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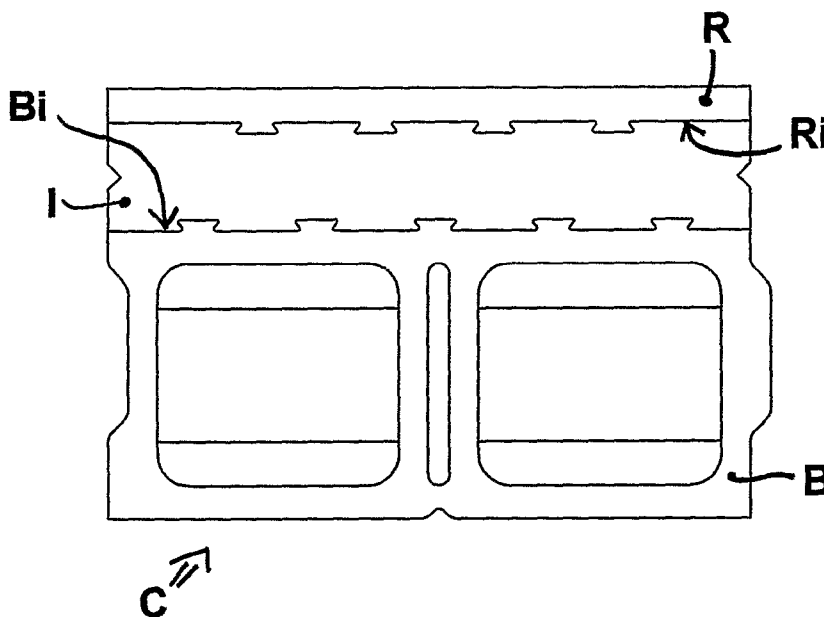
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(54) Title: CONCRETE BLOCK WITH INNER LAYER OF INSULATING MATERIAL



(57) Abstract: The invention is a new element or block (C) made of ordinary and/or lightweight concrete in a parallelepiped shape for the construction of masonry work in general, comprising, on at least one wall (Bi), at least one insulating layer (I) made of heat and/or sound-insulating material integral with it, and wherein on the coupling surface (Ib) of said insulating layer one or more seats and/or lugs (Sb) are obtained for anchoring the concrete of said wall (Bi). The new element or block (C) also comprises a further layer (R) made of ordinary or lightweight concrete, made integral with said insulating layer (I) on the opposite side by means of anchoring to seats and/or lugs (Sr) obtained on the related coupling.

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TITLE

CONCRETE BLOCK WITH INNER LAYER OF INSULATING**MATERIAL**

DESCRIPTION

5 The present patent relates to concrete elements for the production of masonry work, and in particular it concerns a new ordinary or lightweight concrete block with inner layer of insulating material.

The use of concrete elements or blocks is known for the production of masonry work, such as wall elevations or containment walls in general, also
10 for the construction of buildings for civil or industrial use.

Said blocks have a generically parallelepiped shape with rectangular section and can be provided with one or more through holes for lightening the blocks and for the insertion of reinforcing rods if necessary.

Said elements are placed adjacent to and on top of one another, generally
15 offset, and positioned so that said through hole is vertical, to permit the vertical insertion of said reinforcing rods.

Said blocks are nowadays very widespread, given their ease of use and limited cost.

The need to thermally insulate the insides of buildings is known, to reduce
20 thermal dispersion, i.e. to reduce the transmission of heat from the inside to the outside and vice versa.

Reduction of heat transmission is a very important factor in the construction of buildings, since it permits significant reduction of energy costs for heating the rooms during the winter and for cooling them during the
25 summer.

The need to soundproof the insides of buildings is also known, especially if

located near particularly noisy areas, such as industrial areas, motorways, roads with intense or high-speed traffic, railway lines etc.

The known concrete blocks do not provide good heat insulation and soundproofing.

5 In order to obtain masonry work which also provides heat insulation and/or soundproofing, the use of sheets or layers of insulating material is known, i.e. fibreglass, polyester, cork etc. applied to the walls after construction.

The subject of the present patent is a new type of block made of ordinary or lightweight concrete with inner layer/s of insulating material, for the
10 production of masonry work such as containment walls, sound or heat-sound barriers etc.

The main object of the present patent is to carry out an ordinary or lightweight concrete block that simultaneously performs both the structural function and the sound and/or heat insulation function at a limited cost.

15 A further object of the present invention is to reduce heat transmission, limiting energy costs.

A further object of the present invention is to reduce sound transmission.

A further object of the present invention is to simplify the procedures for construction of buildings, masonry work and walls in general, since it does
20 not require further applications of insulating material.

A further object of the present invention is to provide two surfaces, inner and outer, finished or ready for the application of plaster and/or other coating elements or materials.

A further object of the present invention is to construct buildings, masonry
25 work and walls in general without thermal bridges.

These and other direct and complementary objects have been achieved

through the construction of a new type of block made of ordinary or lightweight concrete with inner layer of insulating material, for the construction of masonry work such as walls, sound or heat-sound barriers etc.

- 5 The new block consists in its main parts of at least one parallelepiped element made of ordinary or lightweight concrete, with four vertical walls and intermediate partitions if necessary, arranged vertically in one or both square directions, where at least one of said walls is integral with at least one layer of insulating material.
- 10 In the preferred embodiment of the invention, the new block also comprises at least one further layer of ordinary or lightweight concrete, said layer of insulating material being positioned between said concrete parallelepiped element and said concrete layer, so that said two concrete parts do not have any point of contact.
- 15 In particular, the structural function is performed by said parallelepiped element made of ordinary or lightweight concrete, while the heat and/or sound insulation function is performed by said layer of insulating material. According to the invention, said layer of insulating material, hereinafter simply called insulating layer, is made of polystyrene, cork, polyurethane
- 20 and/or other materials with analogous insulating properties, i.e. with sufficiently low heat conductivity and/or sound transmission coefficients. According to the invention, said parallelepiped element and/or said outer coating layer are made of ordinary and/or lightweight concrete, with the addition of iron and/or nylon fibres if necessary.
- 25 As mentioned, said insulating layer is positioned between said parallelepiped element and said ordinary or lightweight concrete layer,

acting substantially as an outer coating.

Said layer of ordinary or lightweight concrete, hereinafter called outer coating layer, is suitable for being left as it is or covered with plaster, or with other exposed coating products or elements, ceramic elements, paint etc.

5

Said insulating layer is integrally connected to said concrete parallelepiped element and/or to said outer coating layer.

The new block is produced by casting ordinary or lightweight concrete in an appropriate mould containing, in a suitable position, said layer of insulating material.

10

In the preferred embodiment of the invention, said insulating layer comprises seats, preferably dovetailed, which are filled during casting of the concrete so that, after the concrete has set, said parallelepiped element and/or said outer coating layer are integrally anchored to said insulating layer, without said concrete parts coming into contact with one another at any point.

15

The new invention therefore comprises in one single preformed object the structural function, performed by said concrete block, and the sound and/or heat insulation function, performed by said insulating layer.

20

Using the new invention it is therefore possible to construct a building, masonry work or a wall in general with very good heat and/or sound insulation properties, without requiring the use of further walls or coatings of insulating material, such as sheets or layers of fibreglass, cork, polystyrene etc., at a limited cost.

25

The new invention can be effectively applied also in the construction of sound barriers for motorways, roads, railway lines etc.

According to the invention the new blocks can also be installed in pairs facing one another in a mirror fashion, forming two opposing concrete walls, with the insulating layers inside, thus creating, as a whole, one single solid wall also resistant to lateral thrust.

5 The characteristics of the new block will be highlighted in greater detail in the following description, with reference to the illustrations attached as non-limiting examples.

Figure 1 shows an upper view of the new block (C), comprising a parallelepiped element (B) made of ordinary and/or lightweight concrete,
10 coupled with an insulating layer (I), while figures 1a-a and 1b-b show two sections.

Figure 2 shows an upper view of the new block (C) comprising three holes (F) for insertion of reinforcing rods, while figures 2a-a and 2b-b show two sections.

15 Figure 3 shows a three-dimensional view of the insulating layer (I).

Figures 4 and 5 show the upper views of two different solutions for construction of the new block (C), each comprising a parallelepiped element (B) made of ordinary or lightweight concrete and an outer coating layer (R), between which an insulating layer (I) is positioned.

20 Figure 6 shows a possible arrangement for the installation of new opposing blocks (C) where both insulating layers (I-I) are inside the two concrete elements (B-B).

The new block (C) comprises at least one parallelepiped element (B) made of ordinary or lightweight concrete coupled with at least one layer (I) of
25 insulating material.

In the preferred embodiments of the invention, schematised in figures 4 and

5, the new block (C) also comprises at least one further layer (R) of ordinary or lightweight concrete as an outer coating, said insulating layer (I) being positioned between said parallelepiped element (B) and said outer coating layer (R).

5 Said parallelepiped element (B) comprises four vertical walls (B1, B2, B3, Bi) and if necessary one or more intermediate partitions (M) suitable for identifying one or more through holes (F) for the insertion of reinforcing rods.

10 At least one of said vertical walls (Bi) is coupled with said insulating layer (I).

As shown in figures 4 and 5, said insulating layer (I) can be positioned in-between said parallelepiped element (B) and said outer coating layer (R).

15 In the solution shown in figure 3, said insulating layer (I) has, on the surface (Ib) providing the connection with said parallelepiped element (B), a plurality of dovetailed seats (Sb) for the fixed connection between the concrete of said parallelepiped element (B) and said insulating layer (I).

20 Analogously, said insulating layer (I) also comprises, on the surface (Ir) providing the connection with said outer coating layer (R), a plurality of dovetailed seats (Sr) for the fixed connection between the concrete of said outer coating layer (R) and said insulating layer (I).

The optimal dimensions of the new cellular block (C) have been identified as follows:

- thickness of parallelepiped element (B) 16-30 cm
- thickness of insulating layer (I) 3-10 cm
- 25 - thickness of outer coating layer (R) 1.7-10 cm

As shown in figure 6, according to the invention the new blocks (C) can be

installed in opposite pairs, forming two opposing walls, with the insulating layers (I-I) inside, thus creating, as a whole, one single solid wall particularly resistant also to lateral thrust.

Therefore, with reference to the preceding description and the attached
5 drawings, the following claims are made.

CLAIMS

1. New element or block (C) made of ordinary and/or lightweight concrete, comprising at least one parallelepiped element (B), for the construction of masonry work in general, characterised in that it comprises, on at least one wall (Bi), at least one insulating layer (I) made of heat and/or sound-insulating material integral with it, and wherein one or more seats and/or lugs (Sb) are obtained on the coupling surface (Ib) of said insulating layer (I) for anchoring the concrete of said wall (Bi).

2. New element or block (C) according to claim 1, characterised in that it comprises at least one further outer coating layer (R) made of ordinary and/or lightweight concrete, made integral with said insulating layer (I) by means of anchoring to one or more seats and/or lugs (Sr) obtained on the related coupling surface (Ir) of said insulating layer (I), and wherein said coating layer (R) has no contact point with said element (B).

3. New element or block (C) according to claims 1, 2, characterised in that said seats (Sb, Sr) or lugs have a dovetail section.

4. New element or block (C) according to the preceding claims, characterised in that said parallelepiped element (B) and/or said outer coating layer (R) are made of concrete with the addition of iron and/or nylon fibres.

5. New element or block (C) according to the preceding claims, characterised in that said outer coating layer (R) is suitable for being covered in plaster and/or exposed materials and/or elements and/or products.

6. New element or block (C) according to the preceding claims, characterised in that said element or block (C) comprises one or more intermediate partitions (M), arranged in one or both square directions.

7. New element or block (C) according to the preceding claims, characterised in that said insulating layer (I) has a thickness ranging between 3 and 10 cm.

5 8. New element or block (C) according to the preceding claims, characterised in that said parallelepiped element (B) has a thickness ranging between 16 and 30 cm.

9. New element or block (C) according to the preceding claims, characterised in that said outer coating layer (R) has a thickness ranging between 1.7 and 10 cm.

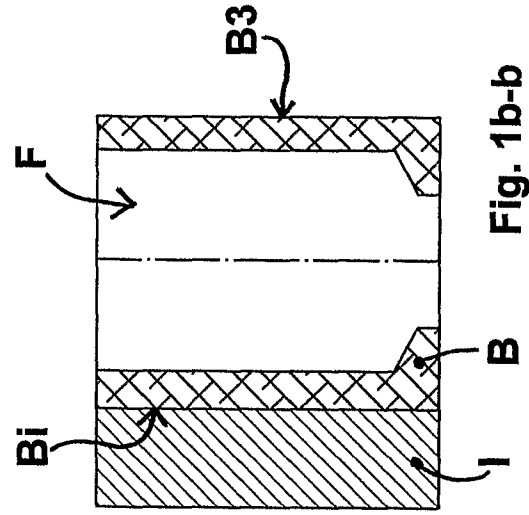


Fig. 1a-a

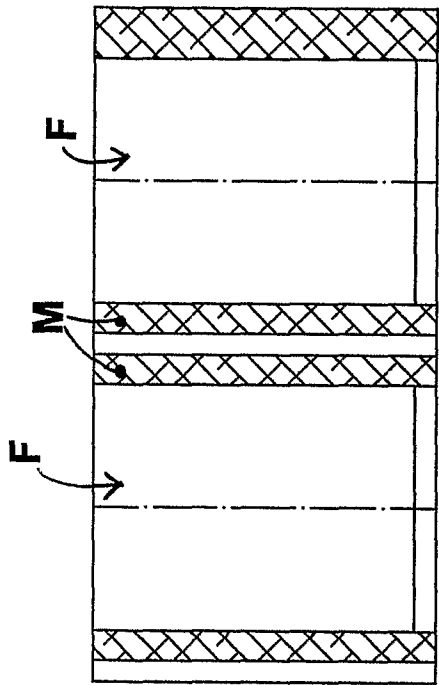


Fig. 1b-b

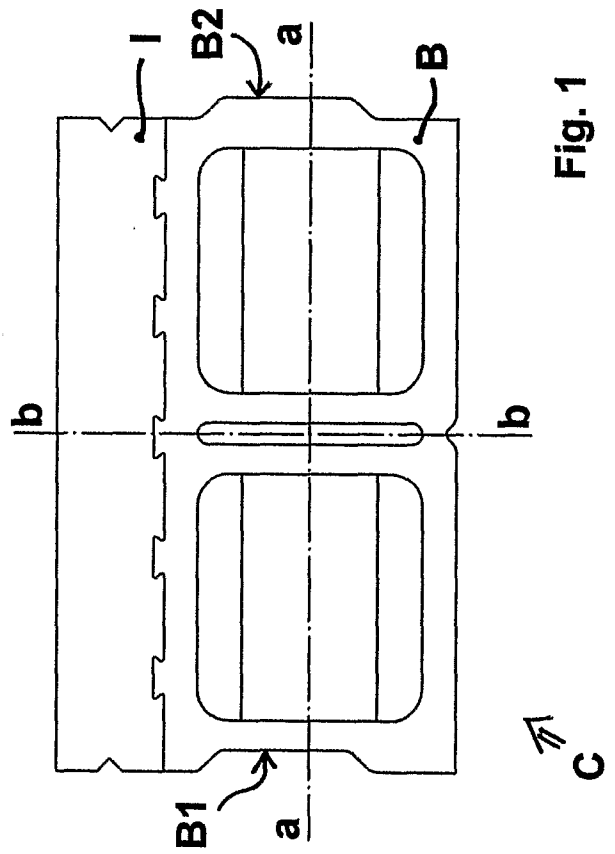


Fig. 1

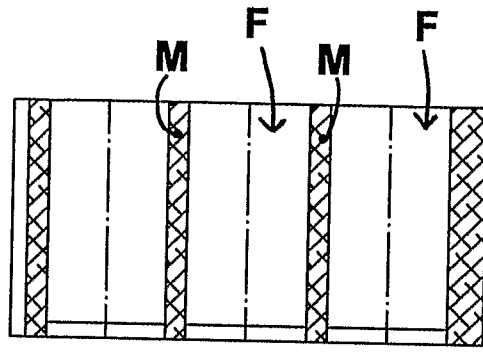


Fig. 2a-a

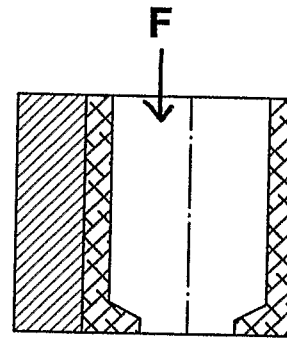


Fig. 2b-b

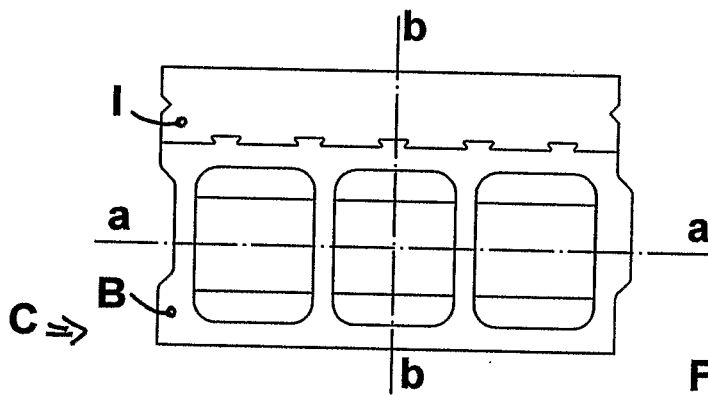


Fig. 2

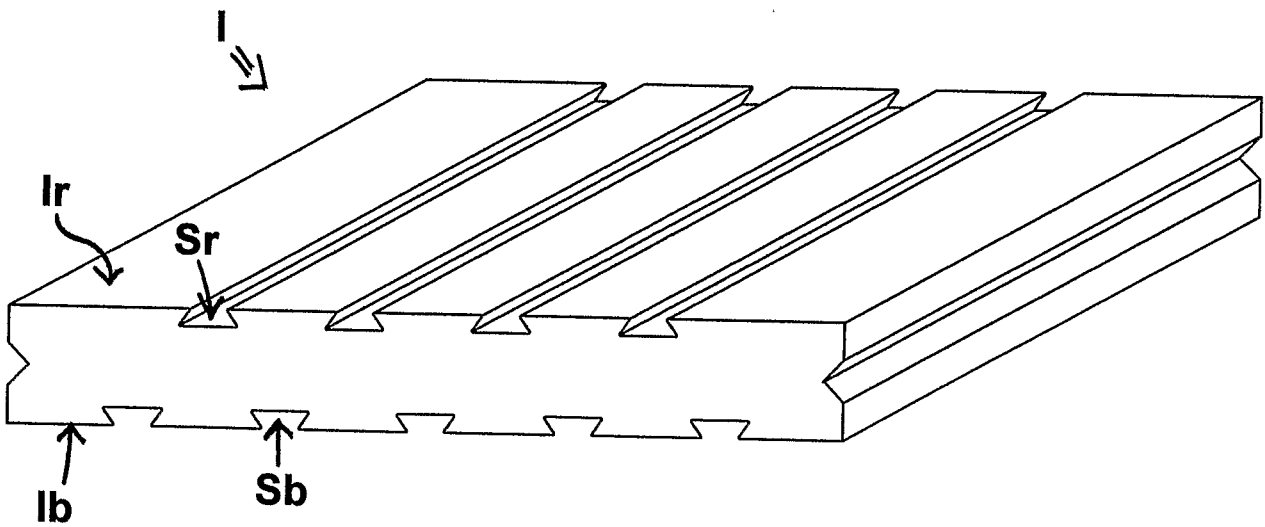
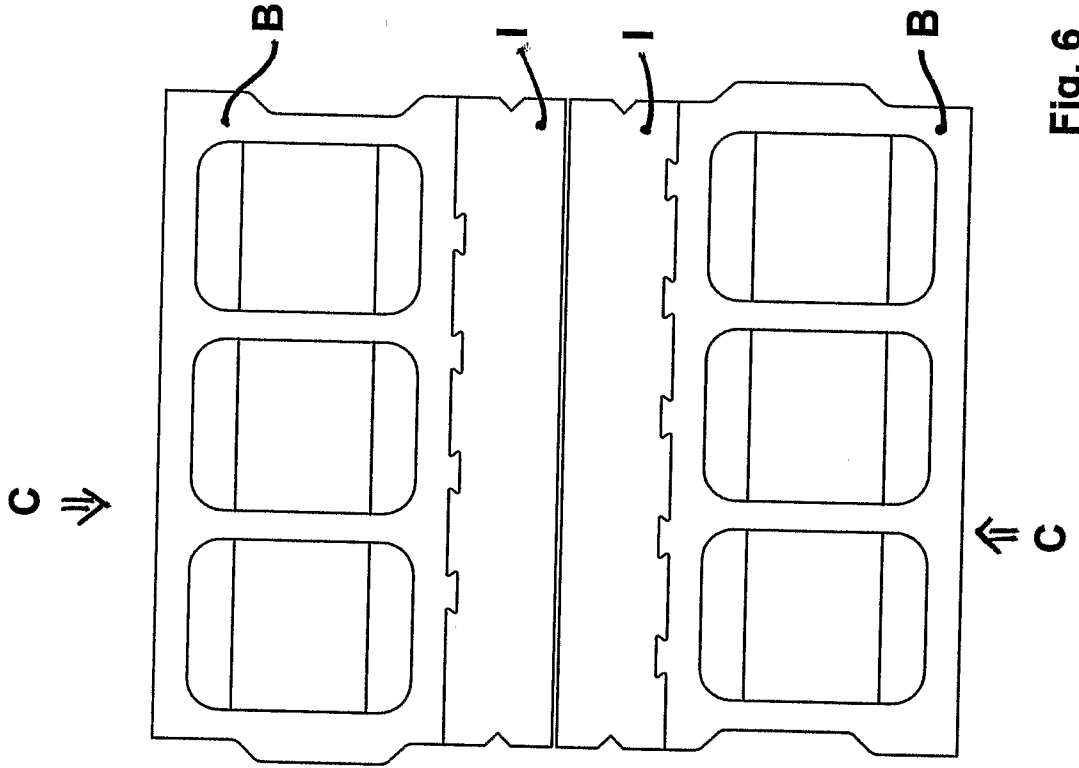
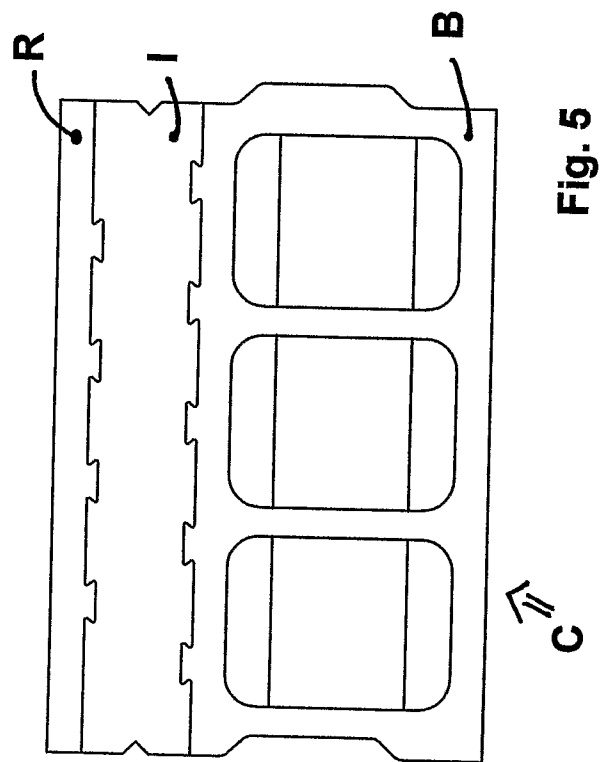
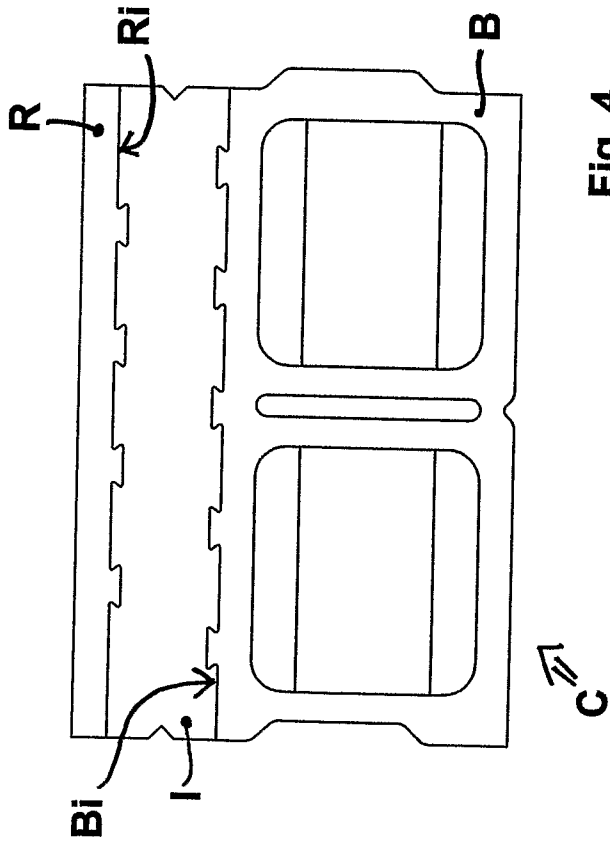


Fig. 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2006/000415

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|---|--|-----------------------|
| A. CLASSIFICATION OF SUBJECT MATTER INV. E04C1/41 | | |
| According to International Patent Classification (IPC) or to both national classification and IPC | | |
| B. FIELDS SEARCHED | | |
| Minimum documentation searched (classification system followed by classification symbols) E04C | | |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched | | |
| Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | US 2006/101756 A1 (MCCLURE LARRY M [US]) 18 May 2006 (2006-05-18) | 1-5,7-9 |
| Y | claim 1; figures 1,3 | 4 |
| X | BE 1 015 331 A3 (DOUTERLOIGNE JAN ALBERT [BE]) 1 February 2005 (2005-02-01) claims 1,2; figures 1,2 | 1,3,5, 7-9 |
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| Y | US 4 854 097 A (HAENER JUAN [US]) 8 August 1989 (1989-08-08) column 6, lines 9-13 | 4 |
| A | EP 1 557 249 A (WOSCHKO WINLITE GMBH [DE]; RIMMELE KG [DE]) 27 July 2005 (2005-07-27) figure 1 | 6 |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex. | | |
| * Special categories of cited documents : | | |
| *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed | | |
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| Date of the actual completion of the international search <p align="center">6 February 2007</p> | Date of mailing of the international search report <p align="center">15/02/2007</p> | |
| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016 | Authorized officer <p align="center">Rosborough, John</p> | |

INTERNATIONAL SEARCH REPORT

Information on patent family members

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