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(54) Insulating partition lining system and mounting procedure thereof

(57) The system object of the invention is provided with insulating panels with edges having scarf joints and grooved protrusions to absorb dilations, as well as bottom levelling and alignment means based on either skirting boards or angles attached to brackets, in turn attached to the floor. The skirting boards are made of an insulating material with a width equal to that of the panel plus a lateral support flange for the laminate plaster board, provided on its top with a step for guiding the insulating panels and on its bottom with grooves for attachment to the floor with binding paste. It is also provided with an upper angle bar aligned with the insulating skirting board and the mounting process uses an auxiliary rule provided with a central support plate. All of this allows solving problems of dilation, difficult handling, attachment and levelling, coordination with other trades and having to wait for the levelling slab to be in place.

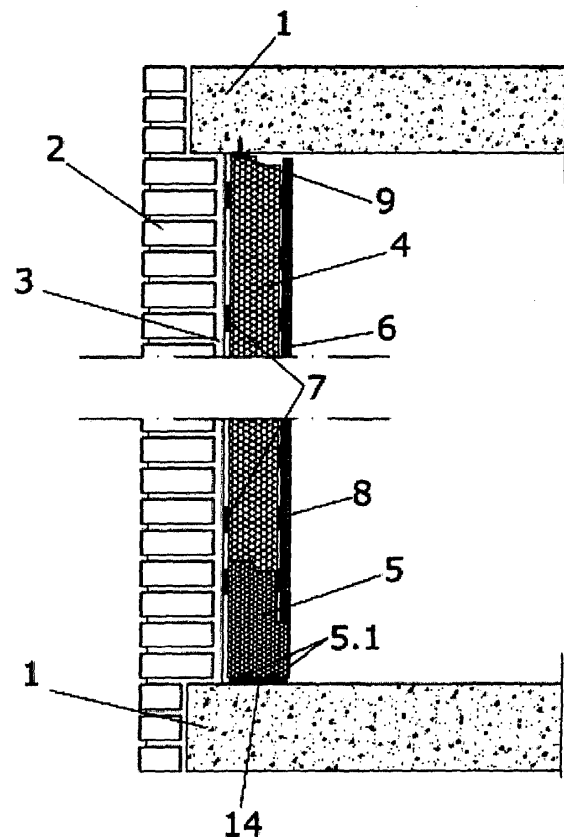


FIG. 1

Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is both an insulating partition lining system and the procedure for mounting said insulating partition.

[0002] In order to comply with European Directives regarding the energy efficiency of buildings, it is necessary to increase considerably the thickness of the insulating materials used in façade walls, so that the object of the present invention is an insulating partition lining system which when attached to the walls provides the required insulation.

[0003] The present invention is characterised by the constructive characteristics of the elements that conform the insulating partition lining system, which provide a number of advantages such as a simple mounting of the partition assembly, the provision of means for absorbing dilations, the reduced complexity of mounting window frames and a simple coordination with other trades.

[0004] Therefore, the present invention lies in the field of construction and more specifically in that of construction methods for insulating panels attached as lining on walls.

BACKGROUND OF THE INVENTION

[0005] Nowadays construction using insulating panels attached as lining on walls is performed using panels formed by expanded polystyrene and a plasterboard laminate board, the assembly being properly attached to the walls.

[0006] The construction of said insulating partitions attached to walls as lining presents several drawbacks as described below:

- Due to the different coefficients of expansion of polystyrene and plasterboard, tensions arise at the seams between the panels which can even lead to cracks in extreme conditions.
- Panels are placed abutting one another and therefore have no elimination of thermal bridges.
- Given the dimensions of the panels and their considerable weight, levelling and attaching them to the wall using the binding pastes is a laborious and time consuming task, so that the laminate plasterboards used in these panels have a reduced thickness in order to lower their weight and simplify their handling, obviously in detriment of the greater sound insulation that would be provided by a thicker board.
- Expanded polystyrene used in the panels has a smooth finish, so that it does not ensure a permanent adherence of the binding pastes used to adhere the panels.
- When mounting the panels it is necessary to coordinate work with other trades, as it is necessary to simultaneously make the ducts for installations such

as electricity, plumbing, TV aerials, etc.

- An additional difficulty is the complicated assembly of window frames, as it is necessary to use complex auxiliary systems due to the limited sturdiness of the support.
- These panels must be mounted after the levelling slab has been made, as otherwise the humidity would reach the laminate plaster board and the flooring edge would lack any thermal insulation.

[0007] It is therefore the object of the present invention to develop an insulating partition system attached as lining to the wall, as well as the method for mounting it, in order to overcome the aforementioned drawbacks, allowing the adherence of the binding pastes used to adhere the panels, a simpler mounting process of the window frames and the coordination with other trades, as it is not necessary for mounting it to wait for the installation of the levelling slab, while allowing to insulate the edge of the levelling slab.

DESCRIPTION OF THE INVENTION

[0008] The invention of the insulating partition lining system and the procedure for mounting said partition basically consists of the use of elements, some known and some unknown, which present a number of structural characteristics which provide several advantages for mounting or manufacture.

[0009] On one hand the insulating panels, regarding their installation, are used separately from the laminate plaster boards. The insulating panels are made of expanded polystyrene and are provided with means for assembly and alignment between panels, preferably by scarf joints, and are provided on the lateral edges with means for absorbing dilations.

[0010] The system is also provided with bottom levelling and alignment means which can be embodied as a skirting board or by an angled profile attached to brackets and fitted in the groove of the insulating panel.

[0011] If a skirting board is used to level and align the insulating partition, it will be an insulating element specifically machined or moulded in expanded polystyrene with a thickness equal to that of the insulating panel plus the flange that supports the plaster boards. The total height is variable and will depend on the height from the ceiling to the floor, with sufficient elevation to pass the thickness of the levelling layer and the flooring.

[0012] The density of the expanded polystyrene used to construct the skirting board is greater than that of the insulating panel, in order to withstand without deformations the weight of the laminated plaster board.

[0013] Its length will be whatever is most convenient for its manufacture and subsequent installation.

[0014] In order to facilitate the attachment of the skirting board, it will be provided on its lower face with attachment means.

[0015] If the bottom levelling and alignment means is

an angled profile, it will be attached by screws or the like to brackets attached to the floor. The angled profile will be fitted in grooves made on the rear face of the insulating panel, so that the weight of the insulating panel rests on said profile.

[0016] Another element participating in the insulating partition lining system is a U-bar made of galvanised plate with a width equal to the insulating panel and which when fitted on it acts as a preliminary frame for mounting the windows.

[0017] To achieve a perfect alignment of the insulating panels and the subsequent attachment of the laminated plaster boards, in addition to insulating skirting boards with a special cross section an angled profile is attached to the ceiling aligned with the skirting board attached to the floor.

[0018] If it is desired to attach or hang any elements from the insulating panels, such as a radiator, it is possible to manufacture the panels with a greater density and reinforced with metal profiles embedded in them. This prevents supporting the radiator hooks directly on the façade wall, avoiding thermal bridges.

[0019] There are cases in which the distance from the insulating panel to the façade wall is more than 20 mm, so that it is necessary to use supplemental means disposed inside the binding paste, based on the use of a drilled plate with alternating truncated cone orifices on both faces, made of moulded or machined expanded polystyrene of about 15 mm thickness.

DESCRIPTION OF THE DRAWINGS

[0020] To complete the description being made and in order to aid a better understanding of its characteristics, the present descriptive memory is accompanied by a set of drawings whose figures represent the most significant details of the invention for purposes of illustration only and in no way limiting the invention.

[0021] Figure 1 is an elevation cross section of a wall with an insulating partition attached to it as a lining.

[0022] Figure 2 shows a perspective view of the insulating panel used to manufacture the insulated wall lining.

[0023] Figure 3 shows an elevation perspective view of the assembly of the insulating panels, the insulating skirting board and the upper angle bar.

[0024] Figure 4 are perspective representations of the insulating panels showing specific constructive characteristics, as well as a drilled plate.

[0025] Figure 5 shows an elevation cross section of a wall with its insulating partition lining attached to it in a second alternative embodiment based on the same principle of bottom alignment.

[0026] Figure 6 shows a perspective and detailed view of the main elements involved in this second embodiment.

[0027] Figure 7 shows a detailed view of the bottom part of an insulating panel and the manner in which it is attached with the levelling angle.

[0028] Figure 8 shows a representation of an insulating panel provided on its rear face with a number of spacers.

PREFERRED EMBODIMENT OF THE INVENTION

[0029] A preferred embodiment of the proposed invention is described below with reference to the figures.

Figure 1, as mentioned before shows a vertical section of a wall with its insulating partition lining attached to it. Specifically, it shows the frames (1) between which, externally closing the frames, is a façade wall (2) made of brick or any other material. The wall is internally provided with a parge coat (3) and on it, on its inner face, is disposed the insulating partition lining.

[0030] Said insulating partition lining is formed by one or more pieces of insulating panels (4) that rest above an insulating skirting board (5) and below an angle bar (9). The insulating panels (4) are adhered to the parge coat (3) by a binding paste (7). In addition, on the outer face of the insulating panels several laminated plaster boards (6) are attached by binding paste (8) which will rest on a side flange of the skirting board (5), so that there is a small space between said laminated plaster boards (6) and the insulating panels (4).

[0031] The insulating skirting boards (5) are attached and levelled on the frame (1) by an adhesive mortar (14). To obtain an improved attachment of the adhesive mortar on the frame, the skirting boards (5) are provided on their bottom face with grip means based on horizontal grooves (5.1) (figure 3).

[0032] Figure 2 shows that the insulating panels (4) have their edges attached by scarf joints (4.3), so that there are two parts (4.1) and (4.2) displaced with respect to each other to form a step. The insulating panels are laterally provided with means for absorbing dilations based on the use of a half round shape with a protrusion (4.4). The half round shape have dimensions on the order of 1/200 of the panel width, and are meant to absorb the dilations of the panel.

[0033] In addition, the U-profile (10) made of galvanised plate has a width equal to the thickness of the insulating panel (4), is fitted directly over it, and is used as a pre-frame to simplify the window mounting.

[0034] Figure 3 shows the arrangement of part of the elements that conform the insulating partition; on one hand is the insulating skirting board (5), which is provided on its bottom with grooves (5.1) meant to improve the grip and allow a level position of the skirting board on the frame (1).

[0035] The insulating skirting board (5) is provided on its side with a flange or step (5.2) with slightly larger dimensions than the thickness of the laminated plaster board (6) used, as this laminated plaster board will rest on said flange.

[0036] The upper face of the skirting board (5) is also

provided with an upper step (5.3) used to align and maintain vertical the insulating panels (4).

[0037] To ensure a perfectly vertical and aligned arrangement of the insulating panels, an angle bar (9) is used attached to the upper frame, as well as an auxiliary rule (11) provided with a central support plate (11.1) parallel to the end wall.

[0038] Figure 4 shows an enlarged view of the manner in which the greater faces of the insulating panels (4) are provided on their surface with a knurling (4.5) meant to improve the attachment of the binding pastes to the wall parge coat (3) or for attachment of the laminated plaster boards (6).

[0039] As a constructive alternative the plate (4), if it will be used to attach suspension means, is made of a higher-density polystyrene, at least 30Kg/m³, reinforced with metal profiles embedded in its body (13), which can be used optionally to prevent having to attach the suspension means to the wall.

[0040] Finally, a representation is provided of a drilled plate (12) that is used when the distance between the façade wall and the insulating panel exceeds 20mm. This drilled orifice (12) is provided on both faces with truncated cone orifices in order to improve the attachment of the binding pastes in both senses.

[0041] In an alternative embodiment of the invention based on the same principle of providing levelling and alignment means on both the bottom and the top, figure 5 shows that the skirting board (5) (figure 1) has been eliminated, using as an alternative levelling and alignment means a levelling angle (16) attached to a bracket (15) attached in turn to the floor of the frame (1).

[0042] As a result of the elimination of the skirting board (5), the insulating panel must now be longer and have constructive characteristics that allow it to be attached to the levelling angle (16), for which it is provided with a groove (4.6) (figure 7) made in the rear part of the panel.

[0043] The skirting board (5) typically has a greater density than the insulating panel; for economic reasons, the insulating panel will have a lower density than the skirting board and will generally be lifted off the floor, so that on the bottom part of the panel orifices (4.7) (figure 6) are provided that may have a cylindrical shape or any other.

[0044] Said orifices (4.7) are meant to act as support for the insulating panels after the concrete has entered and set in the orifices, as they are covered by the levelling mortar. Otherwise, given the low density of the insulating panel and the weight of the plaster board supported by it, if said orifices are not present the panel may be ripped or deformed.

[0045] Figures 6 and 7 show the aforementioned characteristics, remarking the orifices (4.7) made on the bottom of the insulating panel (4) that will house the mortar of the levelling layer (18), which may be provided under it with a previously placed impact resistant sheet (17). Said mortar housed in the spaces (4.7) is used to support the insulating panel, distributing the loads among the var-

ious supports and preventing possible rips of the panel due to the weight of the plaster boards and its low density.

[0046] Finally, figure 8 shows an insulating panel (4) on the rear face of which are provided several spacers that allow increasing at will the thickness of the air chamber between the insulating panel and the wall parge coat.

[0047] As regards the mounting method for the insulating partition lining, it comprises the following stages:

- 10 - firstly dust and foreign particles must be eliminated from the surfaces which will be worked on
- the insulation end position lines are traced on the floor and ceiling with the aid of a laser device in the maximum reach position.
- 15 - a bracket is bolted or nailed to the roof along the auxiliary line.
- the bottom levelling and alignment means are attached.
- reference marks are made on the side walls to establish the verticality of the first and last row of panels, using the auxiliary rule (11) and a panel piece as scantling.
- 20 - the insulating panels (4) are attached by dots of binding paste (7) to the façade wall (2), resting the insulating panels simultaneously on the central plate (11.1) of the auxiliary rule (11) and on the bottom on the lower levelling and alignment means while the panel (4) will rest on the top on an angle bar (9) attached to the upper frame.
- 25 - Tiling the plaster boards on the insulating panels.
- 30

[0048] If the bottom levelling and alignment means are skirting boards (5), the stage of attachment of said means will consist of:

- 35 - Provisional positioning on the floor of the insulating skirting board (5) with mortar (14), levelling the exact end height with a laser device.
- Allowing the mortar to set.
- 40

However, if the bottom levelling and alignment means are levelling angles (16), this stage will involve:

- 45 - screwing or nailing the brackets to the floor along the auxiliary line.
- Screwing the levelling angle (16) onto the brackets (15), levelling horizontally with the aid of a laser.
- 50

[0049] If the bottom levelling and alignment means used is a skirting board, its height will depend on the distance between the ceiling and the floor, as the insulating panels all have the same length, so that it is not necessary to cut them as the varying height of the skirting boards will allow adaptation to different heights of the ceiling from the floor. Likewise, the auxiliary rule has a fixed length.

[0050] However, if the bottom levelling and alignment means used is an angle bar attached to brackets, the

varying heights between the floor and the ceiling are corrected by cutting the insulating panels appropriately, with a telescoping auxiliary rule that can adapt to the different support heights between the angles.

[0051] If it is necessary to solve the window openings the insulating panels must be cut accordingly.

[0052] The construction process continues with any work required on the various installations, performing the chases with a hot wire coil applied on the panel, to form a duct with sufficient depth for the ducts used for the various installations.

[0053] The final stage of the mounting procedure for the insulating partition lining continues with the application of the plaster boards on the insulating panels, for which:

- the plaster boards are first cut with the openings for passage of the installations and window openings and the corners
- the plaster boards are then attached with binding paste strips, resting them on either the flange (5.2) that extends out of the skirting board (5) or on the flange (4.5) provided in the insulating panel itself. The outer edge is used as a reference, and as it was levelled previously the application is performed quickly and effortlessly
- finally, the resulting assembly is furred with a rule to even out all unions.
- The unions are sealed according to the instructions of the plaster board manufacturer.
- The metal U-profiles used as a pre-frame for the windows are inserted by pressure in the polystyrene panels.

[0054] It is not considered necessary to extend this description for an expert in the field to understand the scope of the invention and the advantages derived thereof.

[0055] The materials, shape, size and arrangement of the elements may vary as long as the essence of the invention is unchanged.

[0056] The terms employed in the present memory should be understood in a wide and non-limiting sense.

Claims

1. Insulating partition lining system from among insulating partitions formed by an insulating panel and a laminate plaster board, both attached to a façade wall, **characterised in that** the different elements used in said system are:

- Insulating panel moulded from expanded polystyrene with a variable thickness according the thermal resistance required, provided on its edges with means for assembly and alignment of adjacent panels, also provided on its sides with

means for absorbing dilations, attached to the façade wall by binding paste.

- Upper reference means attached to the frame and aligned with the insulating skirting board, consisting of an angle bar.

- Bottom levelling and alignment means.

- Laminate plaster board attached to the insulating panel with binding paste, resting on the flange of the skirting board.

2. Insulating partition lining system according to claim 1, **characterised in that** the bottom levelling and alignment means is an insulating skirting board made of expanded polystyrene with a thickness equal to that of the insulating panel and the flange that provides a support for a laminated plaster board, as well as means for assembly and alignment provided on its upper face for the disposition of the insulating panels, which consist of an upper step (5.3), also being provided on its bottom face with means for attachment to the floor with mortar or binding paste that consist of grooves (5.1) made in its bottom face. The total height of the skirting board is variable and will depend on the height from the ceiling to the floor, with sufficient elevation to pass the thickness of the levelling layer and the flooring.

3. Insulating partition lining system according to claim 1, **characterised in that** the means for assembly and alignment between adjacent panels consist of providing scarf joints in the edges of the insulating panels and **in that** the means for absorbing the dilations provided in the insulating panels consist of half-round shaped protrusions.

4. Insulating partition lining system according to claim 1, **characterised in that** in the gaps provided in the panels for adapting to the windows, U-bars are employed made of galvanised plate with the same width as the insulating panel, disposed on the edges of the insulating panel that define the space of the window to act as pre-frames to attach the windows.

5. Insulating partition lining system according to claim 1, **characterised in that** in addition to the aforementioned elements used in the assembly an auxiliary rule is used that extends from the bottom levelling and alignment means to the upper reference means, said auxiliary rule being provided with a central support plate that may be an auxiliary telescopic rule.

6. Insulating partition lining system according to claim 1, **characterised in that** when the insulating panels will be used to attach suspension means they will have a minimum density of 30 kg/m³ and be provided with metal profiles embedded in their body.

7. Insulating partition lining system according to claim

- 1, **characterised in that** in cases in which the distance from the insulating panel to the façade wall is greater than 20mm a perforated plate is used with a number of alternating truncated-cone shape orifices on both faces, moulded or machined from expanded polystyrene, used for the backing of the binding paste.
8. Insulating partition lining system according to claim 1, **characterised in that** the insulating panels are provided on both of their faces with a knurling that improves their attachment with binding paste to both the façade wall and the attachment of laminate plaster boards.
9. Insulating partition lining system according to claim 1, **characterised in that** the lower levelling and alignment means consists of brackets fixed to the floor along an auxiliary line, and by levelling angles attached to the brackets that are levelled horizontally with the aid of a laser.
10. Insulating partition lining system according to claim 9, **characterised in that** the insulating panels are provided on their bottom with spaces in which the levelling mortar is introduced, so that when the mortar sets levelling supports for the insulating panel are configured, and **in that** the insulating panel is provided on its rear face with a groove (4.5) in which the levelling angle (16) is introduced, attached to the bracket, which is in turn attached to the floor.
11. Mounting method for the aforementioned insulating partition lining system **characterised in that** the method comprises the following stages:
- firstly dust and foreign particles must be eliminated from the surfaces which will be worked on
 - the insulation end position line is traced on the floor and ceiling with the aid of a laser device in the maximum reach position.
 - a bracket is bolted or nailed to the roof along the auxiliary line.
 - the bottom levelling and alignment means are attached.
 - reference marks are made on the side walls to establish the verticality of the first and last row of panels, using an auxiliary rule and a panel piece.
 - the insulating panels (4) are attached by dots of binding paste (7) to the façade wall (2), resting the insulating panels simultaneously on the central plate (11.1) of the auxiliary rule (11) and on the bottom on the lower levelling and alignment means while the panel (4) will rest on the top on an angle bar (9) attached to the upper frame.
 - Tiling the plaster boards on the insulating panels
12. Mounting method for the aforementioned insulating partition lining system according to claim 10, **characterised in that** if the bottom levelling and alignment means are skirting boards (5), the stage of attachment of said means will consist of:
- Provisional positioning on the floor of the insulating skirting board (5) with mortar (14), levelling the exact end height with a laser device.
 - Allowing the mortar to set.
13. Mounting method for the aforementioned insulating partition lining system according to claim 10, **characterised in that** if the bottom levelling and alignment means are levelling angles (16), said stage will consist of:
- screwing or nailing the brackets to the floor along the auxiliary line.
 - Screwing the levelling angle (16) onto the brackets (15), levelling horizontally with the aid of a laser.
14. Mounting method for the aforementioned insulating partition lining system according to claim 10, **characterised in that** the laminate plaster board tiling process comprises in turn the following stages:
- the plaster boards are first cut with the openings for passage of the installations and window openings and the corners
 - The plaster boards are the attached with binding paste strips, resting them on the flange (5.2) that extends out of the lower skirting board. The outer edge is used as a reference, and as it was levelled previously the application is performed quickly and effortlessly
 - Finally, the resulting assembly is furred with a rule to even out all unions.
 - The unions are sealed according to the instructions of the plaster board manufacturer.

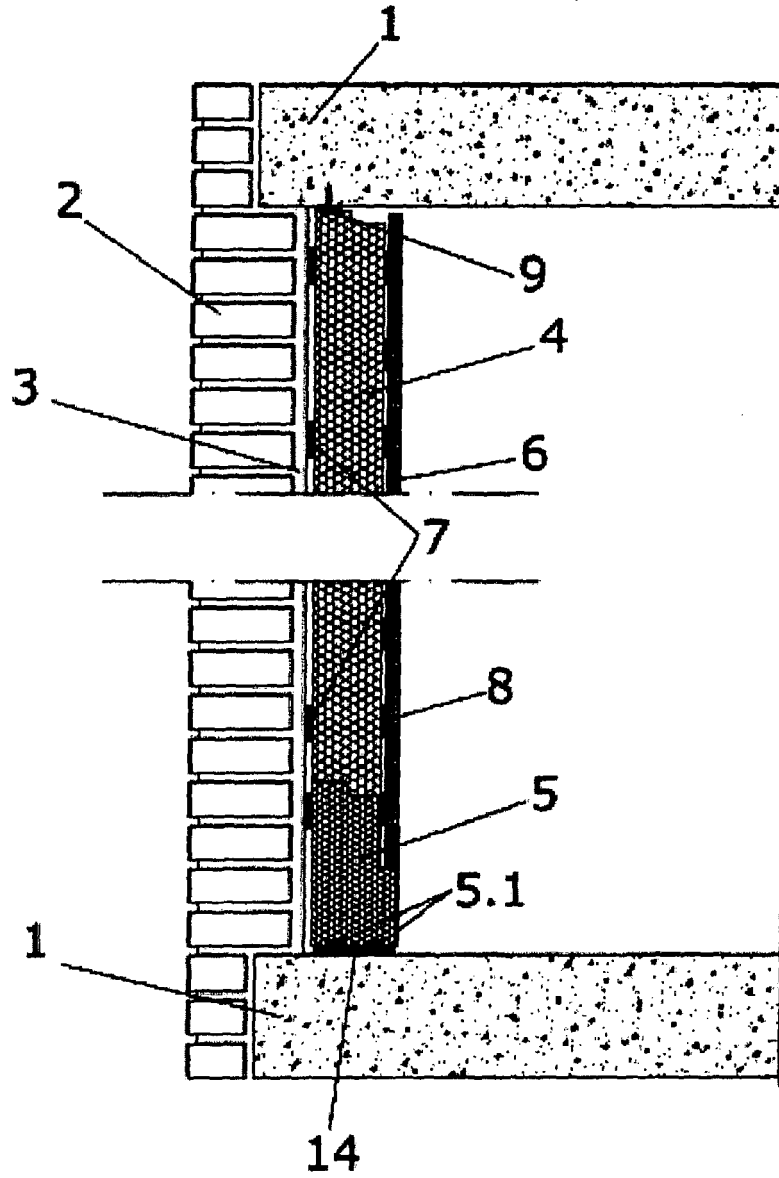


FIG.1

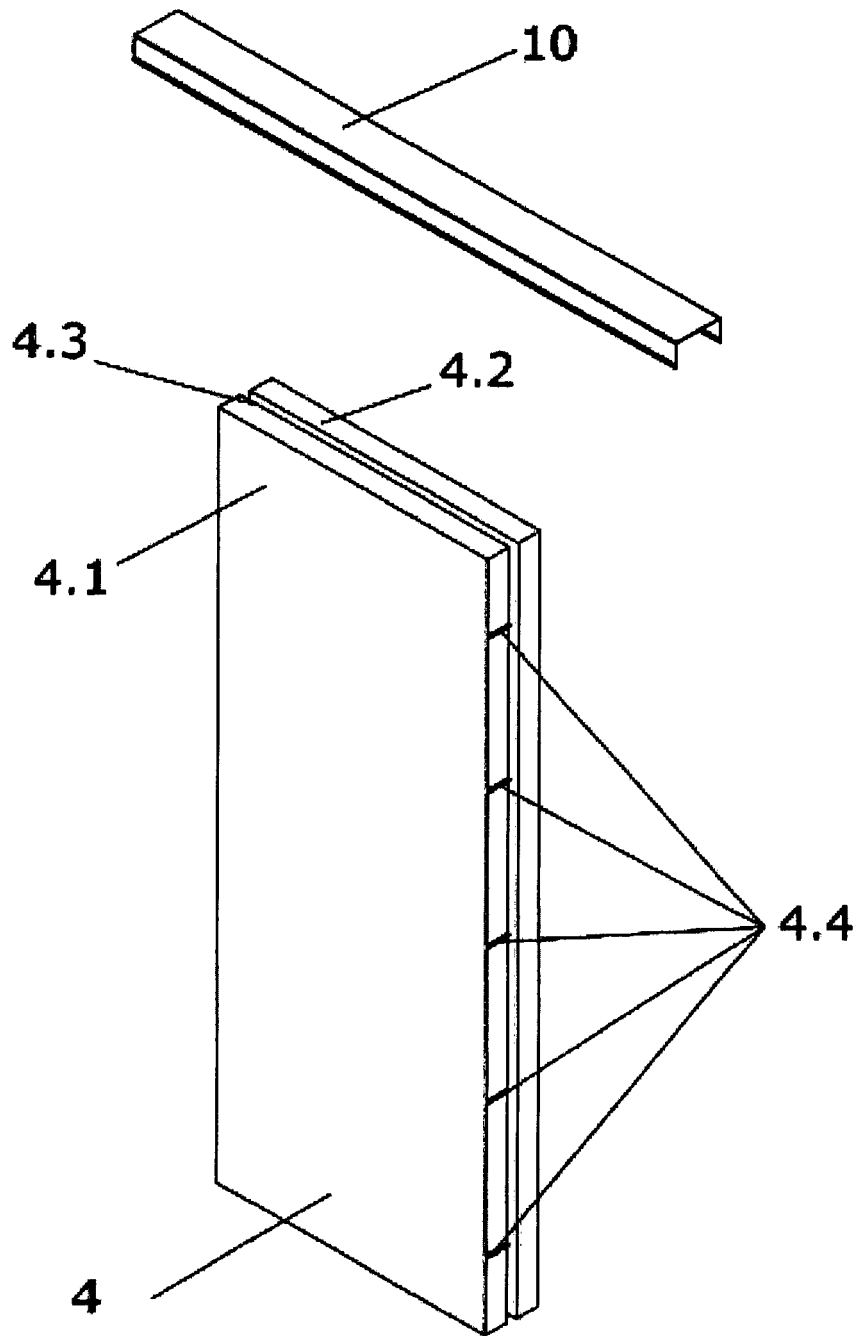


FIG.2

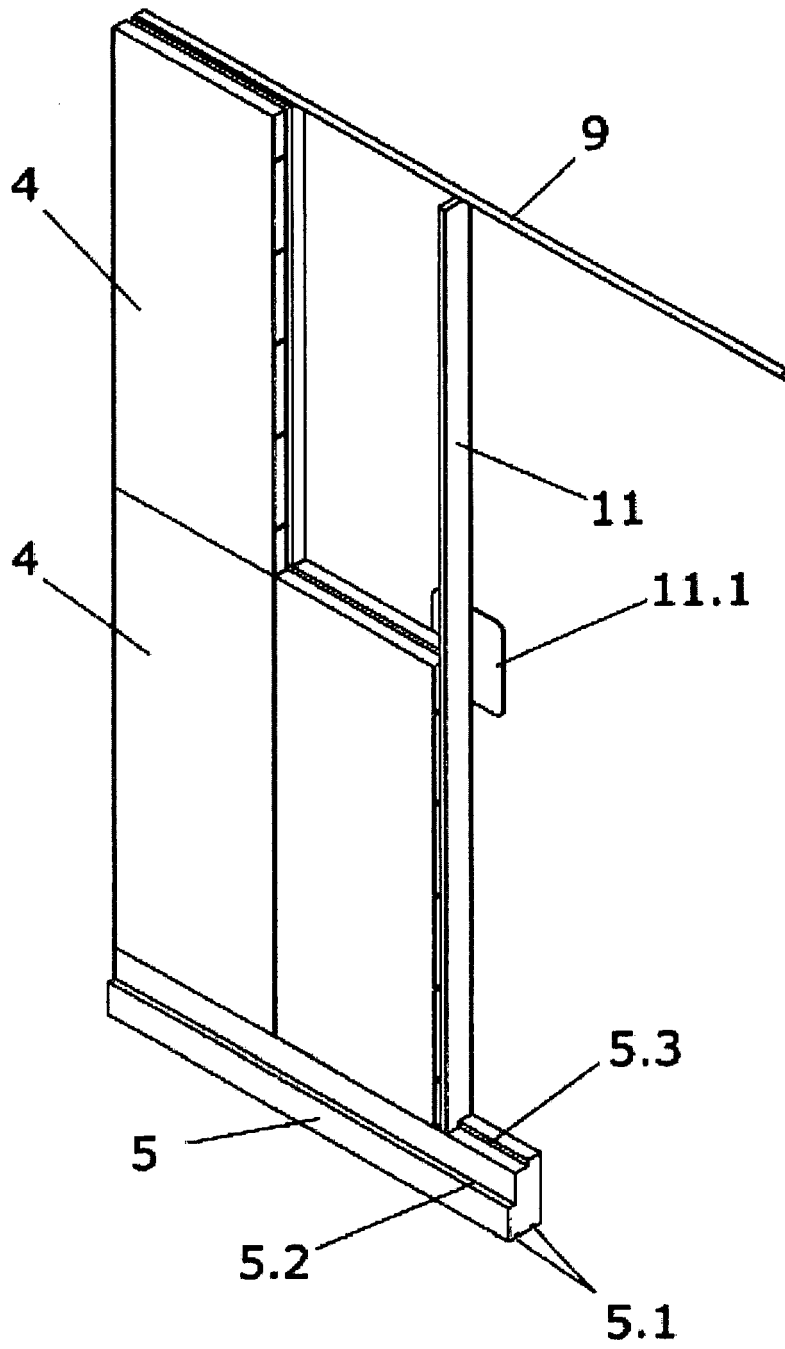


FIG.3

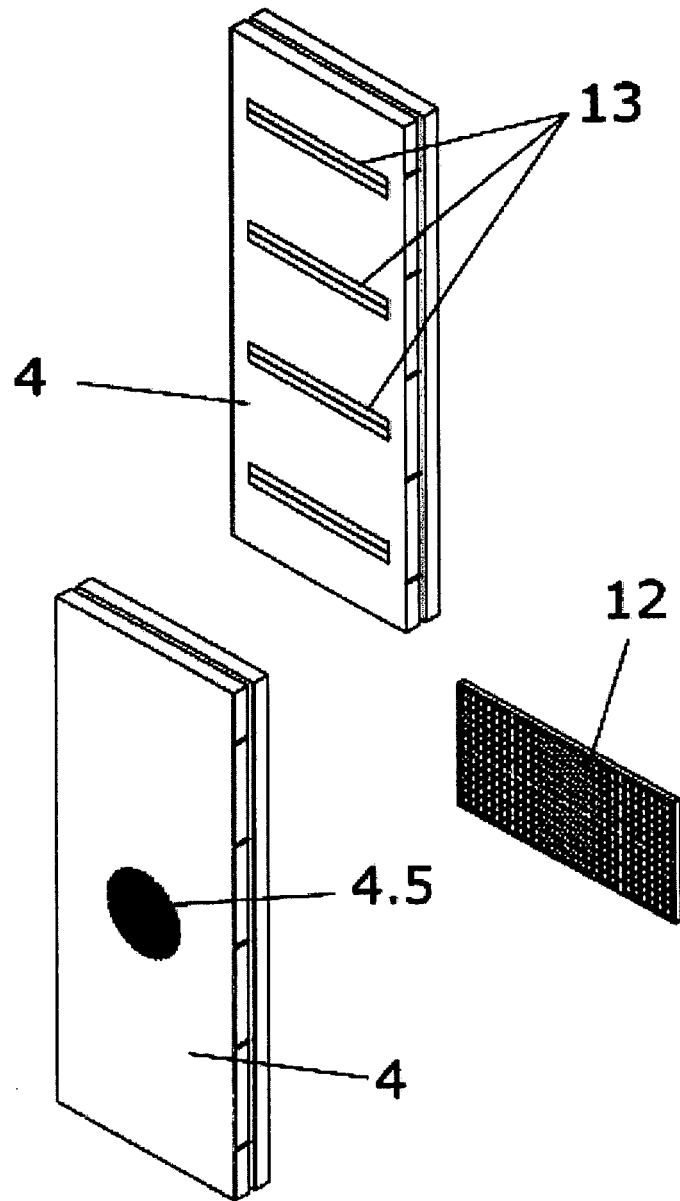


FIG.4

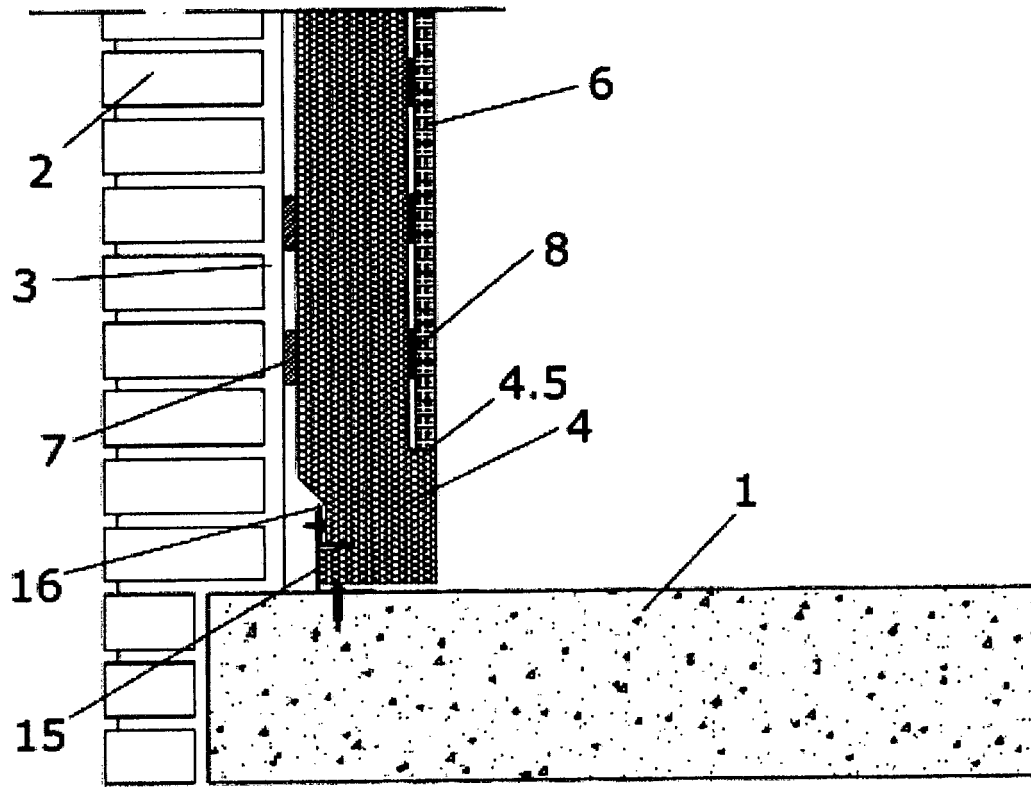


FIG.5

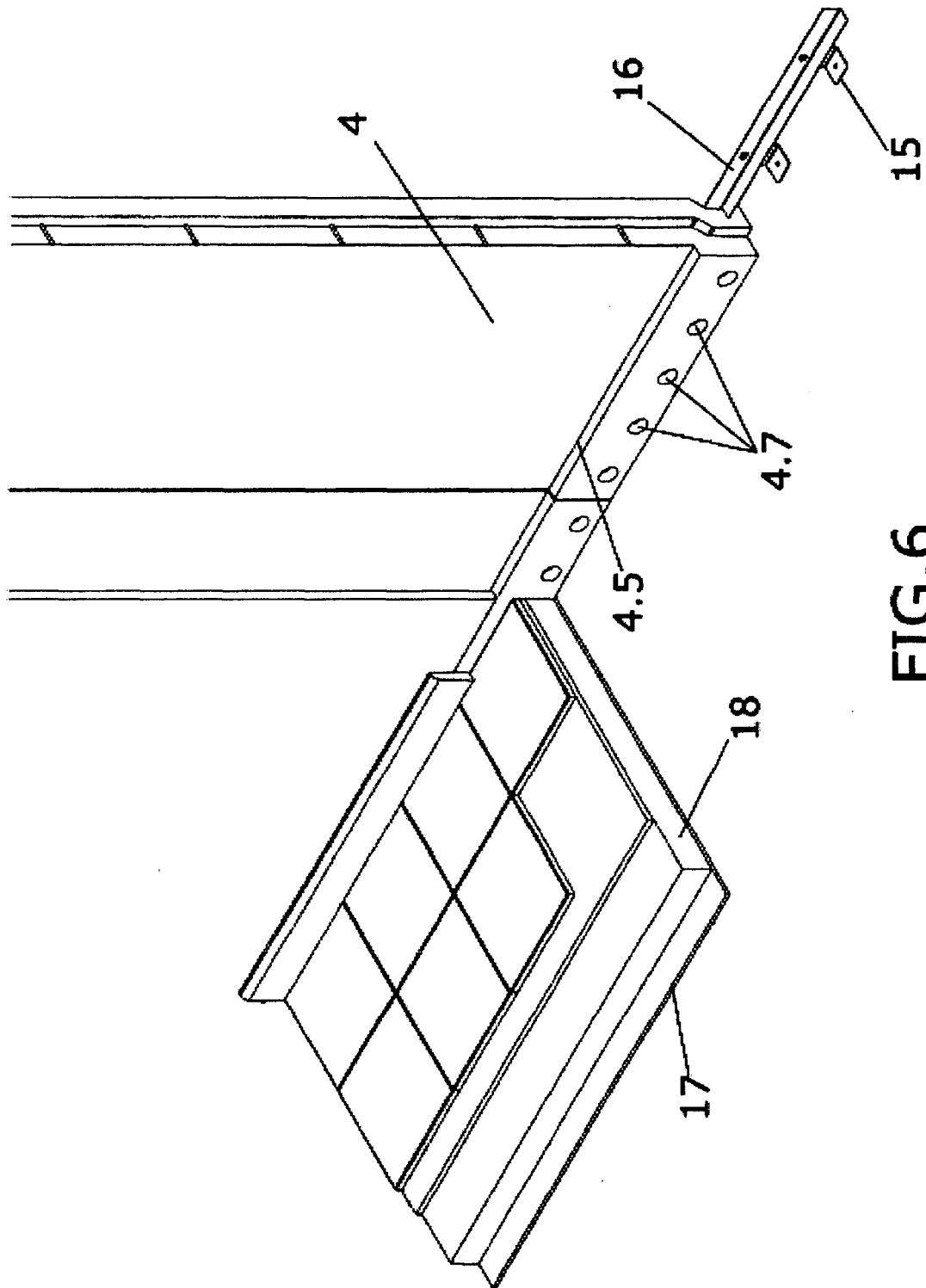


FIG. 6

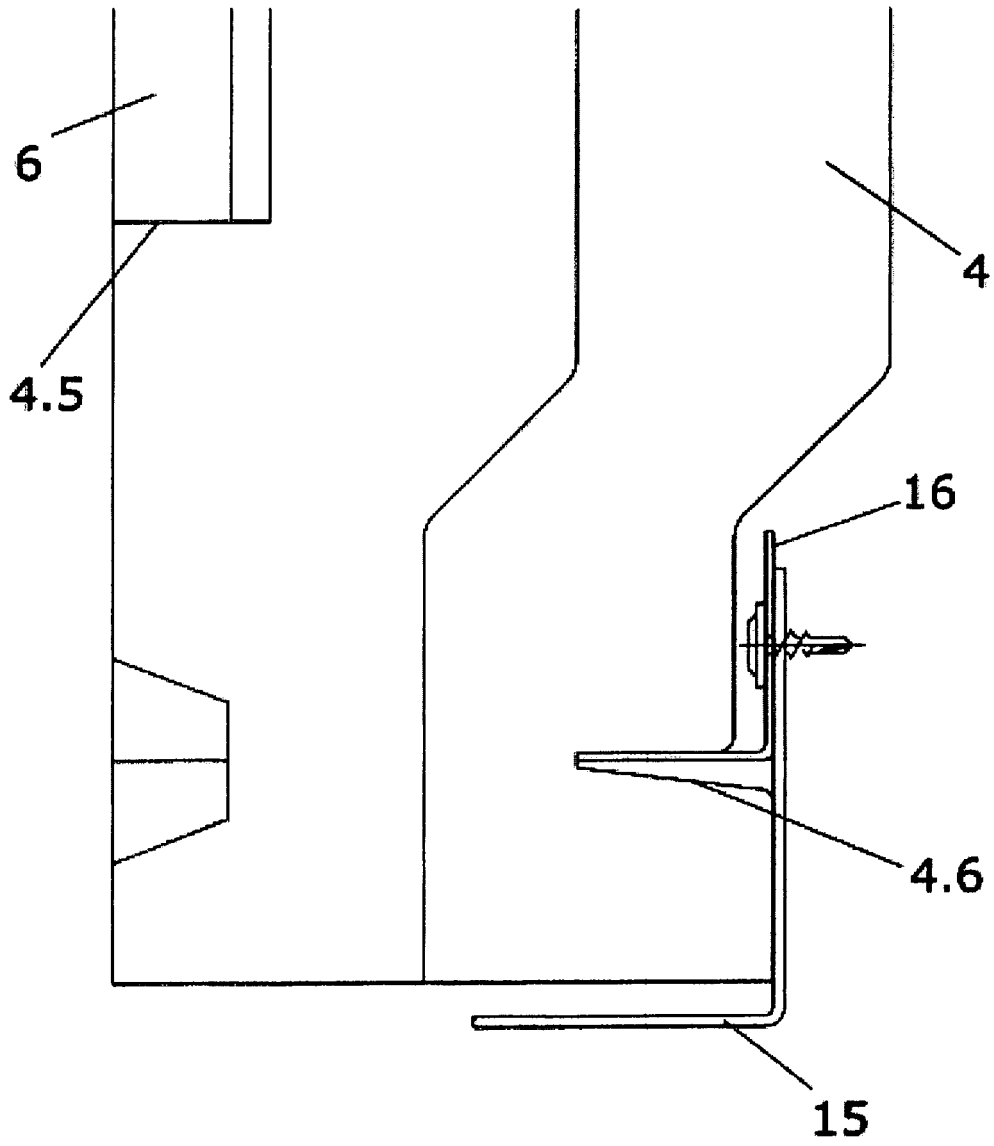


FIG. 7

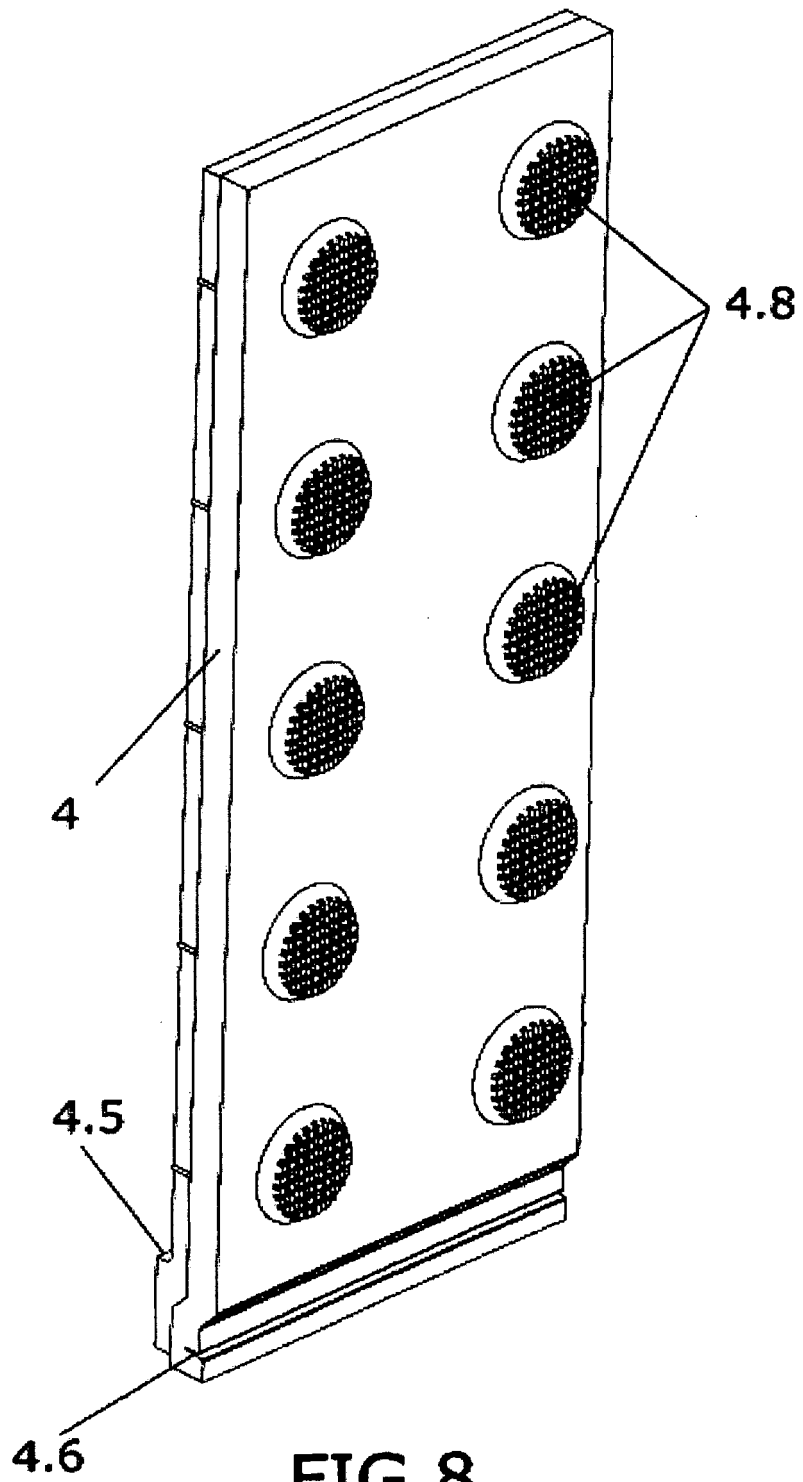


FIG.8