain terminology will be used in the following description for convenience and reference only, and will not be limiting. For example, the words "upwardly", "downwardly", "rightwardly" and "leftwardly" will refer to directions in the drawings to which reference is made. The words "inwardly" and "outwardly" will refer to directions toward and away from, respectively, the geometric center of the arrangement and designated parts thereof. Said terminology will include the words specifically mentioned, derivatives thereof, and words of similar import.

DETAILED DESCRIPTION

[0048] Referring to Figures 1-10, various configurations of a wall panel system 10 are illustrated which system is used to subdivide an open office area 11 into a plurality of individual workstations 12.

[0049] The wall panel system 10 comprises a plurality of wall panels generally identified by reference to numeral 14 wherein representative partial height wall panels 15 are illustrated in the configurations of Figures 1 and 9 while full height panels 16 are illustrated in the configuration of Figure 3. It will be understood that the wall panels 15 and 16 utilize common parts and components and as such, common reference numerals are used for such components where possible.
The layouts of the wall panels 15 and 16 of the wall panel system 10 are illustrated in several configurations with it being understood that such wall panel systems of this type allow for the wall panels 14 to be configured in any of a variety of configurations depending upon the needs of the end user. The following discussion is directed to the specific configurations illustrated herein, namely, the wall panels 15 and 16. The wall panel system 10 thereby is provided in a larger open office area 11 and subdivides such space 11 into the aforementioned workstations 12; the ultimate number, size and layout of the workstations 12 being dependent upon the final assembly of the individual system components.

It will be understood that additional office furniture accessories such as the work surface 17 (Figures 1 and 9) can be mounted to the individual wall panels 15 and 16. Such work surfaces 17 may, for example, be supported by a downwardly depending support leg 19 (Figure 9) or by a panel mounted support bracket 20 (Figures 9 and 31), the support brackets 20 being mountable on the wall panels 14 at a variety of support locations. It will further be understood that additional accessories can be mounted on the wall panels 16.

Generally as to the individual wall panels 15 and 16, these wall panels include interior frames wherein Figure 1 illustrates interior frame 22 for the partial height wall panels 15. Figure 3 illustrates the panel frame 23 for the full height wall panel 16, and Figure 9 illustrates a further partial height panel frame 24 having wire management capabilities.

The various panel frames 22, 23 and 24 are constructed from similar individual frame rail components which are discussed in further detail hereinafter. These panel frames 22-24 further include similar beltline raceway assemblies 25. Additionally, the panel frames 23
and 24 also are provided with vertical raceway assemblies 26 which openly communicate with the beltline raceways 25 and also open downwardly towards the floor to permit routing of cabling to the floor area.

More particularly as to Figure 1, the panel frame 22 is defined by edge frame rails 28 and 29 which extend horizontally across the top and bottom edges of the wall panel 15. These frame rails 28 and 29 are rigidly joined to a pair of vertical end frame rails 30 and 31 to thereby define a rigid rectangular frame which forms the periphery of the wall panel 14.

Also, an intermediate horizontal frame rail 32 is provided which is joined at its opposite end to the vertical end rails 30 and 31 proximate to but spaced downwardly of the top edge rail 28. As described in further detail herein, the intermediate frame rail 32 has a thinner thickness than the thickness of the edge rails 28 and 29 and the end rails 30 and 31.

To close off the open interior space defined between the edge rails and end rails 29-31, a rectangular planar insert panel 34 is secured about its periphery to the grooved inside faces of the horizontal and vertical frame rails 28-31. The insert panel 34 preferably has a single thickness which defines opposite side faces 35 which face outwardly and define exposed exterior faces of the wall panels 14. The insert panel 34 may be formed as a solid material, for example, formed of medium density fiberboard that is covered by an aesthetically pleasing material such as fabric, paint or the like. Alternatively, the insert panel 34 also could be formed of a translucent material such as a plastic or even glass which gives a see-through appearance to the wall panel 15 while also subdividing the various workstations 12 one from the other.
Generally, the intermediate frame rail 32 is adapted to rigidly support the work surface support brackets 20 with the work surface 17 disposed in a horizontal orientation spaced upwardly from the floor.

Further, the intermediate frame rail 32 defines the interior panel space in which the beltline raceway assembly 25 is formed which beltline raceway assembly 25 defines a horizontal raceway or channel 37 through which cabling may be laid horizontally to feed electrical receptacles or outlets 38 such as for power or data which is to be supplied to the workstation 12. The raceway assembly 25 preferably is disposed vertically above the work surface 17.

Referring to Figure 2, the raceway assembly 25 generally is defined by raceway end blocks 40 which are disposed at the opposite ends of the raceway 37 and are affixed to the inside face of the respective vertical end rail 30 or 31. As described in further detail herein, the raceway end blocks 40 are configured to structurally support cabling thereon while also pivotally supporting a hinged raceway cover or hatch 41 by the upper edge 42 thereof. This allows the raceway cover 41 to be swung upwardly to provide for access to the interior raceway channel 37. Additionally, the receptacles 38 may be rigidly affixed to the panel frame and project through ports in the cover 41 such that the plug openings 43 on the receptacle 38 are accessible from the workstation 12.

Generally, therefore, the panel configuration of Figures 1 and 2 utilizes top and bottom edge rails 28 and 29 which extend across the entire lateral width of the wall panels 14, opposite end rails 29 and 30 which extend the entire vertical height of the wall panels 14 and an intermediate frame rail 32 which also extends across the panel width.
Referring to Figures 3-8, a second panel configuration is illustrated therein which uses similar edge and end rails and intermediate frame rails albeit in a modified configuration so as to not only define the beltline raceway 25, but also the vertical raceway 26 therein.

To construct the full height panel frame 23, frame rails are provided similar to that previously discussed. More particularly, each wall panel 16 has a pair of full-height end rails 46 and 47. The end rails 46 and 47 have an identical cross-sectional profile to each other and to the end rails 30 and 31 as viewed from above (see Figures 15 and 18) although they have a vertical length longer than rails 30 and 31. At the upper ends of the end rails 46 and 47, a horizontal top edge rail 48 is rigidly connected thereto which edge rail 48 is formed identical to the top edge rail 28. Further, a raceway assembly 25 is mounted to the end rails 46 and 47 at the same elevation as the raceway assembly 25 described above relative to Figures 1 and 2.

In the upper half of the full height wall panel 16, the open space between the frame rails is enclosed by a pair of vertically adjacent insert panels 50 and 51 which may either have an aesthetic solid surface or be a translucent material as described previously relative to insert panel 34. The insert panels 50 and 51 have a different vertical dimension relative to each other.

The panel frame 16 further includes a pair of intermediate frame rails 53 and 54 which are formed identical to the intermediate frame rail 32. The upper frame rail 53 joins the adjacent horizontal edges of the insert panels 50 and 51 together while the lower frame rail 54 supports the lower edge of the insert panel 51 while also extending along the upper edge of the raceway assembly 25.
[0065] As for the lower portion of the wall panel 16, this wall panel is separated into two different panel sections, namely a closed section 56 and the adjacent vertical raceway assembly 26. The closed section 56 is provided with a further insert panel 57 which has the same vertical dimension and construction as the insert panel 34, but has a shorter lateral width. To support the insert panel 57, a short intermediate frame rail 59 is secured to the lower raceway support tube 44 as seen in Figures 4, 5, 6 and 8. Additionally, a short bottom edge rail 61 is provided which has the same lateral length as the frame rail 59 and joins at one end to the bottom edge of the respective end rail 46 or 47.

[0066] The interior free ends of the frame rail 59 and edge rail 61 are then joined vertically together by a vertical interior frame rail 62 such that the frame rails 59, 61 and 62 as well as the lower half of the respective end rail 46 or 47 defines a rectangular frame section that supports the rectangular periphery of the lower insert panel 57.

[0067] As to the vertical raceway assembly 26 (Figure 4), the opposite, parallel vertical edges thereof are defined by the downwardly projecting sections of the end rail 46 or 47 and the interior frame rail 62 with the lower most end of the end rail 46 or 47 essentially hanging free and being laterally separated from the interior frame rail 62. The weight of the wall panel 15 is carried by a pair of support legs 64 which are rigidly affixed to the bottom frame rail 56.

[0068] To provide further structural support to the free-hanging end of the edge rail, a pair of raceway cross rails 66 (Figures 4 and 5) are rigidly joined at their opposite ends to the respective grooved inside faces of the end rail 46 or 47 and the interior frame rail 62 as illustrated in Figure 4. These cross rails 66
essentially comprise an even shorter section of the intermediate frame rail 59 in that both the frame rail 59 and the cross rail 66 have the same cross-sectional profile generally seen in Figure 20C. As such, a vertical raceway channel 67 is defined which opens upwardly into communication with the horizontal raceway channel 37 and also opens downwardly from the bottom of the wall panel 16 towards the floor. The raceway channel 67 is covered by removable cover tiles 68 which snap-fit onto the panel frame as generally seen in the right half of Figures 4 and 6 while also being removable as depicted in Figure 5 to permit the laying in of wiring into the raceway channel 67. The cover tile 68 defines a space which is disposed outwardly of the outer faces 69 of the cross rails 66 and inwardly of the inside face 70 of the respective cover tile 68 such that cabling may be laid over the outside rail faces 69.

Referring to Figures 9 and 10, a third panel configuration is illustrated which is formed from the partial height wall panels 15 as well as a further partial height wall panel 71. This partial height panel 71 is formed in many respects the same as the partial height panels 15 except that the wall panel 71 is formed with a vertical raceway 26 using the same structural arrangement of frame rails as that described above to form the raceway 26 in the full height wall panels 16. Notably, the wall panel 71 includes an insert panel 72 formed of a translucent material such as polycarbonate or glass to thereby modify the visual appearance of the wall panel 71. Additionally, the wall panels 15 have the insert panels 34 thereof also formed of a translucent material to include the same visual effect.

As to the left most wall panel 15, this has been modified so as to eliminate the beltline raceway assembly 25 and is then instead provided with an
additional see-through insert panel 73 that is supported on the intermediate frame rail 32 thereof and the top edge rail 28 in a manner similar to the insert panel 51. As can be seen from the foregoing, various panel configurations may be developed from substantially the same common components constructed in various configurations.

[0071] Referring more particularly to the individual components, Figures 12-14 illustrate the top edge rail 28, it being understood that this rail 28 is identical to the top edge rails on all of the wall panel configurations illustrated in Figures 1-11.

[0072] The horizontal edge rail 28 preferably is formed of extruded aluminum and has a length, which corresponds to the desired length of the wall panels 14. The edge rail 28 is generally tubular so as to open from the opposite ends and includes an outer wall 75 having pairs of screw holes 76 spaced along the lateral length thereof.

[0073] Outer side walls 77 extend vertically, while inclined side walls 78 incline generally inwardly and terminate at a groove 79 formed on the inside face 80 of the rail 28. The groove 79 is adapted to tightly receive a horizontal edge of any of the insert panels 34, 50 or 73.

[0074] To mount accessories on the rail 28, a horizontal channel 81 is provided on each opposite side face 77. The side walls 77 also project upwardly to define an upper channel 82, wherein the interior faces of the side walls 77 include a recess 83 along the length thereof for the mounting of trim as discussed herein.

[0075] Each of the opposite ends 85 of the edge rail 28 is notched inwardly to define a three-side notch 86 which is adapted to mate with any of the various end rails 30, 31, 46 or 47. Further, the ends 85 include
pairs of vertically-spaced screw bores 87 for rigid connection of the rail ends 85 to the end rails 300, 31, 46, 47.

[0076] It will be understood that the bottom edge rail 29 is formed identical to the above-described edge rail 28 but is oriented with the groove 79 thereof opening upwardly to receive the lower horizontal edge of the panel 34.

[0077] As to the shorter bottom edge rail 61 of Figure 3, this also is formed substantially the same as the edge rails 28 and 29 in that they have the same profile but the edge rail 61 is shorter. Specifically, the edge rail 61 has opposite ends 87 and 88 thereof notched the same as ends 85 to mate with the inside faces of the vertical rail 47 and the inside face of the interior vertical rail 62. The rail groove 79 thereby receives the lower edge of the insert panel 57 therein.

[0078] When it is desired to trim the outside face of the edge rails and particularly the top rails 28 or 48, a snap fit top cap 90 is provided as seen in Figure 12. The top cap 90 has a top wall 91 from which, a pair of connector flanges 92 depend downwardly so as to be received within the top rail channel 82. The outer sides of the connector flanges 92 include a rib 93, which snaps into the corresponding rail recess 83 to removably secure the top cap 90 in position.

[0079] Referring next to the vertical end rails of Figures 15, 17 and 18, the end rails 30, 31, 46, 47 all have the same cross-sectional profile as seen in these figures with the primary difference being the length of the rails as used in the different height wall panels 15 and 16. As to the profile, this profile has a central web 100 which supports an interior wall section 101 and an outer wall section 102.
The inner wall section 101 includes inclined faces 103 which converge inwardly to a panel groove 104 which is formed on the inside face of the vertical end rail. The inclined faces 103 provide an aesthetically pleasing transition from the thicker profile of the rails to the thin thickness of the insert panels supported thereby.

The panel groove 104 tightly receives a respective vertical edge of any of the insert panels 34, 50, 51, 57, 72 or 73. Figures 15 and 18 illustrate solid panel 34 fitted therein with it being understood that the other solid panels fit into the groove 104 in the same way. For translucent panels such as panels 72 and 73, an additional gasket may be fitted in the groove 104 which gasket is described and illustrated in Figure 28. The groove 104 thereby supports the entire vertical edge of the insert panel supported thereby.

The outer rail section 102 includes a pair of spaced apart connector grooves 106 which open sidewardly, for example, toward a sidewardly adjacent wall panel. The connector grooves 106 have a wider, interior space shaped like an oval and then neck down to a narrow slot 107.

Further, the rail section 102 also has an arcuate wall section 108 which has an outer wall 109 that defines one half of a mounting channel 110 for mounting accessories or the like through suitable brackets.

Referring to Figure 17, the upper and lower ends of the edge rail 30 include pairs of screw holes 111 formed through the central web 100. The pairs of screw holes 111 align with the screw bores 87 in the horizontal rail 48 and 61 in the full height panel 16 so that the rails are rigidly joined together at the frame corners. At beltline height, a large cable passage 115 is provided to permit the passage of cables into the raceway assembly.
25. Further screw holes 116 are provided above and below the passage 115 for the connection of the raceway end blocks 40.

[0085] Further screw holes are provided for the intermediate frame rails. Specifically, adjacent to the end block screw holes 116, rail screw holes 117 are provided for the connection of the intermediate frame rails 54 and 59, and another screw hole 118 is provided for the intermediate frame rail 53.

[0086] Another, lower screw hole 119 is provided for engagement with the upper cross rail 66 of raceway 26, with a further screw hole 120 being provided for the lower raceway cross rail 66. In this manner, all of the various frame rails and raceway components of the full-height panel 16 are assembled together.

[0087] As to the partial height end rails 30 and 31, the shorter height of these rails is identified by the dashed line in Figure 17, wherein rails 30 and 31 essentially are a shorter form of rails 46 and 47 and terminate at the dashed line. Hence, rails 30 and 31 include the passage 115, and screw holes 111, 117, 116, 119 and 120 to either form the panel construction of Figure 1, or the raceway equipped and see-through constructions of Figure 9.

[0088] Once constructed, it may be desirable to mount an end cap 125 on the outer rail section 102. The end cap 125 is formed of extruded aluminum and not only provides a finished appearance but also serves to structurally support accessories and the like.

[0089] The end cap 125 has a cross sectional profile which closely mimics the profile of the outer rail section 102. In particular, the end cap 125 has an outer wall 126 which has a finished aesthetic appearance. The inside face of the end cap 125 has a pair of vertically elongate connector grooves 127 which are formed the same
as the rail connector grooves 108 and have open slots 128 which align with the slots 107. To rigidly join the end cap 125 to the end rail, a connector spline 129 is slid downwardly into the aligned connector grooves 106 and 127.

[0090] As seen in Figure 19B, the spline 129 has a narrow web 130 which joins together a pair of enlarged ribs 131. The ribs 131 are hollow and the spline 129 is formed of rigid PVC. The spline 129 slides downwardly through the open upper ends of the end cap 125 and the respective end rail to thereby rigidly join the two frame components together.

[0091] Further, the end cap 125 has an arcuate wall section 132 which has an outer wall 133 that defines the other half of the mounting channel 110. The mounting channel 110 is adapted to structurally connect further panel components thereto with the connector spline 129 being sufficiently strong to carry such loads. The mounting channel 110 has the same profile as the mounting channel 81 described above.

[0092] Referring to Figures 16, 19A and 19B, the interior frame rail 62 is formed from two rail sections which are joined together in back-to-back relation. The rail sections 135 have the same profile as the end rails and join together the same way the end cap 125 and respective end rail are joined together.

[0093] More particularly, each rail section 135 has an inner section 136 formed with a central groove 137, and an outer section 138 which is adapted to mate with the opposing outer section 138 of the other rail section 135. Each outer section 138 includes a pair of connector grooves 139 wherein the opposing pairs of connector grooves 139 of the two rail sections 135 are joined together by splines 129 which are slid vertically therein as seen in Figure 19A. As such the interior frame rail
62 has two grooves 137 facing in opposite directions. One of these grooves 137 receives the vertical edge of the insert panel 57 while the other groove 137 extends along the length of the vertical raceway 26 and receives one end of each raceway cross rail 69 therein.

[0094] The rail sections 135 also have arcuate wall sections 140 which cooperate to define respective halves of a mounting channel 141. The mounting channel 140 is formed the same as the mounting channel 110.

[0095] To assemble the panel frame, the rail sections 135 include a pair of screw holes 142 which align with the screw bores 87 on the lower edge rail 61 for a rigid connection therebetween. Further, the upper end of each rail section 135 has a square notch 143 which fits over the lower raceway support tube 44, and has a screw hole 144 which permits a rigid screw to be engaged with the opposing end face of the intermediate frame rail 59. Since the frame rail 59 is rigidly attached to the tube 44, which tube extends between the end rails 46 and 47, rails 59, 61 and 62 and the lower section of the end rail 47 define a rectangular frame which supports the perimeter of the insert panel 57. Also, upper and lower screw holes 145 and 146 are provided to permit rigid connection of the raceway cross rails 69 within the groove 137.

[0096] Notably, all of the above-described rails 28-31, 46, 47, 61 and 62 have thick cross sections and define the outer periphery of the panel frames. The insert panels, however, are thinner and as such, to maintain the aesthetic appearance of the wall panels, the various intermediate frame rails 32, 53, 54 and 59 have a thin profile. Further, the intermediate frame rails all have the same profile and end configuration as seen in Figures 20A, 20B and 20C, with the primary differences
being the position of the rail in the panel frame and the length of the shorter rail 59.

[0097] More particularly, the intermediate frame rail 32 as illustrated in Figures 20A-20C is formed of extruded aluminum so as to include vertically projecting walls 150 which define an upper groove 151 and lower groove 152.

[0098] The opposite sides of the rail 32 also include a horizontal mounting slot 153 along the length thereof. The slot 153 curves inwardly and upwardly to define a slot wall 154.

[0099] The opposite ends 155 of the rail 32 include a thinner connector block 156 which is adapted slide into a respective rail groove such as the grooves 104 on the vertical rails 30, 31, 46 or 47. The end face 157 of each end 155 includes a screw bore 158 which receives the screw engaged through the respective vertical rail. For example, the bores 158 of: rail 32 align with lower bores 117; rail 53 align with bores 118; and rail 54 align with upper bores 117.

[0100] As such, groove 152 of rail 32 supports the upper edge of panel 34, groove 152 of rail 59 supports the upper edge of panel 57 or panel 72, and the groove 152 of rail 54 supports the lower edge of panel 51. As for rail 53, the grooves 151 and 152 respectively support the lower and upper edges of panels 50 and 51.

[0101] As to the raceway cross rails 66, these rails are the same the above intermediate rails except that they have a shorter length which spans the raceway 26.

[0102] More particularly as to Figure 21, this figure illustrates an intermediate rail such as 32 or 57 engaged below the horizontal raceway 25. The upper channel 151 also receives the lower raceway support tube 44 therein. Further, a PVC seal strip 160 is fitted in one slot 153. This seal strip 160 is provided to block the space
adjacent the back edge of the work surfaces 17. The seal 160 includes a backing flange 161 having resilient fingers 162 and 163 projecting rearwardly therefrom. The finger 163 is serrated to grip the bottom face of the slot 153 while finger 162 projects upwardly to snap behind the slot wall 154. The fingers 162 and 163 are deflectable to fit into the slot 153 and then resiliently grip the slot 153. The upper end of the backing flange 161 includes seal flange 164 which projects forwardly toward the work surface 17 but is deflectable to permit the passage of cabling if necessary.

[00103] Turning next to the horizontal raceway 25, this raceway primarily includes the end blocks 40 as seen in Figures 23-27. The end blocks 40 attach to the vertical end rails 30/31 or 46/47 and support the cover hatches 41 thereon.

[00104] The en block includes a main wall 166 through which a vertically elongate cable passage 167 is defined. The passage 167 aligns with the rail passage 115 of the associated end rail.

[00105] A pair of mounting posts 168 project inwardly from the main wall 166, which posts 168 are hollow and include screw holes 169 there through. The holes 169 align with the rail screw holes 116 and the end blocks 40 are fastened in place.

[00106] The posts 168 are adapted to fit into the hollow ends of the raceway support tubes 44 as generally seen in Figure 23. The support tube 44 has screw holes 170 thereon to which receptacle brackets 171 are mounted as seen in Figure 5. Appropriate power or data receptacles 38 are then mounted on these brackets 171 with the cables therefore being laid through the horizontal or vertical raceways 25 or 26.

[00107] To organize and support the cables, the end blocks 40 include a vertical stack of cable pockets 180
on each side thereof. The pockets 180 are partially closed by pocket walls 181 which define openings 182 and are flexible to permit cabling 183 to be pushed through the openings 82 into the pockets 180 and supported within the raceway channel 37.

[00108] To support the cover 41, the end block includes upstanding wings 185 which have hinge pins 186 projecting inwardly therefrom. The pins 186 have rigid metal pins molded internally therein within the plastic material of the end block 40. The wings 185 are spaced apart to define a space in which a frame rail may be received such as seen in Figure 23.

[00109] With this arrangement, the raceway 25 thereby has a thickness which is greater than the frame rails such that the cable pockets 180 are disposed outwardly of the frame rails. This allows the cabling 183 to be passed outwardly of the frame rails as generally seen in Figures 11 and 23. Alternatively, such cabling may be fished through the passage 167 as indicated by reference numeral 183-1 in Figure 23.

[00110] To close off the raceway 25, the hinged cover 41 is mounted on the hinge pins 186. The cover 41 preferably is formed of sheet metal and is folded over along the top edge 42 to define flange 190. The flange 190 has a U-shape and slides downwardly onto the pins 186 so as to be pivotable about a horizontal pivot axis and also be removable. The cover 41 also has a bottom flange 191 which is adapted to snap over a rib 192 on the end block 40 to secure the cover 41 in the closed position of Figures 1 and 23, and to also swing upwardly as indicated in phantom outline in figure 23.

[00111] Referring to Figure 2, the cover 41 does not completely cover the end blocks 40. Hence additional trim covers are provided. For a two-way, right angle connection, a right-angle cover 195 (Figure 5) is
provided which overlies the frame rails and cabling passing over the frame rails. At an end of run, a raceway end cover 196 is provided. Referring to Figure 11, a two-way, angular cover 197 is provided.

Further, the raceway 25 also may be provided adjacent the vertical raceway 26. As such, the covers 41 when closed do not enclose the bottom of the raceway 25. Rather, a gap 200 is defined between the bottom cover flange 192 and the support tube 44 to permit laying of cabling downwardly into the vertical raceway 26 or even out of the raceway 25 to the work surface 17. These gaps 200 or raceway passages extend along the length of the raceway 25. With this arrangement, a flexible cable management system is provided.

In addition to the foregoing, the panel frame may be outfitted with the translucent panels 72 or 73. In such an instance, the various grooves of the panel rails, such as the groove 152 (Figure 28) may include a U-shaped elastomeric gasket 202 which is adapted to snugly receive the edge of a glass insert panel without creating forces which would crack the panel. The gasket 202 includes outer legs 203 which serve as catches to engage the illustrated frame rail 32. Also, inside ribs 204 are provided to provide a snug fit.

For corner connections, corner tubes or posts 210 are provided as seen in Figures 2, 29 and 30. These tubes 210 have multiple sides and in the illustrated version, four sides. Each side is provide with a pair of mounting slots 211 which are adapted to be secured to aligned frame rail slots 106 (Figure 2) through the splines 129 in the same manner described above relative to the end cap and inner vertical rail. The corner tube 210 also has a cable passage 212 through each side.

While Figures 29 and 30 illustrate a four-sided tube, Figure 11 illustrates a three-sided tube 213 with a
triangular top cap 214 that snaps into the open upper end of the tube 213.

[00116] In addition to the above panel construction, accessories may be mounted onto the panels. As to the work surface, a mounting bracket 20 is illustrated in further detail in Figure 31. The mounting bracket 20 includes a base end 220 which is formed with an upwardly curving flange 221. This flange 221 is slid into the corresponding groove of the panel frame such as the grooves 153 in the intermediate frame rails when in a tilted position. The outer bracket end 222 is then lowered to a horizontal orientation wherein a work surface 17 is supported thereon and secured in position through fastener holes 223. The base end 220 also includes a rectangular slot 224 in which a bracket cover 225 is fitted.

[00117] Although particular embodiments of the invention have been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, and of the methods of use lie within the scope of the present invention.
CLAIMS

1. A space-dividing wall panel comprising:
   a frame comprising horizontal and vertical frame
   rails adapted to be supported in load-bearing relation on
   a floor, said frame defining an open area between said
   frame rails;

   an insert panel mounted to said panel frame within
   said open area to enclose a substantial portion of said
   open area, said insert panel having a first thickness;
   and

   a horizontal raceway which defines a horizontal
   raceway channel within said open area in which cabling
   may be laid longitudinally, said raceway comprising
   internal mounting structure which is supported on said
   panel frame and at least one openable raceway cover which
   is connected to said mounting structure so as to overlie
   said raceway channel and is openable to permit access to
   said raceway channel, said raceway cover extending away
   from said insert panel and having a cover edge which
   extends generally along the length of said insert panel,
   said cover edge being spaced outwardly from said panel
   edge such that said raceway has a second thickness which
   is greater than said first thickness of said insert
   panel, a cable passage being defined between said cover
   edge and said panel edge wherein said cable passage opens
   into said raceway channel and permits cables to exit said
   raceway channel through said cable passage to an exterior
   of said wall panel.

2. The wall panel according to Claim 1, wherein
   said panel frame has a third thickness which is less than
   the second thickness of said raceway.
3. The wall panel according to Claim 2, wherein said first thickness of said insert panel is less than said third thickness of said panel frame.

4. The wall panel according to Claim 2, wherein said raceway extends horizontally and opposite ends of said cover are spaced outwardly of said panel frame to permit cabling to pass into and out of said raceway channel through the opposite ends of said raceway.

5. The wall panel according to Claim 1, wherein said raceway cover is connected to said mounting structure through a hinge connection which permits swinging of said cover between open and closed positions.

6. A wall panel system comprising:
   a frame defined by horizontal and vertical frame rails which said frame is disposed in load-bearing relation on a floor surface, at least one of said frame rails having a two-piece construction defined by first and second rail sections which have opposing back faces such that said rail sections are disposed in back-to-back relation, said opposing back faces including longitudinal connector grooves which narrow sidewardly toward an open side, said open side opening through said opposing face with each said connector groove on one said rail section opening toward an aligned one of said connector grooves which is disposed on the other one of said rail sections, said first and second rail sections being defined by a structurally rigid material and being joined together by an elongate spline which is slidable longitudinally into said aligned connector grooves, said spline comprising parallel enlarged ribs which extend longitudinally and are joined together by a thin web wherein said ribs are received within said aligned connector grooves and said
web spans said opposing back faces through said open sides of said aligned connector grooves to rigidly join said first and second rail sections together.

7. The wall panel according to Claim 6, wherein a pair of said connector grooves are provided on each of said first and second rail sections with a respective pair of said splines being received within said connector grooves to rigidly join said first and second rail sections together.

8. The wall panel according to Claim 7, wherein said first and second rail sections are formed of extruded metal and said spline is formed from a rigid plastic.

9. The wall panel according to Claim 8, wherein said first and second rail sections have opposite side surfaces which face outwardly from exterior faces of said wall panel, said opposite side surfaces each including an accessory mounting channel which opens sidewardly, each of said first and second rail sections including an elongate channel section wherein said elongate channel sections cooperate with each other when said first and second rail sections are joined together to form said mounting channel.

10. The wall panel according to Claim 6, wherein said first and second rail sections have opposite side surfaces which face outwardly from exterior faces of said wall panel, said opposite side surfaces each including an accessory mounting channel which opens sidewardly, each of said first and second rail sections including an elongate channel section wherein said elongate channel sections cooperate with each other when said first and
second rail sections are joined together to form said mounting channel.

11. The wall panel according to Claim 6, wherein said frame defines an open area defined inwardly of said frame rails which said open area is at least partially enclosed by an insert panel connected to said frame, said insert panel defining exposed exterior faces of said wall panel.

12. The wall panel according to Claim 6, wherein said two-part frame rail extends along an outside edge of said frame, said first rail section being disposed outwardly of said second rail section wherein said first rail section has an exterior face which is disposed opposite said back face which said exterior face defines an exterior surface of said wall panel.

13. The wall panel according to Claim 6, wherein said frame defines an open interior area wherein said two-part frame rail extends through said open interior area inwardly of the perimeter of said frame.

14. A space-dividing wall panel comprising:
a rigid panel frame comprising horizontal and vertical rails which are rigidly joined together to define a generally rectangular frame which said horizontal and vertical frame rails extend about a perimeter of said frame, said frame defining an open interior disposed inwardly of said frame rails and said frame rails including interior support channels which open inwardly toward said open interior, said frame further including one or more intermediate frame rails which are joined at their opposite ends to said panel frame and extend through said open interior to divide
said open interior into a plurality of interior sections, each said intermediate frame rail including a support channel along at least one interior side thereof which opens towards said open interior section disposed adjacent thereto; and

at least one insert panel disposed within at least one said interior section wherein perimeter edges of said insert panel are fitted within and supported within said support channels of said outer frame rails and each said intermediate frame rail disposed adjacent thereto, said insert panel having a thickness proximate said support channels which is less than the thickness of said outer frame rails, and said intermediate frame rails having a thickness approximate said insert panel and less than the thickness of said outer frame rails, each said insert panel having opposite side faces which define exposed exterior surfaces of said wall panel.

15. The wall panel according to Claim 14, wherein said intermediate frame rail includes a mounting arrangement extending along an exterior face thereof for the mounting of accessories to said wall panel.

16. The wall panel according to Claim 15, wherein said mounting arrangement comprises a horizontally elongate channel.

17. The wall panel according to Claim 16, wherein said outer frame rails further include mounting channels along the longitudinal lengths thereof for the mounting of office accessories to said wall panel.

18. The wall panel according to Claim 14, wherein said wall panel includes a horizontal raceway extending along one side of one of said intermediate frame rails,
said raceway having an openable cover to provide access to an interior raceway channel wherein said cover has a horizontal edge extending generally parallel to but spaced outwardly of said one intermediate frame rail to define a cable passage which permits the passage of cabling between said raceway channel and the exterior of said wall panel.

19. A space-dividing wall panel comprising:
   a panel frame comprising a plurality of laterally spaced apart full-height end frame rails which extend vertically and at least one full-width edge rail which extends horizontally between said end rails;
   a horizontal raceway assembly having opposite ends connected to said end rails, said raceway assembly defining a horizontal raceway channel adapted to receive cables horizontally therein;
   said panel frame further including a partial-width edge rail which extends horizontally from one of said end rails and terminates at a partial-height interior frame rail which extends from said partial-width end rail to said horizontal raceway;
   an insert panel rigidly connected to said panel frame so as to enclose an open frame area defined between said horizontal raceway and said partial-width edge rail;
   said partial-height frame rail being spaced inwardly from an adjacent one of said end rails to define a vertical raceway extending vertically from said horizontal raceway toward the edge of said wall panel defined by said partial-width edge rail, said raceway further including removable covers which extend laterally between said partial-height frame rail and said end rail disposed adjacent thereto to enclose said vertical raceway.
20. The wall panel according to Claim 19, wherein said panel frame includes at least one raceway cross rail which has opposite ends joined to said partial-height frame rail and said adjacent full-height frame rail to rigidly support the adjacent end of said full-height frame end rail.