(54) Title: MODULAR SYSTEM FOR CONSTRUCTING HOSPITAL WALLS

(57) Abstract: A modular wall system (20) is provided for use in a healthcare facility to divide the available floor space into rooms and to support hospital equipment modules (24). The system (20) includes a plurality of frame units (100) configured to rest on a floor and extend vertically upwardly. The frame units (100) form a grid of vertically and laterally spaced apart wall spaces having a predetermined height (132) and a predetermined width (130). A plurality of modules (24) is configured to be positioned in the wall spaces to form a wall (26).
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, NZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, IE, IS, IT, LI, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

Published:
— without international search report and to be republished upon receipt of that report

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MODULAR SYSTEM FOR CONSTRUCTING HOSPITAL WALLS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit, under 35 U.S.C. § 119(e), of U.S. Provisional Patent Applications Serial Nos. 60/576,868 filed June 3, 2004; 60/576,870 filed June 3, 2004; and 60/640,592 filed December 30, 2004, all of which are hereby incorporated by reference herein.

BACKGROUND OF THE INVENTION

The present disclosure relates to adaptable clinical environments and more particularly, to a modular system for constructing walls in a clinical environment.

Conventional methods for constructing walls in a healthcare facility utilize timber, steel and dry wall which are more or less permanently secured to the floor and/or the ceiling of the healthcare facility. Such traditional methods of construction involve long and unreliable construction times due to the difficulties in scheduling the various craftsmen such as carpenters, painters, plumbers, electricians and the like to complete the construction work. The rooms and spaces constructed using such traditional methods are not readily reconfigurable. Any such reconfiguration requires tearing down the existing walls. Such reconfiguration is not only costly, time consuming and disruptive, but produces a lot of dirt, dust and noise. The material that is removed is generally not reusable, and has to be disposed of.

Modular wall systems for dividing open spaces into cubicles and rooms are well known. Examples of such systems are disclosed in U.S. Patent Publication No. US 2002/0104271 and U.S. Patent No. 6,405,491, both of which are entitled “Modular Patient Room.”

SUMMARY OF THE INVENTION

The present invention comprises a system that has one or more of the following features or combinations thereof, which alone or in any combination may comprise patentable subject matter.

A modular system for constructing walls is provided. Such a modular system may be used, for example, for constructing walls inside a healthcare facility.
The modular wall system allows a quick conversion of a healthcare facility shell space into a patient room or an administrative office with minimal dirt, noise and disruption associated with conventional techniques so that a healthcare facility shell space can be customized to suit patient requirements. Such modular wall system is flexible to accommodate changes in the configuration of the rooms and spaces as the needs of the patient, caregiver and healthcare facility change. Various modular components or modules can be interchanged and reconfigured easily by the users as the use of the space changes due to changes in functional requirements. The infrastructure and modular components can be reused multiple times.

The modular wall system can readily integrate various pieces of modular components, such as, for example, patient care or headwall modules, family zone modules, hygiene zone modules, footwall modules, clinical wall modules, door modules and window modules for use, for example, in a patient room. The exterior surfaces of various modular components can be changed to update the look of the modular components without the need to replace the components. Decorative panels may be used to add color to a patient room.

A system for constructing walls may include a plurality of frame units having connection points and a plurality of modules coupled to the frame units at the connection points to form a wall. The frame units may form a grid of vertically and laterally spaced apart connection points having a predetermined vertical spacing and a predetermined lateral spacing. At least some of the plurality of modules to be coupled to the frame units may have a width substantially equal to a multiple, including one, of the predetermined lateral spacing and a height substantially equal to a multiple, including one, of the predetermined vertical spacing.

The frame units may have additional connection points for securing the frame units to a floor of the healthcare facility, for securing the frame units to existing adjoining conventional walls of the healthcare facility, and for securing the frame units to the adjoining frame units on either side thereof. In some embodiments, the frame units may have connection points for securing the frame units to a ceiling of the healthcare facility.

Some examples of patient care modules are a bed locator module for locating the bed, a headwall module for supplying, for example, medical gas, vacuum, air, AC/DC power, water, plumbing and the like to a patient, a bed for the patient and
other patient care equipment, a viewbox module for viewing x-ray images, a monitor module for displaying patient vital statistics (such as heart rate, blood pressure, blood sugar, etc.), a computer/keyboard module for retrieving data from and inputting data into a central server of the healthcare facility, a supply management module for supplying linen, drugs, wound dressings, sterilized syringes and the like for use by a patient or a caregiver, a waste management module for collecting trash, biohazard, sharps, soiled linen and the like from the patient room for subsequent pick-up and removal, and a pneumatic tube drop module for transporting supplies, drugs, etc into the patient room.

Some examples of family zone modules are a hideaway bed module, a refrigerator module, an entertainment module (including, for example a TV, a VCR and a DVD player), a microwave module, a utensils module, a worksurface module, a cabinet module, a shelving module, a drawer module, a foldout seat module and a reading lamp module. Some examples of hygiene zone modules are a hand washing module, a hand washing and storage module, a shower module, a paper towel dispenser module, a hand dryer module, a mirror module, a towel bar module, a trash bin module, a grab bar module etc. Some examples of footwall modules are a drawer module, a cabinet module, a shelving module, a whiteboard module, a tack surface module and a home theater module.

Some examples of clinical wall modules are a worksurface module, a light module, a supply pass-through module, a drawer pass-through module, a waste pass-through module, a door module and a window module. Clinical wall modules may form a wall between the patient room and an adjoining corridor. Door modules may include various sized doors depending on customer requirements. The doors may be made of various materials, such as metal, wood or glass. The doors may have various sized windows in them. Window modules may have various sized windows depending on customer needs. In some embodiments, the windows are tinted. In some embodiments, the windows comprise LCD panels. The windows may include integral blinds for privacy. The window frames may be made of various materials, such as metal, wood or plastic. Decorative panels and trim pieces may be used for closing or covering modular spaces, corners, joints, etc.

These modules can be assembled in a myriad of ways to form the rooms and spaces throughout a healthcare facility, such as patient rooms, nurses'
work stations, an Emergency Department, administrative offices, reception area, etc. The depth and height of the walls formed by the modular wall system can be varied depending on the needs of the facility.

Illustratively, a plurality of hangers may be detachably coupled to the frame units at the connection points for supporting the modules. Locks may releasably secure the hangers to the associated frame units. The hangers may extend generally horizontally away from the frame units in a cantilevered fashion. The modules may each include a pair of oppositely disposed guide tracks sized to receive an associated pair of hangers. Latches may releasably secure the modules to the associated pair of hangers. The hangers and the guide tracks may illustratively have a generally rectangular cross section.

The connection points in the frame units may be hanger-receiving openings in the frame units, and the hangers may be fitted into the corresponding hanger-receiving openings. Hooks which fit into corresponding hook-receiving openings may be used for supporting the modules instead of the hangers. The frame units may have hanger-receiving openings on both the front and back sides thereof for supporting the modules in a back-to-back arrangement.

Each frame unit may include a pair of vertical members and a pair of horizontal members extending between the vertical members near the top and the bottom of the frame unit to form a generally rectangular structure with an open space or cavity in the middle. The vertical members of each frame unit may have a plurality of hanger-receiving openings spaced apart from each other by a predetermined vertical spacing to form a grid. The vertical members of the frame units may have hanger-receiving openings on both front and back sides. Hangers may fit into the corresponding hanger-receiving openings in the frame units for supporting the modules in a back-to-back arrangement.

At least some of the plurality of modules may have a depth substantially equal to or a multiple of a predetermined depth, while the associated hangers have corresponding depth. At least some of the vertical and horizontal members of the frame units have access openings through which utility lines are routed for supplying utilities (such as medical gas, oxygen, air, AC/DC power, hot and cold water, plumbing etc.) to at least some of the modules coupled to the frame
units. The open space or the cavity formed by the vertical and horizontal members of the frame units may be filled with sound and/or thermal insulation material.

Thus, a modular wall system for use in a healthcare facility is configured to divide available floor space into rooms. The system includes a plurality of frame units configured to rest on the floor and extend vertically upwardly. The frame units form a grid of vertically and laterally spaced apart wall spaces having a predetermined height and a predetermined width. A plurality of modules is configured to be positioned in the spaces to form a wall. At least some of the plurality of modules have a width substantially equal to a multiple, including one, of the predetermined width and a height substantially equal to a multiple, including one, of the predetermined height.

Additional features, which alone or in combination with any other feature(s), such as those listed above and in the appended claims, may comprise patentable subject matter and will become apparent to those skilled in the art upon consideration of the following detailed description of various embodiments exemplifying the best mode of carrying out the embodiments as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

The detailed description particularly refers to the accompanying figures in which:

Fig. 1 is a diagrammatic top plan view of a patient room in a healthcare facility constructed using a modular wall system of the present disclosure, and showing a bed, two chairs, a side table, a headwall having patient care or headwall modules, a footwall having footwall modules, a clinical wall having clinical wall modules, a family zone wall having family zone modules, a hygiene zone wall having hygiene modules, a door module and a window module;

Fig. 2 is a perspective view of a portion of the Fig. 1 wall under construction, and showing a plurality of frame units, a plurality of hangers received in hanger-receiving openings in the frame units and various hospital equipment modules supported by the hangers;

Figs. 3 and 4 are plan views of portions of the Fig. 1 wall under construction;
Figs. 5-7 are plan views illustrating modules having widths and depths which vary;

Fig. 8 is a perspective view showing a module having a guide track for slidably receiving a hanger secured to the frame unit;

Fig. 9 is a perspective view showing attachment of a hanger to the frame unit;

Fig. 10 is a perspective view of a worksurface module;
Fig. 11 is a perspective view of a light module;
Fig. 12 is a side elevational view of the light module;

Fig. 13 is a perspective view of a supply pass-through module;
Fig. 14 is a plan view of the supply pass-through module;
Fig. 15 is a perspective view of a drawer pass-through module;
Fig. 16 is a plan view of the drawer pass-through module;
Fig. 17 is a plan view similar to Fig. 16 showing a drawer opened from the patient room;

Fig. 18 is a plan view similar to Figs. 16 and 17 showing the drawer opened from a corridor adjoining the patient room;

Fig. 19 is a perspective view of a waste pass-through module as viewed from the patient room;

Figs. 20 and 21 are perspective views of waste pass-through module as viewed from the corridor showing a waste receptacle,

Fig. 22 is a plan view of the waste pass-through module showing the waste receptacle opened from the corridor;

Fig. 23 is a perspective view of a first embodiment of the door module having a single door;

Fig. 24 is a perspective view of a second embodiment of the door module having a double door;

Fig. 25 is a perspective view of the window module;
Fig. 26 is a perspective view of a hand washing module;

Fig. 27 is a perspective view of a hand washing and storage module;
Fig. 28 is a perspective view of a shower module;
Fig. 29 is perspective view of a paper towel dispenser module;
Fig. 30 is perspective view of a hand dryer module;
Fig. 31 is perspective view of a mirror module;
Fig. 32 is a perspective view of a towel bar module;
Fig. 33 is perspective view of a trash bin module;
Fig. 34 is a perspective view of a grab bar module;
Fig. 35 is a diagrammatic top plan view of a second embodiment of a patient room including another configuration of the clinical wall;
Fig. 36 is a front elevation view of the clinical wall of Fig. 35 as viewed from the patient room; and
Fig. 37 is a rear elevation view of the clinical wall of Fig. 35 as viewed from an adjoining corridor.

DETAILED DESCRIPTION OF THE DRAWINGS

As shown diagrammatically in Figs. 1 and 2, a modular system 20 for constructing walls includes a plurality of infrastructure or skeletal frame components 22 and a plurality of hospital equipment modules 24 coupled to the infrastructure components 22 to form a modular wall 26. Illustratively, the infrastructure components 22 include frame units 100 supported on a floor 152 and a plurality of hangers 102 coupled to the frame units 100 for supporting the modules 24. Such a system 20 may, for example, be used for constructing walls in a healthcare facility, such as a private patient room 28. The room 28 illustratively includes a bed 30, two chairs 32, a side table 34, a headwall 36 including patient care or headwall modules 38, a footwall 40 including footwall modules 42, a clinical wall 44 including clinical wall modules 46, a family zone wall 48 including family zone modules 50, a hygiene zone wall 52 including hygiene zone modules 54, a door module 56 and a window module 58.

Some examples of the patient care or headwall modules 38 are a bed locator module for locating the bed 30 relative to the headwall 36, a utility services module for supplying medical gas, vacuum, air, AC/DC power etc., a viewbox module for viewing x-ray images, a monitor module for displaying patient parameters (such as heart rate, blood pressure, blood sugar, etc.), a computer/keyboard module for retrieving data from a central computer of the healthcare facility and inputting data to the central computer, a waste management module for collecting trash, biohazard, sharps, linen etc. from the patient room for subsequent pick-up and a pneumatic tube
module for transporting supplies, drugs, etc into the patient room and transporting blood and urine samples, for example, to the hospital lab. Such patient care modules are disclosed in PCT/US2005/xxxxxx, entitled “PATIENT CARE MODULES FOR HOSPITAL WALLS” (attorney docket no. 7175-78002) filed concurrently herewith, assigned to the same assignee as the subject application, and hereby incorporated by reference herein.

Some examples of the footwall modules 42 are a drawer module, a cabinet module, a shelving module, a whiteboard module, a tack surface module and an entertainment module. Such footwall modules 42 are disclosed in PCT/US2005/xxxxxx (attorney docket no. 7175-78001). Some examples of the clinical wall modules 46 are a worksurface module 200 shown in Fig. 10, a light module 220 shown in Figs. 11, 12, a supply pass-through module 240 shown in Figs. 13, 14, a drawer pass-through module 270 shown in Figs. 15-18, a waste pass-through module 290 shown in Figs. 19-22, door modules 320, 340 shown in Figs. 23, 24 and a window module 360 shown in Fig. 25. Other examples of the clinical wall modules 46 are a pneumatic tube module, a flat panel module, a clock module, a computer/keyboard module, a refrigerator module, a cabinet module, a shelving module, a tack surface module and a whiteboard module. Such clinical wall modules 46 are disclosed in PCT/US2005/xxxxxx (attorney docket no. 7175-78001) and PCT/US2005/xxxxxx (attorney docket no. 7175-78002).

Some examples of the family zone modules 50 are a hideaway bed module, a refrigerator module, an entertainment module (including, for example, a TV, a VCR and a DVD player), a microwave module, a utensils module, a worksurface module, a cabinet module, a shelving module, a drawer module, a foldout seat module, a reading lamp module and decorative panel modules. Such family zone modules are disclosed in PCT/US2005/xxxxxx, entitled “FAMILY ZONE MODULES FOR HOSPITAL WALLS” (attorney docket no. 7175-78001), filed concurrently herewith and assigned to the same assignee as the subject application and hereby incorporated by reference herein. Some examples of hygiene zone modules 54 are a hand washing module 400 shown in Fig. 26, a hand washing and storage module 402 shown in Fig. 27, a shower module 404 shown in Fig. 28, a paper towel dispenser module 406 shown in Fig. 29, a hand dryer module 408 shown in Fig. 30, a mirror module 410 shown in Fig. 31, a towel bar module 412 shown in
Fig. 32, a trash bin module 414 shown in Fig. 33, a grab bar module 416 shown in Fig. 34 and a toilet module 418 shown in Fig. 1. All of the lists of exemplary modules in the preceding paragraphs are only illustrative, and not intended to be exhaustive.

The family area 51 of the patient room 28 may include a dual use foldout bed (not shown) which can accommodate a patient’s family, a visitor or a second patient. Such a dual use foldout bed is disclosed in PCT/US2005/xxxxxx, entitled “FOLDOUT BED MODULE” (attorney docket no. 7175-77999) which is assigned to the same assignee as the subject application, and which is hereby incorporated by reference herein.

In the specification and claims, the term “healthcare facility” is used broadly, and includes a hospital, a nursing home, an outpatient clinic, a doctor’s office, a medical care facility, and the like. The term “hospital equipment module” is used broadly, and includes a patient care module 38, a footwall module 42, a clinical wall module 46, a family zone module 50, a hygiene zone module 54, a door module 56, a window module 58, a fold-out bed module, a vital signs module, an equipment storage module, and the like. The terms “modules” and “modular components” are used interchangeably, and each is intended to broadly cover the meanings of both. Whenever the term AC/DC is used herein, including in the claims, it is intended to mean alternating current (AC) or direct current (DC) or both.

The infrastructure components 22 include frame units 100 and a plurality of supporting members 102 configured to be detachably coupled to the frame units 100 to form the wall 26. In the embodiment illustrated in Fig. 2, the supporting members 102 are hangers 102. Each frame unit 100 includes a pair of vertical members 110 and a pair of horizontal members 112 extending between the vertical members 110 near the top and the bottom of the frame units 100 to form a generally rectangular structure with an open space or cavity 114 in the middle that extends between the front and back sides 116, 118 of the frame unit 100. Illustratively, the vertical and horizontal members 110, 112 are made from tubular members having generally rectangular cross section. The members 110, 112 may have cross sections. The tubular members may be made from steel or some other suitable material such as plastic, aluminum, or wood. In the illustrated embodiment, the members 110, 112 are aluminum extrusions.
As shown in Fig. 2, the vertical members 110 of each frame unit 100 have a first plurality of connection points 120 facing the front side 116 of the frame unit 100 and extending along the depth dimension. The vertical members 110 of each frame unit 100 have a second plurality of connection points 120 facing the back side 118 of the frame unit 100 and extending along the depth dimension. In the illustrated embodiment, the connection points 120 are hanger-receiving openings. The hanger-receiving openings 120 are sized and shaped to receive the hangers 102. When inserted, the hangers 102 fit into the hanger-receiving openings 120 in the frame units 100 so that they firmly lock in place. As shown in Fig. 9, the inwardly facing edges 121 of the hanger-receiving openings 120 and the outwardly facing walls 103 of the hangers 102 are dimensioned to provide a friction fit. Illustratively, both the hangers 102 and the hanger-receiving openings 120 are generally rectangular in cross section. The hangers 102 extend generally horizontally away from the frame units 100 in a cantilevered fashion. As explained below, the lengths of the hangers 102 generally match the depth of the respective modules 24 supported by such hangers 102.

In some embodiments, the hangers 102 have vertical slots 122 near their proximal ends as shown in Fig. 9. When the hangers 102 are inserted into the associated openings 120 and pressed down, the inwardly facing edges 123 of the slots 122 engage outwardly and inwardly facing walls 124 of the vertical members 110 to firmly lock the hangers 102 in place. In some embodiments, the hangers 102 comprise hooks which are fitted into the corresponding hook-receiving openings in the frame units 100 to removably attach the hooks to the frame units 100.

In the description that follows, the terms x-axis, y-axis, and z-axis are assigned arbitrarily for purposes of discussing the relationship between the frame members 110, 112 and the hangers 102. Illustratively, the horizontal members 112 of the frame units 100 extend parallel to the width dimension of the frame units 100 which corresponds to the x-axis, the hangers 102 extend parallel to the depth dimension of the frame units 100 which corresponds to the y-axis, and the vertical members 110 extend parallel to the height dimension of the frame units 100 which corresponds to the z-axis.

As used in this description, including claims, the phrase “a connection point” is used generically to mean a coupler (such as a hanger-receiving opening 120) that is attached to, or a part of, a first member (such as a vertical member 110 of the
frame unit 100) that engages a mating coupler (such as a portion of the hangers 102 that fits into the opening 120) that is attached to, or a part of, a second member (such as a hanger 102 that supports a module 24). Thus, regarding the attachment of the hangers 102 to the frame units 100, the couplers are openings 120 in the frame units 100 and the mating couplers are portions of the hangers 102 that fit into the openings 120. Some additional examples of couplers that may be used as connection points 120 include pins, clips, locks, hooks, posts, latches, clasps, clamps, snaps, slots, fingers, flanges, slots, bolts, screws, nuts, nails, cams, and the like, as well as combinations of these. Mating couplers are elements secured to the second members or portions of the second members that cooperate with the couplers secured to the first members to attach the two members to each other.

The center-to-center lateral spacing 130 between the connection points 120 in the vertical members 110 of each frame unit 100 along the width dimension or the x-axis is fixed. Illustratively, the center-to-center lateral spacing 130 between the connection points 120 is about 2 feet (about 0.61 meter). The center-to-center vertical spacing 132 between the connection points 120 in the vertical members 110 of each frame unit 100 along the height dimension or the z-axis is also fixed. Illustratively, the center-to-center spacing 132 between the connection points 120 along the height dimension is about 2 feet (about 0.61 meter). Thus, in the illustrated embodiment, the first and second plurality of connection points 120 are spaced apart from each other by a predetermined width 130 and a predetermined height 132 to form 2 feet-by-2 feet (about 0.61 meter-by-0.61 meter) grids on the opposite sides 116, 118 of the frame units 100. In other embodiments, the spacing between the connection points 120 is other than 2 feet-by-2 feet (about 0.61 meter-by-0.61 meter).

As shown, for example, in Fig. 2, a first plurality of modules 24 may be supported by the hangers 102 on the front side 116 of the frame units 100. A second plurality of modules 24 may be supported by hangers 102 on the back side 118 of the frame units 100. As shown in Fig. 4, decorative transition panels 106 may be provided to cover the exposed sides of the modules 24 when adjacent modules 24 have different depths. Such transition panels 106 are supported by the hangers 102. As shown in Fig. 8, each module 24 includes a pair of oppositely disposed guide tracks or channels 140 near the upper end of the module 24 and a pair of oppositely disposed guide tracks or channels 140 near the lower end of the module 24. The
upper and lower pairs of guide tracks 140 slidably receive the corresponding hangers 102 secured to the vertical members 110 of the frame units 100. Referring to Fig. 8, the inwardly facing walls 141 of the guide tracks 140 and the outwardly facing walls 101 of the hangers 102 are dimensioned to provide a sliding fit. Suitable latches or locks are used for securing the modules 24 to the hangers 102. Examples of such latches and locks include pins, screws or nuts and bolts may be used for securing the modules 24 to the hangers 102.

The lower horizontal member 112 of each frame unit 100 has a pair of vertically extending through openings 150. Fasteners 156 extend through the openings 150 in the lower horizontal members 112 to secure the frame units 100 to the floor 152. Likewise, the upper horizontal member 112 of each frame unit 100 has a pair of vertically extending through openings 150. Where the frame units 100 extend from the floor 152 to the ceiling 154, fasteners 156 extend through the openings 150 in the upper horizontal members 112 to secure the frame units 100 to the ceiling 154. Any suitable fasteners 156, such as pins, studs, screws, bolts, and the like, may be used for securing the frame units 100 to the floor 152 and to the ceiling 154. In the illustrated embodiment, the frame units 100 are secured to a base board 158, instead of the floor 152, so that the modules 24 are protected, for example, from floor cleaning fluids, equipment, mops etc. The base board 158 is, in turn, secured to the floor 152. In those locations of the infrastructure components 22 where pass-through modules 24 which are open to the floor 152 are present, the lower horizontal frame members 112 and the base board 158 adjacent the floor 152 are omitted. Illustratively, the base board 158 is about 4 inches (10.16 centimeters) high.

Each frame unit 100 is coupled to the adjoining frame units 100 on either side thereof in the illustrated embodiment. Of course, the frame unit 100 closest to an existing conventional wall of the healthcare facility, such as a wall 160 shown in Fig. 3, may be secured thereto. To this end, the vertical members 110 of each frame unit 100 have a plurality of laterally extending through openings 162. Any suitable fasteners 164, such as pins, studs, screws, bolts, and the like, may be used for securing each frame unit 100 to the adjoining frame units 100 on the opposite sides thereof and to the adjoining existing wall 160. In some embodiments, the frame units 100 are coupled only to the floor 152. In some embodiments, the frame units 100 are coupled only to the ceiling 154.
Utility lines 172 may be routed from the mechanical room of the healthcare facility into the patient room 28. These utility lines 172 may typically be routed through any one or more of the floor 152, the ceiling 154 or the wall 104 of the patient room 28. The horizontal members 112 have vertically extending through slots or cutouts 170 through which utility lines 172 enter the open space or cutout 114 defined by the frame members 110, 112. The utility lines 172 are then routed from the open space 114 to the associated modules 24. Illustratively, the utility lines 172 include data lines, gas lines, vacuum lines, AC/DC power lines, hot and cold water lines and plumbing lines.

Laterally extending through openings 171 may be formed in the vertical members 110 of the frame units 100 for passing the utility lines 172 from an open space 114 in one frame unit 100 to an open space 114 in the next adjacent frame unit 100 on either side thereof. The utility lines 172 are then routed from the open space 114 in the next adjacent frame unit 100 to the associated modules 24 attached thereto. In some embodiments, the open spaces 114 may be at least partially filled with sound insulation material 174. In some embodiments, the open spaces 114 may be at least partially filled with thermal insulation material 176, in lieu of, or in addition to, the sound insulation material 174.

As previously indicated, the modules 24 have a width substantially equal to a discrete multiple, including one, of the predetermined lateral spacing 130. Illustratively, the predetermined lateral spacing 130 is about 2 feet (about 0.61 meter). Thus, the width of a module 24 may be about 2 feet (about 0.61 meter), 4 feet (about 1.22 meters), 6 feet etc (about 1.83 meters). For example, modules 60, 62 shown in Figs. 5 and 6 have a width of about 2 feet (about 0.61 meter). On the other hand, a module 64 shown in Fig. 7 has a width of about 4 feet (about 1.22 meters). The modules 24 have a height substantially equal to a discrete multiple, including one, of the predetermined vertical spacing 132. Illustratively, the predetermined vertical spacing 132 is also about 2 feet (about 0.61 meter). Thus, the height of a module 24 may be about 2 feet (about 0.61 meter), 4 feet (about 1.22 meters), 6 feet etc (about 1.83 meters) etc.

While the width and the height of the modules 24 are a discrete multiple, including one, of the predetermined lateral spacing 130 and the predetermined vertical spacing 132, the depth of the modules 24 may, however, vary
depending on their functionality. Thus, the depth of a module 24 may be 1 inch (about 2.54 centimeters), 1 foot (about 0.31 meter), 1.5 feet (about 0.46 meter), 2 feet (about 0.61 meter), 2.5 feet (about 0.76 meter), 3 feet (about 0.91 meter) etc. For example, the decorative panels 108 are 1 inch (about 2.54 centimeters) deep in the embodiment shown in Fig. 4. As previously indicated, the lengths of the hangers 102 generally match the depth of the associated modules 24 supported by said hangers 102. Thus, the length of the hangers 102 used for supporting a 1 inch-deep (about 2.54 centimeters-deep) decorative panel 108 would also be 1 inch (about 2.54 centimeters) as shown in Fig. 4. In some embodiments, the decorative panels 108 may have integrated hangers 102.

Thus, a modular wall system 20 for use in a healthcare facility is configured to divide available floor space into rooms and to support and house patient care equipment. The system 20 includes a plurality of frame units 100 configured to rest on the floor 152 or the base board 158 and extend vertically upwardly. The frame units 100 form a grid of vertically and laterally spaced apart 2-dimensional wall spaces having a predetermined height and a predetermined width. A plurality of modules 24 is configured to be positioned in the 2-dimensional spaces to form a wall. At least some of the modules 24 positioned in the 2-dimensional spaces have a width substantially equal to a multiple, including one, of the predetermined width and a height substantially equal to a multiple, including one, of the predetermined height.

In some embodiments, the frame units themselves may have a thickness along the depth dimension (that is along the y-axis) such that they form a grid of vertically and laterally spaced apart 3-dimensional wall spaces having a predetermined height, a predetermined width and a predetermined depth. At least some of the modules 24 positioned in the 3-dimensional spaces have a width substantially equal to a multiple, including one, of the predetermined width, a height substantially equal to a multiple, including one, of the predetermined height, and a depth substantially equal to a multiple, including one, of the predetermined depth.

The modular wall system 20 allows a rapid conversion of a healthcare facility shell space into a patient room or an administrative office with less dirt, noise and disruption than is typical with conventional techniques so that a healthcare facility shell space can be customized to suit patient needs. The modular wall system 20 is flexible to accommodate changes in the configuration of the rooms and spaces
as the needs of the patient, caregiver and healthcare facility change. Various modular components 24 can be interchanged and reconfigured easily by the users as the use of the space changes due to changes in functional requirements. The infrastructure and modular components 22, 24 can be reused multiple times. The modular wall system 20 can integrate various pieces of patient care equipment within the modular components. The exterior surfaces of various modular components can be changed to update the look of the modular components without the need to replace the entire component. Decorative panels 106, 108 may be used to add color to a patient room. These modules 24 can be assembled in a myriad of ways to form the rooms and spaces in a healthcare facility, such as patient rooms, nurse stations, Emergency Department, administrative offices, reception area, etc. The width, height and depth of the walls formed by the modular system 20 can be varied depending on the needs of the healthcare facility.

Referring to Figs. 10-25, the clinical wall modules 46 include a worksurface module 200 shown in Fig. 10, a light module 220 shown in Figs. 11, 12, a supply pass-through module 240 shown in Figs. 13, 14, a drawer pass-through module 270 shown in Figs. 15-18, a waste pass-through module 290 shown in Figs. 19-22, door modules 320, 340 shown in Figs. 23, 24 and a window module 360 shown in Fig. 25. As shown in Fig. 10, the worksurface module 200 comprises a first vertical panel 202 and a second horizontal panel 204 extending outwardly from the first vertical panel 202 in a cantilevered manner. An upwardly facing surface 206 of the horizontal panel 204 provides a worksurface. An upper portion 208 of the vertical panel 202 above the worksurface 206 forms a backsplash. In some embodiments, the backsplash 208 comprises a tack surface. In some other embodiments, the backsplash 208 is a hard washable surface. The horizontal panel 204 has a pass-through opening 210 through which electrical wires from equipment located on the horizontal panel 204 may be routed to associated outlets or ports. Optionally, a one-piece or multi-piece grommet (not shown) may be provided in the opening 210. Such a grommet may have one or more of openings therein for passing wires and/or tubes therethrough. The vertical panel 202 is configured to be secured to the frame units 100 by hangers 102.

The width, height and depth of the vertical panel 202 and the width, height and depth of the worksurface 206 depend on their functionality. Illustratively,
the vertical portion 202 is about 4 feet (about 1.22 meters) wide, 4 feet (about 1.22 meters) high and 1 inch (about 2.54 centimeters) deep. Likewise, the worksurface 206 is about 4 feet (about 1.22 meters) wide and 2 feet deep (about 0.61 meter). The worksurface 206 has a height of about 30 inches (about 0.76 meter) above the floor 152 to permit the worksurface 206 to be used by a caregiver seated in a chair. In other embodiments, the worksurface 206 has a height of about 36 inches (about 0.91 meter) above the floor 152 to permit the worksurface 206 to be used by a caregiver while standing up. In still other embodiments, the worksurface 206 is at another elevation, such as 42 inches (about 1.07 meters), above the floor. As previously indicated, the length of the hangers 102 generally match the depth of the associated module 24 supported by said hangers 102. Thus, the length of the hangers 102 used to support the worksurface module 200 is about 1 inch (2.54 centimeters). Optionally, the worksurface module 200 may have integrated hangers 102.

Figs. 11 and 12 show a light module 220 including a light fixture 222 and a pair of fluorescent tubes 224 supported with respect to the fixture 222. The light fixture 222 includes a first vertical portion 226 and a second horizontal portion 228 extending outwardly from the first vertical portion 226 in a cantilevered manner. A third curved portion 230 extends upwardly and downwardly from an end of the second horizontal portion 228. In some embodiments, the curved portion 230 is somewhat transparent so that the light emitted by the two tubes 224 is diffused through the curved portion 230. In some embodiments, the inner surfaces 232 of the light fixture 222 are reflective to deflect the light from the lower tube 224 toward the floor 152 and the light from the upper tube 224 toward the ceiling 154. The vertical portion 226 is configured to be secured to the frame units 100 by hangers 102. The width, height and depth of the light module 220 depend on customer requirements. Illustratively, the vertical portion 226 is about 4 feet (about 1.22 meters) wide, 2 feet (about 0.61 meter) high and 1 inch (about 2.54 centimeters) deep. The length of the hangers 102 used to support the light module 220 is about 1 inch (about 2.54 centimeters). Optionally, the light module 220 may have integrated hangers 102.

Figs. 13 and 14 show a supply pass-through module 240 including a box-shaped enclosure 242 having a front side 244, a back side 246 and a pass-through cavity 248 that is open at the front and back sides 244, 246. The enclosure 242 has a plurality of adjustable shelves 250 that are supported in the cavity 248 by removable
pins 252 that are adapted to be received in associated pin-receiving openings 254. In some embodiments, the enclosure 242 has one or more doors 256 on both the front and back sides 244, 246. The doors 256 are movable between opened and closed positions. The doors 256 may be transparent or opaque depending on design specifications. The enclosure 242 includes a light 258 coupled to a top wall of the enclosure 242. The enclosure 242 can be stocked from the corridor 29 and accessed from the patient room 28.

The width, height and depth of the enclosure 242 depends on customer specifications. Illustratively, the enclosure 242 is about 2 feet (about 0.61 meter) wide, 6 feet (about 1.83 meters) high and 4 feet (about 1.22 meters) deep. In some embodiments, the length of the hangers 102 used to support the enclosure 242 is about 4 feet (about 1.22 meters). In some other embodiments, the enclosure 242 is not supported by the hangers 102. Instead, the enclosure 242 rests on the floor 152 such that the pass-through cavity 248 in the enclosure 242 is centered with respect to the width dimension of a 2 feet-wide (about 0.61 meter) opening 114 in an associated frame unit 100. In some embodiments, the enclosure 242 is mounted within a 2 feet-wide (about 0.61 meter) opening 114 in an associated frame unit 100. In some other embodiments, the pass-through cavity 248 of the enclosure 242 is sized to be as wide as the opening 114 in the associated frame unit 100.

Figs. 15-18 show a drawer pass-through module 270 including a box-shaped enclosure 272 having a front side 274, a back side 276 and an interior cavity 278 that is open at the front and back sides 274, 276. The enclosure 272 includes a drawer 280 slidably received in the cavity 278 and openable from both the front and back sides 274, 276. The drawer 280 has handles 282 on both the front side 274 (i.e., the patient room side) and back side 276 (i.e., the corridor side). In some embodiments, the drawer 280 is lockable from both sides 274, 276. In some embodiments, the drawer 280 is lockable from one side only. The width, height and depth of the enclosure 272 depend on customer requirements. Illustratively, the enclosure 272 is about 2 feet (about 0.61 meter) wide, 2 feet (about 0.61 meter) high and 2 feet (about 0.61 meter) deep. The length of the hangers 102 used to support the enclosure 272 is about 2 feet (about 0.61 meter). The drawer 280 can be stocked from the corridor 29 and accessed from the patient room 28.
Figs. 19-22 show a waste pass-through module 290 including a box-shaped enclosure 292 having a front side 294, a back side 296 and an interior cavity 298 that is open at the front and back sides 294, 296. The enclosure 292 includes a waste receptacle 300 slidably received in the cavity 298. The enclosure 292 has an opening 302 on the front side 294 (i.e., the patient room side) to deposit soiled linen, trash, etc. The waste receptacle 300 is openable from the back side 296 (i.e., the corridor side) through an opening 303 in the enclosure 292. The opening 302 on the front side 294 of the enclosure 292 is smaller than the opening 303 on the back side 296 of the enclosure 292. Thus, the waste receptacle 300 may only be pulled out from the enclosure 292 by a person in the corridor 429. In some embodiments, a movable door (not shown) is provided in the opening 302 in the enclosure 292. Separate waste pass-through modules 290 are provided for the soiled linen and for trash, respectively. The waste receptacle 300 has a handle 304 on the corridor side. The soiled linen, trash, etc. are picked up from the corridor side. The waste receptacle 300 may be lockable from the corridor side. A separate disposable container and/or a trash bag may be provided inside the receptacle 300 to receive trash therein.

The width, height and depth of the enclosure 292 depend on customer requirements. Illustratively, the enclosure 292 is about 2 feet (about 0.61 meter) wide, 4 feet (about 1.22 meters) high and 2 feet (about 0.61 meter) deep. The length of the hangers 102 used to support the enclosure 292 is about 2 feet (about 0.61 meter). In some embodiments, the enclosure 292 is not supported by the hangers 102. Instead, the enclosure 292 rests on the floor 152 such that the cavity 298 in the enclosure 292 is centered with respect to the width dimension of a 2 feet-wide (about 0.61 meter) opening 114 in an associated frame unit 100. In some embodiments, the enclosure 292 is mounted within a 2 feet-wide (about 0.61 meter) opening 114 in an associated frame unit 100. In some other embodiments, the cavity 298 of the enclosure 292 is sized to be as wide as the opening 114 in the associated frame unit 100.

Fig. 23 shows a first embodiment 320 of the door module 56 including a frame structure 322, a frame 324 received in a frame-receiving opening 326 of the frame structure 322 and a door 328 coupled to the frame 324 for pivoting movement. The door 328 has a window 330 and a handle 332. The door 328 is movable between
opened and closed positions. The frame structure 322, the frame 324 and the door 328 may be made from suitable materials, such as metal, wood or plastic. The width and height of the door 328 depend on customer requirements. Illustratively, the door 328 is about 3 feet (about 0.91 meter) wide and 7 feet (about 2.13 meters) high. The window 330 is about 9 inches (about 0.23 meter) wide 30 inches (about 0.76 meter) high. The frame structure 322 is about 4 feet (about 1.22 meters) wide, 8 feet (about 2.44 meters) high and 1 foot (about 0.31 meter) deep. The length of the hangers 102 used to support the frame structure 322 is about 1 foot (about 0.31 meter). In some embodiments, the frame structure 322 is not supported by the hangers 102. Instead, the frame structure 322 rests on the floor 152 such that the frame-receiving opening 326 in the frame structure 322 is centered with respect to the width dimension of a 4 feet-wide (about 1.22 meters) opening 114 in an associated frame unit 100. In some embodiments, the frame structure 322 is mounted within a 4 feet-wide (about 1.22 meters) opening 114 in an associated frame unit 100. In some other embodiments, the frame-receiving opening 326 of the frame structure 322 is sized to be as wide as the opening 114 in the associated frame unit 100.

Fig. 24 shows a second embodiment 340 of the door module 56 including a frame structure 342, a frame 344 received in a frame-receiving opening 346 of the frame structure 342 and a pair of doors 348, 350 coupled to the frame 344 for pivoting movement. The doors 348, 350 are movable between opened and closed positions. The doors 348, 350 may be provided with lookout windows (not shown). The doors 348, 350 include respective handles 352, 354. The frame structure 342, the frame 344 and the doors 348, 350 may be made from suitable materials, such as metal, wood or plastic. The width and height of the doors 348, 350 depend on customer requirements. Illustratively, the door 348 is about 2 feet (about 0.61 meter) wide and 7 feet (about 2.13 meters) high. The door 350 is about 3 feet (about 0.91 meter) wide and 7 feet (about 2.13 meters) high. The frame structure 342 is about 4 feet (about 1.22 meters) wide, 8 feet (about 2.44 meters) high and 1 foot (about 0.31 meter) deep.

Normally, the 2-feet (60.96 centimeters) wide door 348 is kept closed and the 3-feet (91.44 centimeters) wide door 350 is used for ingress and egress into and out of the patient room 28. Both doors 348, 350 are opened when a relatively wide piece of equipment is to be moved into or out of the patient room 28. The length
of the hangers 102 used to support the frame structure 342 is about 1 foot (about 0.31 meter). In some embodiments, the frame structure 342 is not supported by the hangers 102. Instead, the frame structure 342 rests on the floor 152 such that the frame-receiving opening 346 of the frame structure 342 is centered with respect to the width dimension of a 6 feet-wide (about 1.83 meters) opening 114 in an associated frame unit 100. In some embodiments, the frame structure 342 is mounted within a 6 feet-wide (about 1.83 meters) opening 114 in an associated frame unit 100. In some other embodiments, the frame-receiving opening 346 of the frame structure 322 is sized to be as wide as the opening 114 in the associated frame unit 100.

Fig. 25 shows one embodiment 360 of the window module 58 including a window frame 362 and a glass panel 364 received in an opening 366 in the frame 362. The frame 362 may be made from suitable materials, such as metal, wood or plastic. The width, height and depth of the frame 362 depend on customer requirements. Illustratively, the frame 362 is about 4 feet (about 1.22 meters) wide, 4 feet (about 1.22 meters) high and 6 inches (about 0.15 meter) deep. The length of the hangers 102 used to support the frame 362 is about 6 inches (about 0.15 meter). In some embodiments, the window frame 362 is mounted within a 4 feet-wide (about 1.22 meters) opening 114 in an associated frame unit 100. In some other embodiments, the opening 366 of the window frame 362 is as wide as the opening 114 in the associated frame unit 100. In some embodiments, the glass panel 364 is tinted. In some embodiments, the glass panel 364 is an LCD panel. The glass panel 364 may include integral blinds for privacy. In some embodiments, the window module 58 may have a rectangular frame, instead of a square frame shown in Fig. 25. Such rectangular window frame can be mounted to the hangers 102 with its long dimension extending either horizontally or vertically.

Although not shown in Figs. 10-25, each clinical wall module 46 includes a pair of oppositely disposed guide tracks 140 near the upper end of the module 54 and a pair of oppositely disposed guide tracks 140 near the lower end of the module 54 as shown, for example, in Fig. 8. The upper and lower pairs of guide tracks 140 slidably receive the corresponding hangers 102 secured to the vertical members 110 of the frame units 100. The guide tracks 140 and the hangers 102 are sized to provide a sliding fit. Suitable latches are used for securing the modules 46 to the hangers 102.
The clinical wall modules 46 have a width substantially equal to a discrete multiple, including one, of the predetermined lateral spacing 130 between the hanger-receiving openings 120. The clinical wall module 46 have a height substantially equal to a discrete multiple, including one, of the predetermined vertical spacing 132 between the hanger-receiving openings 120. While the width and the height of the modules 46 are a discrete multiple, including one, of the predetermined lateral spacing 130 and the predetermined vertical spacing 132, the depth of the modules 54 may, however, vary depending on their functionality.

Referring to Figs. 26-34, the hygiene zone modules 54 include a hand washing module 400 shown in Fig. 26, a hand washing and storage module 402 shown in Fig. 27, a shower module 404 shown in Fig. 28, a paper towel dispenser module 406 shown in Fig. 29, a hand dryer module 408 shown in Fig. 30, a mirror module 410 shown in Fig. 31, a towel bar module 412 shown in Fig. 32, a trash bin module 414 shown in Fig. 33 and a grab bar module 416 shown in Fig. 34. As shown in Fig. 26, the hand washing module 400 has a faucet 450 for dispensing water, a basin 452 for draining the water and a counter or shelf 454. The faucet 450 has a spout 456, a hot water control 458 and a cold water control 460. Other types of faucets are within the scope of this disclosure. For example, in alternative embodiments, the faucet has a single temperature control for hot and cold water instead of separate controls for hot and cold water. In some embodiments, the faucet includes a sensor for detecting the presence of a user's hand so that it automatically dispenses a preset mixture of hot and cold water when it senses a user's hand. In other alternative embodiments, the spout has a removable nozzle coupled to a flexible tube to dispense water from a variety of positions. A hot water supply line (not shown) provides hot water to hot water control, while a cold water supply line (not shown) provides cold water to cold water control. A drain line (not shown) is coupled to an aperture 462 of a bottom portion of the basin 452 to drain water therefrom.

The hand washing module 400 includes an enclosure 470. The enclosure 470 has a pair of spaced-apart side walls 472, 474, a back wall 476, a front wall 478 and a top wall 480. The front wall 478 extends downwardly a short distance from the top wall 480. The shelf 454 extends forwardly from the back wall 476. The shelf 454 has an opening 482 for receiving the basin 452. A mirror 484 is attached to the back wall 476. A light 486 is secured to the top wall 480. A switch (not shown)
for the light 486 is conveniently located on one of the side walls 472, 474. A paper
towel dispenser 488 is mounted on the side wall 472. The paper towel dispenser 488
may include a sensor for detecting the presence of a user’s hand so that it
automatically dispenses a paper towel when it senses a user’s hand. The hand
washing module 400 may include a water purification system, a drinking water spout,
and the like. Illustratively, the enclosure 470 of the hand washing module 400 is
about 2 feet (about 0.61 meter) wide, 8 feet (about 2.44 meters) high and 2 feet (about
0.61 meter) deep. The hand washing and storage module 402 shown in Fig. 27 is similar
to the hand washing module 400 shown in Fig. 26. The same or similar elements of
the two modules 400, 402 have the same reference numbers. Thus, the hand washing
and storage module 402 includes a faucet 450, a basin 452, a shelf 454, a spout 456, a
hot water control 458, a cold water control 460 and an enclosure 470. In addition, the
hand washing and storage module 402 includes a drawer 490 and a cabinet 492. The
module 402 does not include a mirror, similar to the mirror 484 in Fig. 26. In some
embodiments, the module 402 includes a mirror mounted on the back wall 276. The
drawer 490 has a knob 494. The cabinet 492 includes a pair of doors 496 with each
door 496 having a knob 498. Illustratively, the hand washing and storage module 402
is about 4 feet (about 1.22 meters) wide, 8 feet (about 2.44 meters) high and 2 feet
(about 0.61 meters) deep.

As shown in Fig. 28, the shower module 404 includes an enclosure 510
having a pair of spaced-apart side walls 512, 514, a back wall 516, a top wall 518 and
a basin 520. The side walls 512, 514, the back wall 516, the top wall 518 and the
basin 520 are configured to form an interior space 522. The enclosure 510 includes a
door 524 having a handle 526. In the illustrated embodiment, the door 524 is
transparent. In other embodiments, the door 524 is nontransparent. A shower head
528 is coupled to the back wall 516. In the illustrated embodiment, the shower head
528 has a removable nozzle 530 coupled to a flexible tube 532 to dispense water from
a variety of positions. A vertical bar 534 is secured on the back wall 516 next to the
shower head 528. A holder (not shown) is secured to the vertical bar 532 for
supporting the nozzle 530 when the shower head 528 is not in use. A single
temperature control 536 for supplying hot and cold water to the shower head 528 is
provided. A hot water supply line 538 provides hot water, while a cold water supply
line 540 provides cold water. While the illustrative shower module 504 has a single temperature control 536, the shower module 404 may instead include separate controls for hot and cold water. A drain line (not shown) is coupled to an aperture 542 of a bottom portion of the basin 520 to drain water therefrom. Illustratively, the shower module 404 is about 4 feet (about 1.22 meters) wide, 8 feet (about 2.44 meters) high and 3 feet (about 0.91 meter) deep.

Fig. 29 illustrates an automatic paper towel dispenser module 406. The automatic paper towel dispenser module 406 may include a sensor for detecting the presence of a user’s hand so that it automatically dispenses a paper towel when it senses a user’s hand. In alternative embodiments, a manual paper towel dispenser module is provided. Illustratively, the paper towel dispenser module 406 is about 2 feet (about 0.61 meter) wide, 2 feet (about 0.61 meter) high and 1 foot (about 0.31 meter) deep.

Fig. 30 illustrates an automatic hand dryer module 408. The automatic hand dryer module 408 may include a sensor for detecting the presence of a user’s hand so that it automatically dispenses air when it senses a user’s hand. In alternative embodiments, a manual air dryer module is provided. Illustratively, the hand dryer module 408 is about 2 feet (about 0.61 meter) wide, 2 feet (about 0.61 meter) high and 1 foot (about 0.31 meter) deep.

Referring to Fig. 31, the mirror module 410 includes a mirror 550 and a shelf 552 extending along a lower edge thereof. Illustratively, the mirror 550 is about 2 feet (about 0.61 meter) wide, 2 feet (about 0.61 meter) high and 1 inch (about 2.54 centimeters) deep, and the shelf 352 is 4 about inches (10.16 centimeters) deep. Alternatively, the mirror may, for example, be 4 feet (about 1.22 meters) wide and 2 feet (about 0.61 meter) high, or 2 feet (about 0.61 meter) wide and 4 feet (about 1.22 meters) high. In some embodiments, the mirror module 410 does not include a shelf.

Referring to Fig. 32, the towel bar module 412 includes a panel 560 and a towel bar 562 attached to the panel 560 by a pair of stub shafts 564. Illustratively, the panel 560 is about 2 feet (about 0.61 meter) wide, 2 feet (about 0.61 meter) high and 1 inch (about 2.54 centimeters) deep. The stub shafts 564 are about 3 inches (about 7.62 centimeters) long. Fig. 33 shows a trash bin module 414 having a trash bin 570 with an opening 572 for trash. Referring to Fig. 34, the grab bar module 416 includes a panel 580 and a grab bar 582 attached to the panel 580 by a pair of
stub shafts 584. Illustratively, the panel 580 is about 4 feet (about 1.22 meters) wide, 
2 feet (about 0.61 meter) high and 1 inch (about 2.54 centimeters) deep. The grab bar 
382 is about 3.5 feet (1.067 meters) long, and the stub shafts 384 are about 3 inches 
(7.62 centimeters) long.

Although not shown in Figs. 26-34, each hygiene zone module 54 includes a pair of oppositely disposed guide tracks 140 near the upper end of the module 54 and a pair of oppositely disposed guide tracks 140 near the lower end of the module 54 as shown, for example, in Fig. 8. The upper and lower pairs of guide tracks 140 slidably receive the corresponding hangers 102 secured to the vertical members 110 of the frame units 100. The guide tracks 140 and the hangers 102 are sized to provide a sliding fit. Suitable latches are used for securing the modules 54 to the hangers 102.

The hygiene zone modules 54 have a width substantially equal to a discrete multiple, including one, of the predetermined lateral spacing 130 between the hanger-receiving openings 120. The hygiene zone modules 54 have a height substantially equal to a discrete multiple, including one, of the predetermined vertical spacing 132 between the hanger-receiving openings 120. While the width and the height of the modules 54 are a discrete multiple, including one, of the predetermined lateral spacing 130 and the predetermined vertical spacing 132, the depth of the modules 54 may, however, vary depending on their functionality.

Figs. 35-37 show a second embodiment 600 of the patient room 28. The same or similar components of the two rooms 28, 600 have the same reference numbers. Thus, the patient room 600 includes a bed 30, a headwall 36, patient care modules 38, a footwall 40, footwall modules 42, a family zone wall 48, family zone modules 50, a hygiene zone wall 52, hygiene zone modules 54, a door module 56 and a window module 58. In addition, the room 600 includes a clinical wall 602 having clinical wall modules 604. As shown in Fig. 36, the clinical wall modules 604 include a worksurface module 606, a light module 608, a supply pass-through module 610, a hand washing module 612, an equipment pass-through module 614 and a cabinet module 616.

The worksurface module 606, the light module 608 and the supply pass-through module 610 are similar to the worksurface module 200 shown in Fig. 10, the light module 220 shown in Figs. 11, 12 and the supply pass-through module 240
shown in Figs. 13, 14. The hand washing module 612 is similar to the hand washing module 200 shown in Fig. 26. The equipment pass-through module 614 includes an interior cavity (not shown) that is sized to receive patient care equipment, such a mobile care cart. The patient care equipment can be stored in the cavity when the equipment is not in use. The patient care equipment can be accessed from the patient room 400 as well as from the corridor 620.

While the disclosure is susceptible to various modifications and alternative forms, specific exemplary embodiments thereof have been shown by way of example in the drawings and have herein been described in detail. It should be understood, however, that there is no intent to limit the disclosure to the particular forms disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure as defined by the appended claims.

There is a plurality of advantages of the present invention arising from the various features of the embodiments described herein. It will be noted that alternative embodiments of the present invention may not include all of the features described yet still benefit from at least some of the advantages of such features. Those of ordinary skill in the art may readily devise their own implementations of a device that incorporates one or more of the features of the present invention and fall within the spirit and scope of the present invention as defined by the appended claims.
CLAIMS:

1. A modular wall system for use in a healthcare facility, the system comprising:
   a plurality of frame units arranged in a side-by-side relationship, and
   a plurality of hospital equipment modules coupled to the frame units to form a wall of the healthcare facility.

2. The system of claim 1, wherein the plurality of hospital equipment modules includes any one or more of the following: a patient care module, a family zone module, a hygiene zone module, a footwall module, a clinical wall module, a door module, a windows module, a fold-out bed module, a vital signs module, and an equipment storage module.

3. The system of claim 1, wherein the plurality of frame units form a grid of vertically and laterally spaced apart wall spaces having a predetermined height and a predetermined width, the plurality of modules are configured to be positioned in the wall spaces to form the wall.

4. The system of claim 3, wherein at least some of the plurality of modules have a width substantially equal to a multiple, including one, of the predetermined width of the wall spaces and having a height substantially equal to a multiple, including one, of the predetermined height of the wall spaces.

5. The system of claim 1, wherein each frame unit has a plurality of connection points spaced apart from each other by a predetermined height and a predetermined width to form a grid, the plurality of modules is coupled to the frame units at the connection points to form the wall.

6. The system of claim 5, wherein at least some of the plurality of modules have a width substantially equal to a multiple, including one, of the predetermined width of the connection points and having a height substantially equal to a multiple, including one, of the predetermined height of the connection points.

7. The system of claim 5, comprising a plurality of supporting members configured to be detachably coupled to the frame units at the connection points, wherein the plurality of modules is configured to be coupled to the supporting members to form the wall.
8. The system of claim 7, wherein each module includes at least one pair of oppositely disposed guide tracks sized to receive an associated pair of oppositely disposed supporting members.

9. The system of claim 7, wherein a length of at least some of the supporting members is substantially equal to the depth of the associated modules.

10. The system of claim 1, wherein each frame unit includes a pair of vertical members and a pair of horizontal members extending between the vertical members, the vertical members of each frame unit have a plurality of connection points spaced apart from each other by a predetermined height and a predetermined width to form a grid, and a plurality of modules is configured to be coupled to the connection points to form the wall.

11. The system of claim 10, wherein the plurality of connection points include a first plurality of connection points facing a front side of the wall and a second plurality of connection points facing a back side of the wall, a first plurality of modules is coupled to the first plurality of connection points, and a second plurality of modules is coupled to the second plurality of connection points.

12. The system of claim 10, further comprising a plurality of supporting members configured to be detachably coupled to the plurality of connection points, wherein the plurality of modules is configured to be coupled to the plurality of supporting members to form the wall.

13. The system of claim 10, wherein at least some of the vertical and horizontal members of the frame units have access openings through which utility lines are routed for supplying utilities to at least some of the modules coupled to the frame units.

14. The system of claim 13, wherein the utility lines include any one or more of the following: medical gas, oxygen, water, sewer and electricity lines.

15. The system of claim 10, wherein the vertical and horizontal members of each frame unit define an interior space, and the interior space is filled with sound and/or thermal insulation material.

16. The system of claim 1, wherein at least one of the hospital equipment module is a clinical wall module comprising any one of the following: a worksurface module, a light module, a supply pass-through module, a drawer pass-through module, a waste pass-through module, a door module and a window module.
17. The system of claim 1, wherein at least one of the hospital equipment module is a hygiene zone module comprising any one of the following: a hand washing module, a hand washing and storage module, a shower module, a paper towel dispenser module, a hand dryer module, a mirror module, a towel bar module, a trash bin module and a grab bar module.

18. A system for constructing walls in a healthcare facility, the system comprising:
   a plurality of frame units, each frame unit including a pair of vertical
   members and a pair of horizontal members extending between the vertical members,
   the vertical members of each frame unit having a plurality of connection points
   spaced apart from each other by a predetermined vertical distance and a
   predetermined horizontal distance to form a grid, and
   a plurality of modules coupled to the frame at the connection points to
   form a wall.

19. The system of claim 18 comprising a plurality of supporting members configured to be detachably coupled to the vertical members at the connection points, wherein the plurality of modules are coupled to the supporting members to form the wall.

20. A clinical wall for use with a modular wall system comprising
    a plurality of frame units configured to form a grid of vertically and laterally spaced
    apart wall spaces having a predetermined height and a predetermined width, the
    clinical wall comprising a plurality of modules configured to be positioned in the wall
    spaces, wherein at least one of the clinical wall modules is a pass-through module.

21. The system of claim 20, wherein the clinical wall separates a
    first space from a second space, and the pass-through module is accessible from both
    the first and second spaces.

22. The system of claim 21, wherein the first space is a patient
    room and the second space is any one of the following: an adjoining corridor and an
    adjoining room.

23. The system of claim 20, wherein the pass-through module
    comprises any one of the following: a supply pass-through module, a drawer pass-
    through module and a waste pass-through module.