

[54] **MODULAR GRID PANEL RETENTION SYSTEM**[75] Inventor: **Joseph Perina**, Huntington, N.Y.[73] Assignee: **American Velcro, Inc.**, Manchester, N.H.[22] Filed: **Sept. 15, 1971**[21] Appl. No.: **180,669****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 853,657, Aug. 28, 1969, abandoned.

[52] U.S. Cl. **52/28, 24/DIG. 18, 52/475, 52/495**[51] Int. Cl. **E04b 5/57**[58] Field of Search **52/28, 38, 475, 474, 488, 495; 24/204, DIG. 18, 201 R**[56] **References Cited****UNITED STATES PATENTS**1,308,083 7/1919 Lachman **52/475 X**

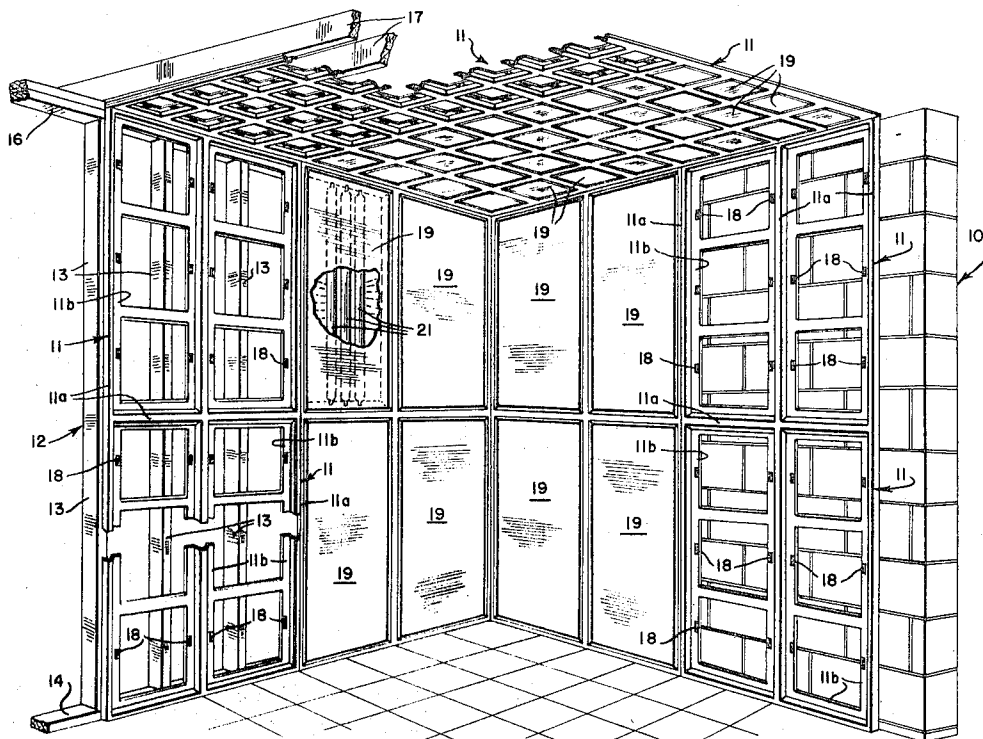
2,728,595	12/1955	Wong	52/474 X
2,910,574	10/1959	Attwood	52/28
3,104,834	9/1963	Lipscomb	52/309 X
3,127,259	3/1964	Boylan	24/204 X
3,251,399	5/1966	Grossman	24/204 X
3,475,810	11/1969	Mates	24/DIG. 18 X

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[57]

ABSTRACT

An integral modular grid arrangement is disclosed for supporting a series of modular panels, such as wall or ceiling panels or tiles. The grid may be attached to wall or ceiling structure. Both the grid and panels are equipped with quick connect and disconnect hook and loop type fastener strips which permit the panels to be quickly installed and removed to provide access to lighting which may be installed behind the panels or grid.

7 Claims, 7 Drawing Figures

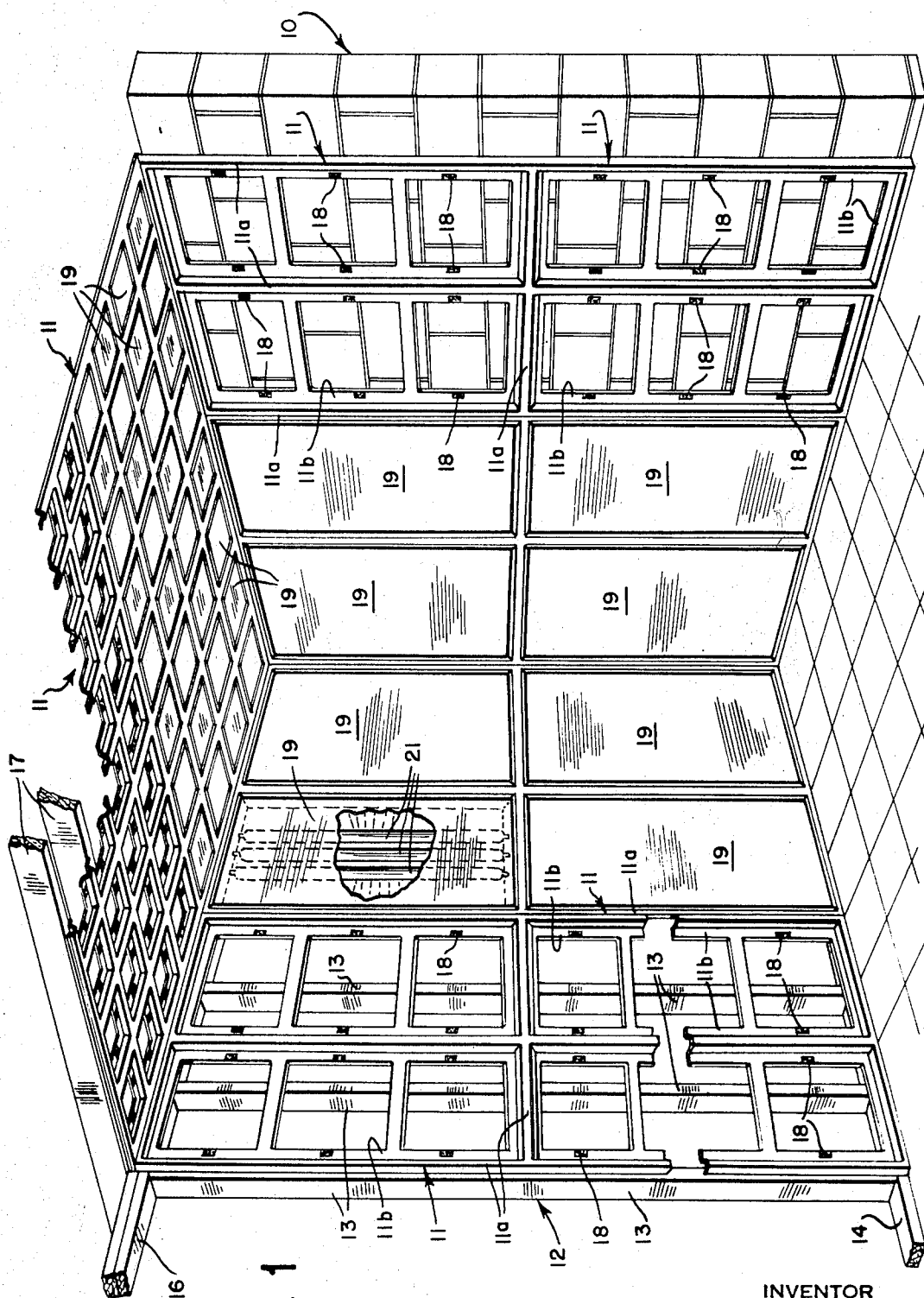
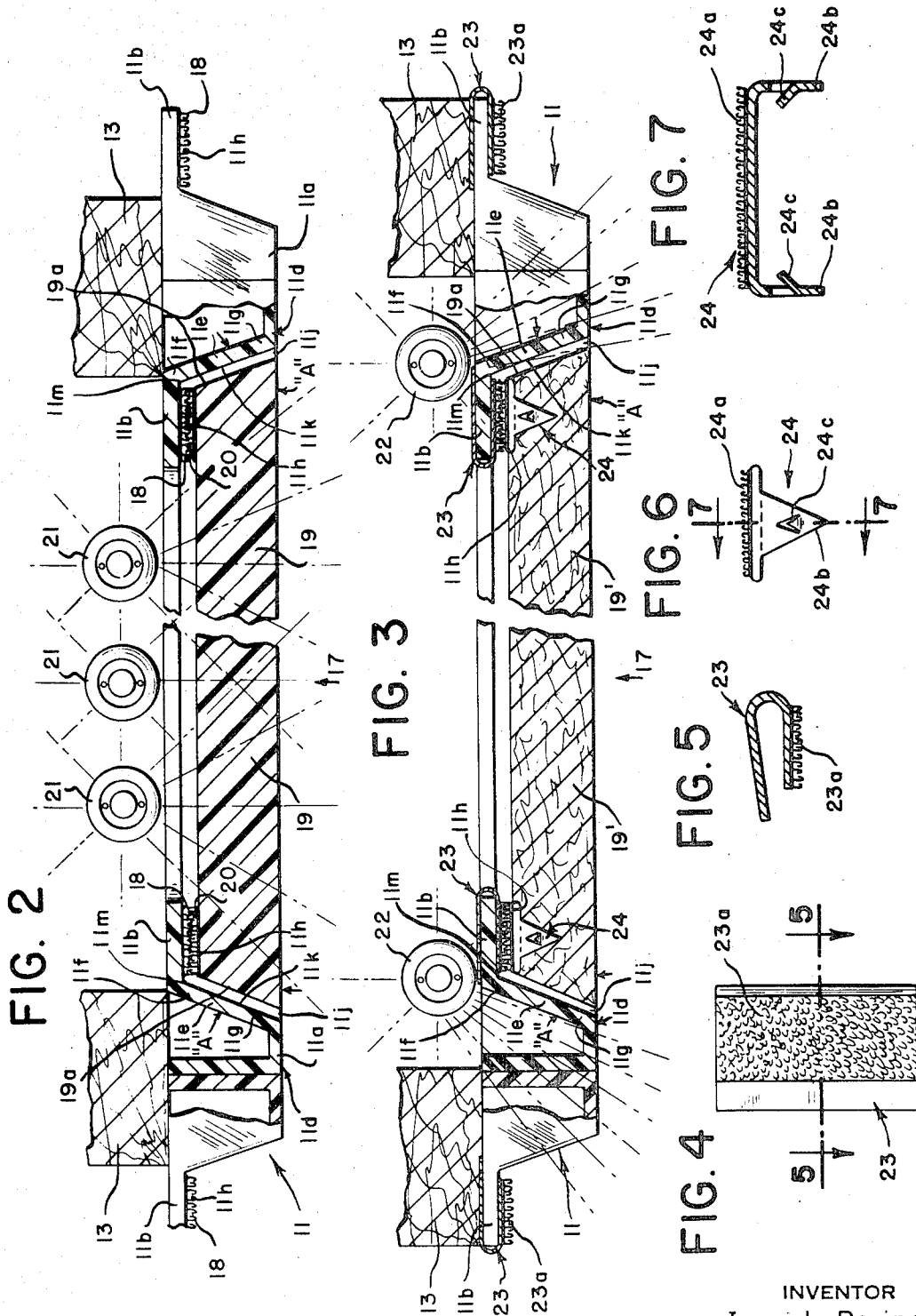


FIG. 1

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MODULAR GRID PANEL RETENTION SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. Pat. application Ser. No. 853,657, filed Aug. 28, 1969, now abandoned.

BACKGROUND OF THE INVENTION

1. Field Of the Invention

This invention relates to interior panel arrangements which readily lend themselves to quick and convenient installation due to their unique prefabricated integral modular construction. It also relates to lighting arrangements to be used with the panels.

2. Description of the Prior Art

Modern-day construction techniques require a maximum of prefabrication or structural packaging as opposed to conventional piecemeal fitting by a mechanic. Skilled and unskilled labor costs in the construction field have far out-stripped the cost of materials. Perhaps the greatest disproportion of labor to material expenses exists in modifying existing structures, as, for example, in the case of finishing basements, offices or attic rooms and the like. While earlier developments include modifying structures which use removable panels for covering surfaces, these developments lacked the modular aspects characterized by my structure whereby a person having limited skills can install or remove them quickly and conveniently.

Separable fasteners such as those described in U.S. Pat. Nos. 2,717,437 and 3,009,235, which are marketed under the registered trademark VELCRO brand hook and loop fasteners by Velcro Corporation, 681 Fifth Avenue, New York, N.Y., have gained wide acceptance because of the properties of the mating hooks and loops which permit their attachment by merely placing a surface defined by at least one of upstanding hook and loop type hooking elements into a face-to-face relationship with a surface defined by complementary hooking elements so that a large number of hooking elements will engage and resist separation forces parallel to the interfacial plane of engagement but are readily separable by peeling forces applied substantially normal to this interfacial plane. These fastening devices, which may be woven, knitted or molded, for example, have had wide application in many fields of art. U.S. Pat. No. 3,475,810 to Mates relates to a method of separating rigid members which are joined together at an interface by inserting a device between the mating surfaces. U.S. Pat. No. 3,453,696 to Mates utilizes the hook and loop fastener of the VELCRO type to hold a necktie by securing a separable fastener member to a clip device.

An application showing the use of said hook and loop type fasteners for attaching a gas cleaning filter to a frame is described in U.S. Pat. No. 3,127,259 to Boylan. However, this does not relate to a modular framework having panels which provide quick and simple installation and removal for covering surfaces such as walls and ceiling. The Boylan patent relates to a filter member which is tightly fitted within its frame whereby prying it out would probably destroy it if it was constructed of a rigid or semi-rigid material. Other prior art generally relating to the field of the invention includes: U.S. Pat. No. 1,308,083 to Lachman relating to

a cumbersome and intricate metal frame and panel construction which requires substantial skill to install it properly. U.S. Pat. No. 3,505,772 to DeClaire et al. teaches a fastening device for automobile panels and trim. Other prior art includes U.S. Pat. No. 2,910,574 to Attwood, and U.S. Pat. No. 3,104,834 to Lipscomb. While these disclosures relate generally to surface modifying structures, panels, lighting and the like, they do not provide an alternative to the complex structures which require a substantial amount of time and skill in order to install them properly.

It is the purpose of the present invention to disclose a prefabrication technique for the construction of extremely attractive walls and ceilings in the interior of existing structure.

It is furthermore an aspect of the present invention that the average person may erect the disclosed modular structures in a short period of time and with great ease. The structure of the invention also includes ceiling or wall panels which are instantly removable for replacement or to provide access to space behind the panels.

Further aspects of the invention will become apparent upon a detailed examination of the drawing and the accompanying description of preferred embodiments.

SUMMARY OF THE INVENTION

The present invention comprises, in combination, a grid-like frame which will be manufactured in appropriate standard dimensions as 4 x 8 foot sections, for example, or other appropriate dimensions. The modular framework may be quickly and efficiently fastened by screws, bolts, hook and loop-type fasteners, etc., to a supporting structure even by persons of limited skill. Due to the framework size, relatively large surface areas of the supporting structure will be covered very quickly. Such structures may be masonry walls, frame studs, ceiling beams, and the like. The framework includes at least one panel receiving receptacle, which is configured to accept a modular panel. At least one side of the receptacle is defined by an extension having a first forward portion and a side wall extending rearwardly from said first forward portion, said side wall having a sloping relation with the framework such that the rear portion of the side wall is spaced apart from a plane passing through the center of the receptacle and perpendicular to the framework less than the forward portion of the side wall. A flange member is positioned at the rear portion of the side wall and extends toward the center line of the panel receptacle. The flange member has a first forward portion which faces the rear portion of the modular plane which is nestled in position within the receptacle. The complementary panel is held in position by at least one separable fastening device, one member being attached to the first forward portion of said flange, and a mating member attached to a corresponding rear portion of the panel. The members of the fastening device are releasably attached to each other in face-to-face relation thereby holding the panel in position within the receptacle.

In the preferred embodiment it is intended that separable hook and/or loop type fastener means such as are described in U.S. Pat. Nos. 2,717,437 and

3,009,235, assigned to the same assignee as the present application are used to secure the panel in position. They have particular utility for retaining the panel members within the receptacle; however, the invention is not intended to be limited to this type of separable fastener. Any separable fastener members, such as those having adhesive surfaces, for example, may be used.

The panel is preferably configured with respect to the panel receptacle such that a space is provided between at least one rearwardly extending side wall of the receptacle and a portion of a side wall of the panel. However, a uniform sloping space around the panel between the panel side wall and the receptacle side wall is preferred. This facilitates insertion of a tool between the receptacle and the panel side walls to initiate separation of the members of the separable fastening device by prying the panel away from the framework to remove it very quickly and efficiently.

In one embodiment, the panels are translucent so that lighting means behind them will illuminate the interior of the room indirectly. Access to the lighting means is provided by the convenient detachability of the panels. In another embodiment, the framework is translucent to provide an indirect lighting effect, and such lighting is also accessible by removing any panel adjacent thereto. Furthermore, in accordance with the present invention, wall or ceiling panels equipped with fastener strips may also be attached to any structure such as studding and the like similarly equipped with mating fastener strips.

It will be seen from the following description that the invention will permit the use of various decorative panels which could be used to change the decorative effects in a room. For example, business establishments and offices will find it practical to change the decorative effect of their walls and ceilings very quickly and inexpensively. Panels could easily be removed and replaced with replacement panels providing a different decorative effect.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an overall perspective view showing the grid frame and panel arrangement of the invention with the grid attached to masonry and wood frame structures;

FIG. 2 is a view showing in cross-section the grid and panel attachment wherein the panels and grid are translucent and lighting is located behind the panels;

FIG. 3 is a view similar to FIG. 2 wherein only the grid is translucent and lighting is appropriately arranged behind the grid;

FIG. 4 is a bottom view of a clip used to secure the hook and loop fastener means to the grid;

FIG. 5 is a cross-section taken along lines 5—5 of FIG. 4;

FIG. 6 is a side elevation of the fastener clip of FIG. 7; and

FIG. 7 is a longitudinal cross-section taken along the lines 7—7 of FIG. 6.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings, there is shown in FIG. 1 a framework and panel combination constructed according to the invention. In the illustrated application, the adjacent structure might be found, for example, in a

basement of industrial buildings, business establishments and the like. Accordingly, in the example shown, a masonry wall 10 forms the backing support for the modular framework 11 having a grid structure as shown. The framework is secured in a known manner to the wall 10. A wall 12 of frame construction adjoins the wall 10 and consists of conventional studs 13, a still 14, and plates 16. Framework 11 is secured to the studs 13 by any suitable means of attachment such as by screws, bolts, or even hook and loop-type fastener means. The framework 11, furthermore, is arranged horizontally to form a ceiling by being attached to overhead beams 17.

It will be understood that the framework 11 may be constructed in any suitable standard dimensions. For example, each of the sections of the frame 11 may comprise, as has been shown, grid areas for the reception of 12 panels and, in this case, the grid may be 4 x 8 foot dimensionally or any other suitable dimensions. Alternatively, as shown in the center of FIG. 1, the wall panels may be considerably larger. The ceiling framework 11 may be of different configuration wherein each of the ceiling tiles is one foot square, for example.

As best seen in FIG. 2, each section of the framework 11 has at least one panel receiving receptacle 17 which is preferably defined by an extension 11d having a first forward portion 11a and a side wall 11e which extends rearwardly and preferably has a sloping relation with the first forward portion 11a of the frame work 11. The rearwardly extending side wall 11e thus defines an acute angle "A" with the framework such that the rear portion 11f of the side wall 11e is spaced apart from a plane passing through the center of the receptacle and perpendicular to the framework less than the forward portion 11g as shown in FIGS. 3 and 5. Flange members 11b are positioned at the rear portion 11f of the side wall 11e and are disposed inwardly toward the receptacle center line. These flanges have a first forward surface 11h which may be viewed from the frontal side of the frame. Strips of hook and/or loop-type fastener members 18 are mounted on the forward surface 11h of the flanges 11b with a complementary hook and/or loop-type fastener member mounted on the rear surface of the panel 19. It is preferable that the panel be configured to provide a space 11j between the side surfaces 19a of the panels and the inner surfaces 11k of the rearwardly extending side walls 11e as is clearly shown in the drawings. This space and the acute angle relation between the receptacle side walls 11e and the panel side surfaces 19a as shown facilitate a convenient means for quick and simple removal of the panel. This is accomplished by inserting a tool into the space and prying the panel outwardly. This configuration is advantageous since the relative rigidity of the panel prohibits peeling of the separable hook and loop members. Consequently, they must be separated by actually separating the panels from the frame structure by tensile forces which are transmitted to the hook and loop members. Insertion of a tool in the convenient space 11e provided facilitates a substantial mechanical advantage such that separating the panel from the frame is made simple.

Also, the space 11j, as shown in the drawings, may be used to permit cool or heated air to flow into the room

without the need for special heating or cooling grids. Particular attention should be directed to the relative thickness of the space 11j with respect to the acute angle "A" formed by the framework and the rearwardly extending side walls 11e. The space as shown preferably has a width which will not permit one to view the junction 11m between the rearwardly extending sidewall 11e and the flange 11b from the frontal side, as may be seen from the drawings. Otherwise, the decorative effect will be spoiled.

In the embodiment of FIG. 2, a translucent panel 19 may be simply installed and held firmly by the flanges 11b by having on its reverse face corresponding hook or loop fastener material 20 as shown. It will be understood that the hook and loop fastener material for strip 20 will engage with the corresponding mating strip 18. Directly behind the panel 19 are three lamps 21 which may be used to create an indirect lighting effect. Servicing and installation of lamps 21 are facilitated by ready installation and removal of panel 19.

In the embodiment of FIG. 3, lamps 22 are installed adjacently behind the grid frames 11 while the panel 19' of opaque construction; however, the panel 19' is secured to the frame sections 11 by means of a spring clip 23 which is attached to the flange 11b as shown. The clip 23 easily slides over the end of the flange to provide a short strip of hook fastener 23a. The panel 19' is correspondingly equipped with a loop-bearing staple 24 which has upon its upper surface a multiplicity of loops 24a which are interengageable with the hooks on the clip fastener 23. The staple 24 has a V-shaped prong 24b having a barb 24c which, when the staple 24 is driven into the panel 19', will effectively prevent disengagement of the staple. Staples for this purpose, however, may be of various configurations in achieving the same purpose. It should be understood, however, that the hook material and the loop material are positioned, as shown, for the purpose of the description. Their positions may be interchanged or their mating surfaces may be comprised of a combination of hooks and loops.

It can be seen from the foregoing that the grid frame is very quickly attached to conventional supporting structure, such as masonry, studs, beams, etc. After such attachments have been made for an entire room, various kinds of wall panels, ceiling tiles, and the like, may quickly be pressed into positive adhering engagement within the grid by means of the respective parts having cooperatively engaging strips of hook and/or loop fastener. Indirect lighting may be installed behind the grids to illuminate the interior of the room either through the panels or the grid frame. Not only is the initial installation of panels quickly accomplished, but service of any area behind the panels is quickly assured by virtue of their ready removal.

It will be understood that the foregoing description is of preferred embodiments of the invention and is therefore merely representative. In order to appreciate more fully the spirit and scope of the invention, reference should be made to the appended claims.

I claim:

1. In one of a wall and ceiling assembly, a structure comprising in combination:

a. a modular framework capable of being attached to

supporting structure in adjacent relation with similar framework, said framework defining at least one panel receptacle having at least one side defined by an extension having a first forward portion and a side wall extending rearwardly from said first forward portion, said side wall having a sloping relation with the framework such that the rear portion of the side wall is spaced apart from a plane passing through the center of said receptacle and perpendicular to said framework less than the forward portion of the rearwardly extending side wall;

- b. a flange member positioned on the rear portion of the side wall and extending toward the center line of said panel receptacle, said flange member having a first forward surface;
- c. at least one modular panel nestled within said receptacle and held in position by at least one separable fastening device, one member of said fastening device being attached to the first forward surface of said flange member and a mating member attached to a corresponding rear portion of said panel, said fastening members being releasably attached to each other in face-to-face relation; and
- d. said panel being configured to have at least one portion of a side wall spaced apart from an adjacent rearwardly extending side wall of said receptacle by a distance which facilitates insertion of a tool between the receptacle and panel side walls to initiate separation of said separable fastener members by prying said panel away from said framework to remove said panel.

2. The combination structure according to claim 1 wherein said receptacle is comprised of an opening in said framework and said extension is positioned along the periphery of said opening such that the rearwardly extending sloping side walls of said extension define said receptacle.

3. The combination structure according to claim 2 wherein said fastening device comprises a member having a surface defined by upstanding engaging elements and a mating member having a surface defined by complementary engaging elements.

4. The combination structure according to claim 3 wherein said engaging elements are hooks and loops.

5. The combination structure according to claim 4 wherein an attachment device having hook and loop fastener means on its outer surface is attached to the rear surface of said panel to provide a cooperating hook and loop fastening member on the rear surface of the panel.

6. The combination structure according to claim 3 wherein said framework is opaque and said panel is translucent and lighting means is positioned behind said structure to provide indirect lighting through said panels with access to said lighting means provided by the convenient detachability of said panel.

7. The combination structure according to claim 3 wherein said framework is translucent and said panel is opaque and lighting means is positioned behind said structure to provide indirect lighting through said framework with access to said lighting means provided by the convenient detachability of said panel.

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