SOLID SURFACE MATERIAL AND PLASTER BOARD COMBINATION AND MEANS FOR MOUNTING

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ABSTRACT
A combination material comprising a surface material and a backing such as plasterboard is adjoined to a connector that allows adjoinment with another connector affixed onto a frame. The combination material comprises overlapping regions, allowing stacking and the connection means allows adjustment of the combination material for perfect fit. A linear frame element provides an efficient means for connecting the combination material to a frame.
Figure 4

OUTSIDE CORNER (3D)

INSIDE CORNER (3D)
SOLID SURFACE MATERIAL AND PLASTER BOARD COMBINATION AND MEANS FOR MOUNTING

BACKGROUND OF THE INVENTION

1. Field of Invention

2. Background of the Invention

An efficient means for the construction of walls and other interior surfaces could provide many benefits. Ideally, materials for forming walls would incorporate a means for adapting the surfacing to pre-existing surfaces or frames. For example, an ideal surface material would be readily adjoined to a metal frame and comprise areas where additional surfaces can overlap. This stacking of surfaces provides that the surfaces are adjoined strongly. Further, adapting the surface composition may result in a surface mounting means that can incorporate several materials in a seamless manner. There is a present need for a device that can reduce labor, time, and cost in the construction of walls and other surfaces according to the above specifications.

SUMMARY OF THE INVENTION

The present invention is, in one or more embodiments, a composite wall system comprising at least one first frame element adapted to join onto an existing frame; said first frame element(s) adapted to mate with at least one second frame element joined with a composite panel; and said composite panel comprising a solid surface material adhered onto a board panel; said composite panel optionally having at least one edge adapted to overlap with any additional composite panel(s); said first frame element(s) and said second frame element(s) adapted to allow for translational adjustment such that said composite panel may be adjusted for fitting. The present invention is also a method of installing the composite wall system of claim 1 comprising installing the first frame element(s) onto the existing frame; mating a first composite panel having said second frame element(s) with the first frame element(s); adjusting the mate to allow for a perfect fit of the composite wall material; optionally mating said additional composite panel(s) having additional second frame element(s) with said first frame element(s) and adjusting the mate of any composite panels to allow for a perfect fit of all composite wall materials; repeating until all composite panels are installed and adjusted for perfect fit; and optionally permanently joining any board element(s) onto the existing frame, thereby locking the composite panel(s) into place. Finally, the present invention is a linear frame element for mating comprising a flat panel having an angled extrusion, said angled extrusion adapted to squeeze a second angled extrusion on a second flat panel of a second linear frame element, said squeezing occurring by the force of the angled extrusion onto the second angled extrusion and the force of the flat panel onto the second angled extrusion, and the force of the second angled extrusion onto the angled extrusion and the force of the second flat panel onto the angled extrusion.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention can best be understood in connection with the accompanying drawings. It is noted that the invention is not limited to the precise embodiments shown in drawings, in which:

Fig. 1 is a side cross-sectional view of the combination material showing female/male connections on the frame and combination material, respectively;

Fig. 2 is a cross-sectional view of the combination material and its overlapping edge adjoined in the top view and not adjoined in the bottom view;

Fig. 3 is a front view of the combination material disposed on a frame and a side-view of the same;

Fig. 4 and 5 show various views of the combination material adapted for corners;

Fig. 6 is a side view detailing mated linear frame elements;

Fig. 7 is a side view showing overlapping edges and positions of linear frame elements; and

Fig. 8 is a perspective view showing overlapping edges and positions of linear frame elements.

BRIEF DESCRIPTION OF REFERENCE NUMERALS

50 Joined Connectors (Male and Female); 60 First Frame Element; 70 Second Frame Element; 80 Linear Frame Elements (First and Second); 90 Studs or other Architectural Mount Point; 100 Frame or other Architectural Feature; 102 Female Connector; 104 Male Connector; 106 Plasterboard; 108 Solid Surface Material; 109 Optional Beveled Edge; 120 Group 1—Screw, Bolt, or other Joining Means; 122 Group 2—Screw, Bolt, or other Joining Means; 130 Embedded Nut; 140 Adhesive and/or Insulating Material; 200 Overlapping Edge of Board Material; 202 Overlapping Edge of Solid Surface Material; 300 Force Point; and 302 Additional Force Point.

DETAILED DESCRIPTION OF THE INVENTION

Turning to the drawings, Fig. 1 shows a side view of the combination material. Gypsum material, plasterboard, woodboard, plastic, metal, wood, or any other combination of commonly used mounting materials may comprise the board. In a preferred embodiment, plasterboard is commonly recognized as a material comprising a rigid board made of layers of fiberboard, paper, or glass matte (sometimes called paperless drywall) bonded to a gypsum plaster core, used instead of plaster or wood panels in construction to form walls. The layers and core, which comprise the plasterboard, may be made from a variety of materials. For example, the core may comprise cement, metal, plastic, wood or other materials surrounded by layers of fiberboard, paper, glass matte, fibers, or other compositions. Again, the board may comprise plasterboard, plasterboard-like materials, and other materials for paneling such as woodboard, plastic, metal, or polymeric compositions.

Attached to the board is a solid surface material—such as acrylic polymer, plastic, CORIAN, or other material including especially those materials with minimal porosity—which comprises the outer surface. In some preferred embodiments, the solid surface material is comprised of com-
pounds adapted to allow the diffuse transfer of light, such as to form ambient lighting for an environment. In a highly preferred embodiment, 108 is a solid surface-material comprising an acrylic polymer.

[0018] Normally, plasterboard is spackled. Utilization of an adhered or disposed solid surface material obviates the need for spackling. To the combination of 106 and 108, is a connector 104 (shown as a male connector, but optionally female or "neuter"). In another embodiment, the connector may be a female adaptor. Suitable adaptors are well known in the art and include: brackets, push button handle sections, angle adaptors, bolt and socket arrangements, magnetic attachments, sock and ball attachments, and any other device in which an extrusion can be placed in a cavity such that the cavity adheres, candles, supports, or encloses the extrusion. The adaptors need not be female/male counterparts but can be "neuter" as in a magnet-to-magnet coupling. In a preferred embodiment, the adaptors are further adapted to allow translational adjustment of the connection. For example, a female to male coupling would be ideal if after the coupling is made, the female or male adaptor, while remaining disposed in, on, or around its counterpart, can be moved in a direction. Such a feature allows the material on which the adaptor is affixed to be adjusted to allow for better fitting of the material. A ball and socket joint may allow such translation adjustment or any other device which allows, by friction or otherwise, the adjustment of the fitting. The joint may be in combination with another adaptor, such as a linear adaptor, or the ball and socket joint or other joint may be linearly extended itself. The adaptor 102 (shown as female but optionally male or neuter) is disposed on a frame or other architectural feature 100. Element 50 shows the female to male coupling. The coupling need not be made by a female to male attachment, but may be made by linear (extended) elements.

[0019] FIG. 2 shows a side view, which helps describe the invention’s “overlapping” functionality. The combination material 106 and 108 is disposed together in such a manner as to leave an overlap on at least one edge, preferably two or more. Note the edges of 106 or 108 may independently be beveled (109). The overlap is designed to allow additional material to be disposed onto the first material. In a preferred embodiment, the outer material comprises an acrylic or other plastic, which can be heated to allow sealing of the surface, thereby providing a seamless joint. The combination material will have disposed on or in its body frame element 70/104 which is attached by a screw or bolt, glue patch, or other affixing means 120. The frame or architectural feature 100 will have disposed on or in it another frame element 60/102 that is affixed by affixing means 122 (such as a bolt, screw, nail, or adhesive). As such, the composite material may be joined with the attachment point on the frame, i.e. 60/102 and 70/104 are joined (optionally they may be permanently joined using adhesive, nails, screws, bolts, and so on). Note, 60/70 refer to a mate which has female/male connectivity (not shown). 102/104 refer to any type of connectivity, such as by linear elements extending along the length of the frame and composite material (shown).

[0020] The composite wall system has a first frame and second frame element or elements. These elements may be, but need not be, male/female or female/male mate-able elements. Alternatively, the elements may be any coupling system but preferably are mate-able and adjustable such that the element-to-element fitting may be adjusted to provide a better fit for the board element. Mating does not require a male and female element but can occur anytime an element, including linear elements, are disposed onto, interposed with, or inter-leaved with another element such as a second linear element in such a manner that friction, gravity, or other forces retain the elements together. Such other forces can include adhesive forces such as from a glue or joining forces such as from a bolt or screw. Additionally, the elements are, in a preferred embodiment, linear elements, meaning the element extends along an axis, such as, for example, a point on the far left portion of a frame to a point on the far right portion of a frame, thereby providing uniform, high-holding strength. The element systems are preferably metal, especially light-weight and high-strength metals. The board wall panel can be a number of compositions and in an exemplary embodiment is plasterboard, gypsum, or gypsum-composite since these are commonly used materials for installation of walls. The board wall panel is affixed onto a solid surface material.

[0021] FIG. 3 shows a front and side view of the invention disposed on a frame. In a preferred embodiment, the adjoining means is extended in one direction to provide, for example, the horizontal (parallel to ground) frame element 60/102 which is attached to frame 100. The frame element 60/102 on frame 100 mates or joins with its complementary frame element 70/104 attached to the combination material 106 & 108. The disposing means need not be extended but can be a point-to-point adjoinment. When extended, it can extend in any direction, such as vertically or at an angle.

[0022] FIG. 4 and FIG. 5 show various views of another embodiment of the invention in which the composite wall material has been adapted for placement in a corner. As can be seen in the drawing, the materials comprise curves that make them suitable for placement in corners. This aspect of the invention, when used in conjunction with the linear, i.e. non-curved, elements of the invention, can be used to provide a room in which all surfaces in the room have been covered by the material providing an environment that has seamless seals at all conjunction points. This is of particular benefit in environments where sterility and cleanliness are a concern.

[0023] FIG. 6 shows a side-view detailing an exemplary and preferred embodiment of the attachment system. The system comprising the composite panel may be mounted to metal or other studs (using, e.g., a screw, bolt, or other joining means 122) on an existing frame such that the composite panel hangs on a clip rail and allows the composite panel to slide along a rail and attached to an existing frame until the panel engages a panel next to it. The clip rail need not, however, be attached to a stud. Any architectural feature can comprise the frame for attaching the clip rail. For example, the clip rail could be mounted to an existing wall, such as masonry walls or even walls that already contain plasterboard or other materials such as for fire, sound, or other insulation purposes. The clip rail only requires a surface or feature providing an attachment point such as by use of a screw, bolt, adhesive, nail, or other joining means.

[0024] Engagement between adjoining composite panels occurs via the overlapping edges, which may be beveled, on the complimentary solid surfaces. The exposed plasterboard or other material on the right side of the panel thus mounted can then be fixed to the metal studs (or other architectural feature) with a joining means, such as a screw, nail or adhesive, before the next panel is mounted, slid to adjoin the now fixed panel, and then again fixed to studs (or other architectural feature) on or of the frame. Non-metal studs may also be used, such as high-strength plastic studs or studs made of
other high-strength materials sufficient to securely hold the composite wall panels into place. With particular reference to the elements in FIG. 6, it can thus be seen that linear frame element 70 is disposed onto linear frame element 60, such that the force of gravity and friction, among other forces, are helping maintain the connection between elements.

The particular structure of linear elements 60 and 70 shown in FIG. 6 is preferred because it provides a simple means for joining two elements together. Further, the connection between the frame elements does not need glue or other joining means since the action of gravity, friction, and the squeezing of one frame element by the other provide sufficient rigidity and strength to keep the elements in place. The elements may slide, however, along the length of the linear element (such as to allow adjustment for perfect fit). A final bolt, screw, adhesive, or other similar joining means may be disposed in, through, or on the linear elements to secure them permanently into place. This is not necessary though since adjoining board elements, i.e. other panels that are placed on the linear frame elements, may exert sufficient lateral force to keep the elements in place. For example, if the panels are secured around four walls of a room, there is sufficient frictional and other force to prevent the panels from moving laterally under normal forces.

Again, FIG. 6 shows linear frame elements for mating comprising a flat panel having an angled extrusion, said angled extrusion adapted to squeeze the second angled extrusion on the second flat panel of the second linear frame element, said squeezing occurring by the force of the angled extrusion onto the second angled extrusion and the force of the flat panel onto the second angled extrusion, and the force of the second angled extrusion onto the angled extrusion and the force of the second flat panel onto the angled extrusion.

Bolts, screws, or other similar joining means 122 are shown joining the elements to the frame, as by connection to studs (not shown). Bolts, screws, other joining means 120 attach the other linear element to the board material. The bolts or screws need not extend into the solid surface material as shown in FIG. 6 but may go only so far as the thread 130. Solid surface material 108 may be joined with the board material 106 either by a bolt or screw or by an adhesive layer 140 interposed between the solid surface and the board element. The adhesive layer may comprise insulation, such as electromagnetic insulation, inclusion of or other radiation barriers, or the adhesive layer may be absent and the interposed layer comprise only insulation. The insulation, if present, may comprise thermal or sound barriers as well. In one alternative embodiment, the intervening layer may comprise KEVLAR or other very high strength materials adapted to prevent projectiles from puncturing the material.

FIG. 7 shows another front view of an embodiment of the present invention. Here, the overlapping edge 200 of the solid surface material 108 and the overlapping edges 200 of the board element are shown. Studs 90 (which alternatively could be any other architectural feature such as a wall board or other panel), such as those that may be found on the frame to which the panels are attached, provide a point at which the linear frame elements 80 may be attached. As can be seen in the figure, the solid surface panel can be slid along the linear frame element onto the frame. At this point it can be fixed in place and additional panels installed, their edges overlapping to provide a seal.

FIG. 8 provides a detail view of frame elements 60 and 70 mated together. Bold lines indicate points of touching between the two elements in this embodiment. Most touching occurs on the angled extrusion. The angle can be narrow, such as 10 degrees between the plane and the extrusion or wide such as 45 degrees are more. In a preferred embodiment, the angle is adapted to maintain a center of gravity such that the board panel elements are retained, i.e. the mate is maintained by action of gravity, by friction, and squeezing forces. Pressure, such as from force points 300 and 302, which arise by action of gravity, by friction, and squeezing forces between points of touching on the panel provide the means for retention of the mate but allow lateral translation. Such lateral translation would occur, in one embodiment, by slightly lifting the top element, sliding it, and refitting the top element to mate with the bottom element.

In the foregoing description, certain terms and visual depictions are used to illustrate the preferred embodiment. However, no unnecessary limitations are to be construed by the terms used or illustrations depicted, beyond what is shown in the prior art, since the terms and illustrations are exemplary only, and are not meant to limit the scope of the present invention. It is further known that other modifications may be made to the present invention, without departing the scope of the invention, as noted in the appended claims.

1 claim:
1. A composite wall system comprising
   a) At least one first frame element adapted to join onto an existing frame;
   b) said first frame element(s) adapted to mate with at least one second frame element
      joined with a composite panel; and
   c) said composite panel comprising
      a surface material adhered onto a board panel;
      a surface material optionally having at least one edge adapted to overlap with any additional composite panel(s);
      said first frame element(s) and said second frame element(s) adapted to allow for translational adjustment such that said composite panel may be adjusted for fitting.

2. The composite wall system of claim 1 in which said board panel comprises a core material surrounded by one or more layers of a layered material.

3. The composite wall system of claim 1 in which said first frame element(s) is a clipable female unit and said second frame element(s) is a clipable male unit.

4. The composite wall system of claim 1 in which said first element(s) and said second element(s) are metal elements.

5. The composite wall system of claim 1 in which said board panel is plasterboard or gypsum.

6. The composite wall system of claim 1 in which said board panel comprises a core material surrounded by one or more layers of a layered material.

7. The composite wall system of claim 1 in which said composite wall system comprises curves.

8. The composite wall system of claim 1 in which said composite wall system is adapted for placement at corners.

9. The composite wall system of claim 1 further comprising an intervening layer of material between the solid surface material and the board material.

10. The composite wall system of claim 9 in which said intervening layer of material is KEVLAR.

11. The composite wall system of claim 9 in which said intervening layer of material is adapted to prevent projectiles from puncturing or breaking the intervening layer.
12. The composite wall system of claim 9 in which said intervening layer of material is adapted to provide insulation.

13. A method of installing the composite wall system of claim 1 comprising
   a) installing the first frame element(s) onto the existing frame;
   b) mating a first composite panel having said second frame element(s) with the first frame element(s);
   c) adjusting the mate to allow for a perfect fit of the composite wall material;
   d) optionally mating said additional composite panel(s) having additional second frame element(s) with said first frame element(s) and adjusting the mate of any composite panels to allow for a perfect fit of all composite wall materials;
   e) repeating step d) until all composite panels are installed and adjusted for perfect fit; and
   d) optionally permanently joining any board element(s) onto the existing frame, thereby locking the composite panel(s) into place.

14. The method of claim 13 in which any overlapping edges that meet any other overlapping edges are sealed; thereby resulting in a seamless joining of composite wall materials.

15. The method of claim 13 in which the adjustment for perfect fit comprises aligning any overlapping edges on adjacent composite wall materials.

16. The method of claim 13 in which adjustment of fitting is performed once, after any and all first frame elements have been mated with their corresponding second frame elements, and prior to permanently joining any board elements.

17. A linear frame element for mating comprising a flat panel having an angled extrusion, said angled extrusion adapted to squeeze a second angled extrusion on a second flat panel of a second linear frame element, said squeezing occurring by the force of the angled extrusion onto the second angled extrusion and the force of the flat panel onto the second angled extrusion, and the force of the second angled extrusion onto the angled extrusion and the force of the second flat panel onto the angled extrusion.

18. The linear frame element of claim 17 in which said mate is also achieved by force of friction and/or gravity.

19. The linear frame element of claim 17 where the angle of extrusion is no more than 60 degrees between the flat panel and the angled extrusion.

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