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(54) **Construction system for ventilated facade wall**

(57) Construction system for ventilated façade wall comprising: a veneer piece (3) to form the façade; a wall piece (2) to support the veneer piece (3). The wall piece (2) has a rectangular block shape with L length, E width, which has a first outer face configured to be oriented to the façade and a first inner face opposite the first outer face. The wall piece (2) has a plurality of supports (20): of the same material as the rectangular block to form a one-piece piece; in the first outer face; which have a support length L20 to define a separation to allow air circulation between the first outer face and veneer piece (3). The wall pieces have grooves for horizontal and vertical alignment and fastening through metal straps.

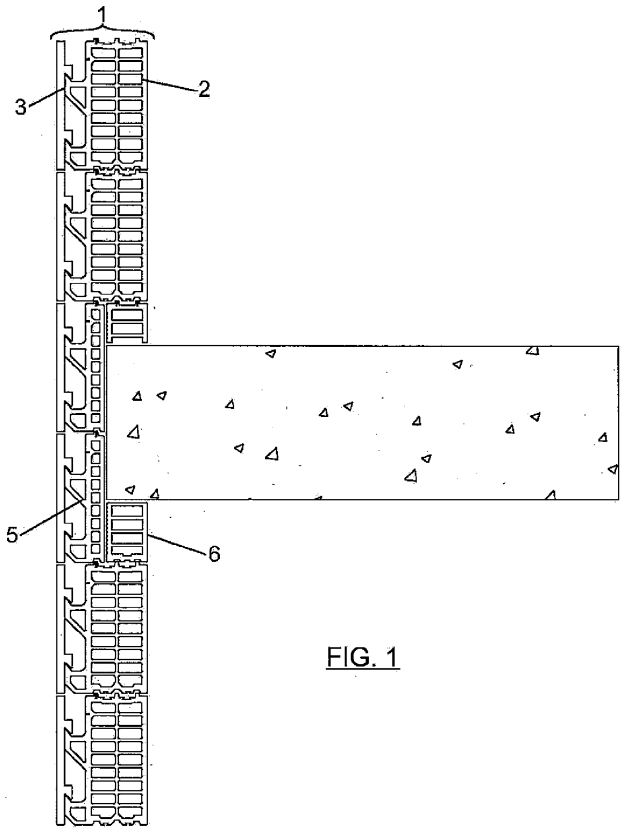

FIG. 1

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Description

Field of the invention

[0001] The invention refers to the field of Industrial Design and the technical field of construction and more specifically to solutions for façade enclosures.

Background of the invention

[0002] Traditional ventilated façade enclosures have a series of problems, such as:

- Complex metallic structures bearing the veneer pieces joined together by screws and fixed to the enclosure wall by metallic or plastic anchorages. Thus these traditional ventilated façades need very specialized mounting operators.
- Need to mount the aforementioned metallic structures on a wall with enough bearing quality, and as it is not controlled by ventilated façade manufacturers, it may not have the resistance necessary to support the structure-veneering assembly over time.
- Deterioration of the fixings, screws and other metallic elements over time, as they are exposed to hard atmospheric conditions which can exist in cities, coastal areas or extreme climates.
- Long execution time of traditional ventilated facades.
- High cost of the wall + metallic structure + veneering or coating assembly.

Description of the invention

[0003] The invention presents a ventilated wall system for façades, comprising a lower wall formed by rectangular prism-shaped pieces, featuring a plurality of supports made of the same material as the outer face of the inner wall. On the inner wall a plurality of visible veneer pieces are embedded through brackets in the inner face of the visible veneer pieces, and they are perfectly coupled with the supports of the inner wall, allowing air to pass through the gap between the inner wall and the visible veneer pieces, thus attaining a ventilation effect and constituting a ventilated wall for façades.

[0004] This new invention is presented in order to solve the aforementioned problems of existing ventilated façades. It is a simple solution, based on making the enclosure wall with pieces which already have on their outer face some supports, which serve to mount the visible veneer pieces, all of which is made of the same material and with durability guarantee, over time. Thus, the advantages of the invention are the following:

- Absence of metallic structures, fixings and screws;
- Possibility to substitute veneer or coating pieces by others with different formats;
- Fastness of execution:
  - o When the outer enclosure wall is made, the coating supports are already placed and aligned
  - o The coating is placed very fast once the inner wall is finished.

[0005] This new wall comprises at least:

(i) A **wall piece,** which is placed directly on the building structure and is installed as a finished façade. It consists of a large-sized rectangular block, with supports of the same material on its face at the outer side of the wall, where the veneers will be mounted. Said supports allow enough separation between the wall and the veneer, once fitted, for the air to circulate between them. They are placed with butted joint to give greater shear strength to the wall. According to other characteristics:

2. The wall piece can also comprise:

2a) an upper face comprising a plurality of protuberances;
2b) a lower face comprising a plurality of recesses
2c) being the protuberances and recesses configured to form tongue and groove joining means between the recesses of an upper wall piece and the protuberances of a lower wall piece.

3. The wall piece can also comprise alignment and fastening means selected between:

3a) an elevated alignment and fastening grooving, located in the first outer face, configured to house in horizontal position an elevated alignment and fastening strap;
3b) a plan alignment and fastening grooving, located in the upper face, configured to house in vertical position a plan alignment and fastening strap;

and combinations thereof. The elevated alignment and fastening strap and the plan alignment and fastening strap can be metallic.

4. The plan alignment and fastening grooving can be located in a protuberance.

(ii) A **veneer piece,** which consists of a large-sized plate, with the outer face visible and featuring on the inner face brackets, which fit perfectly in the supports of the wall pieces.

Also, to solve all the contacts between the wall and the structure, the following elements and pieces have been developed to make said wall:

(iii) A **half wall piece,** which is a section of the wall piece with ½ its horizontal length.

(iv) A **patching piece,** which consists of a block having 1/3 the thickness of the wall piece, with identical supports in the outer face as said piece and which is used to cover the building structure in those areas in which the wall piece does not fit, such as slabs and pillars, and which has as the wall piece, some grooves for the correct alignment and fastening thereof through straps.

(v) A **coupling piece,** consisting of a block having 2/3 the thickness of the wall piece, which is always used in vertical or horizontal sections and as the back of the patching piece when it meets the structure.

(vi) A **recess piece,** which is a block with the visible outer faces and which serves to complete the wall in the door and window holes up to the woodwork. Said piece has dovetailed shaped reliefs on the face in contact with the wall, to prevent the mortar from detaching. Likewise, said pieces are connected to the wall through fiberglass mesh embedded in the mortar of the horizontal joint.

(vii) A **metal hoop piece,** which is a U-shaped block with the same format as the wall piece and with the same surface finish in the outer face as the veneer piece. It is used to form the lintel in doors and windows talking advantage of the hole inside it to make a load bearing beam with reinforced concrete.

(viii) A **water drip piece,** with the same visible surface finish of the veneer piece, and which serves to cover the window sills. Said piece has a drain outlet in the lower piece which extends to the outside of the wall, to prevent water from dripping along the façade.

(ix) Fastening elements, such as **metallic straps** which serve to longitudinally and transversally align the wall and patching piece, when they are installed in some grooves of said pieces to that end. Likewise, they serve as fastening means while the joining mortar of said pieces is hardened. And the **fiberglass meshes** which are embedded in the mortar of the horizontal joint and guarantee, thanks to their high tensile strength, the fastening of the corner pieces and of the recesses.

Brief description of the drawings

[0006] The following is a brief description of a series of drawings which will help understand the invention better relating to an embodiment of said invention which is presented as a non-limiting example thereof.

Figure 1 shows a cross sectional view of the ventilated pall system for façade enclosure of the present invention.

Figures 2A to 2E are views of the main pieces forming the wall object of the intention, and their mounting.

Figures 3A to 3F are views of the complementary pieces which accompany the main pieces in the wall contacts.

Figures 4A and 4B show views of different fastening elements which are used in the wall object of the invention.

Figures 5A and 5B show views of the placement of the veneer on wall pieces, and ventilation area.

Figures 6A and 6B show views of a corner finish of the wall with mitre cut veneer pieces.

Figure 7 shows a view of a window hole made with the different pieces which take part therein: wall piece, recess, metal hoop and water drip.

Detailed description of an embodiment

[0007] As it can be seen in figure 1, the ventilated wall system (1) is located in the building façade, without any need to use complex metallic structures or fixings of any kind, simply with the brackets of the pieces themselves; attaining great air ventilation upwardly, which enables to optimize the enclosure insulator operation, eliminate thermal bridges protecting the slab fronts, and improve the building behavior vis-à-vis humidity, both external (rainwater) and internal (building transpiration), since the presence of a highly ventilated chamber makes the humidity, which can reach the chamber be eliminated by the air movement inside it.

[0008] Figures 2A-2E show the main pieces constituting this ventilated wall system. Thus, the construction system for ventilated façade wall (1) comprises:

1a) a veneer piece (3) configured to form the façade;
1b) a wall piece (2) configured to support the veneer piece (3).

The wall piece (2):

1b1 has a rectangular block shape with L length, E width, having:

1b11) a first outer face configured to be oriented to the façade;
1b12) a first inner face opposite the first outer face;

1b2) is large-sized;
1b3) comprises a plurality of supports (20):

1b31) of the same material as the rectangular

block to form a one-piece piece; so that, both the rectangular block and the supports (20) have a homogeneous material;
1b32) in the first outer face;
1b33) with a support length L20 configured to define a separation to allow air circulation between the first outer face and the veneer piece (3).

[0009] According to other characteristics of the invention:

2. The wall piece (2) also comprises:

2a) an upper face comprising a plurality of protuberances;
2b) a lower face comprising a plurality of recesses;
2c) being the protuberances and recesses configured to form tongue and groove joining means between the recesses of an upper wall piece (2) and the protuberances of a lower wall piece (2).

3. The wall piece (2) can also comprise alignment and fastening means selected between:

3a) an elevated alignment and fastening grooving, located in the first outer face, configured to house in horizontal position an elevated alignment and fastening strap (10);
3b) a plan alignment and fastening grooving, located in the upper face, configured
to house in vertical position a plan alignment and fastening strap (10);

and combinations thereof. The elevated alignment and fastening straps (10) and the plan alignment and fastening straps (10) can be metallic.

4. The plan alignment and fastening grooving can be located in a protuberance.

5. The veneer piece (3):

5a) has a plate shape which has a second outer face configured to be oriented towards the façade as it has a surface finish suitable to form a visible face and a second inner face opposite the outer face;
5b) is large-sized;
5c) comprises a plurality of brackets (30) configured to fit in the supports (20):

5c1) of the same material as the plate to form a one-piece piece; so that, both the rectangular block and the brackets (30) have a homogeneous material;
5c2) in the second inner face;
5c3) with a bracket length L30 configured to define a separation to allow air circulation between the second inner face and the wall piece (2).

The mounting of the veneer on the wall can be seen in positions (A), (B) and (C) of figures 2C-E.
Figures 3A-F show all the complementary pieces which form the ventilated wall system: 6. A half wall piece (4):

6a) which is a section of a wall piece (2) cross sectioned at a length L/2.

7. A patching piece (5):

7a) which is a section of a wall piece (2) longitudinally sectioned at a thickness 1/3E from the first outer face.

8. A coupling piece (6):

8a) which is a section of a wall piece (2) longitudinally sectioned at a thickness 2/3E from the first inner face.

9. A metal hoop piece (7):

9a) which is a U-shaped transversal section block configured to form a lintel in doors and windows;
9b) with the same format as the format of the wall piece (2);
9c) which has the same surface finish in visible faces as the surface finish of the veneer piece (3);
9e) where the U-shaped hole is configured to be filled with reinforced concrete and constitute a load bearing beam.

10. A recess piece (8):

10a) which has a block shape configured to complete the ventilated façade wall (1) in door and window holes up to the woodwork; the recess piece (8) can have a thickness at least equal to a width of the ventilated façade wall (1);
10b which has a surface finish in visible faces equal to the surface finish of the veneer piece (3);
10c) comprising a plurality of dovetailed shaped reliefs on a face in contact with the ventilated façade wall (1), to prevent the mortar, which is to fix the recess piece (8) to the ventilated façade wall (1), from detaching.

11. A water drip piece (9):

11a) which has a plate shape configured to cover a window sill,
11b) which has the same visible surface finish in visible faces as the surface finish of the veneer piece (3);
11c) which has a drain outlet in the lower piece which extends to the outside of the wall, configured to prevent water from dripping along the façade.

12. A plurality of meshes (12) of a material with high tensile strength, such as fiberglass, configured to be embedded in mortar of horizontal joints and guarantee the fastening of corner pieces and recess pieces (8).

Claims

1. Construction system for ventilated façade wall (1) **characterized in that** it comprises:

1a) a veneer piece (3) configured to form the façade;
1b) a wall piece (2) configured to support the veneer piece (3), where the wall piece (2):

1b1) has a rectangular block with L length, E width, having:

1 b11) a first outer face configured to be oriented to the façade;
1 b12) a first inner face opposite the first outer face;

1b2) is large-sized;
1b3) comprises a plurality of supports (20):

1b31) of the same material as the rectangular block to form a one-piece piece;
1b32) in the first outer face;
1b33) with a support length L20 configured to define a separation to allow air circulation between the first outer face and the veneer piece (3).

2. Construction system for ventilated façade wall (1) according to claim 1 **characterized in that** the wall piece (2) also comprises:

2a) an upper face comprising a plurality of protuberances;
2b) a lower face comprising a plurality of recesses;
2c) being the protuberances and recesses configured to form tongue and groove joining means between the recesses of an upper wall, piece (2) and the protuberances of a lower wall piece (2).

3. Construction system for ventilated façade wall (1) according to claim 2 **characterized in that** the wall piece (2) also comprises alignment and fastening means selected between:

3a) an elevated alignment and fastening grooving, located in the first outer face, configured to house in horizontal position an elevated alignment and fastening strap (10);
3b) a plan alignment and fastening grooving, located in the upper face, configured
to house in vertical position a plan alignment and fastening strap (10);

and combinations thereof.

4. Construction system for ventilated façade wall (1) according to claim 3 **characterized in that** the plan alignment and fastening grooving can be located in a protuberance.

5. Construction system for ventilated façade wall (1) according to any of the claims 1-4 **characterized in that** the veneer piece (3):

5a) has a plate shape which has a second outer face configured to be oriented towards the façade as it has a surface finish suitable to form a visible face and a second inner face opposite the outer face;
5b) is large-sized;
5c) comprises a plurality of brackets (30) configured to fit in the supports (20):

5c1) of the same material as the plate to form a one-piece piece;
5c2) in the second inner face;
5c3) with a bracket length L30 configured to define a separation to allow air circulation between the second inner face and the wall piece (2).

6. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a half wall piece (4):

6a) which is a section of a wall piece (2) cross sectioned at a length L/2.

7. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a patching piece (5):

7a) which is a section of a wall piece (2) longitudinally sectioned at a thickness 1/3E from the

first outer face.

8. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a coupling piece (6):

8a) which is a section of a wall piece (2) longitudinally sectioned at a thickness 2/3E from the first inner face.

9. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a metal hoop piece (7):

9a) which is a U-shaped transversal section block configured to form a lintel in doors and windows;
9b) with the same format as the format of the wall piece (2);
9c) which has the same surface finish in visible faces as the surface finish of the veneer piece (3);
9e) where the U-shaped hole is configured to be filled with reinforced concrete and constitute a load bearing beam.

10. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a recess piece (8):

10a) which has a block shape configured to complete the ventilated façade wall (1) in door and window holes up to the woodwork;
10b) which has a surface finish in visible faces equal to the surface finish of the veneer piece (3);
10c) comprising a plurality of dovetailed shaped reliefs on a face in contact, with the ventilated façade wall (1), to prevent the mortar, which is to fix the recess piece (8) to the ventilated façade wall (1), from detaching.

11. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a water drip piece (9):

11a) which has a plate shape configured to cover a window sill,
11b) which has the same visible surface finish in visible faces as the surface finish of the veneer piece (3);
11c) which has a drain outlet in a lower piece which extends to the outside of the wall, configured to prevent water from dripping along the façade.

12. Construction system for ventilated façade wall (1) according to the preceding claims, **characterized in that** it also comprises a plurality of meshes (12) of a material with high tensile strength, such as fiberglass, configured to be embedded in mortar of horizontal joints and guarantee the fastening of corner pieces and recess pieces (8).

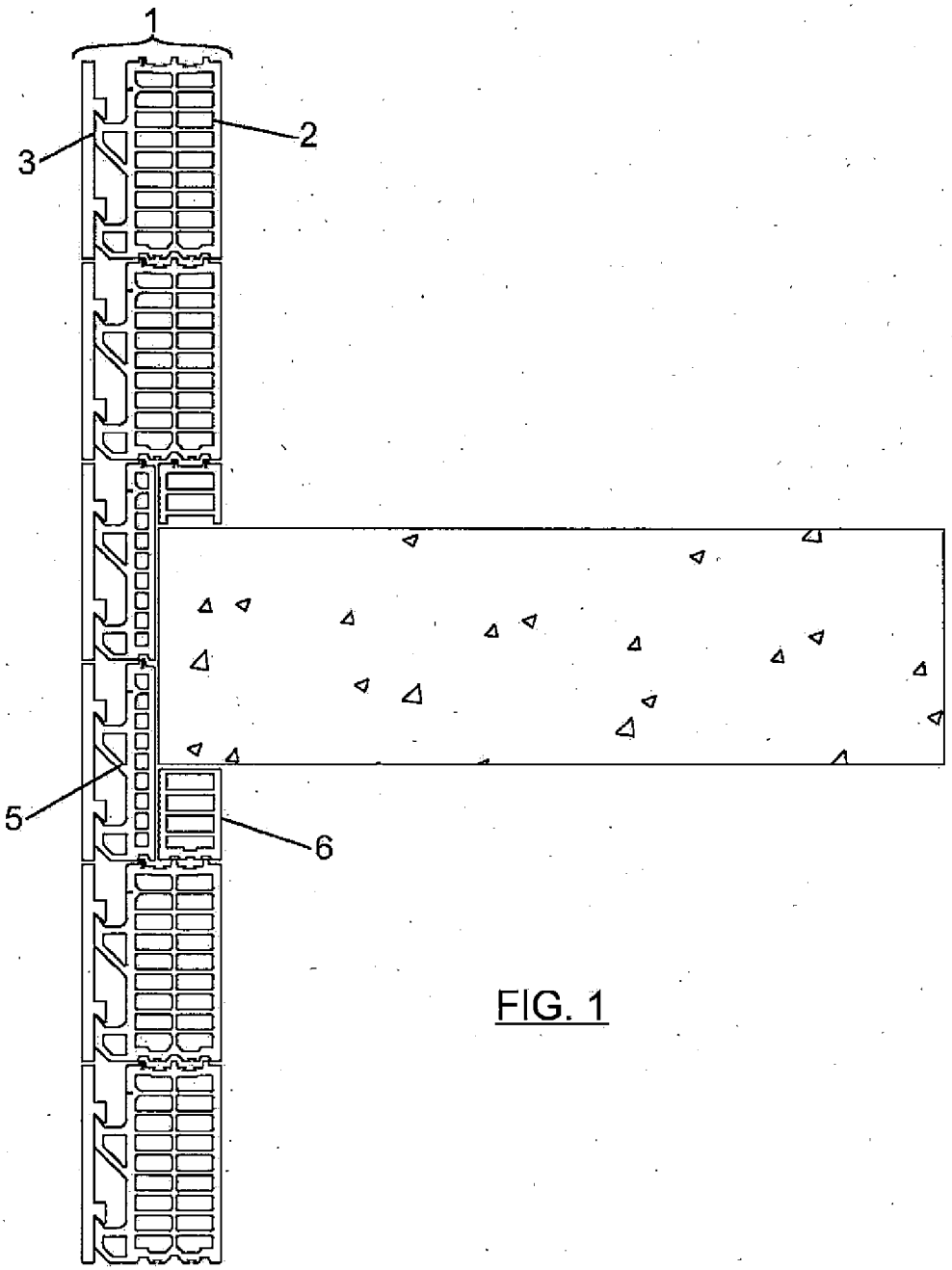

FIG. 1

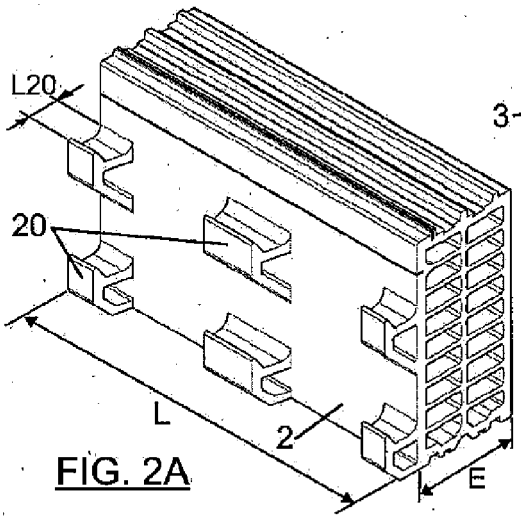

FIG. 2A

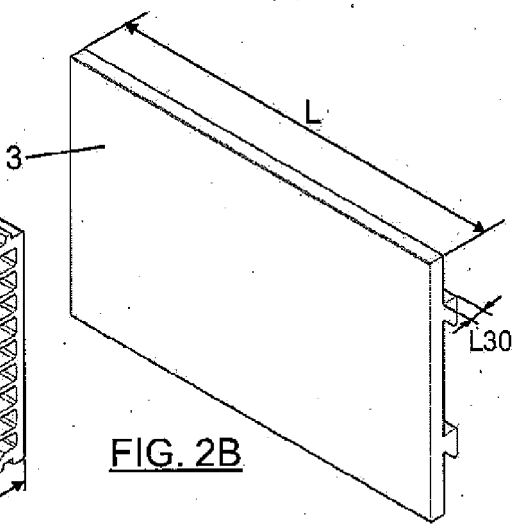

FIG. 2B

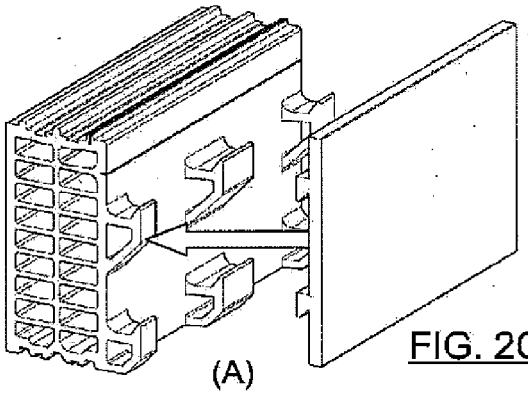

FIG. 2C

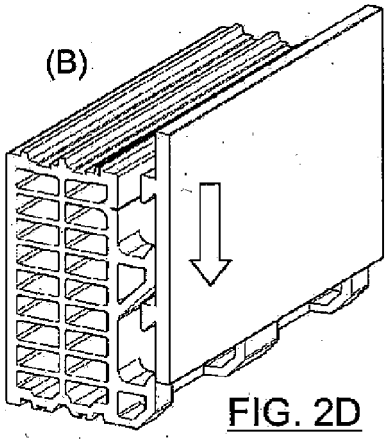

FIG. 2D

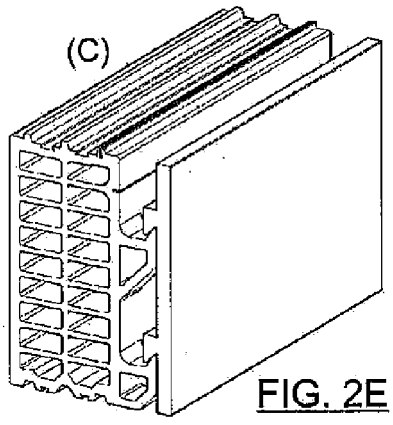

FIG. 2E

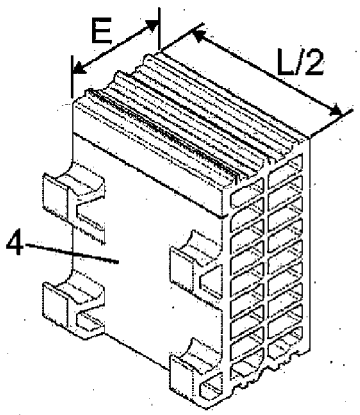

FIG. 3A

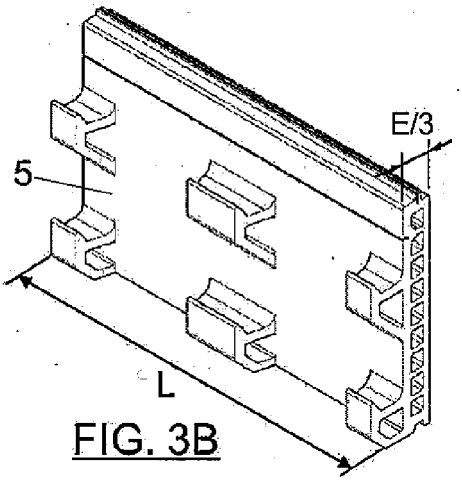

FIG. 3B

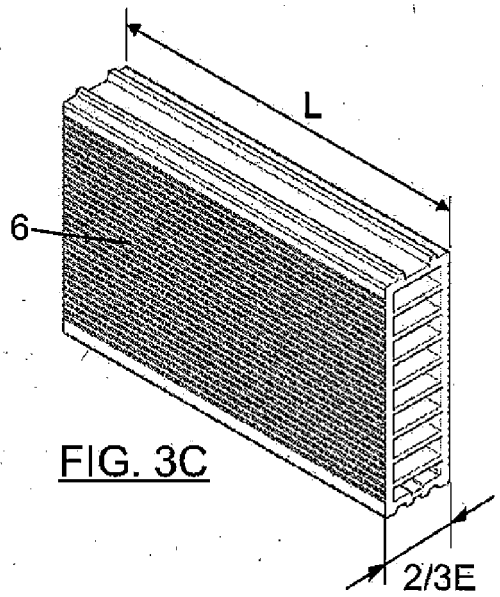

FIG. 3C

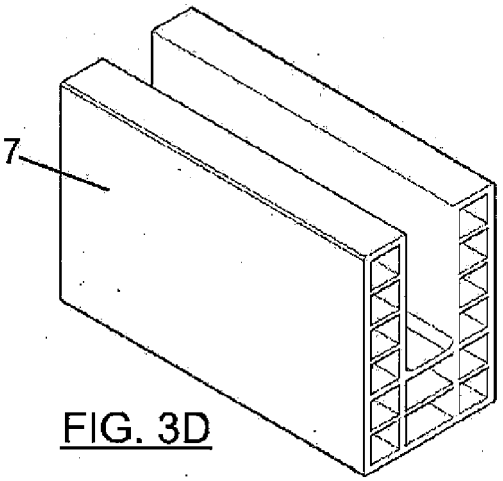

FIG. 3D

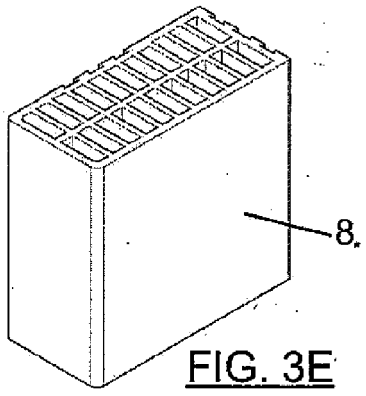

FIG. 3E

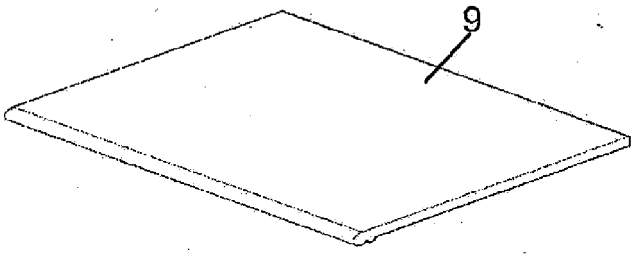

FIG. 3F

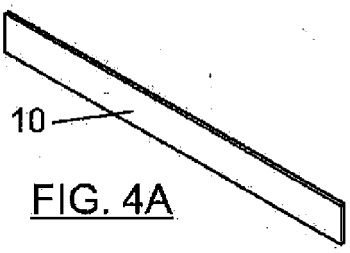

FIG. 4A

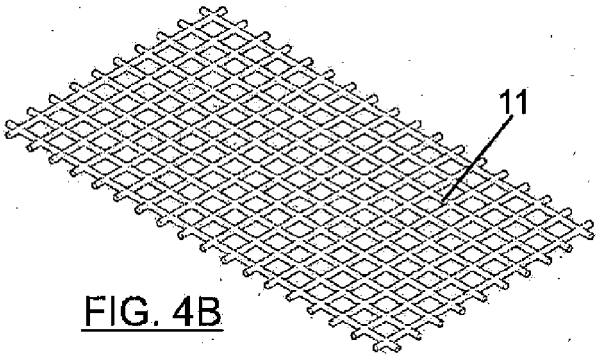

FIG. 4B

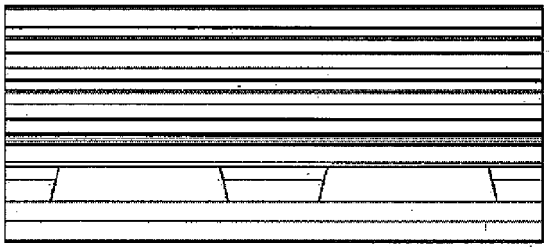

FIG. 5A

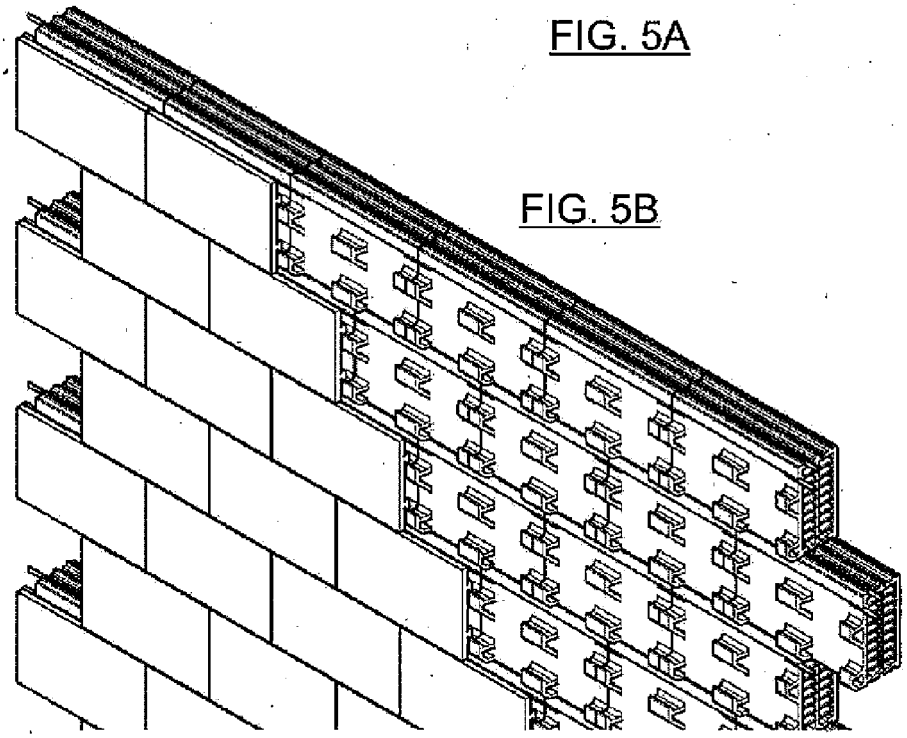

FIG. 5B

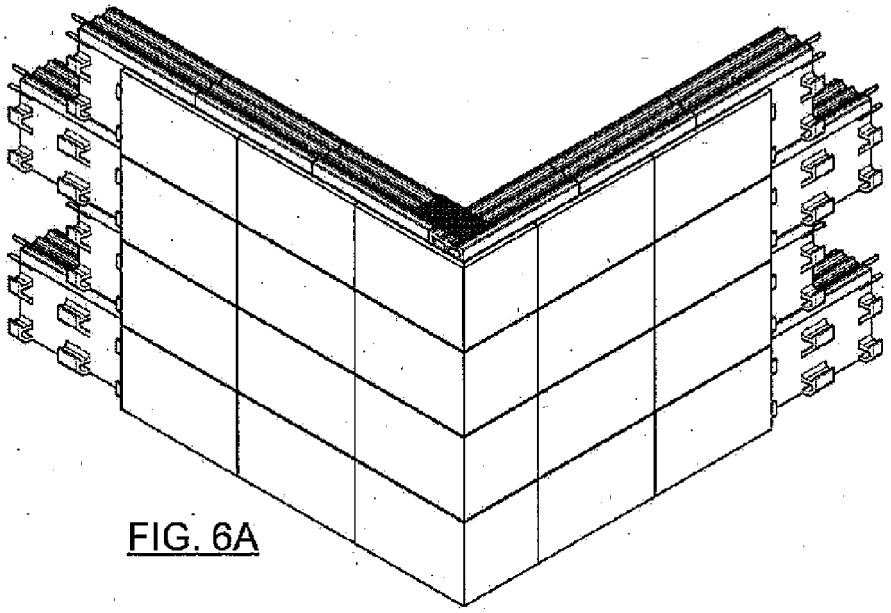

FIG. 6A

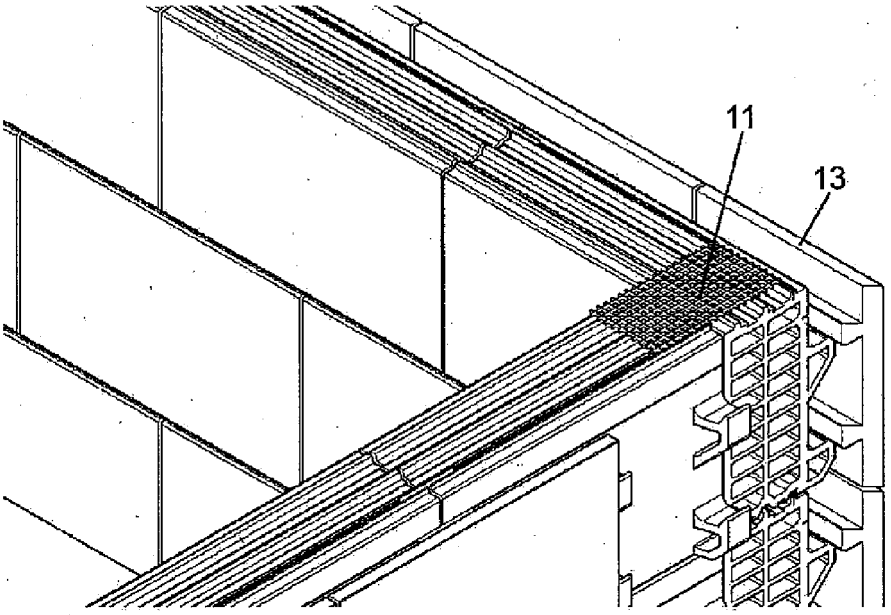

FIG. 6B

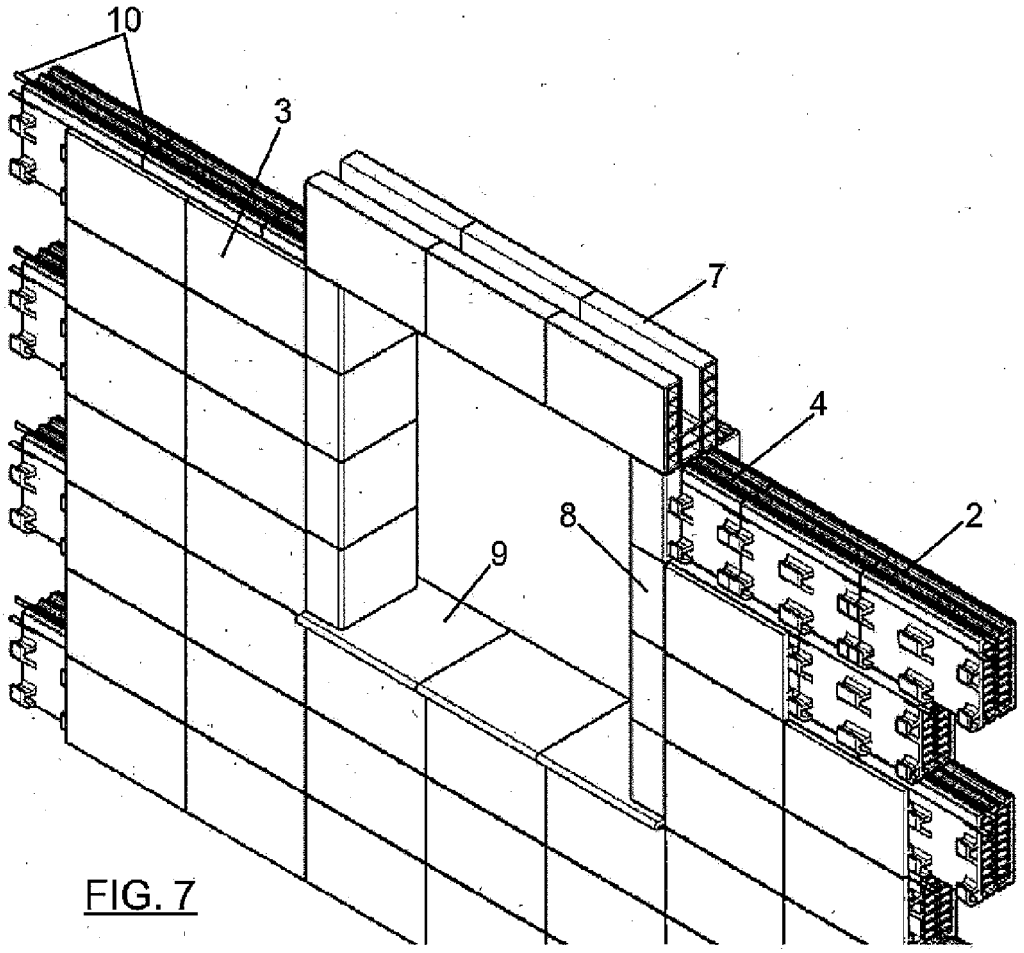

FIG. 7