

Description

This invention is directed to heavy construction attachment systems, in particular, to a system incorporating major disassemblable units and to the units of the system.

In the construction industry, concrete foundations are commonly manufactured by using formwork into which concrete is poured. This formwork usually consists of re-usable wood and aluminum composite struts and joists which provide a supporting crib-work or lattice for the actual sheathing members onto which the concrete is poured. The sheathing frequently consists of plain or paper faced plywood members. Thus, a substantial plywood sheathing sheet for example 3/4 inch (approximately 1.9 cm) ply, having a replaceable paper liner as the casting surface, is usually nailed to an underlying supporting joist having an inset nailing strip. After the concrete has set, the underlying formwork lattice and plywood is removed. Frequently the plywood has to be torn down, owing to the entrapment of the attachment nails into the concrete. Similarly, the face of the plywood may be penetrated by the concrete and become damaged. The wood nailing strips of the supporting laticework will become damaged over time due to repeated re-use and will have to be replaced. Considerable expenditures in material and labour costs are therefore involved, and valuable resources are used up.

The present method of manufacturing concrete foundations also has a drawback in that seam outlines of the 4 x 8 foot (about 122 x 244 cm) sheathing sheets, caused by misalignments, gaps and penetrating cement flashings must be ground away where a smooth finished surface is required.

The use of hook and loop elements for the purpose of joining flexible elements is not new. The garment and footwear industries have for many years employed a particular hook and loop type attachment material, commonly referred to by the trade mark VELCRO, for securing the adjacent surfaces of clothing and footwear. However, this material is limited both by the presently available widths, which do not exceed four inches (about 10 cm), and by the maximum anchoring force developed by the plastic hook elements. Furthermore, prior usage appears to have been concentrated on the application of this type of fastener in areas where a peeling, wave-like relative movement can be used to attach and detach a pair of complementary hook and loop surfaces, as when opening a garment or a shoe flap or on the installation of decorative, non-structural panels such as shown in Wilson, U.S. Patent Number No. 4,744,189 issued May 17, 1988 or room dividers such as shown in Curatolo, U.S. Patent No. 4,090,335 issued May 23, 1978.

European Patent Application No. 326 925, published August 9, 1989 describes a plaster board having a surface substantially covered by one part of a hook and loop fastening system. A finishing sheet or a structural support member having the complementary part of the hook and loop fastening system may be used for attachment of the board to either or both of the finishing sheet and support member.

European Patent Application No. 288 393, published October 26, 1988 discloses a sealing material for cement. A polymeric sheet having loops on one side is placed on fresh cement to be sealed, loops embedded in the concrete becoming set therein to fasten the sheet to the cement.

In one aspect, the present invention provides an *in situ* building structure such as a wall, ceiling or floor formed on site from a settable material and having at least a first surface and an overlay covering having a rear surface embedded in the first surface. The overlay covering includes a front surface substantially covered in a part of a hook and loop fastening system.

In a particular embodiment of the building structure, the first surface is substantially planar. The rear surface can have structural means for embedding into the material. Such structural means can be a part of a hook and loop fastening system. The rear surface of the overlay covering can be treated to facilitate bonding to the material.

It is possible for the building structure to be supported by a form work having a complementary part of a hook and loop fastening system that is detachable from the overlay covering.

Further, the building structure can include a substantially planar first surface and a substantially planar second surface opposing the first surface. It can include a further overlay covering including a front surface substantially covered in a part of a hook and loop fastening system and an opposing rear surface wherein the rear surface of the overlay is embedded in the second surface.

In another aspect, the invention includes a system for construction of building elements cast *in situ* of settable material and includes walls, ceilings and floors. The system comprises a temporary assembly including a plurality of rigid components for assembly in layered, substantially planar facing relation. In such an aspect, there is a first component sheet member manufactured having a first part of a hook and loop fastening system substantially uniformly adhering to, covering and supported across at least a first surface of the sheet member. There is a second component manufactured having a second part of a hook and loop fastening system of complementary attachability to the first part and substantially uniformly adhering to, covering and supported across at least a second surface of the

support member. There is a removable covering secured in detachable, substantially concealing relation to the sheet member along a third surface. The covering layer can have a fourth surface having attachment means to enable bonding of the covering layer with concrete when cast thereon. Alternatively, the covering can have a fourth surface having release means to preclude bonding of the covering layer with concrete when cast thereon and to facilitate removal of the covering layer from the concrete when the concrete is set.

In such a system, the first and second components can be such that they can be sized on site and detachably engage each other in an assembled system.

There can be a plurality of construction layers, having the parts of the hook and loop system between more than one pair of interfaces of the construction layers.

The first and second surfaces can both be substantially planar and similarly inclined, and they can both be horizontal.

The sheet member may be a wall sheathing member.

One or more of the components can be of generally uniform cross-section at areas where they are to be cut.

The sheet member of the system can be a sheathing member and there can be a number of support members that are joist members, each joist member having a second part of a hook and loop fastening system substantially uniformly adhering to, covering and supported across a third surface opposing the second surface. There can be a third component including a plurality of beam members having a first part of the hook and loop fastening system of complementary attachability to the second part of the third surface substantially uniformly adhering to, covering and supported across at least a fifth surface.

The system can include a plurality of the sheathing members having mutually substantially abutting edges, each sheathing member having a first part of the hook and loop fastening system, substantially uniformly supported across an upper surface. The covering layer can include an overlay cover having a lower surface substantially covered with a second part of the hook and loop fastening system of complementary attachability to the first part of the upper surface, secured to the upper surface of the sheathing members and located to cover the abutting edges to preclude liquid concrete from entering the area of the abutting edges.

In another aspect, the invention includes a method of constructing a wall, ceiling or floor. The method includes a step of erecting a formwork, the formwork having a sheathing member having a front surface and having a part of a hook and loop

fastening system on the front surface and an overlay covering substantially covered on a front surface thereof with a part of a hook and loop fastening system of complementary attachability to that on the first surface of the sheathing member, and having an opposing rear surface. The front surface of the overlay covering is fastened to the front surface of the sheathing member through the fastening system. The method includes a step of pouring a settable material against the rear surface of the overlay covering, the step of setting the material and the step of dismantling the form work from the structure, including removing the sheathing member.

As part of the method, the rear surface of the overlay cover can have release means to preclude bonding of the overlay cover to the settable material.

The method can also include a step of embedding a portion of the rear surface of the overlay covering in a first surface of the settable material adjacent to the rear surface. Further, that portion of the overlay covering which is embedded in a settable material can have structural means on the rear surface of the overlay covering which forms a bond with the settable material when the material sets. The structural means can be part of a hook and loop fastening system substantially covering the rear surface of the overlay covering.

The method can further include the step of treating the rear surface of the overlay covering, prior to pouring the material, in order to facilitate bonding to the material.

The sheathing member of the method can have a first surface opposing its front surface, and have a part of a hook and loop fastening system on the first surface. The formwork can include a support member having a part of the hook and loop fastening system of complementary attachability to the part of the hook and loop fastening system on the first surface of the sheathing member on a second surface, wherein the sheathing member and support member are fastened by their respective parts of the hook and loop fastening system.

Thus, according to one embodiment a carpet or other floor covering having suitable fastening elements on the undersurface, or ceiling panels or tiles having appropriate fastening elements on the upper surface may be readily, detachably secured to an appropriate structure. Similarly, wall surfaces for partitions and the like can be attached to a stud system. Also, the elements of the stud system may incorporate such complementary layered fastening elements.

In another embodiment a structural member having a first surface with a layer of surface connecting means first component parts mounted to a backing sheet and bonded to the member is pro-

vided with a removable protective cover secured thereover in protective relation, the protective cover including on one face thereof a layer of surface connecting means second components complementary to the first components of the connecting means, to permit the attachment and removal of the protective cover and exposure of the surface layer of connecting means first components. Such an embodiment may comprise a floor and sub-floor construction, wherein the protective cover remains in place during the completion of construction, so as to protect the surface connecting means therebeneath. Subsequently, a carpet or other covering may be substituted wherein the protected underlying connecting components are utilized to removably secure the covering to the sub-floor.

In general, the area fastening elements of complementary hooks and loops are of synthetic material, formulated in layers attached to backing sheets to facilitate area coverage by way of the attachment means, so as to develop the requisite attachment strength.

Certain embodiments of the invention are described, without limiting the invention thereto, reference being made to the accompanying drawings, wherein;

Figure 1 is a general view of a concrete formwork system in accordance with the present invention, in partially exploded relation;

Figure 2 is a general view of a structural floor system in accordance with the present invention;

Figures 3 and 4 are general views of structural elements incorporating component connecting means in accordance with the invention;

Figure 5 is a sideview section of a poured ceiling or roof incorporating one element of a connecting means combination in installed relation therewith.

Figure 6 is a view similar to Figure 5, the ceiling incorporating the complementary elements of the connecting means combination.

Figure 7 is a general view in exploded relation showing the elements of a portion of a partition wall embodying the invention.

In the making of the present invention it will be appreciated that certain inherent deficiencies and limitations of presently available hook and loop fasteners, such as the presently limited width of four inches in the VELCRO product, and the present upper limit on its gross developed joint strength can be overcome by the provision of wide width sheets of the respective hook and loop elements, the development of elements of improved characteristics and the adoption of improved manufacturing processes for the fasteners. An aspect of the components presented is the integration of a hook and loop fastening system into the surfaces

of the products. What is described is an incorporation of this system directly into the elements comprising the building system. This aspect is required in order to provide the necessary flexibility of attachment when products are to be transported to the site as standard components or cut and fit on site for assembly into a building.

In addition, the invention presented in this application as well as European Patent Application No. 89101267 for an ANCHOR BOARD SYSTEM are not fastening products *per se* but rather are new designs of conventional building materials.

Referring to Figure 1, a concrete formwork assembly 10 comprises a number of supporting struts 12 carrying beams 14 across which are laid joists 16, to which sheathing sheets 18 are secured.

A covering 41 overlays the gaps or joints 39 between adjoining sheathing sheets 18. At the interfaces 11, 22, 24 between the respective rigid components 14, 16, 18 area fastening elements comprising loops 27 and hooks 29 are located, to attach the respective components in securely anchored relation.

The covering 41 also utilizes area fastening elements comprising loops 27 and hooks 29 to secure it to the sheathing sheets 18.

Referring to Figure 2, a portion 30 of a floor construction is shown. Illustrated are fabricated joists 32, each comprising a pair of opposed flanges 34, 36 having a web 38 secured therebetween. Such joists 32 can be of extruded light alloy such as aluminum, or fabricated of metal, or of wood and plywood as indicated.

The ends of joists 32 usually are supported by peripheral basement walls (not shown).

A subfloor comprising panels 40 is supported by joists 32. At the interface contact areas 46 and 47 are located area fastening elements secured to the respective components comprising loops 27 and hooks 29, to hold the respective components in mutually anchored relation. A flexible, protective cover sheet 50 overlies the upper surface of floor panels 40, being arranged to cover the floor panel intermediate gaps or joints 39.

During the erection of a building, sheet 50 may comprise a protective over-flooring element, to safeguard the underlying, upwardly extending hook portions 29 against damage from above. Once the building is erected and the finishing work completed, the protective sheet 50 can be removed and 4 x 8 foot (approximately 122 x 244 cm) sheets of plywood for a flooring system having a complementary loop layer on the underface thereof or a covering carpet with a looped underface, as disclosed in US-A-4 822 658 can be installed.

Figure 3 shows a substantially rigid panel 52 having a layer of loop elements 27 on one face

thereof. This panel may comprise a finished surface element, which can be attached to installed hook elements 29 of a construction.

In the case of a poured ceiling surface, as illustrated in Figures 5 and 6, respective surface area attachment elements 54, 56 can be secured in situ at the time of pouring the concrete ceiling, or subsequently applied thereto. The enhanced utility achieved in making the surface area elements 54 or 56 as part of the formwork illustrated in Figure 1, by appropriate adaptations, can be readily appreciated. Thus, in the case of the ceiling embodiment referred to in the Figure 1 arrangement, a covering 41 may be either releasable so that it does not attach to the concrete or it may include upwardly extending loops or hooks, so as to bond the covering 41 to the undersurface of a ceiling that is poured thereover. It will be understood that the undersurface of covering 41 also is provided with hooks or loops, the selection of loops or hooks being appropriate to the fastening elements incorporated with the finish ceiling surface to be suspended therefrom. Further, fastening elements complementary to the selected elements of the undersurface of covering 41 will be secured to the upper surface of sheathing sheets 18, to enable detachable attachment of covering 41 to sheets 18, to facilitate initial assembly, and subsequent disassembly of the formwork.

Figure 4 illustrates a panel 60 having a layer of loop elements 27 and hook elements 29 thereon, for use as an intermediate construction.

In operation, referring first to Figure 1, a supporting grill work of elements 12, 14, 16 is erected. The presence at the respective interface areas of the hook/loop area attachments permits assembly without nailing or other auxiliary fastening steps. Similarly, the sheathing sheets 18 are readily positioned in place and secured by the weight of the sheeting, together with the temporary application of downward force thereon, to engage the respective loop and hook elements 27, 29.

The barrier sheet 41 protects the upper surface of the sheathing sheets 18 so that liquid concrete cannot penetrate between adjacent sheets 18. This minimizes the need for subsequent joint-flash grinding.

In the case of the sheathing sheet members 18, it is contemplated that they may be fabricated of materials other than plywood, such as aluminum composites having a foam core, in order to reduce the weight of these members while maintaining adequate structural strength and rigidity.

The barrier sheet 41 may have a treated upper surface thereon, to facilitate bonding with the concrete when it is poured, or a surface barrier layer which precludes such bonding. Also, the upper surface of sheet 41 may have recesses or protrusions,

to facilitate in-situ bonding to the poured concrete.

In Figure 2, suitable floor joists such as the illustrated prefabricated joists are installed at the requisite intervals. The joists 32 may also incorporate area attachment elements in accordance with the present invention at their end lower surfaces to facilitate their installation. The sub-floor panels 40 are then positioned in place where temporary downward force will engage the interface fastener elements, loops 27 and hooks 29.

A protective flexible sheeting 50 then is laid over the sub-floor, so as to cover the intermediate joints 39. The purpose of the sheeting 50 is to protect hook elements 29 of the subfloor panels 40. Once construction activity, such as that of the allied trades, electricians, plumbers, carpenters is completed, a carpet having a looped undersurface in accordance with US-A-4 822 658 can be substituted for the sheeting 50.

In disassembling the subject system it will be understood that, owing to the potentially large securing forces that can be generated between the interface attachment hook and loop means, the use of auxiliary mechanisms, such as pry bars or pulling mechanisms may be required.

Referring to Figure 7 a portion of a partition wall assembly 70 is shown. A sill piece 72 of U-section, having fastening elements 73 therein receives a stud member 74 in inserted relation. An end under-face of portion 75 of stud member 74 has fastening elements 77 thereon, to engage the fastening elements 73 of sill piece 72. The side portions 78 of stud member 74 have the outer faces thereof covered or at least partially covered with fastening elements 77, to which the elements 73 of sheet 79 can adhere. In use a partition wall can be readily and rapidly assembled to provide a partition wall of adequate strength, yet which can be readily disassembled. The sill piece 72 may also be provided with attachment elements 73 or 77 on the underface thereof. The partition wall elements 72 and 74 are generally of rolled metal, of thin section, similar to the metal studs and sills presently used with nailing constructions.

It will be understood that the foregoing disclosed embodiments are illustrative of the invention, and modifications thereto can be made, within the scope of the claims appended hereto.

Claims

1. An in situ building structure such as a wall, ceiling or floor formed on site from a settable material and having at least a first surface and an overlay covering (50) having a rear surface embedded in the first surface characterized in that the overlay covering has a front surface

thereof. This panel may comprise a finished surface element, which can be attached to installed hook elements 29 of a construction.

In the case of a poured ceiling surface, as illustrated in Figures 5 and 6, respective surface area attachment elements 54, 56 can be secured in situ at the time of pouring the concrete ceiling, or subsequently applied thereto. The enhanced utility achieved in making the surface area elements 54 or 56 as part of the formwork illustrated in Figure 1, by appropriate adaptations, can be readily appreciated. Thus, in the case of the ceiling embodiment referred to in the Figure 1 arrangement, a covering 41 may be either releasable so that it does not attach to the concrete or it may include upwardly extending loops or hooks, so as to bond the covering 41 to the undersurface of a ceiling that is poured thereover. It will be understood that the undersurface of covering 41 also is provided with hooks or loops, the selection of loops or hooks being appropriate to the fastening elements incorporated with the finish ceiling surface to be suspended therefrom. Further, fastening elements complementary to the selected elements of the undersurface of covering 41 will be secured to the upper surface of sheathing sheets 18, to enable detachable attachment of covering 41 to sheets 18, to facilitate initial assembly, and subsequent disassembly of the formwork.

Figure 4 illustrates a panel 60 having a layer of loop elements 27 and hook elements 29 thereon, for use as an intermediate construction.

In operation, referring first to Figure 1, a supporting grill work of elements 12, 14, 16 is erected. The presence at the respective interface areas of the hook/loop area attachments permits assembly without nailing or other auxiliary fastening steps. Similarly, the sheathing sheets 18 are readily positioned in place and secured by the weight of the sheathing, together with the temporary application of downward force thereon, to engage the respective loop and hook elements 27, 29.

The barrier sheet 41 protects the upper surface of the sheathing sheets 18 so that liquid concrete cannot penetrate between adjacent sheets 18. This minimizes the need for subsequent joint-flash grinding.

In the case of the sheathing sheet members 18, it is contemplated that they may be fabricated of materials other than plywood, such as aluminum composites having a foam core, in order to reduce the weight of these members while maintaining adequate structural strength and rigidity.

The barrier sheet 41 may have a treated upper surface thereon, to facilitate bonding with the concrete when it is poured, or a surface barrier layer which precludes such bonding. Also, the upper surface of sheet 41 may have recesses or protrusions,

to facilitate in-situ bonding to the poured concrete.

In Figure 2, suitable floor joists such as the illustrated prefabricated joists are installed at the requisite intervals. The joists 32 may also incorporate area attachment elements in accordance with the present invention at their end lower surfaces to facilitate their installation. The sub-floor panels 40 are then positioned in place where temporary downward force will engage the interface fastener elements, loops 27 and hooks 29.

A protective flexible sheeting 50 then is laid over the sub-floor, so as to cover the intermediate joints 39. The purpose of the sheeting 50 is to protect hook elements 29 of the subfloor panels 40. Once construction activity, such as that of the allied trades, electricians, plumbers, carpenters is completed, a carpet having a looped undersurface in accordance with US-A-4 822 658 can be substituted for the sheeting 50.

In disassembling the subject system it will be understood that, owing to the potentially large securing forces that can be generated between the interface attachment hook and loop means, the use of auxiliary mechanisms, such as pry bars or pulling mechanisms may be required.

Referring to Figure 7 a portion of a partition wall assembly 70 is shown. A sill piece 72 of U-section, having fastening elements 73 therein receives a stud member 74 in inserted relation. An end under-face of portion 75 of stud member 74 has fastening elements 77 thereon, to engage the fastening elements 73 of sill piece 72. The side portions 78 of stud member 74 have the outer faces thereof covered or at least partially covered with fastening elements 77, to which the elements 73 of sheet 79 can adhere. In use a partition wall can be readily and rapidly assembled to provide a partition wall of adequate strength, yet which can be readily disassembled. The sill piece 72 may also be provided with attachment elements 73 or 77 on the underface thereof. The partition wall elements 72 and 74 are generally of rolled metal, of thin section, similar to the metal studs and sills presently used with nailing constructions.

It will be understood that the foregoing disclosed embodiments are illustrative of the invention, and modifications thereto can be made, within the scope of the claims appended hereto.

Claims

1. An in situ building structure such as a wall, ceiling or floor formed on site from a settable material and having at least a first surface and an overlay covering (50) having a rear surface embedded in the first surface characterized in that the overlay covering has a front surface



- substantially covered in a part of a hook and loop fastening system (27, 29).
2. The building structure of claim 1, wherein the first surface is substantially planar. 5
 3. The building structure of claim 2, wherein the rear surface has structural means for embedding into the material. 10
 4. The building structure of claim 3, wherein the structural means are a part of a hook and loop fastening system (27, 29). 15
 5. The building structure of claim 2 or claim 3, wherein the rear surface of the overlay covering is treated to facilitate bonding to the material. 20
 6. The building structure of claim 4, wherein the overlay covering (50) is supported by a form work (10) having a complementary part of a hook and loop fastening system detachable from the overlay covering. 25
 7. The building structure of claim 4, further comprising a substantially planar second surface opposing the first surface, and a further overlay covering including a front surface substantially covered in a part of a hook and loop fastening system (27, 29) and an opposing rear surface, wherein the rear surface of the further overlay covering is embedded in the second surface. 30
 8. A system for construction of building elements cast in situ of settable material and including walls, ceilings and floors, the system comprising a temporary assembly including a plurality of rigid components for assembly in layered, substantially planar facing relation wherein: 35
 - a first component comprises a sheet member (40) manufactured having a first part of a hook and loop fastening system (27, 29) substantially uniformly adhering to, covering and supported across at least a first surface of the sheet member; and 40
 - a second such component comprises a support member (32) manufactured having a second part of a hook and loop fastening system of complementary attachability to the first part and substantially uniformly adhering to, covering and supported across at least a second surface of the support member; and further comprising, 45
 9. A system for construction of building elements cast in situ of settable material and including walls, ceilings and floors, the system comprising a temporary assembly including a plurality of rigid components for assembly in layered, substantially planar facing relation wherein: 50
 - a first component comprises a sheet member (40) manufactured having a first part of a hook and loop fastening system (27, 29) substantially uniformly adhering to, covering and supported across at least a first surface of the sheet member; and
 - a second such component comprises a support member (32) manufactured having a second part of a hook and loop fastening system of complementary attachability to the first part and substantially uniformly adhering to, covering and supported across at least a second surface of the support member; and further comprising,
 - a removable covering layer (50) secured in detachable, substantially concealing relation to the sheet member along a third surface, wherein the covering layer comprises a fourth surface having attachment means to enable bonding of the covering layer with concrete when cast thereon. 55
 10. The system of claim 8 or claim 9, wherein the first and second components may be sized on site and detachably engage each other in an assembled system.
 11. The system of claim 8 or claim 9, wherein there is a plurality of construction layers, having the parts of the hook and loop system between more than one pair of interfaces (11, 22, 24) of the construction layers.
 12. The system of claim 8 or claim 9, wherein the first surface is substantially planar, the second surface is substantially planar and the first and second surfaces are substantially horizontal.



13. The system of claim 8 or claim 9, wherein the first surface is substantially planar, the second surface is substantially planar and the first and second surfaces are similarly inclined.
14. The system of claim 8 or claim 9, wherein the sheet member is a wall sheathing member.
15. The system of claim 10, wherein each component is of generally uniform cross-section at areas where it may be required to be cut.
16. The system of claim 12 wherein the sheet member is a sheathing member and the support member is a joist member, the joist member having a second part of a hook and loop fastening system substantially uniformly adhering to, covering and supported across a third surface opposing the second surface, the second component further comprises a plurality of joist members, and a third component comprises a plurality of beam members having a first part of a hook and loop fastening system of complementary attachability to the second part of the third surface substantially uniformly adhering to, covering and supported across at least a fifth surface.
17. The system of claim 16, wherein the first component further comprises a plurality of sheathing members having mutually substantially abutting edges and each sheathing member having a first part of a hook and loop fastening system, substantially uniformly supported across an upper surface, and wherein the covering layer comprises an overlay cover having a lower surface substantially covered with a second part of a hook and loop fastening system of complementary attachability to the first part of the upper surface, secured to the upper surface of the sheathing members and located to cover the abutting edges to preclude liquid concrete from entering the area of the abutting edges.
18. A method of constructing a wall, ceiling or floor, the method characterized in that it includes:
- the step of erecting a formwork having:
 - a sheathing member having a front surface and having a part of a hook and loop fastening system on the front surface; and
 - an overlay covering substantially covered on a front surface thereof with a part of a hook and loop fastening system of complementary attachability to that on the first surface of the sheathing member, and having an opposing rear surface;
- wherein the front surface of the overlay covering is fastened to the front surface of the sheathing member through the fastening system;
- the step of pouring a settable material against the rear surface of the overlay covering;
- the step of setting the material; and
- the step of dismantling the form work from the structure, including removing the sheathing member.
19. The method of claim 18, characterized in that the rear surface of the overlay cover has a surface barrier layer to preclude bonding of the overlay cover to the settable material.
20. The method of claim 18, characterized in that it further comprises the step of, embedding a portion of the rear surface of the overlay covering in a first surface of the settable material adjacent to the rear surface.
21. The method of claim 20, characterized in that that portion of the overlay covering which is embedded in a settable material has structural means on the rear surface of the overlay covering which forms a bond with the settable material when the material sets.
22. The method of claim 21, characterized in that the structural means are a part of a hook and loop fastening system substantially covering the rear surface of the overlay covering.
23. The method of claim 22, characterized in that it further comprises the step of treating the rear surface of the overlay covering, prior to pouring the material, in order to facilitate bonding to the material.
24. The method of claim 23, characterized in that the sheathing member has a first surface opposing its front surface, and has a part of a hook and loop fastening system on the first surface, and the form work further includes a support member having a part of a hook and loop fastening system of complementary attachability to the part of the hook and loop fastening system on the first surface of the sheathing member on a second surface, wherein the sheathing member and support member are fastened by their respective parts of the hook and loop fastening system.



Patentansprüche

1. In-situ Baukonstruktion, z. B. eine Wand, eine Decke oder ein Fußboden, die vor Ort aus einem härtbaren Werkstoff ausgebildet wird und mindestens eine erste Oberfläche und einen Deckbelag (50) mit einer in die erste Oberfläche eingebetteten Rückseite aufweist, dadurch gekennzeichnet, daß der Deckbelag eine Vorderseite hat, die im wesentlichen mit einem Teil eines Haken-und-Schlaufen-Befestigungssystems (27, 29) bedeckt ist. 5
2. Baukonstruktion nach Anspruch 1, wobei die erste Oberfläche im wesentlichen eben ist. 10
3. Baukonstruktion nach Anspruch 2, wobei die Rückseite eine konstruktive Einrichtung zum Einbetten in den Werkstoff hat. 15
4. Baukonstruktion nach Anspruch 3, wobei die konstruktive Einrichtung ein Teil eines Haken-und-Schlaufen-Befestigungssystems (27, 29) ist. 20
5. Baukonstruktion nach Anspruch 2 oder 3, wobei die Rückseite des Deckbelags behandelt ist, um eine Bindung an den Werkstoff zu erleichtern. 25
6. Baukonstruktion nach Anspruch 4, wobei der Deckbelag (50) durch eine Schalung (10) mit einem komplementären Teil eines Haken-und-Schlaufen-Befestigungssystems gestützt wird, der von dem Deckbelag abnehmbar ist. 30
7. Baukonstruktion nach Anspruch 4, ferner mit einer der ersten Oberfläche gegenüberliegenden, im wesentlichen ebenen zweiten Oberfläche und einem weiteren Deckbelag mit einer Vorderseite, die im wesentlichen mit einem Teil eines Haken-und-Schlaufen-Befestigungssystems (27, 29) bedeckt ist, und einer gegenüberliegenden Rückseite, wobei die Rückseite des weiteren Deckbelags in die zweite Oberfläche eingebettet ist. 35
8. System zum Aufbau von in situ aus einem härtbaren Werkstoff gegossenen Bauelementen, einschließlich Wänden, Decken und Fußböden, wobei das System eine Vormontage mit mehreren starren Komponenten zur Montage in Schichten aufweist, die im wesentlichen eben zueinander liegen, und wobei: 40
 - eine erste Komponente ein Plattenteil (40) aufweist, das mit einem ersten Teil eines Haken-und-Schlaufen-Befestigungssystems (27, 29) hergestellt ist, der im wesentlichen gleichmäßig an mindestens einer ersten Oberfläche des Plattenteils haftet, sie bedeckt und durch sie abgestützt wird; und
 - eine zweite derartige Komponente ein Stützteil (32) aufweist, das mit einem zweiten Teil eines Haken-und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem ersten Teil hergestellt ist, der im wesentlichen gleichmäßig an mindestens einer zweiten Oberfläche des Stützteils haftet, sie bedeckt und durch sie abgestützt wird; und ferner aufweist: 45
 - eine entfernbare Belagschicht (50), die an dem Plattenteil an einer dritten Oberfläche abnehmbar befestigt ist und es im wesentlichen verbirgt, wobei die Belagschicht eine vierte Oberfläche mit einer Löseeinrichtung aufweist, um eine Bindung der Belagschicht mit Beton beim Aufgießen zu verhindern und eine Entfernung der Belagschicht von dem Beton zu erleichtern, wenn der Beton ausgehärtet
9. System zum Aufbau von in situ aus einem härtbaren Werkstoff gegossenen Bauelementen, einschließlich Wänden, Decken und Fußböden, wobei das System eine Vormontage mit mehreren starren Komponenten zur Montage in Schichten aufweist, die im wesentlichen eben zueinander liegen, und wobei: 50
 - eine erste Komponente ein Plattenteil (40) aufweist, das mit einem ersten Teil eines Haken-und-Schlaufen-Befestigungssystems (27, 29) hergestellt ist, der im wesentlichen gleichmäßig an mindestens einer ersten Oberfläche des Plattenteils haftet, sie bedeckt und durch sie abgestützt wird; und
 - eine zweite derartige Komponente ein Stützteil (32) aufweist, das mit einem zweiten Teil eines Haken-und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem ersten Teil hergestellt ist, der im wesentlichen gleichmäßig an mindestens einer zweiten Oberfläche des Stützteils haftet, sie bedeckt und durch sie abgestützt wird; und ferner aufweist: 55
 - eine entfernbare Belagschicht (50), die an dem Plattenteil an einer dritten Oberfläche abnehmbar befestigt ist und es im wesentlichen verbirgt, wobei die Belagschicht eine vierte Oberfläche mit einer Löseeinrichtung aufweist, um eine Bindung der Belagschicht mit Beton beim Aufgießen zu verhindern und eine Entfernung der Belagschicht von dem Beton zu erleichtern, wenn der Beton ausgehärtet



ist.

10. System nach Anspruch 8 oder 9, wobei die erste und zweite Komponente auf der Baustelle auf Maß gebracht werden können und in einem montierten System abnehmbar ineinander eingreifen. 5
11. System nach Anspruch 8 oder 9, wobei mehrere Aufbauschichten mit den Teilen des Haken- und-Schlaufen-Systems zwischen mehr als einem Paar Paßflächen (11, 22, 24) der Aufbauschichten vorgesehen sind. 10
12. System nach Anspruch 8 oder 9, wobei die erste Oberfläche im wesentlichen eben ist, die zweite Oberfläche im wesentlichen eben ist und die erste und zweite Oberfläche im wesentlichen waagrecht sind. 15
13. System nach Anspruch 8 oder 9, wobei die erste Oberfläche im wesentlichen eben ist, die zweite Oberfläche im wesentlichen eben ist und die erste und zweite Oberfläche ähnlich geneigt sind. 20
14. System nach Anspruch 8 oder 9, wobei das Plattenteil ein Wandverkleidungsteil ist. 25
15. System nach Anspruch 10, wobei jede Komponente einen im allgemeinen gleichmäßigen Querschnitt in Bereichen hat, in denen sie gegebenenfalls geschnitten werden muß. 30
16. System nach Anspruch 12, wobei das Plattenteil ein Verkleidungsteil und das Stützteil ein Längsträgerteil ist und das Längsträgerteil einen zweiten Teil eines Haken- und-Schlaufen-Befestigungssystems hat, der im wesentlichen gleichmäßig an mindestens einer der zweiten Oberfläche gegenüberliegenden dritten Oberfläche haftet, sie bedeckt und durch sie abgestützt wird, die zweite Komponente ferner mehrere Längsträgereile aufweist, und eine dritte Komponente mehrere Balkenteile aufweist, die einen ersten Teil eines Haken- und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem zweiten Teil der dritten Oberfläche haben, der im wesentlichen gleichmäßig an mindestens einer fünften Oberfläche haftet, sie bedeckt und durch sie abgestützt wird. 35
17. System nach Anspruch 16, wobei die erste Komponente ferner mehrere Verkleidungsteile mit im wesentlichen aneinanderstoßenden Kanten aufweist, und jedes Verkleidungsteil einen ersten Teil eines Haken- und-Schlaufen-Befesti- 40

gungssystems hat, der im wesentlichen gleichmäßig durch eine Oberseite gestützt wird, und wobei die Belagschicht einen Deckbelag mit einer Unterseite aufweist, die im wesentlichen mit einem zweiten Teil eines Haken- und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem ersten Teil der Oberseite bedeckt ist, der an der Oberseite der Verkleidungsteile befestigt und so angeordnet ist, daß er die aneinanderstoßenden Kanten bedeckt, um zu verhindern, daß flüssiger Beton in den Bereich der aneinanderstoßenden Kanten eintritt.

18. Verfahren zum Aufbauen einer Wand, einer Decke oder eines Fußbodens, wobei das Verfahren dadurch gekennzeichnet ist, daß es aufweist:
den Schritt des Errichtens einer Schalung mit:
einem Verkleidungsteil mit einer Vorderseite und einem Teil eines Haken- und-Schlaufen-Befestigungssystems auf der Vorderseite; und
einem Deckbelag, der auf einer Vorderseite im wesentlichen mit einem Teil eines Haken- und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem auf der ersten Fläche des Verkleidungsteils bedeckt ist und eine gegenüberliegende Rückseite hat;
wobei die Vorderseite des Deckbelags auf der Vorderseite des Verkleidungsteils über das Befestigungssystem befestigt ist;
den Schritt des Gießens eines härtbaren Werkstoffs auf die Rückseite des Deckbelags
den Schritt des Aushärtens des Werkstoffs; und
den Schritt des Abbauens der Schalung von der Konstruktion einschließlich der Entfernung des Verkleidungsteils. 45
19. Verfahren nach Anspruch 18, dadurch gekennzeichnet, daß die Rückseite des Deckbelags eine Oberflächensperrschicht hat, um eine Bindung des Deckbelags an den härtbaren Werkstoff zu verhindern. 50
20. Verfahren nach Anspruch 18, dadurch gekennzeichnet, daß es ferner den Schritt des Einbetons eines Abschnitts der Rückseite des Deckbelags in eine erste Oberfläche des härtbaren Werkstoffs neben der Rückseite aufweist. 55
21. Verfahren nach Anspruch 20, dadurch gekennzeichnet, daß jener Abschnitt des Deckbelags, der in einen härtbaren Werkstoff eingebettet ist, eine konstruktive Einrichtung auf der Rückseite des Deckbelags aufweist, die eine Bindung mit dem härtbaren Werkstoff ausbildet,



wenn der Werkstoff aushärtet.

22. Verfahren nach Anspruch 21, dadurch gekennzeichnet, daß die konstruktive Einrichtung ein Teil eines Haken-und-Schlaufen-Befestigungssystems ist, das die Rückseite des Deckbelags im wesentlichen bedeckt.

23. Verfahren nach Anspruch 22, dadurch gekennzeichnet, daß es ferner den Schritt des Behandelns der Rückseite des Deckbelags vor dem Gießen des Werkstoffs aufweist, um eine Bindung an den Werkstoff zu erleichtern.

24. Verfahren nach Anspruch 23, dadurch gekennzeichnet, daß das Verkleidungsteil eine zu seiner Vorderseite gegenüberliegende erste Oberfläche und einen Teil eines Haken-und-Schlaufen-Befestigungssystems auf der ersten Oberfläche hat, und die Schalung ferner ein Stützteil mit einem Teil eines Haken-und-Schlaufen-Befestigungssystems mit komplementärer Befestigungsmöglichkeit an dem Teil des Haken-und-Schlaufen-Befestigungssystems auf der ersten Oberfläche des Verkleidungsteils auf einer zweiten Oberfläche aufweist, wobei das Verkleidungsteil und das Stützteil durch ihre jeweiligen Teile des Haken-und-Schlaufen-Befestigungssystems befestigt werden.

Revendications

1. Structure de bâtiment in situ telle qu'un mur, un plafond ou un plancher, formée sur site à partir d'un matériau durcissant, et présentant au moins une première surface et un joint de recouvrement (50) pourvu d'une surface arrière encastrée dans la première surface caractérisée en ce que le joint de recouvrement est pourvu d'une surface avant essentiellement recouverte d'une partie d'un système de fixation par crochets et boucles (27,29).
2. Structure de bâtiment selon la revendication 1, dans laquelle la première surface est essentiellement plane.
3. Structure de bâtiment selon la revendication 2, dans laquelle la surface arrière est pourvue de moyens d'accrochage pour l'encastrement dans le matériau.
4. Structure de bâtiment selon la revendication 3, dans laquelle les moyens d'accrochage sont constitués par une partie d'un système de fixation par crochets et boucles (27,29).

5. Structure de bâtiment selon la revendication 2 ou la revendication 3, dans laquelle la surface arrière du joint de recouvrement est traitée de façon à faciliter la liaison au matériau.

6. Structure de bâtiment selon la revendication 4, dans laquelle le joint de recouvrement (50) est supporté par un coffrage (10) disposant d'une partie complémentaire d'un système de fixation par crochets et boucles détachable du joint de recouvrement.

7. Structure de bâtiment selon la revendication 4, comprenant en outre une seconde surface essentiellement plane opposée à la première surface, et un joint de recouvrement supplémentaire incluant une surface frontale essentiellement recouverte d'une partie d'un système de fixation par crochets et boucles (27,29) et une surface arrière opposée, dans laquelle la surface arrière du joint de recouvrement supplémentaire est encastrée dans la seconde surface.

8. Système pour la construction d'éléments de bâtiment coulés in situ avec un matériau durcissant et comprenant des murs, des plafonds et des planchers, le système comprenant un assemblage provisoire incluant une pluralité de composants rigides pour l'assemblage en relation de face essentiellement plane, par couches, dans lequel:

un premier composant comprend un élément en feuilles (40) préfabriqué disposant d'une première partie d'un système de fixation par crochets et boucles (27,29) adhérant sur celui-ci de façon essentiellement uniforme, recouvrant au moins une première surface de l'élément en feuille et supportée sur celle-ci; et un second composant similaire comprend un élément support (32) préfabriqué, pourvu d'une seconde partie d'un système de fixation par crochets et boucles présentant une fixabilité complémentaire à la première partie et adhérant sur celle-ci de façon essentiellement uniforme, recouvrant au moins une seconde surface de l'élément support et supportée sur celle-ci; et comprenant en outre, une couche de couverture amovible (50) fixée en relation essentiellement masquée détachable par rapport à l'élément en feuille le long d'une troisième surface, dans laquelle la couche de couverture comprend une quatrième surface pourvue de moyens de fixation afin de permettre la liaison de la couche de couverture avec le béton lors de sa coulée par-dessus.



9. Système pour la construction d'élément de bâtiment coulés sur place avec un matériaux durcissant et incluant des parois, des plafonds et des planchers, le système comprenant un assemblage provisoire incluant une pluralité de composants rigides pour l'assemblage en relation de face essentiellement plane, par couches, dans lequel:
- un premier composant comprend un élément en feuille (40) préfabriqué disposant d'une première partie d'un système de fixation par crochets et boucles (27,29) adhérent sur celui-ci de façon essentiellement uniforme, recouvrant au moins une première surface de l'élément en feuille et supportée sur celle-ci; et
- un second composant similaire comprend un élément support (32) préfabriqué pourvu d'une seconde partie d'un système de fixation par crochets et boucles présentant une fixabilité complémentaire à la première partie et adhérent sur celle-ci de façon essentiellement uniforme, recouvrant au moins une seconde surface de l'élément support et supportée sur celle-ci; et comprenant en outre, une couche de couverture amovible (50) fixée en relation essentiellement masquée détachable par rapport à l'élément en feuille le long d'une troisième surface, dans laquelle la couche de couverture comprend une quatrième surface présentant un moyen de dépose destiné à empêcher la liaison de la couche de couverture avec le béton lors de sa coulée dessus et pour faciliter l'enlèvement de la couche de couverture par rapport au béton lorsque le béton est pris.
10. Système selon la revendication 8 ou la revendication 9, dans lequel les premier et second composants peuvent être dimensionnés sur le site et engagés de façon amovible l'un par rapport à l'autre dans un système assemblé.
11. Système selon la revendication 8 ou la revendication 9, dans lequel il existe une pluralité de couches de construction, disposant des parties du système de crochets et boucles entre plus d'une paire d'interface (11, 22, 24) des couches de construction.
12. Système selon la revendication 8 ou la revendication 9, dans lequel la première surface est essentiellement plane, la deuxième surface est essentiellement plane et les première et seconde surfaces sont essentiellement horizontales.
13. Système selon la revendication 8 ou la revendication 9, dans lequel la première surface est essentiellement plane, la deuxième surface est

essentiellement plane et les première et seconde surfaces sont inclinées de façon similaire.

14. Système selon la revendication 8 ou la revendication 9, dans lequel l'élément en feuille est un élément d'enveloppe de paroi.
15. Système selon la revendication 10, dans lequel chaque composant est d'une section transversale essentiellement uniforme dans des zones au niveau desquelles il peut être nécessaire de les couper.
16. Système selon la revendication 12, dans lequel l'élément en feuille est un élément d'enveloppe et l'élément support est un élément en poutrelle, l'élément en poutrelle étant pourvu d'une seconde partie d'un système de fixation par crochets et boucles adhérent sur celui-ci de façon essentiellement uniforme, recouvrant une troisième surface opposée à la seconde surface et supportée sur celle-ci, le deuxième composant comprend en outre une pluralité d'éléments en poutrelles, et un troisième composant comprend une pluralité d'éléments en poutres pourvus d'une première partie d'un système de fixation par crochets et boucles présentant une fixabilité complémentaire par rapport à la seconde partie de la troisième surface adhérent sur celui-ci de façon essentiellement uniforme, recouvrant au moins une cinquième surface et supportée sur celle-ci.
17. Système selon la revendication 16 dans lequel le premier composant comprend en outre une pluralité d'éléments d'enveloppe disposant de bords venant essentiellement en butée l'un sur l'autre et chaque élément d'enveloppe étant pourvu d'une première partie d'un système de fixation par crochets et boucles, supportée de façon essentiellement uniforme le long d'une surface supérieure, et dans lequel la couche de recouvrement comprend un joint de recouvrement dont une surface inférieure est essentiellement recouverte d'une seconde partie d'un système de fixation par crochets et boucles présentant une fixabilité complémentaire par rapport à la première partie de la surface supérieure fixée sur la surface supérieure des éléments d'enveloppe et disposés de façon à recouvrir les bords d'about de façon à empêcher le béton liquide d'entrer dans la zone des bords d'about.
18. Procédé de construction d'une paroi, d'un plafond ou d'un plancher, le procédé étant caractérisé en ce qu'il inclut:



l'étape d'érection d'un coffrage pourvu:

d'un élément d'enveloppe disposant d'une surface frontale et pourvu d'une partie d'un système de fixation par crochets et boucles sur la surface frontale; et

d'un joint de recouvrement essentiellement recouvert sur sa surface frontale d'une partie d'un système de fixation par crochets et boucles présentant une fixabilité complémentaire à celle de la première surface de l'élément d'enveloppe, et

disposant d'une surface arrière opposée;

dans lequel la surface frontale du joint de recouvrement est fixée sur la surface frontale de l'élément d'enveloppe par l'intermédiaire du système de fixation;

l'étape de coulée d'un matériau durcissant contre la surface arrière du joint de recouvrement;

l'étape de prise du matériau; et

l'étape de démontage du coffrage par rapport à la structure, incluant la dépose de l'élément d'enveloppe.

19. Procédé selon la revendication 18 caractérisé en ce que la surface arrière du couvercle de recouvrement dispose d'une couche formant barrière de surface afin d'empêcher la liaison du joint de recouvrement au matériau durcissant.

20. Procédé selon la revendication 18 caractérisé en ce qu'il comprend en outre l'étape d'encastrement d'une partie de la surface arrière du joint de recouvrement dans une première surface du matériau durcissant adjacente à la surface arrière.

21. Procédé selon la revendication 20 caractérisé en ce qu'une partie du joint de recouvrement qui est encastrée dans un matériau durcissant est pourvue de moyens d'accrochage sur la surface arrière du joint de recouvrement qui constituent une liaison avec le matériau durcissant lorsque le matériau prend.

22. Procédé selon la revendication 21, caractérisé en ce que les éléments d'accrochage sont constitués par une partie d'un système de fixation par crochets et boucles recouvrant essentiellement la surface arrière du joint de recouvrement.

23. Procédé selon la revendication 22, caractérisé en ce qu'il comprend en outre l'étape de traitement de la surface arrière du joint de recouvrement avant de verser le matériau dans le but de faciliter la liaison avec le matériau.

24. Procédé selon la revendication 23, caractérisé en ce que l'élément d'enveloppe est pourvu d'une première surface opposée à sa surface frontale, et est pourvu d'une partie d'un système de fixation par boucle et crochet sur la première surface, et en ce que le coffrage comprend en outre un élément support pourvu d'une partie de système de fixation par crochets et boucles, présentant une fixabilité complémentaire à la partie du système de fixation par crochets et boucles disposée sur la première surface de l'élément d'enveloppe, sur une deuxième surface, dans lequel l'élément d'enveloppe et l'élément support sont fixés à l'aide de leur partie respective du système de fixation par crochets et boucles.

