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(54) **KIT FOR BUILDING A MODULAR STRUCTURE, MODULAR STRUCTURE, ASSEMBLY
METHOD AND ITS USE**

(57) The present invention relates to a vertical wall that allows the easy attachment of finishing components, a kit for building a modular structure comprising said wall, a modular structure and a method of assembling said modular structure. The kit that allows easy attachment of finishing components comprises a plurality of coplanar plates interconnectable by shape which assembled together form the base of the modular structure, a first system of metal profiles (lower strength structure) to be fixed to the base plate through fastening means, a plurality of coplanar plates placed interconnectable by shape, which assembled together form a support layer with ferromagnetic properties which are fixed over the base of the modular structure, a plurality of vertical walls to be arranged perpendicular to the basic structure and fixable in the first system of metal profiles (lower strength structure) at their

lower part, wherein the vertical walls are provided with a layer with ferromagnetic properties on at least one of the outer surfaces, a second system of metal profiles (upper strength structure) to be fixed to the top of the vertical walls to ensure the stability and rigidity of the structure, at least one multilayer magnetic support to be arranged over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls, wherein the multilayer magnetic support is formed at the bottom facing the support layer with ferromagnetic properties of a magnetic film and a means of attachment to the opposite side of the support with ferromagnetic properties for attaching said finishing components. The invention also discloses a structure obtained by using said kit, a method of assembling said modular structure and its uses.

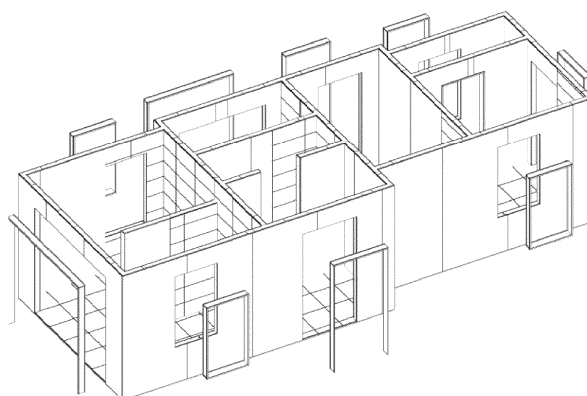


Fig. 10

Description

[0001] The present invention relates to a kit for building a modular structure that allows the easy attachment of finishing components, a modular structure that can be used for easily attaching various finishing components and presenting the various ways of decorating the rooms of a house (bathroom, kitchen), being intended for the partitioning of open-space type offices, the arrangement of stands at various exhibitions, the construction of temporary or permanent rooms in office spaces, homes or for the construction of "shop in shop" type spaces. The invention also relates to a method of assembling this modular structure. The invention also provides a vertical wall which allows easy attachment of the finishing components and which can be used in such modular structures.

[0002] The invention provides multiple configurations that can be constructed using such modular structures.

State of the art

[0003] Until now, classical solutions have been used mainly for the presentation of different ways of decorating and / or partitioning spaces. These are limited to the construction / placement of a load-bearing interior structure (a wooden or metal frame) on which are mounted boards (either plasterboard or chipboard / MDF / OSB or other materials), boards to which a permanent coating is to be applied - either paint or ceramic tiles, wallpaper, etc.

[0004] The disadvantages of the existing presentation methods are that they require the creation of rigid structures that involve changing the space, a considerable amount of working time for its arrangement, a high consumption of materials that cannot be reused, a lot of dust and discomfort when changing it and a long period of time in which the space cannot be used. At the same time, the long execution time of a classic structure must be taken into account, a not negligible time.

[0005] The objective of the present invention is to provide a modular structure that eliminates the aforementioned disadvantages simultaneously with the realization of structures that allow their assembly / modification / disassembly in a significantly shorter time than for obtaining classical systems, with the possibility of reusing materials, relocation and without structurally modifying the enclosure in which they were mounted.

[0006] Another objective of the invention is to provide a vertical wall that allows easy attachment of finishing components that can be used / reused and assembled / disassembled in various configurations of the modular structure.

[0007] Another objective of the invention is to provide another way of presenting / exposing the finishing components e.g. ceramic / parquet / mosaic and other finishing elements that cover the surfaces of a living space / location (walls, floor, etc ...).

[0008] Also, another objective of the present invention

is to provide a kit for building a modular structure that can be easily mounted / disassembled / relocated without modifying the basic structure of the location where it is to be used and to which finishing components such as tiles, etc. can be attached.

[0009] Also, for another purpose, the invention relates to a new way of partitioning open-space type spaces without altering in any way the structure of the initial space. When the beneficiary of the space wants to return to the initial partitioning, this is done in an extremely short time and without the inconveniences that occur when using the currently available systems on the market.

Brief Description of the Invention

[0010] The present invention provides a vertical wall that allows easy attachment of finishing components that can be used / reused and assembled / disassembled in various configurations of a modular structure.

[0011] The present invention also provides a kit for building a modular structure that allows easy attachment of finishing components.

[0012] Finishing components are all components that can be used to decorate the walls / floor of a particular room, but not limited to tiles, marble, granite, parquet, linoleum, carpet.

[0013] In another embodiment, the invention provides a modular structure that can be configured in a plurality of configurations using the same materials and that can have various uses for both commercial and personal purposes.

[0014] In another embodiment, the present invention provides a method of assembling such modular structures.

[0015] The present invention also relates to the use of such structures for the easy attachment of finishing components for the purpose of presentation / exposure to various exhibitions, for the partitioning of exhibition spaces, for the partitioning of office spaces of type open-space or commercial spaces or for the temporary subdivision of dwellings or spaces that allow this.

Brief description of the drawings

[0016] The present invention will be further described by means of the accompanying drawings which are considered to be illustrative but are not intended to be limiting.

Figure 1 shows the basic panel of a room made by assembling the plates marked with the code of the structure that is to be placed and the exact position of the structure (P01-P10)

Figure 2 shows the mounting of the resistance structure at the base according to the corresponding markings

Figure 3 shows the ferromagnetic support plates mounted on the base panel.

Figure 4 shows the mounting of the vertical walls in the lower strength structure

Figure 5 shows the installation of the vertical walls that show the window / door gaps pre-cut in the factory in the load-bearing vertical walls, mounted in the lower resistance structure and the corner panels processed with the "folding" technique.

Figure 6 shows the attachment of the superior strength structure to the walls using: "U" profiles, combined profiles, "L" profiles and "T" profiles on the upper end of the vertical walls

Figure 7 shows the application of the pre-adhesive magnetic support based on the modular structure which is covered with the ferromagnetic support

Figure 8 shows the application of the pre-adhesive magnetic support on the walls of the modular structure

Figure 9 shows the installation of the finishing components for the floor and walls

Figure 10 shows the installation of ornamental masking profiles in the openings for doors, windows or other cutouts

Figure 11 shows the possible modular combinations with the same components

Figure 12- shows the schematic representation of the L-shaped corner of the modular structure

Description of the invention

[0017] The present invention will be described in more detail below.

[0018] The present invention provides in a first embodiment, a vertical wall that allows easy attachment of finishing components having a layered structure formed by an ultra-light core such as foam, polystyrene, mineral wool located between 2 layers with ferromagnetic properties with a thickness ranging from 0.1 mm to 2 mm where at least one layer with ferromagnetic properties is painted on the outside with a non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer, chrome as a chemical layer and a coating layer of the inner face of the layer with ferromagnetic properties.

[0019] In a preferred embodiment, the ultra-light core, for example polystyrene or mineral wool, is applied to the two layers with ferromagnetic properties by means of an adhesive layer.

[0020] In another embodiment, when the ultra-light core is foam, it is no longer necessary to apply the adhesive.

[0021] The walls are characterized by an interlocking or "click" type of system placed vertically. The vertical interlocking system is not a system that embeds the two walls, fixing them in place, but it is a system that allows the alignment of the walls in plan but also leaving a space to adjust them in the vertical plane.

[0022] In one embodiment, the ultra-light core is made

of foam, polystyrene and mineral wool.

[0023] In a preferred embodiment, the ultra-light core has a thickness of between 30 and 150 mm, preferably between 60-100 mm. The thicknesses were chosen taking into account the lift offered by the thickness of the panel corroborated with the metal structure of resistance. The geometry of the metal structure changes depending on the thickness of the panel, without altering the properties of the wall.

[0024] The main criterion for which these materials were chosen (foam, polystyrene and mineral wool) is that between the two layers with ferromagnetic properties a filling material is needed - a filler - and when choosing this filler, the main advantage is its weight. Other advantages of these materials are: homogeneity, predictability of their behaviour in production, ease of cutting them and so on.

[0025] In one embodiment, the layer with ferromagnetic properties is preferably, but not limited to, a sheet of galvanized sheet, having a thickness between 0.1 mm and 2 mm. In a preferred embodiment, the thickness of the galvanized sheet is between 0.1 mm and 0.8 mm, a thickness which may be chosen by the person skilled in the art depending on the desired application. In another preferred embodiment, the galvanized sheet varies between 0.18 mm and 0.4 mm with optimal results / performance results on a 0.25 mm sheet.

[0026] The layer with ferromagnetic properties is covered with a special non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer layer, chromium as a chemical layer and an inner face coating of the layer with ferromagnetic properties. This special non-slip paint is described in patent application no. EP3429434.

[0027] It should be mentioned that when the desired space is built, whenever a turn is made (creating an "L" shaped corner looking at the plane of the structure), that wall will be subjected to a "folding" type processing - that is a incision of the layer with ferromagnetic properties at the top, piercing the ultra-light core but not intersecting the layer with ferromagnetic properties located at the bottom.

[0028] This milling will be performed at an angle of 91 degrees, to create a fold at 90 degrees. The remaining layer with ferromagnetic properties acts as a hinge around which the remaining "wings" of the panel will fold. Through folding, an "L" section corner will form that will act as a pillar of the structure (Fig. 12). As in the case of a classic construction, the pillars are placed on the corners giving the strength of a rigid structure, even in the case of unclosed contours. Also, the corners thus obtained are much stronger than those made of 2 pieces, which results in an additional advantage of this modular structure.

[0029] The walls are delivered cutted from the factory at the required height according to the customer's specifications (generally between 2.2 and 3 meters, the most

common being used 2.4-2.5 meters).

[0030] The preferred section of the vertical wall is 80 mm. There is the possibility of decreasing this section in some cases up to 30 mm, but also increasing it in certain situations, over 150 mm. The increase or decrease of the preferred section of the wall is determined by several factors. First of all, the plane geometry of the assembly must be considered. The more narrow, resistant, it is, the walls are more strongly linked, the more the section of the wall can be reduced. The more it is necessary to support heavy bodies on the wall (in the case of applications for showrooms, for example - toilet bowls, suspended washbasins, etc.), the thicker the panels must be.

[0031] The present invention provides, in another embodiment, a kit for building a modular structure that allows easy attachment of finishing components that comprises:

- a plurality of coplanar plates interconnectable by shape which assembled together form the base of the modular structure,
- a first system of metal profiles (lower strength structure) to be fixed to the base plate through fastening means,
- a plurality of coplanar plates placed interconnectable by shape, which assembled together form a support layer with ferromagnetic properties which are fixed over the base of the modular structure,
- a plurality of vertical walls to be arranged perpendicular to the basic structure and fixable in the first system of metal profiles (lower strength structure) at their lower part
wherein the vertical walls are provided with a layer with ferromagnetic properties on at least one of the outer surfaces,
- a second system of metal profiles (upper strength structure) to be fixed to the top of the vertical walls to ensure the stability and rigidity of the structure,
- at least one magnetic support to be attached over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls

wherein the magnetic support is formed at the bottom facing the support layer with ferromagnetic properties of a magnetic film and a means of attachment to the opposite side of the support with ferromagnetic properties for attaching said finishing components.

[0032] In one embodiment, said first system of metal profiles (lower strength structure) is composed of a plurality of interconnectable metal segments having the profile section U, and the planar shape of said section being straight and / or alternately the shape of the letter "L", "H" or "T" or mixed profiles.

[0033] In one embodiment, the shape interconnection is of puzzle type with interlocking type system.

[0034] In one embodiment, the modular structure building kit comprises a base consisting of the plurality of puzzle-shaped plates interconnected with an interlocking system, preferably marked or labeled with a code.

[0035] In one embodiment, a plurality of coplanar plates interconnectable by shape which assembled together form the support layer with ferromagnetic properties that are fixed over the base are engraved with codes, i.e. the position where each plate forming the support layer with ferromagnetic properties must be placed is indicated, in plane, according to a coding resulting from the design. The cutting in plan (the shape) of the plates that form the layer with ferromagnetic properties is with interlocking type system, so that its placement cannot be wrong, and in the end, the contour resulting from the joining of several plates is a dimensionally correct one.

[0036] In one embodiment, said second system of metal profiles (upper strength structure) are made of a plurality of interconnectable metal segments having the profile section U, and the planar shape of that section being straight and/or alternately in the shape of the letter "L", "H" or "T" or mixed profiles.

[0037] In another embodiment, the means for attaching the magnetic backing is an acrylic adhesive applied to a sponge or vinyl or hot-melt adhesive.

[0038] In another embodiment the acrylic adhesive applied to the sponge support has the closed cell sponge.

[0039] In another embodiment, the backing layer with ferromagnetic properties is a galvanised sheet.

[0040] Hot melt adhesives are adhesives that are solid at room temperature and become viscous when heated to a certain temperature. Bonding is done by pressing and after cooling to room temperature, in a few seconds, a strong, durable bonding is achieved in an extremely short time.

[0041] In a further embodiment, the modular structure is provided for the vertical walls or for the finishing components to be installed (i.e ceramic tiles, parquet, carpet), with the magnetic support glued directly to the cladding material of the vertical walls with a vinyl or hot-melt adhesive.

[0042] Hot-melt or vinyl adhesives were chosen for cost reasons because acrylic adhesive applied on a sponge support is more expensive and its use on walls that are not subjected to mechanical pressure on the floor leads to significant cost reductions.

[0043] In a preferred embodiment, the attachment means is an acrylic adhesive applied on a sponge support.

[0044] If the application is desired to be on a ceramic plate that has a back with irregularities and with a high pattern, then it is desirable that the multilayer magnetic support be provided with a means of attachment of spongy adhesive type that will be able to take the pattern from the back of the ceramic tile, thus increasing the contact force between the ceramic tile and the layer with ferromagnetic properties.

[0045] The multilayer magnetic support with acrylic adhesive applied on a the sponge support gives the following advantage: when you want to change the ceramic / carpet collection due to wear, damage, delisting from the portfolio, this removal / replacement of finishing compo-

nents takes place quickly. The attachment to the magnetic support removes the disadvantages of the classic gluing (with adhesive of ceramic tiles / parquet / carpet) whose replacement would have led to the appearance of noise, dust and, in general, discomfort for the space in which it is intended. After detaching the finishing elements together with the magnetic support on the walls / floor, the integrity of the vertical walls / floor is ensured, which can thus be reused in other configurations or for the exposure of other finishing elements.

[0046] Another major advantage is that the installation / uninstallation of products using this system takes place at a speed of approx. 10 times higher than in the classic working mode.

[0047] The role of the sponge is to take over the unevenness behind the finishing elements, especially in the case of ceramic tiles. Basically, the relief behind the ceramics is "imprinted" in the sponge, and the finish is uniform and levelled in this way. An additional advantage of using a sponge layer is that it minimises the risk of ceramic tiles breaking. In the absence of the sponge, there is a risk that the ceramic tiles, for example, will break when they are joined only with magnetic foil because their placement would be only on the "ridges" of the relief on the back.

[0048] The preferred composition of the sponge support is "polyolefin" with a density between 50 and 120 kg / m³ but polyethylene or polyurethane variants with the same density are also accepted. If the density of the sponge support is less than 50 kg / m³, then it is very malleable and will settle very easily. If it is denser than 120 kg / m³, then it will be too rigid to penetrate the relief cavities on the back of the ceramic tile and the gluing will be done on the "ridges" of the back of the ceramic tile. In a preferred embodiment, the density is 95 kg / m³ which provides optimal bonding.

[0049] It is preferable that the acrylic adhesive applied to the sponge support has the sponge with the cell closed and not with the cell open. It is preferable that the sponge over which the adhesive is applied has a closed cell for the following reasons:

- resistance against compression is superior,
- "memory" of the support on which the adhesive is applied - the one with the closed cell "recovers", the compaction is not a permanent one. If the compaction were permanent, in the case of gluing on ceramic tiles, especially for those on the floor, the adhesive applied on the sponge not returning to its original shape, would not fill the gaps on the back of the tiles,
- superior resistance to stresses (for example to tension / traction) compared to the support sponge with open cell.

[0050] Next, each component of the modular structure building kit will be described in detail.

The basis of the modular structure

[0051] A plurality of coplanar plates interconnectable by shape (of type puzzle with interlocking type system) is assembled to form the basis of the modular structure.

[0052] These interconnecting plates can be made of any type of suitable material selected, preferably from the range of wood chipboard (water-repellent, MDF, OSB). In a preferred embodiment, the interconnectable plates forming the base of the modular structure are preferably made of, but not limited to, waterproof chipboard. The advantage of using this material is given by the advantageous price, the ease of processing it on machines with high speed numerical control (laser cutting, CNC router cutting etc.), the versatility in terms of preferred thickness for application, durability over time. The thickness of the interconnectable plates that form the basis of the modular structure is between 9 and 40 mm, but can vary depending on several factors. The thickness of the plate is determined by a specialist in the field depending on the stress to which the modular structure will be subjected. For example, a vertical wall that due to the geometry of the assembly does not benefit from supports (which does not close in a shape type "L" or "H" or "T"), will require, when pushed, the base of the modular structure. Thus, it will tend to rise from the floor, considering an inconvenient moment around the support (i.e around the modular structure attached to the base of the structure, the structure in which the panel is mounted). The smaller the thickness of the interconnectable plates that form the base of the structure, the greater the bending moment. In such situations, rigid interconnectable plates will be dimensioned, with a greater thickness, preferably 30-40mm and maybe even with an increased mechanical strength (OSB).

[0053] The base of the modular structure is thought of as a puzzle, the multitude of interconnectable plates being cut on an interlocking system, i.e the plates can only be mounted in certain positions, the intended positions. This interlocking system and puzzle structure give one of the main advantages of the product by saving assembly time compared to conventional systems. The multitude of interconnectable plates that together form the base of the structure, preferably made of chipboard, but not limited to it, are placed on the floor according to the plan, are coupled in interlocking type system. Thus, the base of the modular structure is made.

[0054] To facilitate the assembly, on each plate interconnectable by shape, a respective number is marked, engraved the space where the resistance metal profile will be mounted and possibly the number of the corresponding vertical wall and its delimitation (Fig 1, Fig 2).

[0055] Thus, the base of the modular structure is inscribed with assembly instructions in order to be able to carry out the assembly easily and quickly.

[0056] Optionally, the construction kit may contain written instructions on paper for easy mounting of the modular structure.

[0057] A first system of metal profiles (lower strength structure) consisting of a multitude of profiles interconnectable metal segments of type U, L, T, H or mixed profiles, depending on the necessary geometry that will describe the contour of the walls and will be mounted on the base structure in the appropriate positions. The "U", "L", "T" and "H" type profiles or mixed profiles play a structural role, supporting at the bottom the vertical walls of the magnetic modular structure. The metal profiles arranged on the basis of the structure form a first system of metal profiles (lower strength structure) which consists of a multitude of interconnectable segments having the profile section U and the planar shape of said section being straight and / or alternately the shape of the letter L, H, T or mixed profiles.

[0058] The metal profiles type "U", "L", "T" and "H" have the inner section equal to the dimension of the vertical wall section to which 1-2 mm is added. The preferred thickness of the material from which the "U", "L", "T" and "H" profiles are made of is between about 1 and about 5 mm. In a preferred embodiment, the thickness of the metal profile material is between about 1.5 mm and about 2 mm.

- the strength given to the lower strength structure by the use of this thickness is sufficient,
- by using this thickness of the metal profiles of the resistance structure, the finishing plate (for example plasterboard or MDF, but not limited to them) will "pass" over the metal structure when it is mounted elegantly finishing the wall. This is because we must not forget that on the back of the plate it is applied a magnetic foil accompanied by a suitable means of attachment (preferably an acrylic adhesive applied on a sponge or vinyl or hot melt type adhesive), layers that accumulate 1.5 -2 mm.

[0059] In a preferred embodiment, each profile has marked or labeled a code indicating the mounting position, being already cut to length (Fig. 1 and Fig. 2).

[0060] In another embodiment, the profiles can also be cut on the spot / on site.

[0061] If marked, the profiles are placed in the corresponding marked positions based on the modular structure.

Support layer with ferromagnetic properties (placed over the base of the structure)

[0062] The support layer with ferromagnetic properties is formed by assembling a plurality of puzzle-type interconnectable plates with interlocking system. These interconnecting plates that form the support layer with ferromagnetic properties can be cut and marked with a code so that they can be mounted in the appropriate places based on the modular structure.

[0063] In one embodiment, the layer with ferromagnetic properties is preferably, but not limited to, a galvanized

metal sheet, having a thickness between 0.1 mm and 2 mm. In a preferred embodiment, the thickness of the galvanized metal sheet is between 0.1 mm and 0.8 mm, the thickness which may be chosen by the person skilled in the art depending on the desired application. In another preferred embodiment, the thin galvanized metal sheet varies between 0.18 mm and 0.4 mm with optimal results / performance results on a 0.25 mm sheet.

[0064] The layer with ferromagnetic properties can be coated with a special non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer, chrome as a chemical layer and a coating covering the inner face of the layer with ferromagnetic properties.

[0065] This special non-slip paint is described in patent application no. EP3429434.

[0066] In another embodiment, the layer with ferromagnetic properties can be cased over the base of the modular structure, thus the base and the ferromagnetic layer becoming a single piece.

Vertical walls of the modular structure

[0067] Vertical wall that allows easy attachment of finishing components that has a layered structure consisting of an ultra-light core such as foam, polystyrene, mineral wool located between 2 layers with ferromagnetic properties with a thickness ranging from 0.1 mm to 2 mm, where at least one layer with ferromagnetic properties is painted on the outside with a non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer, chrome as a layer chemical and a coating covering the inner face of the layer with ferromagnetic properties.

[0068] The walls are characterized by an interlocking system "interlocking" or "click" placed vertically. The vertical interlocking system is not a system that embeds the two walls, fixing them, but it is a system that allows the alignment of the panels in the plane but also leaving a space to adjust them in the vertical plane.

[0069] The arrangement of the vertical walls next to each other together with the interlocking or "click" system creates a structure with a common body.

[0070] A second system of metal profiles (upper strength structure) are comprised of a plurality of interconnectable metal segments type U, L, T, H or mixed profiles, depending on the required geometry will describe the outer perimeter of the upper side of the vertical walls and will be mounted at the top of them (upper strength structure). These "U", "L", "T", "H" type profiles or mixed profiles are mounted at the top of the vertical walls which are also "glued" to the vertical wall by inserting suitable fastening means, being preferred, but not limited to, pop-rivets. These have the same characteristics as those that form the first system of metal profiles (lower strength structure) for the reasons listed above.

[0071] It is important to note that the metal profiles that form the first system of metal profiles (lower strength structure) at the base of the walls are offset from the metal profiles that form the second system of profiles (upper strength structure), so that in a vertical section, their joints to be staggered or "woven" to give additional strength to the modular structure.

Multilayer magnetic support

[0072] The multilayer magnetic support consists of a magnetic foil (through which it can be fixed to the layer with ferromagnetic properties) and a suitable means of attachment (e.g. acrylic adhesive applied on a sponge support or vinyl or hot melt adhesive) on which the desired finishing components (e.g. ceramic, ceramic wall and floor tiles, marble, granite, parquet, linoleum, carpet and other materials suitable for covering surfaces, etc.) can easily be attached.

[0073] Preferably, the magnetic foil has a thickness of between 0.2 and 3 mm, preferably 0.4 mm for an optimal contact force, but its thickness can be chosen by the person skilled in the art, depending on the weight of the plate to be exposed. In a preferred embodiment, the acrylic adhesive type attachment means applied on a sponge support has a thickness between 0.2 and 5 mm, preferably 1 mm which has an optimal level of taking up the unevenness of the element which is applied on the multilayer magnetic support. If it is desired to attach to the multilayer magnetic support of a ceramic tile that has an irregular back and a high pattern, it is preferable to use an acrylic adhesive applied on a sponge support (especially if the ceramic tile is will mount on the floor where it is subjected to higher pressure) which will be able to adhere to the embossed pattern on the back of the ceramic tile, thus increasing the contact force between the ceramic tile and the layer with ferromagnetic properties. The role of the acrylic adhesive applied on the sponge support is to take over the unevenness behind the finishing elements, especially in the case of ceramic tiles. Basically, the relief behind the ceramics is "imprinted" in the acrylic adhesive applied on a sponge support, and the finishing element is uniform and levelled in this way. An additional advantage of using acrylic adhesive applied on a sponge is that the ceramic tiles do not break. In the absence of acrylic adhesive applied on a sponge, there is a risk that if the pressure is very high and the traffic is heavy, the ceramic tiles will break because their placement would be only on the "ridges" of the relief on the back of the ceramic tile.

[0074] The multilayer magnetic support with acrylic adhesive applied on a sponge support gives the following advantage: when you want to change the ceramic / carpet collection due to wear, damage, delisting from the portfolio, this change is done quickly, the products being easily detached. The use of magnetic foil removes the disadvantages of the classic gluing of finishing elements (ceramic tiles, parquet, carpet) whose replacement

would have led to the appearance of noise, dust and, in general, discomfort for the space in which it is intended.

[0075] Another major advantage is that the installation / uninstallation of the finishing elements takes place with a speed of approx. 10 times higher than in the classic working mode.

[0076] If you want to use a ceramic tile that has a back with irregularities and a high pattern on one of the vertical walls where it is not subjected to a pressure as high as that of a tile placed on the floor, you can use adhesives such as vinyl or hot melt that ensures the stability of the ceramic tile at the same time at a low cost.

[0077] When using the acrylic adhesive applied on a sponge support that has a protective layer called "liner", the finishing components (ceramic, parquet, linoleum, etc.) are placed on the acrylic adhesive applied on the sponge support after removing the liner and fixed in desired position by pressing.

[0078] The present invention provides, in a second embodiment, a modular structure comprising:

- a base of the modular structure consisting of a plurality of coplanar plates interconnectable by shape,
- a first system of metal profiles (lower strength structure) fixed to the base through fastening means,
- a support layer with ferromagnetic properties arranged above the base and composed of a plurality of plates interconnectable by shape,
- a plurality of vertical walls arranged perpendicular to the base and fixed in the first system of metal profiles at their lower part

where the vertical walls are provided with a layer with ferromagnetic properties for at least one of the outer surfaces,

- a second system of metal profiles (upper strength structure) fixed to the upper part of the vertical walls to ensure the stability and rigidity of the structure,
- a multilayer magnetic support arranged over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls

wherein the multilayer magnetic support is formed at the bottom towards the support layer with ferromagnetic properties of a magnetic foil and a corresponding attachment means at the top.

[0079] In a preferred embodiment, the shape interconnection is of type puzzle with interlocking system.

[0080] In one embodiment, said first system of metal profiles (lower strength structure) is composed of a plurality of interconnected metal segments having the profile section U, and the planar shape of said section being straight and / or alternately letter-shaped. "L", "H" or "T" or mixed profiles.

[0081] In one embodiment, said second system of metal profiles (superior strength structure) consists of a plurality of interconnected metal segments having the profile

section U, and the planar shape of that section being straight and/or alternately in the shape of the letter "L", "H" or "T" or mixed profiles.

[0082] The appropriate attachment means can be an acrylic adhesive applied on a sponge support or a vinyl or hot melt type adhesive.

[0083] In a further embodiment, the modular structure has, for the vertical walls or for the finishing components to be installed (e.g. ceramic tiles, parquet, carpet), the magnetic foil glued directly to the cladding material of the vertical walls with a vinyl or hot-melt adhesive.

[0084] Next, each component of the magnetic modular structure will be described in detail.

The basis of the modular structure

[0085] The base of the modular structure is obtained by interconnecting the multitude of plates that can be made of any type of suitable material selected from the range of wood chipboards (water-repellent, MDF, OSB). In a preferred embodiment, the base of the modular structure is preferably made of, but not limited to, water-repellent pallet. The advantage of using this material is given by the advantageous price, the ease of processing it on machines with high speed numerical control (laser cutting, CNC router cutting, etc.), the versatility in terms of preferred thickness for the application, durability over time. The thickness of the base plate or print is between 9 and 40 mm, but may vary depending on several factors. The thickness of the plate is determined by a specialist in the field depending on the stress to which the structure is exposed. For example, a vertical wall that due to the geometry of the assembly does not benefit from supports (which does not close in a shape type "L" or "H" or "T"), will require, when pushed, the basic structure and default base plate. Thus, it will tend to rise from the floor, considering a bending moment around the back support (i.e. around the structure attached to the plate, the structure in which the panel is mounted). The smaller the plate thickness, the greater the bending moment. In such situations a rigid base plate will be dimensioned, with a greater thickness, preferably 30-40mm and maybe even with an increased mechanical resistance (OSB).

[0086] The base of the modular structure is thought of as a puzzle, the interconnectable plates that form the base being cut on an interlocking system, i.e. the plates can only be mounted in certain positions, the positions that are for which they were intended. This interlocking system and puzzle structure give one of the main advantages of the product by saving assembly time compared to conventional systems. The interconnectable plates that are assembled form the basis of the modular structure which are preferably, but not limited to, water-repellent chipboard, are placed on the floor according to the plan, are coupled, in the interlocking type system. Thus, the basis of the modular structure is realised.

[0087] To facilitate the assembly, on each piece of the base plate or the imprint a number engraved is engraved

respectively the space where the resistance profile will be mounted and possibly the number of the vertical wall and its delimitation (Fig 1, Fig 2).

[0088] Thus, the base of the modular structure is noted so that assembly can be done easily and quickly.

[0089] A first system of metal profiles (lower strength structure) consisting of a multitude of profiles interconnectable metal segments of type U, L, T, H or composite profiles, depending on the necessary geometry that will describe the contour of the walls and will be mounted on the base structure in the appropriate positions. The "U", "L", "T" and "H" type profiles or mixed profiles play a structural role, supporting at the bottom the vertical walls of the magnetic modular structure. The metal profiles arranged on the basis of the structure form a first system of metal profiles (lower strength structure) which consists of a multitude of interconnectable segments having the section of the U profile and the planar shape of that section is straight and / or alternately shaped like the letter L, H, T or mixed profiles. The characteristics of the metal profiles are described above here.

[0090] In a preferred embodiment, each profile has marked or labeled a code indicating the mounting position, being already cut to length (Fig. 1 and Fig. 2).

[0091] In another embodiment, the profiles can also be cut on the spot/ on site.

[0092] If marked, the profiles are placed in the corresponding marked positions based on the modular structure.

Support layer with ferromagnetic properties (placed over the base of the structure)

[0093] The support layer with ferromagnetic properties is formed by assembling a plurality of puzzle-type interconnectable plates with interlocking system. These interconnectable plates forming the support layer with ferromagnetic properties can be cut and marked with a code so that they can be mounted in the appropriate places based on the modular structure.

[0094] In one embodiment, the layer with ferromagnetic properties is preferably, but not limited to, a galvanized metal sheet, having a thickness between 0.1 mm and 2 mm. In a preferred embodiment, the thickness of the galvanized metal sheet is between 0.1 mm and 0.8 mm, the thickness which may be chosen by the person skilled in the art depending on the desired application. In another preferred embodiment, the thin galvanized metal sheet varies between 0.18 mm and 0.4 mm with optimal results / performance results on a 0.25 mm sheet.

[0095] The layer with ferromagnetic properties is covered with a special non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer layer, chromium as a chemical layer and an inner face coating of the layer with ferromagnetic properties: this special non-slip paint is described in patent application no. EP3429434.

Vertical walls of the modular structure

[0096] Vertical wall that allows easy attachment of finishing components that has a layered structure consisting of an ultra-light core such as foam, polystyrene, mineral wool located between 2 layers with ferromagnetic properties with a thickness ranging from 0.1 mm to 2 mm where at least one layer with ferromagnetic properties is painted on the outside with a non-slip paint characterized by a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer, chrome as a chemical layer and a coating covering the inner face of the layer with ferromagnetic properties.

[0097] The walls are characterized by an interlocking system or "click" placed vertically. The vertical interlocking system is not a system that embeds the two walls, fixing them, but it is a system that allows the alignment of the panels in the plane but also leaving a space to adjust them in the vertical plane.

[0098] The arrangement of the vertical walls next to each other together with the interlocking or "click" system creates a structure with a common body.

[0099] The vertical wall is inserted on the "channel" formed by the profiles "U", "L", "T", "H" and in these profiles holes are drilled that pierce the layer with ferromagnetic properties of the wall (both on the front and on the back) and the "gluing" of the vertical walls to the profiles is done by inserting suitable fastening means, being preferred, but not limited to, pop-rivets (rivets) that open behind the layer with ferromagnetic properties (sheet) of the vertical wall, in the ultra-light layer, preventing it from coming out.

[0100] A second system of metal profiles (superior strength structure) are comprised of a plurality of interconnectable metal segments type U, L, T, H or mixed profiles, depending on the required geometry will describe the outer perimeter of the upper side of the vertical walls and will be mounted at the top of them (upper strength structure). These "U", "L", "T", "H" type profiles or mixed profiles are mounted at the top of the vertical walls which are also "glued" to the vertical wall by inserting suitable fastening means, being preferred, but not limited to, pop-rivets. These have the same characteristics as those that form the first system of metal profiles (lower strength structure) for the reasons listed above.

[0101] Here it is important to take into account the following aspect: the profiles at the bottom are offset from the profiles at the top, so that their joints are "woven" to give additional strength to the magnetic modular structure thus obtained.

Multilayer magnetic support

[0102] The multilayer magnetic support consists of a magnetic foil (through which it can be fixed to the layer with ferromagnetic properties) and a suitable means of attachment (e.g acrylic adhesive applied on a sponge

support or vinyl or hot melt adhesive) on which can easily attach the desired finishing components (e.g ceramic, ceramic wall and floor tiles, marble, granite, parquet, linoleum, carpet and other materials suitable for covering surfaces, etc.).

[0103] Preferably, the magnetic foil has a thickness of between 0.2 and 3 mm, preferably 0.4 mm for an optimal contact force, but its thickness can be chosen by the person skilled in the art, depending on the weight of the plate to be exposed. In a preferred embodiment, the attachment of type sponge adhesive has a thickness between 0.2 and 5 mm, preferably 1 mm which has an optimal level of taking up the unevenness of the element which is applied on the multilayer magnetic support.

[0104] If it is desired to attach the multilayer magnetic support on ceramic tiles that has an irregular back and a high pattern, it is preferable to use an acrylic adhesive applied on a sponge support (especially if the ceramic plate will be mounted on the floor where it is subjected to higher pressure) which will be able to adhere to the embossed pattern on the back of the ceramic tile, thus increasing the contact force between the ceramic tile and the layer with ferromagnetic properties. The role of the acrylic adhesive applied on the sponge support is to take over the unevenness behind the finishing elements, especially in the case of ceramic tiles. Basically, the relief behind the ceramics is "imprinted" in the acrylic adhesive applied on a sponge support, and the finishing element is equalised and leveled in this way. An additional advantage of using acrylic adhesive applied on a sponge is that the ceramic tiles do not break. In the absence of acrylic adhesive applied on a sponge, there is a risk that if the pressure is very high and the traffic is heavy, the ceramic tiles will break because their placement would be only on the "ridges" of the relief on the back of the ceramic tile.

[0105] The multilayer magnetic support with acrylic adhesive applied on a sponge support gives the following advantage: when you want to change the ceramic / carpet collection due to wear, damage, delisting from the portfolio, this change is done quickly, the products being easily detached. The use of magnetic foil removes the disadvantages of the classic gluing of finishing elements (ceramic tiles, parquet, carpet) whose replacement would have led to the appearance of noise, dust and, in general, discomfort for the space in which it is intended.

[0106] Another major advantage is that the installation / uninstallation of the finishing elements takes place with a speed of approx. 10 times higher than in the classic working mode.

[0107] If you want to use a ceramic tile that has a back with irregularities and a high pattern on one of the vertical walls where it is not subjected to a pressure as high as that of a tile placed on the floor, you can use adhesives such as vinyl or hot melt that ensures the stability of the ceramic tile at the same time at a low cost.

[0108] When using the acrylic adhesive applied on a sponge support that has a protective layer called "liner",

the finishing components (ceramic, parquet, linoleum, etc.) are placed on the acrylic adhesive applied on the sponge support after removing the liner and fixed in position desired by pressing.

[0109] The modular structure thus obtained can be decorated with the desired finishing components.

[0110] Thus, if on the bottom (on the floor) you want a carpet, parquet, ceramic finish that has a magnetic support for easy replacement over the base of the structure, place the layer with laser-cut ferromagnetic properties also in interlocking system (interlocking) and marked with a code.

[0111] In a preferred embodiment, over the layer with ferromagnetic properties which is preferred, but not limited to, the galvanized metal sheet painted with the non-slip paint described in patent application no. EP3429434, the magnetic support is placed.

[0112] On the multilayer magnetic support are placed the desired finishing components (e.g ceramics, parquet, linoleum, carpet and other materials suitable for covering surfaces).

[0113] If it is desired to use a ceramic tile that has a back with irregularities and a high pattern, it is preferable to use a sponge adhesive for the reasons mentioned above. The sponge has the role of taking over the unevenness on the back of the finishing tiles, especially in the case of ceramic tiles.

[0114] If you want to use a ceramic tile that has a back with irregularities and a high pattern on one of the vertical walls where it is not subjected to a pressure as high as that of a tile placed on the floor, you can use adhesives such as vinyl or hot melt that ensures the stability of the ceramic tile at the same time at a low cost.

[0115] Therefore, the support layer with ferromagnetic properties is placed, which is preferably, but not limited to, the galvanized metal sheet based on the modular structure which is preferably made of, but not limited to, waterproof chipboard, and the sandwich composed of magnetic foil and the corresponding means of attachment selected from the acrylic adhesive applied on a sponge support or vinyl or hot melt type adhesives are placed over the support with ferromagnetic properties.

[0116] On the multilayer magnetic support are placed the desired finishing components (eg. ceramics, parquet, linoleum, carpet and other materials suitable for covering surfaces).

[0117] If it is desired to use a ceramic tile that has a back with irregularities and a high pattern, it is preferable to use a sponge adhesive for the reasons mentioned above. The sponge has the role of taking over the unevenness on the back of the finishing tiles, especially in the case of ceramic tiles.

[0118] If you want to use a ceramic tile that has a back with irregularities and a high pattern on one of the vertical walls where it is not subjected to a pressure as high as that of a tile placed on the floor, you can use adhesives such as vinyl or hot melt that ensures the stability of the ceramic tile at the same time at a low cost.

[0119] Therefore, the support layer with ferromagnetic properties is placed, which is preferably, but not limited to, the galvanized metal sheet based on the modular structure which is preferably made of, but not limited to, water-repellent, and the sandwich composed of magnetic foil and the corresponding means of attachment selected from the acrylic adhesive applied on a sponge support or vinyl or hot melt type adhesives are placed over the support with ferromagnetic properties.

[0120] When using the acrylic adhesive applied on a sponge support that has a protective layer called "liner" the finish (ceramic, parquet, linoleum, etc.) is placed on the acrylic adhesive applied on the sponge support after removing the liner and is fixed in the desired position by pressing.

[0121] After the floor finish is applied, the wall finish begins. There are many variants available here, from plasterboard to MDF with or without interlocking system, up to paneling, ceramics, wallpaper, print, etc.

[0122] The finish will also be magnetically attached to the vertical walls. Thus, on the back of the finishing materials will be longitudinally glued strips of magnetic foil, similar to the one used for the floor. The magnetic foil can be glued using acrylic adhesive applied on a sponge support or vinyl or hot melt type adhesives.

[0123] In a preferred embodiment, the vertical walls will be finished with MDF which has an interlocking system (using Unilin's ClicWall technology) which once joined has no joints and can be painted with washable paint which is very advantageous in terms of execution time. Or you can use the same product, but in the melamine or directly printed version. Other suitable materials such as MDF or plasterboard can also be used, which must be putty and then painted, which slightly increases the execution time.

[0124] The modular structure of the present invention can be made in a plurality of interchangeable configurations according to Fig. 12, using the same material, which is one of the main advantages of the present application.

[0125] Additionally, the invention also provides a method of assembling this magnetic modular structure. This method comprises the following steps:

- providing a base consisting of a plurality of plates interconnected by shape,
- fixing a first system of metal profiles (lower strength structure) at the base by means of fixing means, where on each metal profile is inscribed its exact position in the plan
- placing a support layer with ferromagnetic properties above the base, a layer made up of a multitude of plates interconnected by shape, where each support layer with ferromagnetic properties is inscribed with its exact position in the plane
- fixing a plurality of vertical walls arranged perpendicular to the base and fixed in the first system of metal profiles at their lower part,
- fixing a second system of metal profiles (upper

strength structure) to the upper part of the walls,

where the metal profiles that fix the metal walls at the top have the joints offset from the metal profiles at the bottom

- fixing a multilayer magnetic support over the metal support layer and on at least a portion of the surface of the vertical walls.

[0126] In a preferred embodiment, the positions of the metal profiles as well as the position / identification code of the walls are engraved on the base.

[0127] The present invention also provides in one embodiment the use of the modular structure for partitioning commercial spaces, open-space office spaces and living spaces.

[0128] In another preferred embodiment, the invention provides the use of the magnetic modular structure for showing the ways of decorating the various living spaces, preferably the bathroom, kitchen, hallway.

[0129] In another embodiment the invention provides the use of the building kit or modular structure for the construction of stands for the display of selected finishing components of sandstone, faience, marble, granite, parquet, carpet, linoleum.

[0130] In another embodiment the invention provides the use of the building kit or modular structure for easy compartmentalization of a room / household that allows this.

Claims

1. A vertical wall that allows easy attachment of the finishing components that has a layered structure consisting of an ultra-light core such as foam, polystyrene, mineral wool located between 2 layers with ferromagnetic properties with a thickness ranging from 0.1 mm to 2 mm, where at least one layer with ferromagnetic properties is painted on the outside with a non-slip paint **characterized by** a succession of layers, namely a layer of polyethylene as a protective layer, an acrylic layer as a top layer, polyester as a primer, chrome as a chemical layer and a coating layer of the inner face of the layer with ferromagnetic properties.
2. The vertical wall according to claim 1, further comprising at least one multilayer magnetic support disposed on at least a portion of the wall surface, where the multilayer magnetic support is formed at the bottom towards the support layer with ferromagnetic properties by a magnetic foil and a means of attachment to the opposite side of the support with ferromagnetic properties for attaching said finishing components.
3. A kit for building a modular structure that allows easy

attachment of finishing components that comprises:

- a plurality of coplanar plates interconnectable by shape which assembled together form the base of the modular structure,
- a first system of metal profiles (lower strength structure) to be fixed to the base plate through fastening means,
- a plurality of coplanar plates placed interconnectable by shape, which assembled together form a support layer with ferromagnetic properties which are fixed over the base of the modular structure,
- a plurality of vertical walls to be arranged perpendicular to the basic structure and fixable in the first system of metal profiles (lower strength structure) at their lower part

wherein the vertical walls are provided with a layer with ferromagnetic properties on at least one of the outer surfaces,

- a second system of metal profiles (upper strength structure) to be fixed to the top of the vertical walls to ensure the stability and rigidity of the structure,
- at least one multilayer magnetic support to be arranged over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls

wherein the multilayer magnetic support is formed at the bottom facing the support layer with ferromagnetic properties of a magnetic film and a means of attachment to the opposite side of the support with ferromagnetic properties for attaching said finishing components.

4. Kit according to claim 3, wherein the interconnection is of the type puzzle with a system of type interlocking..
5. Kit according to claims 3-4, wherein said first system of metal profiles (lower strength structure) and said second system of metal profiles (upper strength structure) are made of a plurality of interconnectable metal segments having the profile section U, and the planar shape of that section being straight and/or alternately in the shape of the letter "L", "H" or "T" or mixed profiles.
6. Kit according to claims 3-5, wherein the base structure and the layer with ferromagnetic properties are engraved or labeled with a code.
7. Kit according to claims 3-6, wherein the attachment means is selected from acrylic adhesive applied on a sponge support or vinyl or hot-melt type adhesives.

8. Kit according to claims 3-7, wherein the acrylic adhesive applied to the sponge support is a closed cell sponge.

9. Kit according to claims 3-8, wherein the layer with ferromagnetic properties is a galvanized sheet. 5

10. A modular structure that allows easy attachment of finishing components that includes: 10

- a base of the modular structure comprising of a plurality of coplanar plates interconnectable by shape, 15
- a first system of metal profiles (lower strength structure) fixed to the base through fastening means, 20
- a plurality of coplanar plates interconnectable by shape, which when assembled together form a support layer with ferromagnetic properties which are fixed over the base of the modular structure, 25
- a plurality of vertical walls to be arranged perpendicularly on the basis of the modular structure and fixable in the first system of metal profiles at their lower part 30

wherein the vertical walls are provided with a layer with ferromagnetic properties on at least one of the outer surfaces, 35

- a second system of metal profiles (upper strength structure) to be fixed to the top of the vertical walls to ensure the stability and rigidity of the structure, 40
- at least one multilayer magnetic support to be arranged over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls 45

wherein the multilayer magnetic support is formed at the bottom facing the support layer with ferromagnetic properties of a magnetic foil and a means of attachment to the opposite side of the support with ferromagnetic properties for attaching said finishing components. 50

11. The modular structure according to claim 10 wherein said first system of metal profiles (lower strength structure) and said second system of metal profiles (upper strength structure) are comprised of a plurality of interconnectable metal segments having the profile section U, and the planar shape of said section being straight and / or alternately the shape of the letter "L", "H" or "T" or mixed profiles. 55

12. A method of assembling a modular structure that allows easy attachment of finishing components according to claims 10-11 comprising the steps of:

- connecting a plurality of plates to form the basis of the modular structure,
- fixing a first system of metal profiles (lower strength structure) to said base by means of fixing means
- connecting a plurality of plates interconnectable by shape to form a support layer with ferromagnetic properties above the base plate, where the support layer with ferromagnetic properties is inscribed with its exact position in the plane
- fixing a plurality of vertical walls arranged perpendicular to said base and fixed in the first system of metal profiles at their lower part,
- fixing a second system of metal profiles (upper strength structure) to the upper part of the vertical walls, where the metal profiles that fix the vertical walls in the upper part have the joints offset from the metal profiles at the bottom,
- fixing at least one multilayer magnetic support over the support layer with ferromagnetic properties and on at least a portion of the surface of the vertical walls

13. Use of the kit according to claims 3-9 or the modular structure according to claims 10-11 for the construction of stands for displaying the selected finishing components of floor tile, faience, marble, granite, parquet, carpet, linoleum. 30

14. Use of the kit according to claims 3-9 or the modular structure according to claims 10-11 for easy compartmentalization of a room. 35

Fig 1

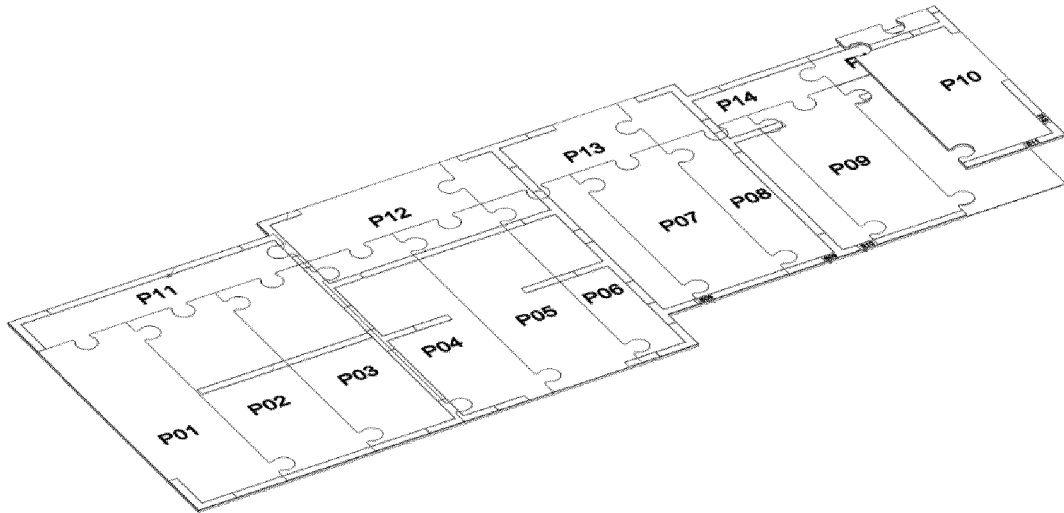


Fig 1

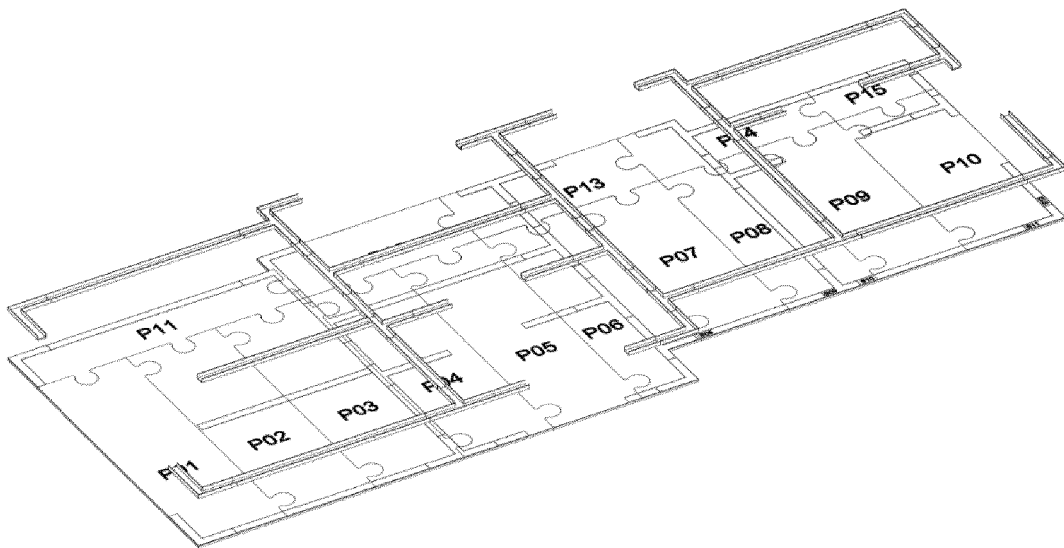


Fig. 2

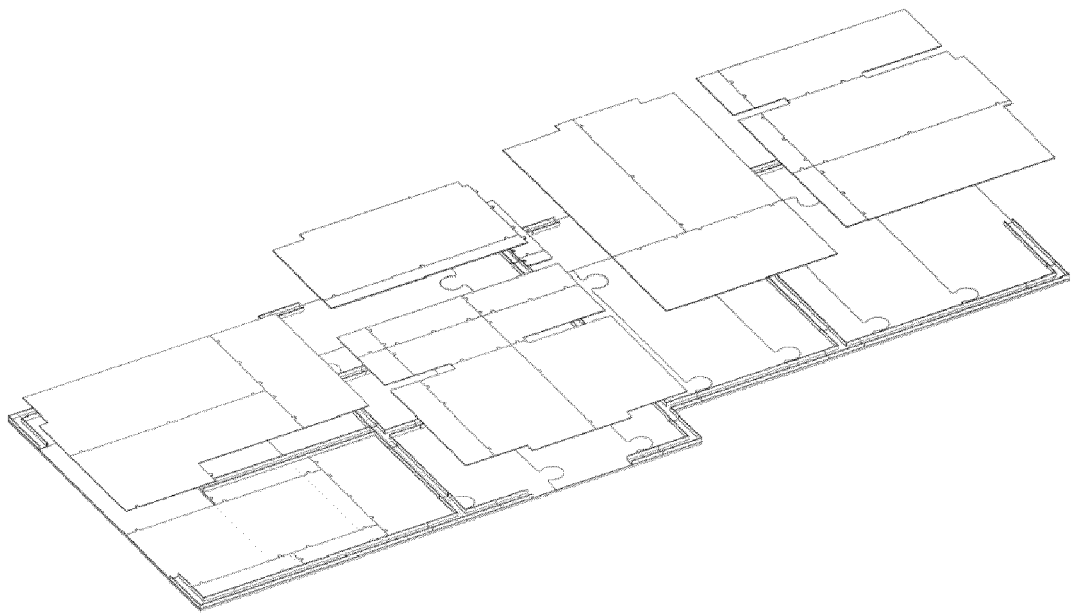


Fig. 3

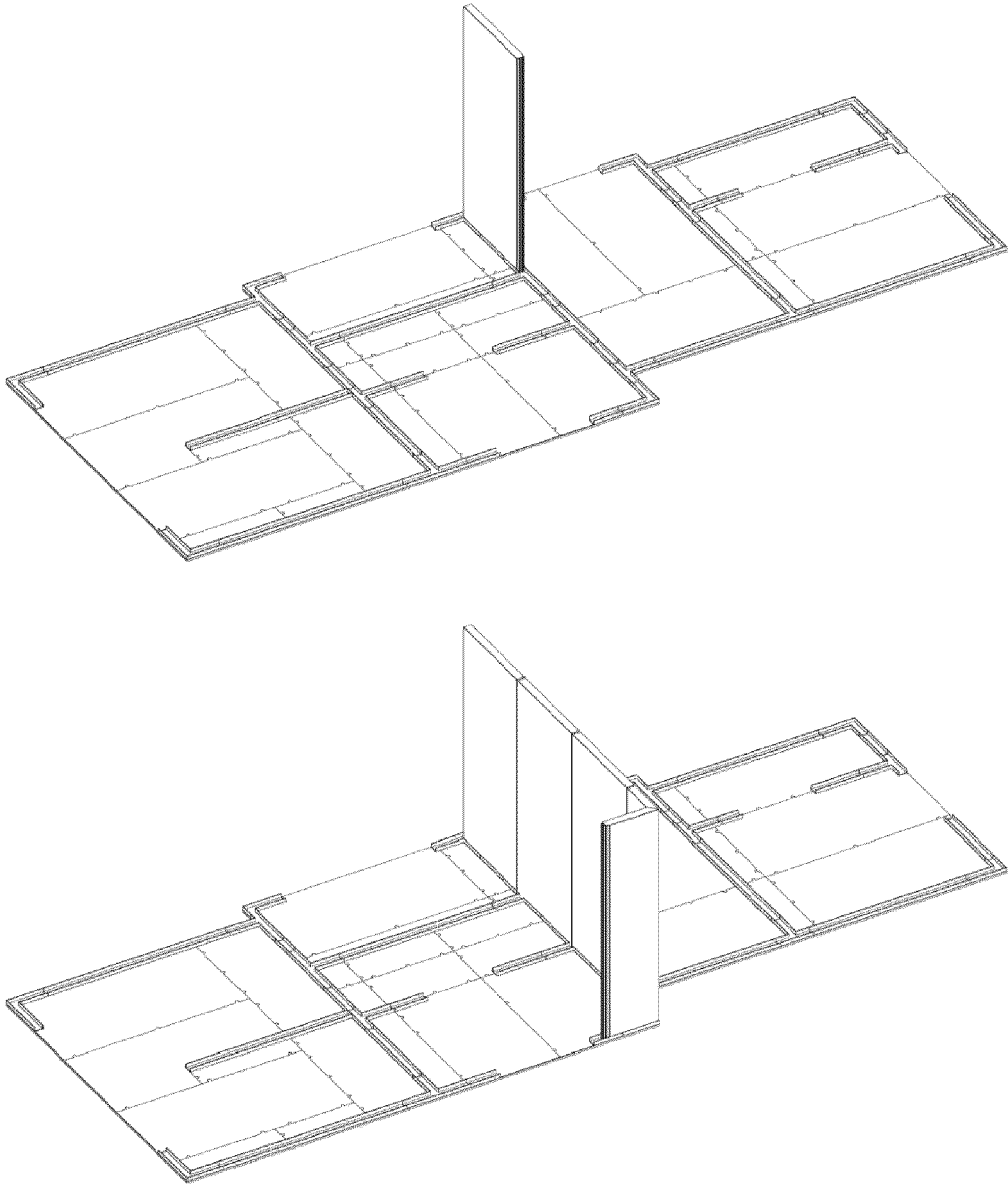


Fig. 4

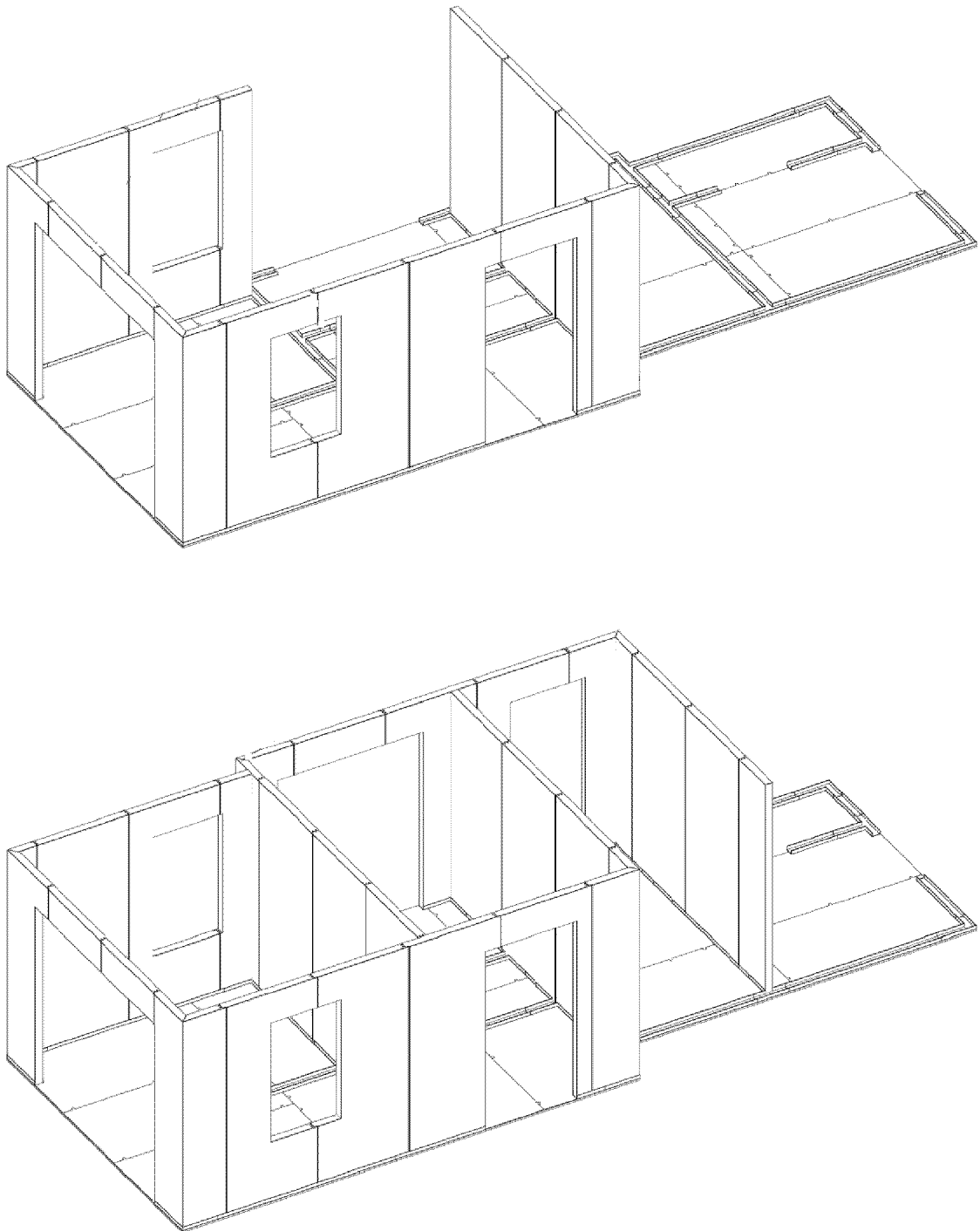


Fig.5

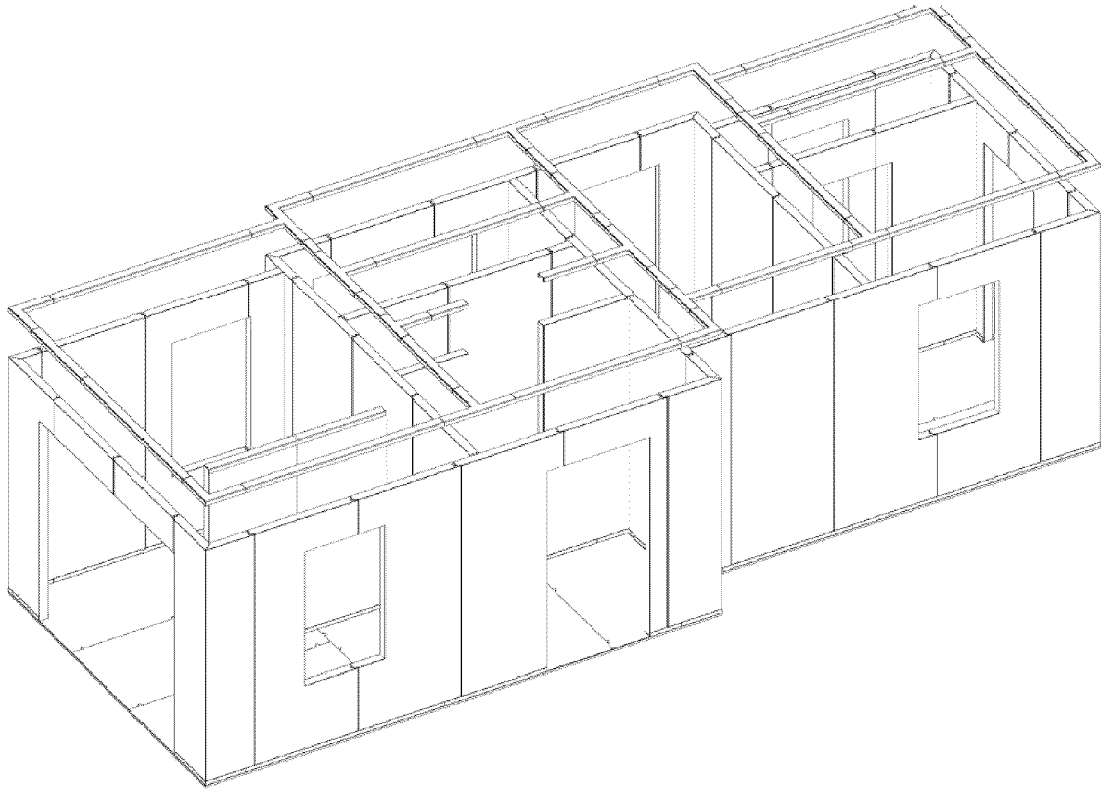


Fig. 6

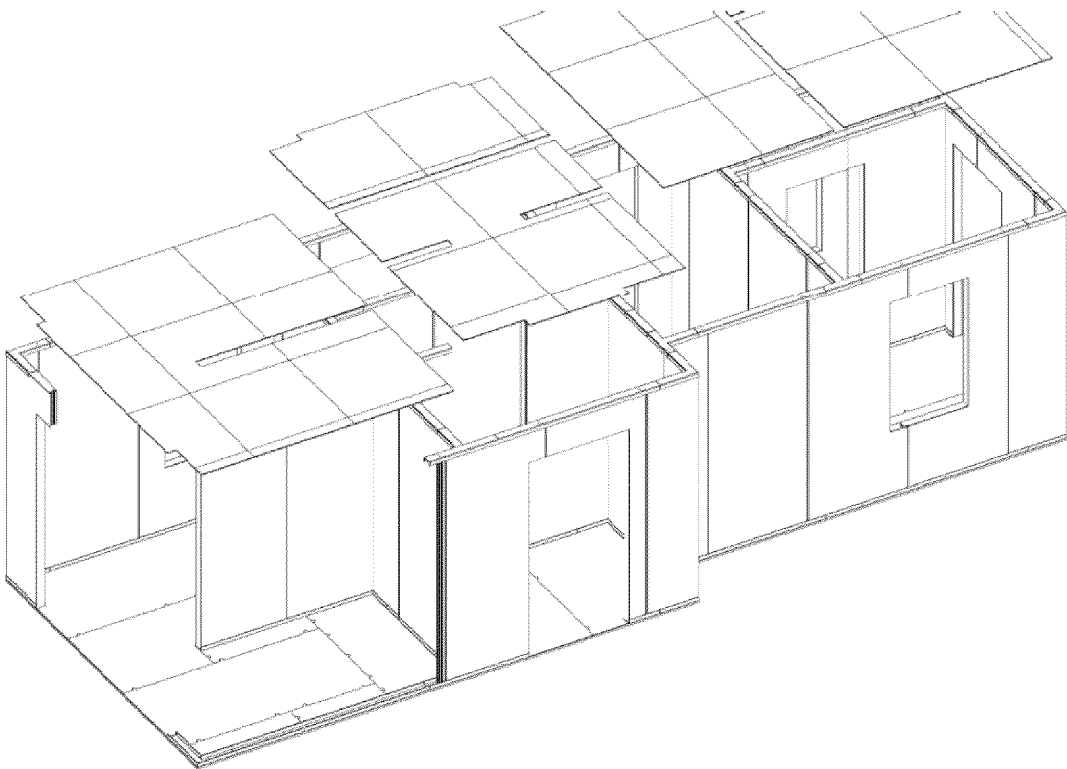


Fig. 7

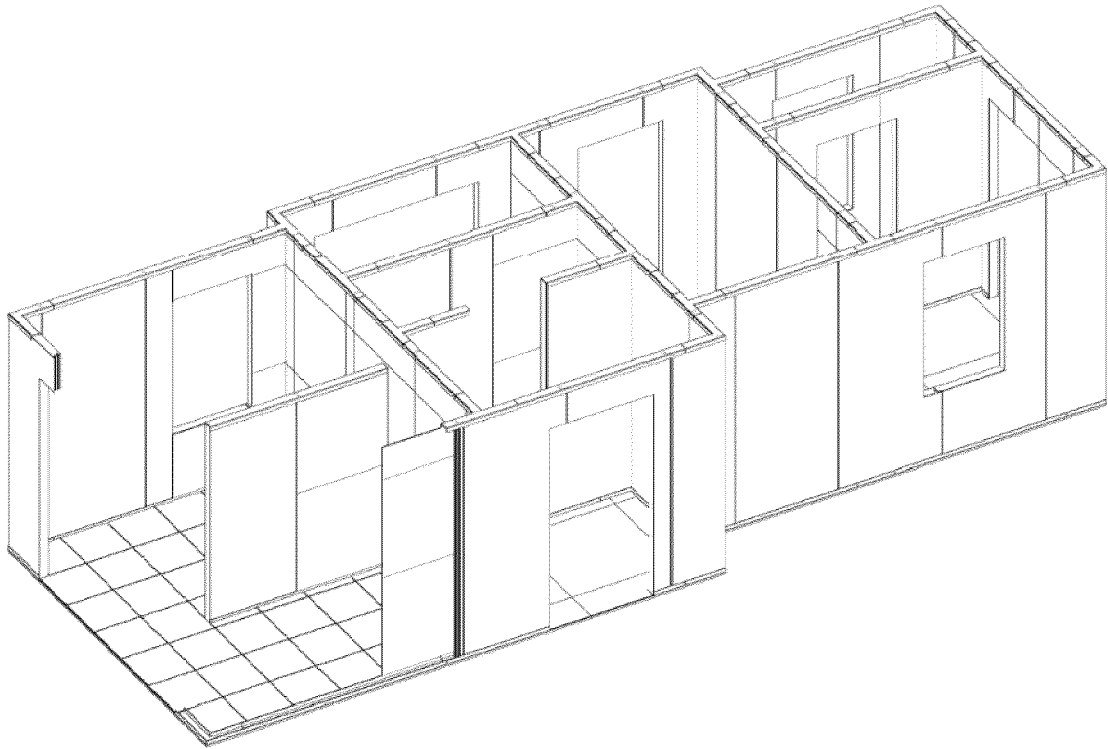


Fig. 8

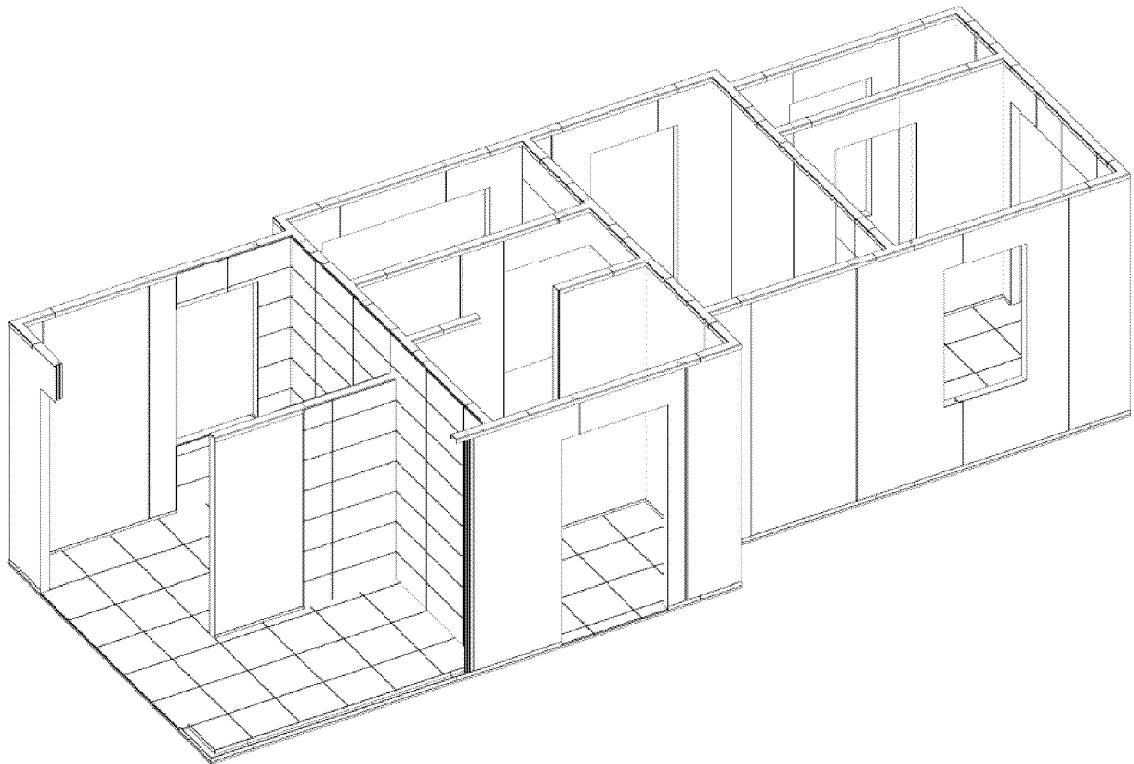


Fig. 9

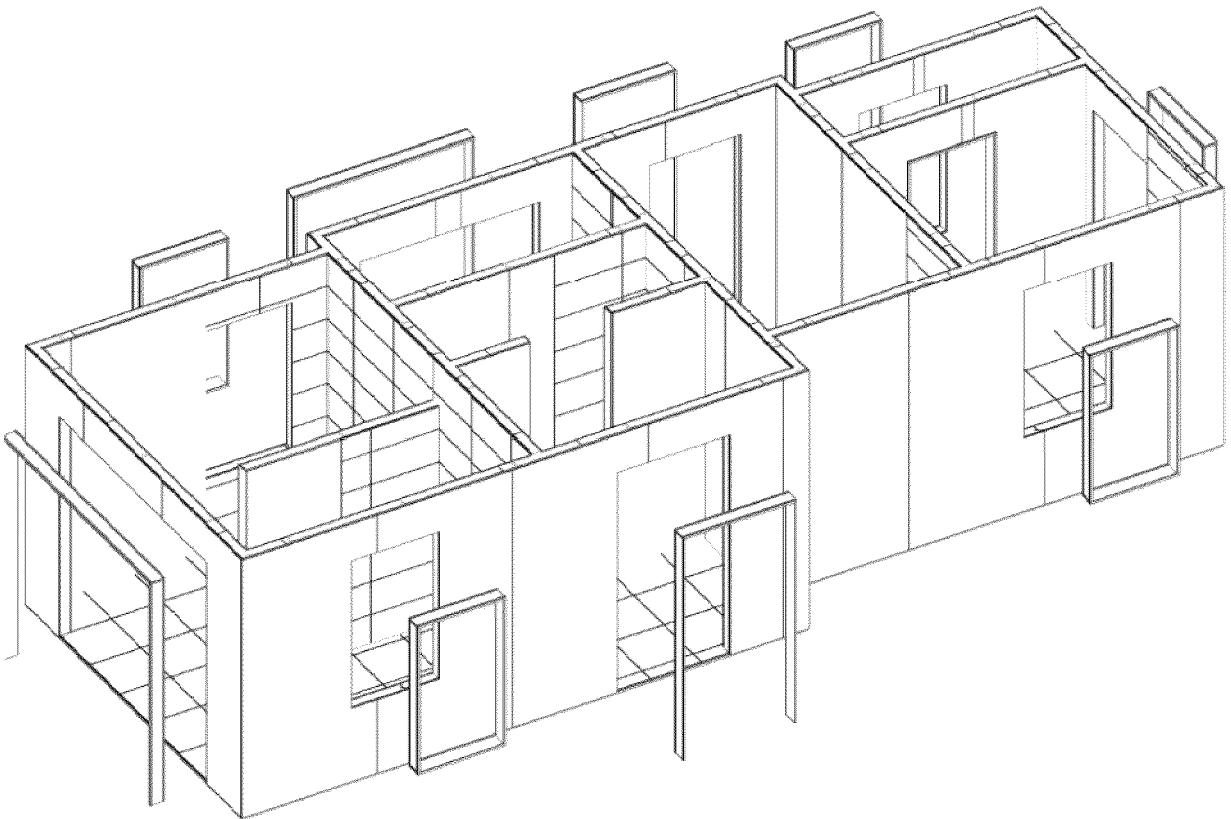


Fig . 10

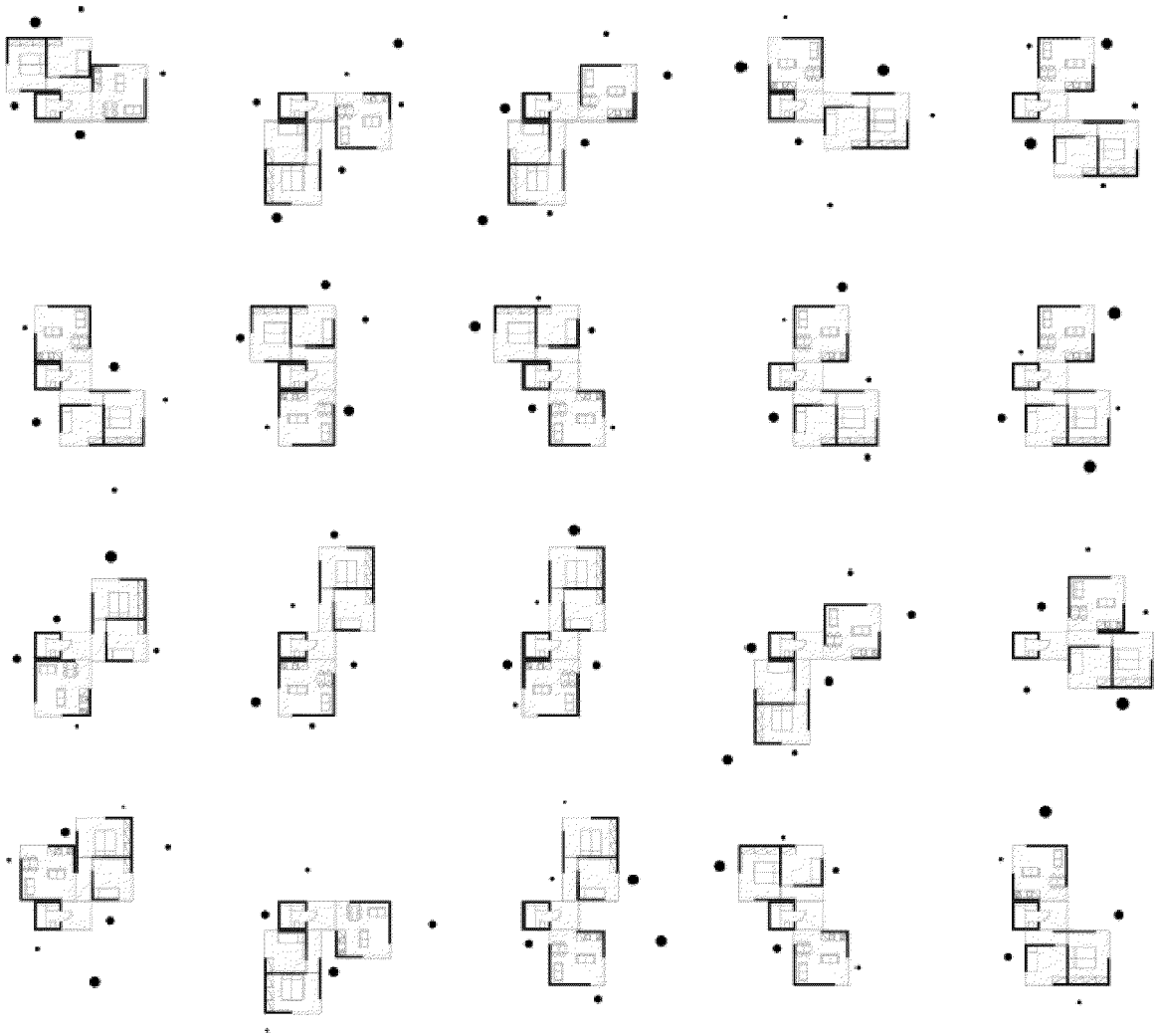


Fig. 11

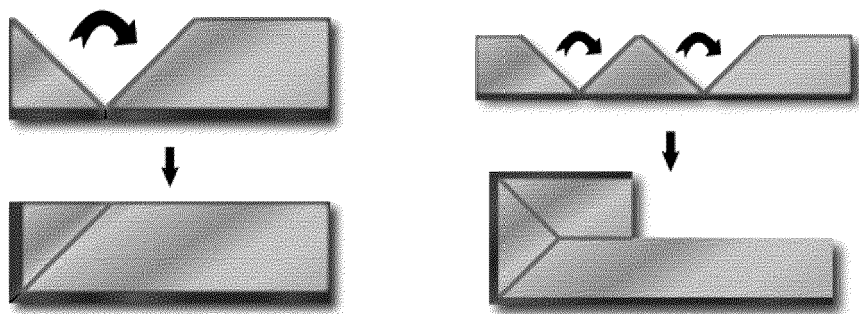


Figure 12



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 4503

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Place of search Munich		Date of completion of the search 29 January 2021	Examiner Giannakou, Evangelia
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