

(19)



(11)

EP 2 910 705 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.08.2015 Bulletin 2015/35

(51) Int Cl.:
E04F 13/08 (2006.01)

(21) Application number: **14460046.7**

(22) Date of filing: **28.07.2014**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
 GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
 PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA ME

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(30) Priority: **29.07.2013 PL 40488313**

Remarks:

Claims 16 - 19 are deemed to be abandoned due to non-payment of the claims fees (Rule 45(3) EPC).

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(54) **A modular system of panels, especially wall panels**

(57) The subject matter of the invention is a modular system of panels, particularly wall panels, intended for creating an interactive surface of a wall, ceiling, screen, panel, to be used for various functions, including decoration, play or fun, and in the case of commercial applications - for advertising and decoration, and as a rack, organiser, a place for installing lighting, an information centre, a menu, etc.

plank covered with a magnetically active coating (13). The magnetic panels (5), which are placed vertically and symmetrically in the frame (1), constitute a screen, on which a magnetic cover (7) is placed. Magnetic panels (5) are joined with a connector (6) by means of a tongue and a groove, and immobilized by the force of bottom permanent magnets (4) acting on the metal strips of the support structure (2) or hook and loop fastners. The bottom permanent magnets (4) are fixed to the reverse of the magnetic panels (5).

The modular system has a frame (1) surrounding the support structure (2) in the form of strips, to which at least one magnetic panel (5) is fixed; the panel is a rectangular

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Description

[0001] The subject matter of the invention is a modular system of panels, especially wall panels, intended for creating an interactive surface of a wall, ceiling, screen, panel, to be used for decoration, play or fun, and in the case of commercial applications - for advertising, decoration, as a rack, shelf, organiser, a place for installing lighting, an information centre, a menu, etc.

[0002] The layered wallboard is known from Polish patent description No. PL191471. A wallboard has one outer facing made up of at least two panel segments that are permanently connected with the core, which is equipped with rectangular cutouts that are parallel to one another, in which there are placed tightly fitting opposite internal and external flanged edges of panel segments, while the other outer facing, which is permanently fixed to the core, has perpendicularly bent edges. Wallboards are particularly designed to be used to construct light load-bearing walls, partition or elevation walls as part of erection of industrial, residential or commercial facilities.

[0003] The manner of joining wall panel elements known from Polish patent application No. 397551 consists in placing an additional connecting element in between the panels to be joined. First, one panel is installed, then a connecting element is inserted into it, together with a spline tenon, and then another panel is pressed into it by putting it on the connecting elements that stick out, and at the end, the structure is screwed together to connect the outer panel with the connecting element in the same way on both sides.

[0004] The composite panel system, known from Polish patent application No. 393840, is intended to be used outside for building elevations, in various types of rooms and as internal panels. The first layer of each panel is made from oriented strand board (OSB). The board forms a base for the panel core, which is made from a half log-shaped piece of polystyrene foam. The successive layers are made from wood-like boards, e.g. from cork, one to four centimetres thick, and a layer of veneer. They protect the panel core against the weather and perform an aesthetic function, making the product look like natural wood. All panel elements are joined together under the press, with the use of a single-component polyurethane-based glue. The hardening occurs under the influence of moisture contained in the air. The glue is weatherproof. The external, visible part of the panel is weatherproof and varnished.

[0005] A coffered ceiling containing cladding sheets and a cladding sheet for coffered ceilings known from Polish patent description No. PL198892 has cladding sheets on the main flat surface, closed by longitudinal connecting sections, as well as at least one longitudinal stiffening section, placed at an angle to the main surface. The connecting sections are designed in such a way that any sheet may be removed easily, with no special tools needed, so that the appropriate scale between sheets is preserved and so that it is possible to remove a sheet in

order to ensure appropriate ceiling measurements. Furthermore, sheets can be clipped together and will remain tight even if they expand and warp downwards, because of fire or other causes. This is achieved by each sheet-connecting section having spacers with hook-shaped endings, with spacers and hooks ensuring tightness and hooks catch one another before sheets move apart a short distance.

[0006] A coffered ceiling known from Polish patent description No. PL208985 constitutes a load-bearing board made from joined sheets of a stiff material, suspended on vertical load-bearing elements in the form of spreader beams. Some parts of the surface of the load-bearing board let the light through, and over the board and under the ceiling proper there is at least one source of light. The load-bearing board has holes with the same or different shapes, which are covered with a glass plate that lets the light through. Furthermore, the load-bearing board is composed of sheets joined together into a layered structure, in which each sheet is made from two layers of a pressed composite material. The corresponding holes in the two layers have the same shape, but the hole in the upper layer is bigger. Such a hole arrangement forms a cut on the edges of which a glass sheet is placed.

[0007] The essence of the modular panel system, according to the invention, consists in the fact that it has a frame surrounding a support structure in the form of strips from wood or metal, to which at least one magnetic panel is fixed; the panel is a rectangular plank covered with a magnetically active coating, and the magnetic panels placed in the frame, preferably vertically and symmetrically, form a screen on which a magnetic cover is placed.

[0008] The frame should be made from a surrounding channel section or a surrounding angle.

[0009] The magnetic panels are covered with a magnetically active coating with an isotropic or anisotropic structure, and the magnetic field lines run parallel to a magnetic panel edge, or the magnetic panels have a magnetically active coating with an anisotropic structure, or the magnetic panels are covered with surface permanent magnets, which should most preferably be covered with a masking blind.

[0010] The magnetic panels should be fixed in a frame with metal strips of the support structure by means of bottom permanent magnets fixed on the reverse of the magnetic panels.

[0011] Adjacent magnetic panels should be connected with a tongue and a groove.

[0012] Preferably, the magnetic panels should be fixed in the frame with mounting brackets that attach the magnetic panel to the wooden strips of the support structure.

[0013] The magnetic cover should be a sheet made from a ferromagnetic powder composite in synthetic thermoplastic rubber or a sheet from a magnetically neutral material coated with ferromagnetic powder, or a sheet from a magnetically neutral material on which a ferromagnetic layer has been sprayed. The magnetic cover should be coated with surface-printed film, fabric or pa-

per.

[0014] A magnetic cover in the form of a sheet or ribbon can be made from a composite of ferromagnetic powder and synthetic thermoplastic rubber, or from a magnetically neutral material such as paper, cardboard, fabric, wallpaper, film or a plastic plate coated with ferromagnetic powder, or a magnetic cover can be made from a magnetically neutral material on which a layer of a ferromagnetic material has been sprayed, and then - or earlier - it was decorated or surface printed. A magnetic cover made from a composite of ferromagnetic powder and synthetic thermoplastic rubber can be coated or laminated with film, fabric or paper, and then - or earlier - decorated or surface printed. The decoration can be based on the material structure, its texture or shape, or consist in a colour of shade put on its surface. It can also perform additional aesthetic or utility functions based on lenticular, prismatic or photoluminescent structures, or acoustic, reflecting, aromatic, germicidal, refreshing, moisturizing, insecticidal, warning, deterrent, etc. properties. Using permanent magnets with a bigger attraction energy, other objects can be freely mounted on and repositioned on modular magnetic panel system walls, e.g. LED lights, clamps for direct current lighting, electronic elements, displays, LCD screens, audio or video equipment, speakers, transmitters, sensors, clocks, indicators, locks, stops, etc.

[0015] The panel system makes use of magnetic attraction force on the entire surface of a panel wall. Magnets' utility parameters depend on the magnetic properties of the material from which they are made, on their shape - which affects how field force lines are arranged around the magnet, on the magnet size and the method applied to magnetize it. Where significant attraction forces are needed, it is advisable to use permanent magnets in the form of cylinders or rectangles placed next to one another throughout the screen surface or on its part, permanently attached to the board base. When choosing the material from which the magnet is to be made, its working temperature should be considered. The utility parameters include the shape and reach of magnetic field force lines and the field strength at a particular point on the magnet surface or at a given point in the space around the magnet, the lifting capacity, magnetic flux and magnetic moment. Each magnet has a specific magnetization direction. Most often, the North and South poles of a magnet are to be found on the biggest, opposite surfaces of the magnet.

[0016] The modular magnetic panel system enables innumerable utility properties to be created and so will encourage manufacturers and users to be creative. The optimum use will allow constant change, will evolve in terms of function, shape, colour or arrangement, and will enable interaction with the user. The magnetic cover is a final element that introduces new functions and allows changes to be made easily by the very user, with no effort, funds or experience needed - just based on intuition. The cover and its preprogrammed functions can be made by

the manufacturer and can be put on a part of or entire screen, or form a multi-layered arrangement. The cover can also be modified, e.g. by being cut, printed or painted on, reprogrammed, washed, wetted, etc. It can be applied in whole or in part, on the full surface or at certain points. The user can play or work with one or more covers; they can quickly modify, decorate or disassemble it/them. It allows the user to create or individualize its functions or decoration, to create, cut out or print their own images, photos, games, adverts, signs, symbols or letters. The cover lets the user engage in interactive games with elements placed on the screen. Such elements can be repeatedly taken off and stuck on, moved, placed one on top of another, and arranged at will. All such actions do not require any preparation, experience, specialist knowledge or even dexterity. They can be done by nearly anyone: a child, salesperson, teacher or decorator without any previous training. A magnetic panel screen can be made using a magnetic base with various attraction forces. For typical, thin decorative covers and light magnetic elements a cheap base with a relatively small attraction force, made from, for instance, isotropic magnetic film, can be used. In projects requiring a big attraction energy, more expensive anisotropic film or permanent magnets need to be used. Such a solution enables all of the above-mentioned decorative covers to be magnetized, and other objects, with a bigger mass, to be mounted: hooks, clamps, scissors, knives, tools, shelves, lighting and electronic equipment, plants or items with multiple utility functions.

[0017] Various implementation examples of the subject of the invention are pictured in the illustration; Fig. 1 shows a front view of the screen of a modular magnetic panel system; Fig. 2 shows a fragment of a screen of a modular magnetic panel system with marked magnetization lines using an isotropic cover; Fig. 3 shows a modular magnetic panel system with marked magnetic cover magnetization lines and with permanent magnets fitted on strips from above; Fig. 4 shows a modular magnetic panel system with marked magnetic cover magnetization lines and with mounting brackets from above; Fig. 5 shows a fragment of a screen of a modular magnetic panel system with panels equipped with surface permanent magnets; and Fig. 6 shows a modular magnetic panel system with panels equipped with bottom and surface permanent magnets from above.

Example 1

[0018] A modular system of panels, especially wall panels, has a frame 1, which surrounds the support structure 2 in the form of wooden strips, and magnetic panels 5. The support structure 2 is attached to the wall with brackets 8. In the frame 1 there are permanently fixed magnetic panels 5 in the form of rectangular MDF boards covered with a magnetically active coating 13, and the magnetic panels 5 are attached to the support structure 2 with mounting brackets 8. The magnetic panels 5, which

are placed vertically and symmetrically in the frame 1, constitute a screen, on which a magnetic cover 7 is placed. The magnetic panels 5 are covered with a magnetically active coating with an isotropic structure, and the magnetic field lines are parallel to the longer edges of the magnetic panel 5. The magnetic cover 7 is a sheet from a composite of ferromagnetic powder in synthetic thermoplastic rubber, and the magnetic cover 7 is coated with surface printed film.

Example 2

[0019] The modular system of panels, especially of wall panels, is similar to that in Example 1, except for the following: the frame 1 is made from a surrounding angle, the support structure 2 has metal strips and is attached to the wall with screw anchors 3, the magnetic panels 5 are covered with a magnetically active coating 13 with an isotropic structure, and the magnetic field lines are parallel to the longer edges of the magnetic panels 5 in the form of rectangular MDF boards covered with a magnetically active coating, and on the reverse of the magnetic panels 5 there are bottom permanent magnets 4 attached at the height of the metal strips of the support structure 2. The adjacent magnetic panels 5 are joined by means of a connector 6 with a tongue and a groove, and immobilized in the frame 1 by the effect of the permanent magnets 4 on the metal strips of the support structure 2. The magnetic cover 7 is constituted by a ribbon made from a magnetically neutral material, which is coated with ferromagnetic powder, and then isotropically magnetized.

Example 3

[0020] A modular system of panels, especially wall panels, made as in Examples 1 or 2, except for the fact that the magnetic cover 7 is a sheet from a magnetically neutral material, such as paper, fabric, nonwoven fabric, cardboard, wallpaper or film, on which a ferromagnetic layer has been sprayed. The magnetic cover 7 can also be made from a composite of a ferromagnetic powder in synthetic thermoplastic rubber; it can also be pressed in any form, e.g. a belt or ribbon. The ribbon is magnetized anisotropically.

Example 4

[0021] The modular system of panels, particularly of wall panels, is made as in Examples 1 or 2, with the exception that the magnetic panels 5 are covered with surface permanent magnets 9, which are placed symmetrically all over their surface. Furthermore, the magnetic panels 5 are covered with a thin, plastic masking blind 10. The wall made from magnetic panels 5 covered with surface permanent magnets 9 has a big attraction strength, capable of holding on its surface a rack 11 and battery-operated LED lights 12.

[0022] The magnetic cover 7 is made from a composite of ferromagnetic powder in synthetic thermoplastic rubber, and can be coated or laminated with film, fabric or paper, and then - or earlier - decorated or surface printed. Depending on the needs, the magnetic cover 7 can have magnetic properties or not; if it has been magnetized, it can attract magnetized or metal elements, and if it is made from 'rubber or paper steel', it can serve as an attractive base for magnetized objects. The decoration can be based on the material's structure, texture, shape, colour or shade. On the surface of the magnetic cover 7 there form longitudinal or non-directional fields with opposite North and South poles. The process is durable and the final product is very flexible and easy to work with many common tools, such as scissors, knives, guillotines, drilling machines, etc. A sheet, strip or ribbon prepared in such a way can then be sprayed with plastic, varnish, fillings, crystals, pellets or fibre, e.g. glass fibre, or laminated with paper, wood-like or stone facing, film, wallpaper, fabric or nonwoven fabric. On a magnetized strip or sheet, some additional items can be mounted, e.g. lighting 12, electronic or other equipment. In a similar way, polarization is applied to magnetic panels 5, which are boards from wood, cardboard, chipboard, MDF, plastic or other composite. The magnetic panels 5 are butted with a connector 6, or joined by means of a tongue and a groove. 11 The panels 5 are laminated with an elastic magnetic film or covered with a ferrite layer. The panels 5 with surface permanent magnets 9 are covered with a masking blind 10, which can be made from plastic, fabric, nonwoven fabric, etc.

[0023] If during manufacture of a magnetic panel system surface permanent magnets 9 are placed all over the panel surface 5, it will have a very big attracting power, capable of holding on its surface very heavy objects, such as LCD displays, speakers, shelves, racks 11. The support structure 2 enables easy assembly, balances out any wall irregularities and provides for its ventilation. The fixing to the support structure 2 takes place by means of plastic or metal mounting brackets 9 or small bottom permanent neodymium, ceramic or cobalt magnets 4 with a big attraction force, placed on the reverse of the panel 5, at specific, always-the-same spots. Such a solution enables easy assembly without tools and makes it possible to assemble and disassemble the structure repeatedly. The magnetic cover 7 is most often pressed and rolled, and then laminated with paper or film. A magnetic cover can also be made by spraying or coating ferromagnetic powder over a sheet from plastic, paper, synthetic paper, microfibre, fabric or canvas, and then by polarizing it with a magnetizer. Irrespective of the manufacturing method, such a cover 7 is a perfect base for printing by means of the following methods: screen or offset printing, flexography or digital printing methods, such as inkjet printing. In some cases, because of technical reasons, e.g. in order to improve the printing process, magnetization should take place after the printing is completed.

[0024] The panel system makes use of magnetic at-

traction force on the entire surface of a panel wall made from magnetic panels 5. The utility parameters of the panels 5 depend on the properties of the magnetic material from which the permanent magnet 4, 9, and the cover 13 of the panel 5 are made, as well as on how they are shaped, which affects the magnetic field force line arrangement. When choosing the material for the panels, its working temperature should be taken into consideration.

Claims

1. A modular system of panels, especially wall panels, **characterized in that**, a frame (1) surrounding the support structure (2) in the form of strips, to which at least one magnetic panel (5) is fixed; the panel is a rectangular plank covered with a magnetically active coating (13), and the magnetic panels (5) placed in the frame (1), preferably vertically and symmetrically, form a screen. 5
2. System, according to claim 1, **characterized in that**, it a magnetic cover (7) placed onto the screen. 10
3. System, according to claim 1, **characterized in that**, it a frame (1) made from a surrounding angle. 15
4. System, according to claim 1, **characterized in that**, it a frame (1) made from a surrounding channel section. 20
5. System, according to claim 1, **characterized in that**, it the magnetic panels (5) are covered with a magnetically active coating (13) with an isotropic structure, and the magnetic field lines are favourably parallel to an edge of the magnetic panel (5). 25
6. System, according to claim 1, **characterized in that**, it the magnetic panels (5) are covered with a magnetically active coating (13) with an anisotropic structure. 30
7. System, according to claim 1, **characterized in that**, it the magnetic panels (5) are covered with surface permanent magnets (9). 35
8. System, according to claim 7, **characterized in that**, it the magnetic panels (5) are covered with a masking blind (10). 40
9. System, according to claim 1, **characterized in that**, it that the strips of the support structure (2) are made from metal. 45
10. System, according to claim 1 and 9, **characterized in that**, it the fact that the magnetic panels (5) are permanently fixed to a metal support structure (2) with bottom permanent magnets (4), which are mounted on the reverse of the magnetic panels (5). 50
11. System, according to claim 1, **characterized in that**, it the strips of the support structure (2) are made from wood. 55
12. System, according to claim 1, **characterized in that**, it the adjacent magnetic panels (5) are joined with a connector (6) by means of a tongue and a groove.
13. System, according to claim 1, **characterized in that**, it the magnetic panels (5) are permanently fixed in the frame (1) with mounting braces (8) that attach the magnetic panel (5) to the wooden strips of the structure (2).
14. System, according to claim 1, **characterized in that**, it the magnetic cover (7) is made up from a sheet from a composite of ferromagnetic powder in synthetic thermoplastic rubber.
15. System, according to claim 1, **characterized in that**, it the magnetic cover (7) is made up from a sheet from a magnetically neutral material, which is coated with ferromagnetic powder.
16. System, according to claim 1, **characterized in that**, it the magnetic cover (7) is made up from a sheet from a magnetically neutral material, sprayed with a ferromagnetic layer.
17. System, according to claim 10, 11 or 12, **characterized in that**, it the magnetic cover (7) is coated with surface printed film.
18. System, according to claim 10, 11 or 12, **characterized in that**, it the magnetic cover (7) is coated with surface printed fabric.
19. System, according to claim 10, 11 or 12, **characterized in that**, it the magnetic cover (7) is coated with surface printed paper.

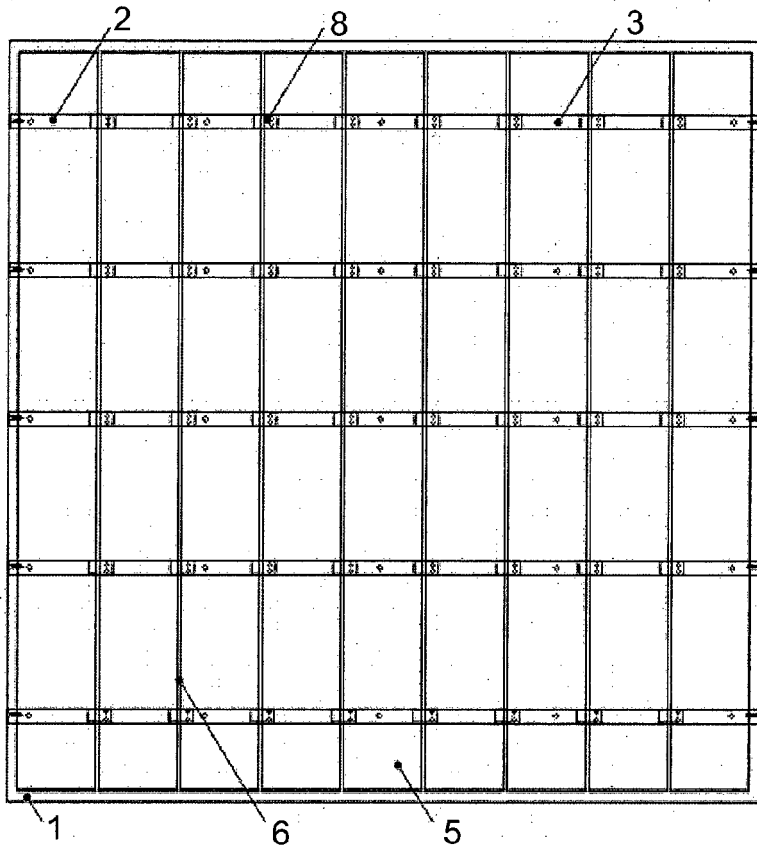


Fig. 1

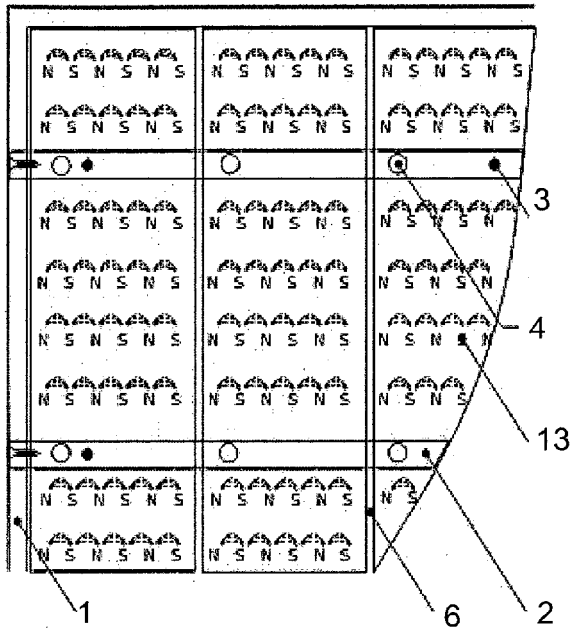


Fig. 2

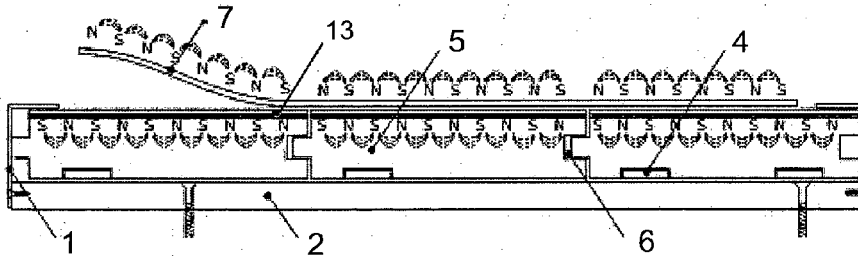


Fig. 3

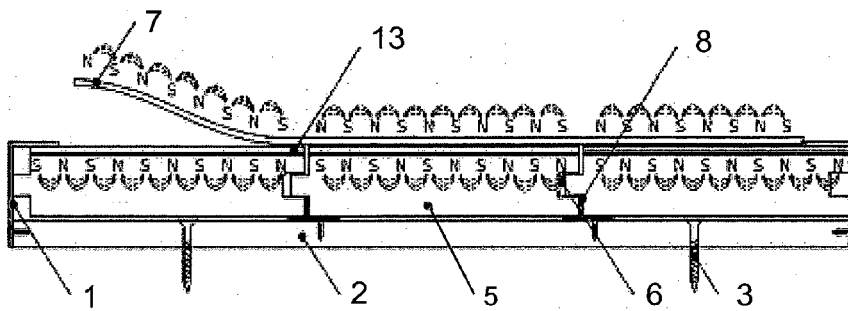


Fig. 4

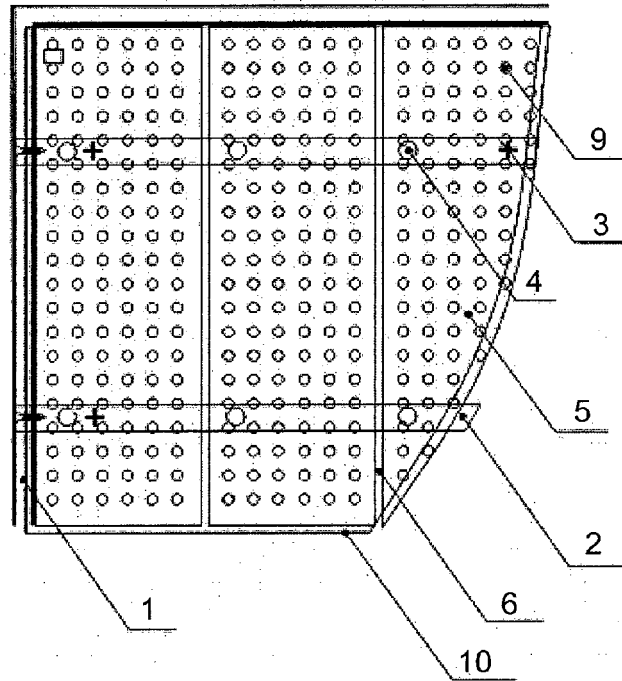


Fig. 5

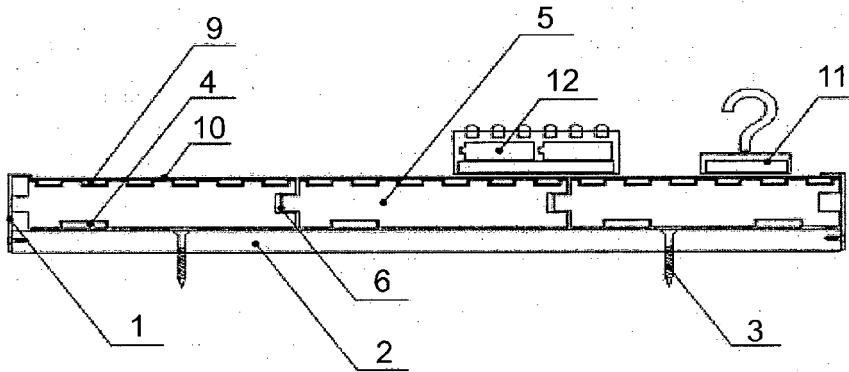


Fig. 6



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