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54 **A set of "L" shaped prefabricated insulating wall modules and a rectangular flat module for building structures.**

57 A "L" shaped prefabricated insulating wall module for building structures comprising two perpendicular connected walls, that in association with a floor module allow realization of buildings.

Each wall includes one external reinforced concrete panel (3) and an internal reinforced concrete panel (1), said panels being spaced apart and interconnected by transversal connecting steelrods and in the respective interspace an insulating foam material (2) is enclosed, net-work electric wiring and water-piping being in it integrated.

Said "L" module being associated with a rectangular flat module to be utilized as prosecution in walls and as floor component.

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A set of "L" shaped prefabricated insulating wall module and a rectangular flat module for building structures.

The present invention has for object a set of a "L" shaped prefabricated insulating wall module and a rectangular flat module for building structures.

In prior art "L" shaped prefabricated insulating modules for building structures are well known. These "L" shaped modules are normally used to realize with one of their walls a vertical wall of the structure and with the other wall a respective upfloor/roof, being the respective placing position "upside down" in order that one wall is vertical and one is horizontal.

This solution has the inconvenience to need further support modules to allow its support.

Insulating stratifications in panels also with foamed material are well known in prior art, but in prefabricated concrete walls insulation is obtained or by using an internal insulating layer or by mixing with the concrete expanded insulating material.

The first solution does not allow to obtain a well balanced uniform structure and the second do not allow to realize a good insulation.

Purpose of the present invention is to obviate said drawbacks.

This and other purposes are reached with the present invention as claimed solving the exposed problems by means of a set of "L" shaped prefabricated insulating wall module and a rectangular flat module for building structures, characterized by :

- three stratus:
- one external net reinforced concrete panel;
- one internal net reinforced concrete panel;
- said external reinforced concrete panel and internal reinforced concrete panel being spaced apart by steelrods transversal crossing structures, connecting the respective reinforcing nets;
- the interspace between the two panels encase an insulating foamed material, in said foamed material being eventually included a network electrical wiring an water piping;
- said "L" shaped prefabricated insulating wall module:
- having orthogonal walls of different extension that in building construction are both vertical;
- each module being realized in three main steps:
- the external concrete panel is firstly prepared with respective reinforcing steel structure protruding from the internal surface;
- after eventually including the respective electrical wiring and water piping network on said internal surface, the insulating material is foamed and;
- the internal concrete panel is poured on said insulating material, to realize a single integrated "L" shaped multilayer concrete-foam-concrete

block module structure.

In such way the prefixed scope is completely obtained and is possible to obtain both the external structure of the building and the its internal structure, in conformity of the specific exigencies. Furthermore such modules are easily transportable being even stackeable and easy assemblable making possible the completion of the building in short time. The particularity of the structure as well the modules system connection consent an optimum isolation both thermic and acoustic. A good insulation is furthermore obtained even in water piping and electric wiring encapsulated in the respective prefabricated panels, being this ones included in the respective insulating material, avoiding heat dispersion particularly in pipelines for heating plants. The insulating material being conveniently fire-resistant to prevent accidental combustion, easily generated for example by short circuits in the incapsulated electric wire network.

These and other advantages will better be understood from the following description and drawings that show specific preferred solutions of the invention, which particulars of execution are not to be considered limitative but exemplificative only.

Figure 1 represents a diagrammatic lateral view of the main "L" shaped module comprehending two perpendicular connected walls.

Figure 2 represents a diagrammatic plant view in section x-x of the module as represented in figure 1.

Figures 3 and 4 represent particulars of fixation means of said modules.

Figure 5 represents a perspective view of a pre-equipped portion of the module.

Figure 6 represents a perspective view of a module for the realization of the floor.

Making reference to the figures we can see that for the realization of a building at least two kinds of prefabricated modules are needed for assembling. The first one (A) for the realization of the walls, the second one (B) for the realization of the floors. The first one prefabricated module (A) for the realization of walls is conformed essentially in "L" shape made by perpendicular intersection of two walls (a') and (a'') forming a right angle. Said walls are obtained by means of a reinforced concrete (1, 3) the reinforcing being made by means of the interposition of an electrowelded net (6). Between the concrete spaced apart panels (1, 3) the insulating material (2) e.g. polyurethane foaming is placed.

Such structure (A) is obtained first realizing in reinforced concrete the external panel (3), then an

insulating foam layer (2) is applied on its internal surface and successively the internal panel by respective final concrete casting (1) is realized, the last one being solidarized to the first one by means of the transverse thoroughgoing iron-rods connection that across the inner insulated core and that is connected to the respective electrowelded nets (6). In the module (A) means for allowing jointing to an analog module (A) are provided to realize the continuity of the wall. Said means are composed by a wedges range (1', 3') applied on one side of the edges of a wall (a') to be inserted in receiving sheaths or holes (1'', 3'') obtained in the opposite edges of the module wall (a''). In such a way the possibility of composition of respective series of modules (A) is available, being associable one to one between them by means of side junction. The fixation of the wall-modules to the basis of the building and/or to the floors, is realized by a plurality of holes (f) obtained laterally (1, 3) in the wall-modules (a', a'') closest to the respective upper and inferior edges, which protract internally and curving parallel to the respective panel debouching in the underlying basis in which a corresponding receiving recesses (f') was preventively obtained. Inside the holes (f) obtained on one side of the wall or in both sides (1 and/or 3), are insertable plinths (4) to engage both the hole basis portion (f) and the hole wall module portion (f').

In a successive phase a concrete casting (g) is carried out into the interior of the hole (f), solidarizing all.

Furthermore the walls (a', a'') are warded-off between them for not creating thermic bridges caused by jointing of the modules (A), in particular one wall (a') is longer than the other (a'') and the first one has the external panel (3) with the respective insulating material (2) protruding beyond the end edge (1') of the interior panel (1), viceversa the opposite wall (a'') having the external panel (3) with the respective insulating material (2) recessed in respect the interior panel (1).

In this way the ideal coupling of the first longer wall (a') of a module (A) with the second shorter wall (a'') of analog other module (A) is made possible.

For the realization of a floor a parallelepiped flat module (B) is essentially a rectangular panel obtained from analog core-insulated-concrete-structure, the reinforced concrete encasing in this case the insulating core. The conformation of the respective borders provides a longitudinal recess (8) and an opposite longitudinal tongue (9).

Finally between the interior-exterior panels (1, 3) of said walls, and drowned in the insulating material (2), the respective hydraulic and electric connections and also phone network wiring, and so on (7) are disposed.

Claims

1. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, characterized by :

- three stratus:
- one external net reinforced (6) concrete panel (3);
- one internal net reinforced (6) concrete panel (1);
- said external reinforced concrete panel (3) and internal reinforced concrete panel (1) being spaced apart by steelrods transversal crossing structures, connecting the respective reinforcing nets (6);
- the interspace between the two panels (1-3) encase an insulating foamed material, in said foamed electrical wiring an water piping;
- said "L" shaped prefabricated insulating wall module (A):
- having orthogonal walls (a', a'') of different extension that
- in building construction are both vertical;
- each module being realized in three main steps:
- the external concrete panel is firstly prepared with respective reinforcing steel structure protruding from the internal surface (3);
- after eventually including the respective electrical wiring and water piping network on said internal surface (7), the insulating material is foamed and;
- the internal concrete panel is poured (1) on said insulating material (2), to realize a single integrated "L" shaped multilayer concrete-foam-concrete block module structure.

2. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, in which the "L" shaped prefabricated insulating wall module (A) has the respective outside panel (3) of the walls (a') and (a'') warded-off in respect of the internal panel (1).

3. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, in which the "L" shaped prefabricated insulating wall module (A):

- has the respective outside panel (3) of the walls (a') and (a'') warded-off in respect of the internal panel (1) and;
- one wall (a') has the outside panel (3) with the respective insulating material (2) extended beyond the end of the interior panel (1),
- viceversa in the opposite wall (a'') the outside panel (3) with its insulating material (2) extends shorter respect to the interior panel (1) in order to allow the relative coupling of opposed walls, first wall (a') with second wall (a'') of analog modular module (A),
- in order an "L" module comprising one reinforced concrete "L" (3) with internal insulating material layer (2), integrally connected to another reinforced concrete "L" (1) with larger basis and shorter

height.

4. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, in which the respective outside panel (3) and internal panel (1) of the walls (a') and (a'') of the "L" shaped prefabricated insulating wall module (A) have in their respective opposite borders:

- in one vertical side respective recesses (1'',3'');
- in the opposed vertical side respective reinforcing steel protrusions (1') to allow head-jonction between other modules.

5. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, in which the respective outside panel (3) and internal panel (1) of the walls (a') and (a'') of the "L" shaped prefabricated insulating wall module (A) have inferiorly in their respective panel surfaces a curved recess (f) extending internally and debouching vertically on the basis of the module to correspond of basement recess (f'), to allow continuity hole connection (f, f') wherein plinth means can be insertable (4) to allow concrete casting (g) for fixing the wall structure module on said basement.

6. A set of "L" shaped prefabricated insulating wall module (A) and a rectangular flat module (B) for building structures, in which the flat module (B) comprises a floor module panel having the opposed edges one with longitudinal stair (8) and the other with a longitudinal tongue (9).

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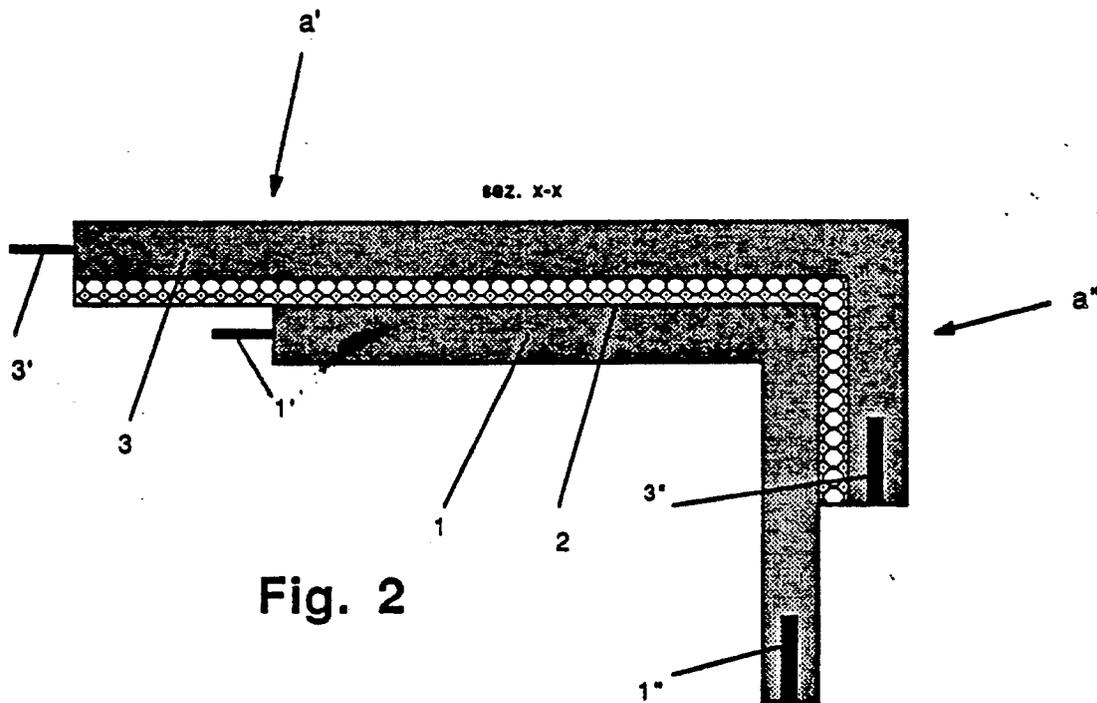
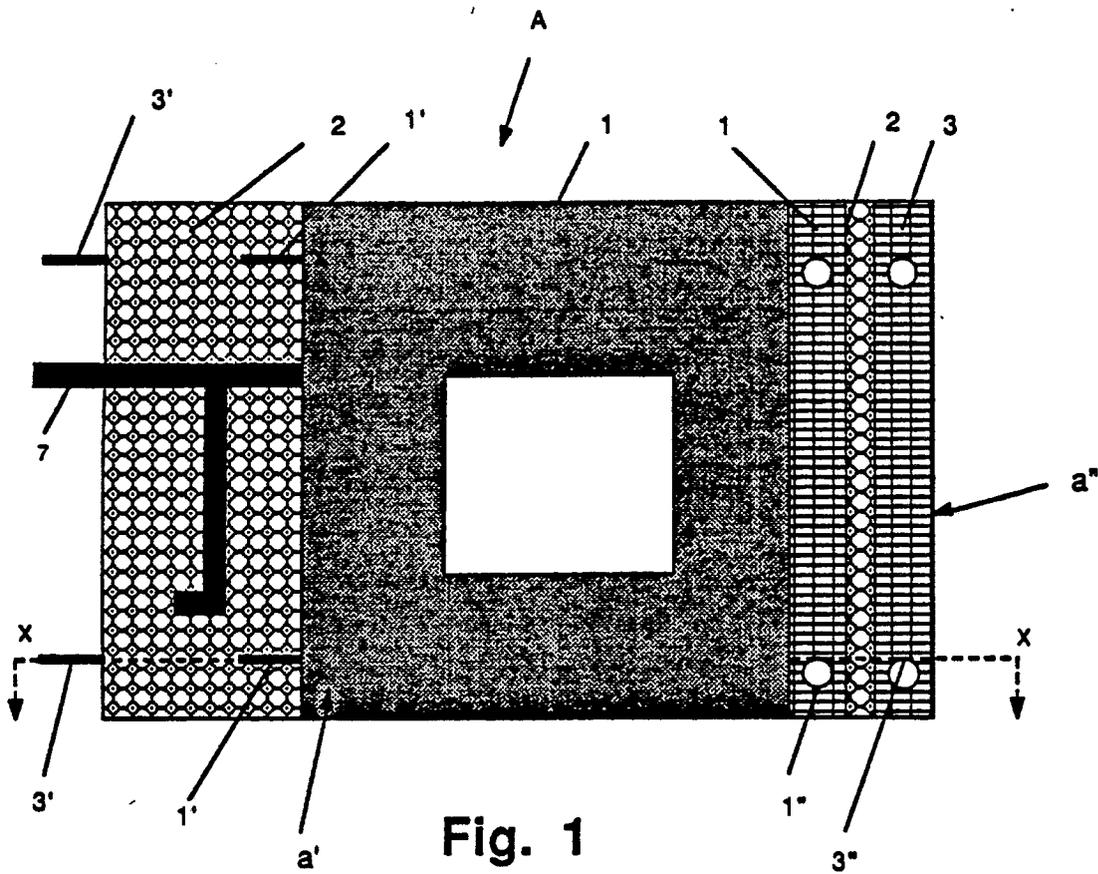
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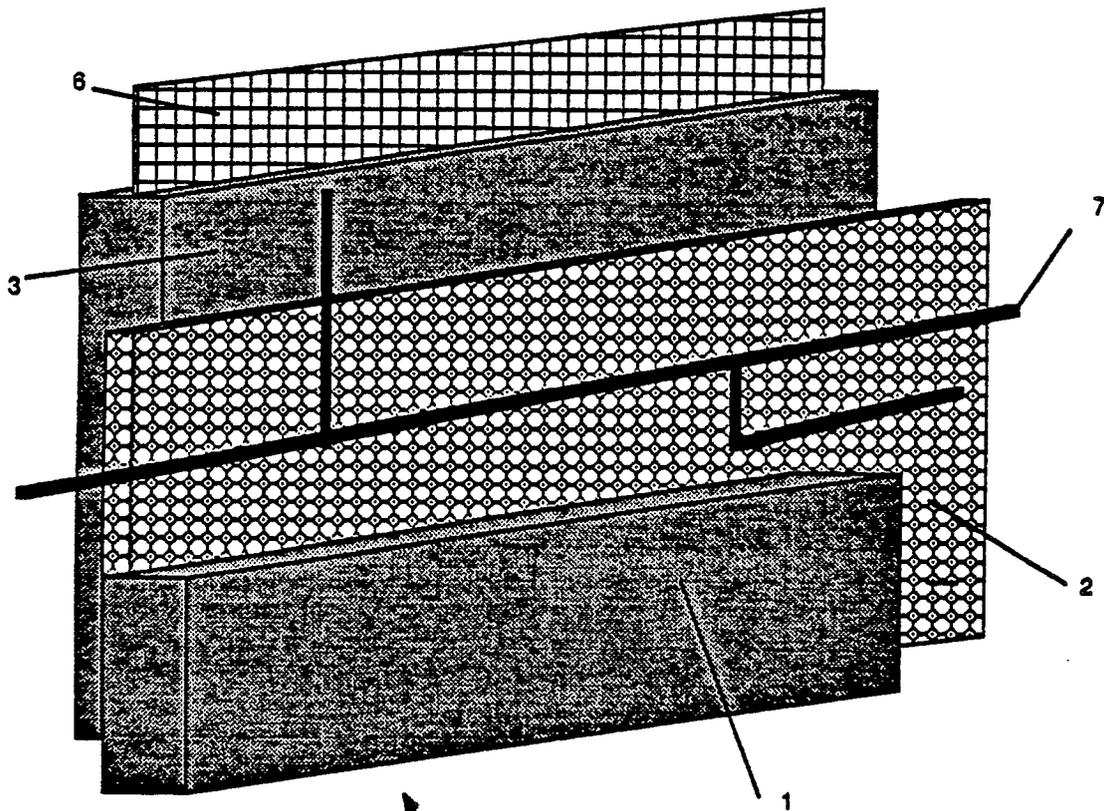


Fig. 5

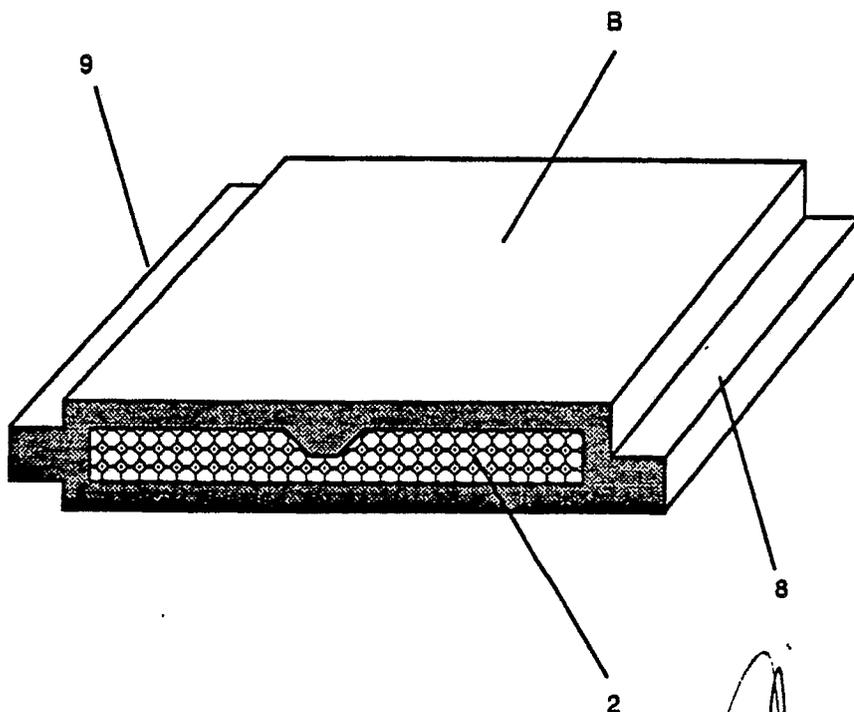


Fig. 6

p. CAPRETTA, Sesto, and BOLLOTTI, Lucio
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D'AGOSTINI, Giovanni, *[Signature]*



| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A | FR-A-1 508 689 (HAEUSSLER) * Figure 1; page 2, right-hand column, lines 29-39 * --- | | E 04 C 2/26 E 04 B 2/00 |
| A | DE-A-3 103 491 (KLEIN) * Figure 1 * --- | 1 | |
| A | US-A-3 707 165 (STAHL) * Figure 1; column 1, line 56 - column 4, line 17 * ----- | 1 | |
| | | | TECHNICAL FIELDS SEARCHED (Int. Cl.5) |
| | | | E 04 C E 04 B |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 12-04-1990 | Examiner MYSLIWETZ W.P. |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | |