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(54) **Block assembly for buildings and relevant manufacturing method**

Bausatz von Blöcken für Gebäude und relevantes Herstellungsverfahren

Assemblage de blocs pour des bâtiments et méthode de fabrication correspondante

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Description

[0001] The present invention relates to building materials, and in particular to a block assembly that may also include an insulating panel, as well as to a relevant manufacturing method.

[0002] In the building industry there is already known a type of block assembly including an insulating panel, disclosed in the European patent EP 1085137. In brief, said block assembly is made up of two clay blocks with an insulating panel therebetween, the latter also acting as a mechanical connector between the two blocks. In fact, the insulating panel is provided on each face with at least one coupling element suitable to engage a corresponding seat formed in one of the blocks, the at least two coupling elements being furthermore mutually joined and fastened to the insulating panel through a fastening element.

[0003] In practice, in the above-mentioned known block assembly there are provided four metal clips joined in pairs by pairs of rivets passing through the insulating panel and provided with spacers to keep the distance between the two clips of each pair.

[0004] Although somewhat effective, this known arrangement has various drawbacks from the manufacturing point of view due to the number and shape of its components as well as to the complexity of the assembling phase. In fact, in order to manufacture a single block assembly there are required 12 elements (in addition to the two blocks and the insulating panel), namely 4 clips, 4 rivets and 4 spacers and the clips have to be shaped to engage by snap-fitting or vertical sliding the corresponding seats formed in the two blocks.

[0005] It is therefore clear that the manufacturing method of such a block assembly implies several assembling steps such as: boring holes in the insulating panel, slipping the spacers onto the rivets, introducing the rivets through the clips and the insulating panel, bending over the ends of the rivets to fasten the clips onto the insulating panel, forcing the clips into the coupling seats. Such a complicated assembling obviously involves a complex and expensive assembling machinery and a low manufacturing rate.

[0006] Moreover, this type of block assembly is sensitive to the thickness tolerances of the insulating panel since the latter is part of the coupling structure between the two blocks. In other words, if the insulating panel is too thick it is difficult where not impossible to fasten the clips thereon and to lock the clips into the corresponding seats of the two blocks; on the contrary, if the panel is too thin the clips will lack proper support and the connection between the two blocks will not be sufficiently rigid to be able to handle the block assembly conveniently.

[0007] Coupling elements comprising a dovetail tenon for securing cementious panels provided with dovetail recesses are disclosed in GB-A-1 598 237. This shape of the coupling elements is however difficult to realize in most panels and renders more complicated to assemble the panels.

[0008] Therefore the object of the present invention is to provide a block assembly, and a relevant manufacturing method, which overcomes said drawbacks. This object is achieved by means of a block assembly as defined in claim 1. This block assembly is made up of two clay blocks and at least two shaped plate-like connecting elements suitable to be introduced and glued into corresponding seats formed in the two blocks. A relevant manufacturing method includes only the pre-arrangement of the blocks and of the connecting elements, the introduction of the latter in the corresponding seats formed in the blocks and their gluing in said seats.

[0009] A first great advantage of the present block assembly and of the relevant manufacturing method is a huge saving, achieved by dramatically reducing both the number of components and the assembling steps. This results also in a simplification of the assembling machinery and a significant increase in the manufacturing rate.

[0010] A second important advantage of this block assembly stems from the fact that the insulating panel is not part of the coupling structure between the two blocks. This means that the block assembly can be made even without said insulating panel, which is not possible with the prior art method, and in any case the thickness tolerances of the insulating panel do no affect the manufacturing of the block assembly.

[0011] A further advantage of said block assembly is the possibility of arranging even more than one insulating panel between the two blocks, each panel having different characteristics. Typically, a first panel for thermal insulation and a second panel for acoustic insulation will be combined and arranged slightly staggered to obtain an abutment that guarantees a thermal/acoustic insulation enhanced with respect to a conventional flat panel.

[0012] These and other advantages and characteristics of the block assembly according to the present invention will be clear to those skilled in the art from the following detailed description of two embodiments thereof, with reference to the annexed drawings wherein:

Fig.1 is a perspective exploded view of a first embodiment of the present block assembly;
Fig.2 is a perspective view of said block assembly in the assembled condition ready for use;
Fig.3 shows a top plan view and a front view of the connecting element used in said first embodiment; and
Fig.4 shows a top plan view and a front view of a connecting element that can be used in a second embodiment.

[0013] With reference to figures 1-3, there is seen that a block assembly for buildings according to the present invention conventionally includes a first block B and a second block B' and, preferably, an insulating panel P therebetween. The sides of blocks B, B' facing panel P have at corresponding positions a pair of vertical coupling

seats S, S' extending along the full height of the block assembly.

[0014] The novel aspect of the present invention is provided by the plate-like connecting elements C as well as, by the shape of seats S, S' that are simple rectangular recesses.

[0015] As shown in fig.3, a connecting element C has an elongated plate-like structure with a central wide portion W and two narrow end portions N. This shape of the connecting element C is devised so that the central wide portion W is wider than seats S, S' and therefore acts as a spacer between blocks B, B', whereas the end portions N are sized to enter with a minimum play seats S, S' where they are glued with a suitable adhesive (e.g. polyurethane foam).

[0016] The plate-like structure of the connecting elements C allows them to be easily passed through the insulating panel P, when present, without any previous working of the latter and by means of a mere push since they act like a blade. In this way, the connecting elements C are fastened onto the insulating panel P very quickly and easily, without any risk of damaging panel P and without any problem even when the thickness of panel P is beyond the intended tolerances.

[0017] To make easier the alignment of the connecting elements C and their correct horizontal penetration of panel P, said elements C are preferably provided with longitudinal edge fins F extending substantially perpendicular to the plane of the plate-like structure, typically only at the central portion W. Moreover, in order to increase the bending stiffness of the connecting elements C they are preferably provided with one or more longitudinal ribs R (two in the illustrated example).

[0018] In the second embodiment illustrated in fig.4, there are provided connecting elements C' in which the central portion W' is still a simple rectangular plate, whereas the end portions N' are T-shaped. It is obvious that in this case also seats S, S' will correspondingly be T-shaped, and the introduction of the connecting elements C' will take place through vertical sliding rather than through horizontal sliding as in the first embodiment.

[0019] This second embodiment allows to achieve a longitudinal resistance not only thanks to the gluing but also due to the mechanical coupling between ends N' and the corresponding seats S, S'. However, this implies an increased difficulty in assembling the block assembly and requires a stricter compliance with the manufacturing tolerances for the connecting elements C' and blocks B, B' with respect to the simple rectangular shape of the first embodiment.

[0020] Furthermore, in this second type of connecting element C' there are provided longitudinal edge fins F' more pronounced than the similar fins F of fig.3. In this way, fins F' act also as bending reinforcements and it is unnecessary to provide ribs R.

[0021] It is clear that the above-described and illustrated embodiments of the block assembly according to the invention are just examples susceptible of various modifications. In particular, it is possible to make connecting elements C, C' with other shapes as long as they retain a plate-like structure with a central wide portion W, W' that acts as a spacer between blocks B, B'. Moreover, it is obvious that the number and arrangement of the connecting elements and of the corresponding seats may change according to specific manufacturing needs.

Claims

1. Block assembly for buildings including a first block (B) and a second block (B') that have at least one pair of vertical coupling seats (S, S') formed in their mutually facing sides, as well as at least one pair of connecting elements (C; C') suitable to enter said seats (S, S'), said connecting elements (C; C') having a plate-like structure with a central portion (W; W') wider than the seats (S, S') and end portions (N; N') sized to enter the seats (S, S') with a minimum play, **characterized in that** said seats (S,S') are rectangular or T-shaped recesses extending along the full height of the block assembly.

2. Block assembly for buildings according to claim 1, **characterized in that** it further includes an insulating panel (P) arranged between the two blocks (B, B').

3. Block assembly for buildings according to the preceding claim, **characterized in that** the insulating panel (P) is made up of at least two panels having different characteristics and arranged slightly staggered.

4. Block assembly for buildings according to claim 1 or 2, **characterized in that** the end portions (N) of the connecting elements (C) are shaped so as to enter the seats (S, S') through horizontal sliding.

5. Block assembly for buildings according to one of the preceding claims, **characterized in that** the end portions (N') of the connecting elements (C') are shaped so as to enter the seats (S, S') through vertical sliding.

6. Block assembly for buildings according to one of the preceding claims, **characterized in that** the connecting elements (C') are provided with longitudinal edge fins (F; F') extending substantially perpendicular to the plane of the plate-like structure.

7. Block assembly for buildings according to the preceding claim, **characterized in that** the longitudinal edge fins (F; F') are present only at the central portion (W; W').

8. Block assembly for buildings according to one of the preceding claims, **characterized in that** the con-

necting elements (C; C') are provided with one or more longitudinal ribs (R) suitable to increase their bending stiffness.

9. Method for manufacturing a block assembly for buildings according to one of the preceding claims, including the steps of

a) arranging a first block (B);
b) arranging a second block (B');
c) placing said blocks CB, B') so that they have at least one pair of vertical coupling seats (S, S') in their mutually facing sides;
characterized in that it further includes the steps of
d) arranging at least one pair of connecting elements (C; C') having a plate-like structure with a central portion (W; W') wider than said seats (S, S') and end portions (N; N') sized to enter the seats (S, S') with a minimum play;
e) introducing said end portions (N; N') into the seats (S; S') through horizontal or vertical sliding; and
f) gluing said end portions (N; N') into the seats (S; S') by means of a suitable adhesive.

10. Method according to claim 9, **characterized in that** it further includes the steps of:

c') arranging an insulating panel (P);
d') pushing the connecting elements (C; C') through said insulating panel (P) so as to fasten them onto the latter.

Patentansprüche

1. Bausatz von Blöcken für Gebäude, umfassend einen ersten Block (B) und einen zweiten Block (B'), die mindestens ein Paar von auf ihren einander zugewandten Seiten angeformten senkrechten Kupplungssitzen (S, S') sowie mindestens ein Paar von zum Eintritt in diese Sitze (S, S') angepassten Verbindungselementen (C; C') aufweisen, wobei diese Verbindungselemente (C; C') einen plattenförmigen Aufbau haben, mit einem Mittelteil (W; W'), das breiter ist als die Sitze (S, S'), und mit Endteilen (N; N'), die so dimensioniert sind, um mit minimalem Spiel in die Sitze (S, S') einzutreten, **dadurch gekennzeichnet, dass** diese Sitze (S, S') rechteckige oder T-förmige Ausnehmungen sind, die sich über die ganze Höhe des Bausatzes von Blöcken erstrecken.

2. Bausatz von Blöcken für Gebäude nach Anspruch 1, **dadurch gekennzeichnet, dass** er eine zwischen den beiden Blöcken (B; B') angeordnete Dämmplatte (P) weiter umfasst.

3. Bausatz von Blöcken für Gebäude nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Dämmplatte (P) aus mindestens zwei Platten besteht, die unterschiedliche Merkmale besitzen und etwas versetzt angeordnet sind.

4. Bausatz von Blöcken für Gebäude nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Endteile (N) der Verbindungselemente (C) so ausgestaltet sind, um durch horizontales Gleiten in die Sitze (S, S') einzutreten.

5. Bausatz von Blöcken für Gebäude nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Endteile (N') der Verbindungselemente (C') so ausgestaltet sind, um durch vertikales Gleiten in die Sitze (S, S') einzutreten.

6. Bausatz von Blöcken für Gebäude nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungselemente (C') mit Längsrandflügeln (F; F') versehen sind, die sich im Wesentlichen senkrecht zu der Ebene des plattenförmigen Aufbaus erstrecken.

7. Bausatz von Blöcken für Gebäude nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Längsrandflügel (F; F') nur in dem Mittelteil (W; W') vorgesehen sind,

8. Bausatz von Blöcken für Gebäude nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungselemente (C; C') mit einer oder mehreren Rippe(n) (R) versehen sind, die dazu geeignet ist/sind, ihre Biegesteifigkeit zu erhöhen,

9. Verfahren zur Herstellung eines Bausatzes von Blöcken für Gebäude nach einem der vorhergehenden Ansprüche, umfassend die Schritte von:

a) Anordnen eines ersten Blocks (B);
b) Anordnen eines zweiten Blocks (B');
c) Legen der Blöcke (B; B') auf so einer Weise, dass sie mindestens ein Paar von senkrechten Kupplungssitzen (S, S') auf ihren einander zugewandten Seiten aufweisen,
dadurch gekennzeichnet, dass es die folgenden Schritte weiter umfasst:
d) Anordnen von mindestens einem Paar von Verbindungselementen (C; C'), die einen plattenförmigen Aufbau haben, mit einem Mittelteil (W; W), das breiter ist als die Sitze (S, S'), und mit Endteilen (N; N'), die so dimensioniert sind, um mit minimalem Spiel in die Sitze (S, S') einzutreten;
e) Einführen der Endteile (N; N') in die Sitze (S, S') durch horizontales oder vertikales Gleiten;

und
f) Kleben der Endteile (N; N') in den Sitzen (S, S') mittels eines geeigneten Klebstoffs.

10. Verfahren nach Anspruch 9, **dadurch gekennzeichnet, dass** es die folgenden Schritte weiter umfasst:

c') Anordnen einer Dämmplatte (P);
d') Schieben der Verbindungselemente (C; C') durch die Dämmplatte (P) in so einer Weise, dass sie an dieser Platte befestigt werden.

Revendications

1. Assemblage de blocs pour bâtiments, comportant un premier bloc (B) et un deuxième bloc (B') qui ont au moins une paire de sièges d'accouplement verticaux (S, S') formés dans leurs faces mutuellement opposées, ainsi qu'au moins une paire d'éléments de liaison (C; C') adaptés pour entrer dans lesdits sièges (S, S'), lesdits éléments de liaison (C; C') ayant une structure en forme de plaque avec une partie centrale (W; W') plus large que les sièges (S, S') et des parties d'extrémité (N; N') dimensionnés de façon à entrer dans les sièges (S, S') avec un jeu minimum, **caractérisé en ce que** lesdits sièges (S, S') sont des évidements rectangulaires ou en forme de 'T' s'étendant sur toute la hauteur de l'assemblage de blocs.

2. Assemblage de blocs pour bâtiments selon la revendication 1, **caractérisé en ce qu'**il comporte en outre un panneau isolant (P) disposé entre les deux blocs (B, B').

3. Assemblage de bloc pour bâtiments selon la revendication précédente, **caractérisé en ce que** le panneau isolant (P) est constitué par au moins deux panneaux ayant des caractéristiques différentes et disposés de façon légèrement décalée.

4. Assemblage de blocs pour bâtiments selon la revendication 1 ou 2, **caractérisé en ce que** les parties d'extrémité (N) des éléments de liaison (C) sont conformées de manière à entrer dans les sièges (S, S') par coulissement horizontal.

5. Assemblage de blocs pour bâtiments selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les parties d'extrémité (N') des éléments de liaison (C') sont conformées de manière à entrer dans les sièges (S, S') par coulissement vertical.

6. Assemblage de blocs pour bâtiments selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les éléments de liaison (C') sont pourvus d'ailettes de bord longitudinales (F; F') s'étendant en direction sensiblement perpendiculaire au plan de la structure en forme de plaque.

7. Assemblage de blocs pour bâtiments selon la revendication précédente, **caractérisé en ce que** les ailettes de bord longitudinales (F; F') ne sont présentes que en correspondance de la partie centrale (W; W').

8. Assemblage de blocs pour bâtiments selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les éléments de liaison (C; C') sont pourvus d'une ou plusieurs nervures longitudinales (R) adaptées pour augmenter leur rigidité la flexion.

9. Procédé de fabrication d'un assemblage de blocs pour bâtiments selon l'une quelconque des revendications précédentes, comprenant les étapes consistant à:

a) disposer un premier bloc (B);
b) disposer un deuxième bloc (B');
c) placer lesdits blocs (B, B') de sorte qu'ils ont au moins une paire de sièges d'accouplement verticaux (S, S') dans leurs faces mutuellement opposées;
caractérisé en ce qu'il comprend en outre les étapes consistant à :
d) disposer au moins une paire d'éléments de liaison (C; C') ayant une structure en forme de plaque avec une partie centrale (W; W') plus large que lesdits sièges (S, S') et des parties d'extrémité (N; N') dimensionnées pour entrer dans les sièges (S, S') avec un jeu minimum;
e) introduire lesdites parties d'extrémité (N; N') dans les sièges (S, S') par coulissement horizontal ou vertical; et
f) coller lesdites parties d'extrémité (N; N') dans les sièges (S, S') au moyen d'un adhésif approprié.

10. Procédé selon la revendication 9, **caractérisé en ce qu'**il comprend en outre les étapes consistant à:

c') disposer un panneau isolant (P);
d') pousser les éléments de liaison (C; C') à travers ledit panneau isolant (P) de manière à les fixer sur celui-ci.

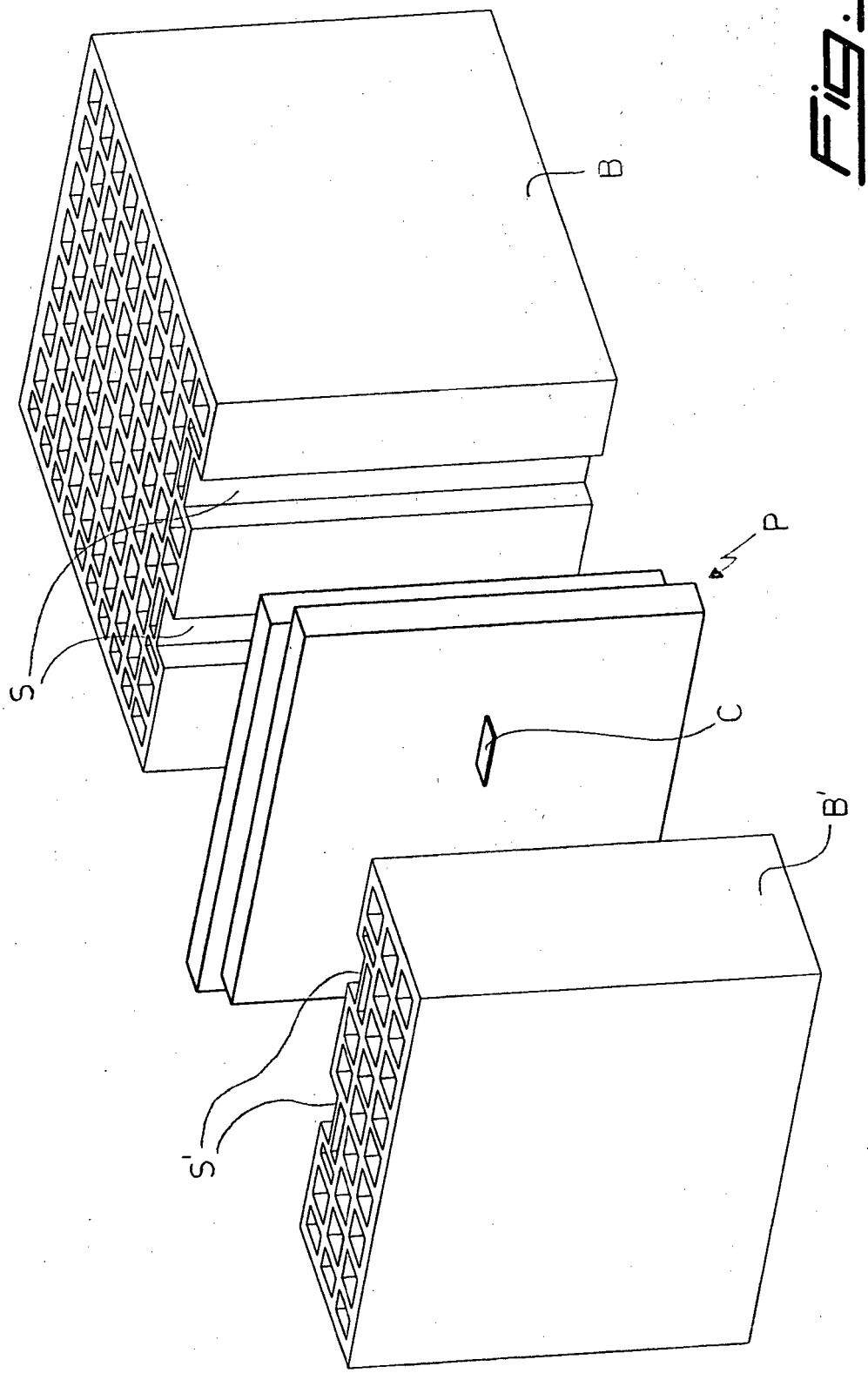
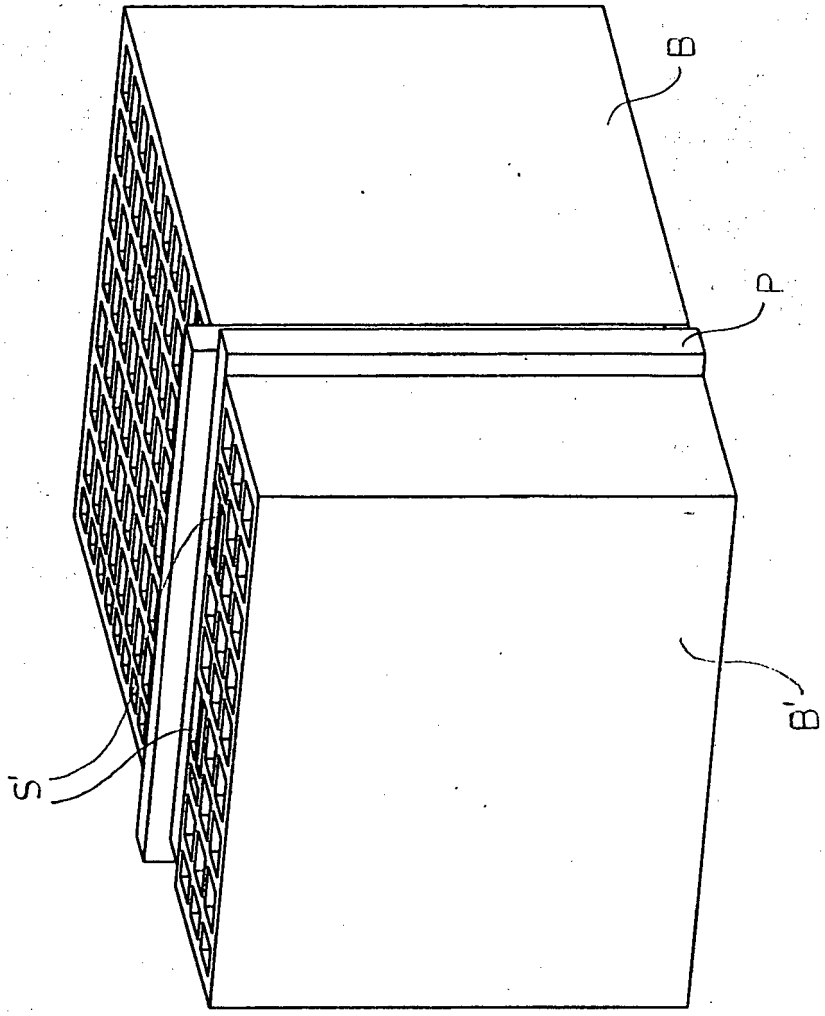
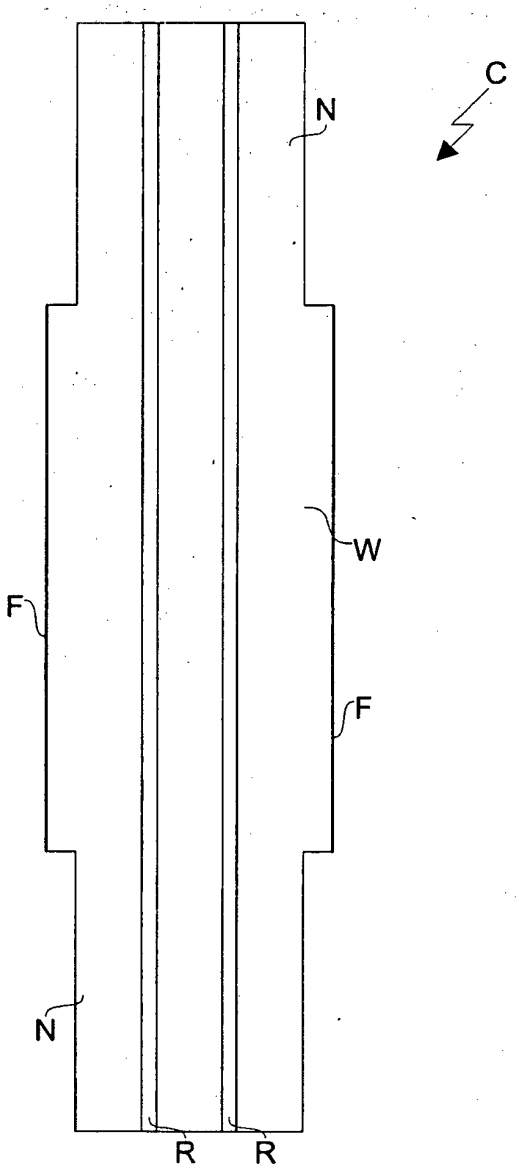


Fig.1

Fig.2





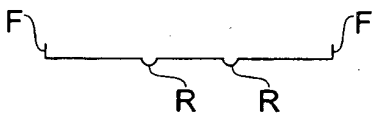


Fig.3

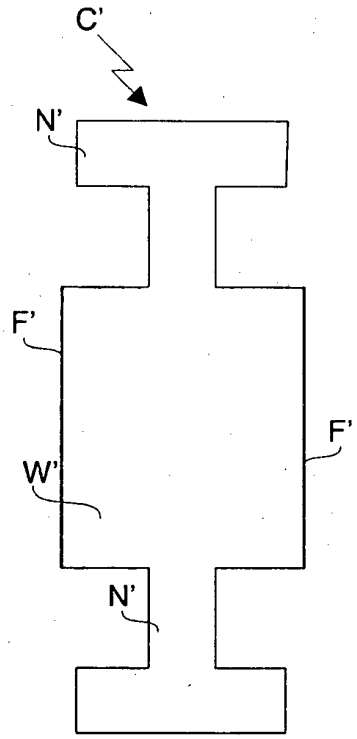




Fig.4

REFERENCES CITED IN THE DESCRIPTION

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- GB 1598237 A **[0007]**