Abstract: Partition for construction, comprising a core formed of prefabricated panels (1) and an outer coating (2). The panels are of a tubular extruded structure, consisting of a series of cells (3) longitudinally overlapped. The end cells (3) have, in the wall defined by the edges of the panels, longitudinal male(7) and female(8) conformations couplable to each other in consecutive panels.
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PARTITION FOR CONSTRUCTION

Field of the invention

The present invention relates to a partition for construction, of the type constituted by a core and an outer coating, whose core constitutes the resistance element of the partition, and whose coating is made up of a mortar or similar and will define the visible surface of the partition.

Background of the invention

Other partitions of the type described are known in the art, in which the core is composed of bricks, pieces, or blocks overlapped and joined together by means of a mortar. The core thus formed is covered on its surfaces with mortar, plaster, etc., in order to obtain the visible surface. The bricks, pieces, or blocks can be either solid or hollow. In any case, the construction of the core requires a long working time, and besides, it does not allow for the development of a construction with good thermal and acoustic insulation properties.

Other partitions are also known in the art, in which the core element is composed of prefabricated panels, which are mounted on a supporting structure, usually on both sides of the structure. This system is expensive, since it requires the preassembly of the supporting structure and the subsequent fixing of the panels to said structure, being it possible to apply a coating product, if desired, to obtain the visible surface.

Some other partitions are also known in the art, which are composed of prefabricated panels made of plastic material, thus citing for example, in this respect, US3992839, which discloses a panel of plastic material which allows for the construction of walls of reduced thickness. The panels are snapped together in order to obtain a wall structure that does not provide adequate thermal and sound insulation properties.

US3662507 describes the formation of walls, more specifically basements, by means of prefabricated panels with grooved inner faces, fixable by means of tongues, which don't allow for a fast construction of the house or other structure being erected, since said tongues cannot be quickly and easily pegged.

US4557091 describes a panel which has an inner hollow space, or cavity, formed by extrusion, by using a process that is prohibitive, time-consuming and expensive, and wherein, besides, the panels obtained do not prove to be the practical and acceptable structures which can form walls at low cost and be covered with the most usual wall coverings.
**Description of the invention**

The present invention seeks to introduce a partition, consisting of a core and an outer coating, whose core is shaped in a way that allows for a fast and simple installation, thus allowing to reduce construction times and costs.

Another advantage of the partition in this invention is that it provides excellent insulation properties, both thermal and acoustic.

A further advantage of the partition of this invention is that it facilitates the fitting of all kinds of service facilities, as well as the arrangement of any accessories and components associated thereof.

In the partition of the invention, the core has external means which ensure the secure positioning and fixation of the outer coating, thereby ensuring the duration of said coating in excellent finish condition.

The partition of the invention is composed of a core and an outer coating. According to the invention the core consists of several prefabricated panels with tubular extruded structure; made of thermoplastic materials, whose tubular structure is defined by or made up of a series of longitudinal cells of polygonal cross section, in overlaying layers. The panel obtained is of the same length and thickness as those of the cells and its height will depend on the number of overlaying cells. The opposite side walls of the cells conforming the panel include external means for fastening the outer coating. Said fastening means may consist of tabs protruding out from the opposite lateral sides of the cells, extending in parallel to said cells. The tabs that make up the fastening means for the outer coating may be flat and protrude through edges and/or angles, determined by the intersection of two sides of the same cell and/or consecutive cells. Furthermore, the longitudinal tabs may be topped off with transversal wings in their unattached end, thus adopting a 'T' shaped profile.

According to another characteristic of the invention, the end cells have some longitudinal, male and female pieces in their unattached side which determines the panel edges, joinable to each other in consecutive panels, so as to define connecting means amongst said panels.

The cells conforming the panel may have inner longitudinal intermediate partitions, for strengthening purposes. In line with these partitions, some longitudinal tabs with the aforementioned structure may also protrude outwardly from the cells.

The cells conforming a panel may have all of them flat surfaces. Also at least partly of the side walls of one area of the cells may have a vertical, curved-convex section.
The aforementioned male and female pieces, which conform the fastening means between consecutive panels, consist of a longitudinal protrusion and a longitudinal channel, respectively, of approximately equal thickness. Both the protrusion and the channel are limited by flat lateral sides joinable by coupling a male element to a female element. Furthermore, the protrusion and the channel both have, in both their edge and base respectively, two opposing grooves which determine, by coupling the male piece to the female piece, a longitudinal accommodation slot for an intermediate connecting element.

The channel defining the female conformation will preferably be of bigger depth than the height of the protrusion defining the male conformation, being it also possible for the female conformation to have some side steps restricting the penetration of the male element and which, when coupling a male conformation to a female conformation will determine an intermediate cavity between the opposing grooves of said conformations:

In order to ensure connection between consecutive panels, through the male and female conformations, the opposing side walls of said male and female conformations include longitudinal ribs and holes, in coincident number, position and section. Theses ribs and holes comprise built-in means, which, upon coupling a male conformation to a female conformation, prevent the accidental separation of the corresponding panels.

Being the panels of a hollow structure, they allow utilities to run through them. In order to be able to access and manipulate these utilities, the side walls of the cells comprise openings. As for the intermediate connecting element, which serves as a means of union among consecutive panels, it shall comprise bars with coincident section with the grooves included in the conformations and in the cavity separating said grooves. Said bars may be independent, isolated pieces, whose sections shall be coincident with the sections of the grooves in the male and female conformations, and with the section in the intermediate hollow cavity separating said grooves. Also, all the bars may form a single piece, whose section shall coincide with that of the whole area delimited between the grooves of the male and female conformations.

As previously stated, the panels conforming the partition of the invention are obtained by means of extrusion of plastic materials, of mixed composition, for example by using recovered plastics, either mixed or virgin, and also reinforced plastics made up of standard fibers, or of any other type. For the manufacturing of the panels the raw material is placed within a hopper and dosed from the storage hopper through the end of some kind of barrel whose exterior is equipped with several resistors generating heat in
each of the various areas where they are located. The barrel is fitted with a screw or small spindle in the inside, which, by rotating, pushes the raw material outward. At the same time said raw material is exposed to a temperature high enough to make it acquire a workable consistency, and then it is moved onto an extruding nozzle which exercises pressure on it. The necessary temperatures and pressure must be strong enough for the raw material to achieve the desired shape and thickness and then make it pass through a caliper or rectifier bridge, whose main functions are those of cooling and rectifying the panels. These functions allow the panels to achieve hardness and structural rigidity. It should be taken into account that both the mold or nozzle and the caliper or rectifier bridge, must possess the same features, i.e. form and design, for the panels to be manufactured.

The following step in the manufacturing process involves cutting the panels in the desired lengths, depending on the applications, or the demand from manufacturers and consumers.

The partitions comprising the panels of the form described above are designed primarily for the massive construction of housings, thus allowing to obtain walls, partitions and coatings generally within a very short time period.

**Brief description of the drawings**

The attached drawings show possible embodiments of the invention, given by way of example only and not as a limitation. In the drawings:

Figure 1 is a partial perspective view of a partition or structure built according to the invention.

Figure 2 is a perspective view of the panel conforming the core of the partition in Figure 1.

Figure 3 is a cross-sectional representation of the panel shown in Figure 2.

Figure 4 is a perspective view similar to that of Figure 1, showing a variant of execution.

Figure 5 is a similar section to that of Figure 3, showing a variant of execution.

Figures 5 to 8 are similar views to that of Figure 3, illustrating other variants of execution of the panel conforming the core of the partition in Figures 1 and 4.

Figure 9 shows a perspective view of the junction of two consecutive panels.

Figure 10 is a cross-sectional view of the junction between two consecutive panels, taken according to the cutting line X-X of Figure 9.

Figure 11 shows a perspective view of the connection between panels in an intersection of partitions at 90°.
Figure 12 is a perspective view similar to that of Figure 11, showing the connection system between panels belonging to walls which cross perpendicularly.

Figure 13 is a perspective view of a possible embodiment of the intermediate connecting element between the panels.

Figure 14 shows a section of the coupling between the male and female pieces of two consecutive panels.

Figure 15 schematically shows a perspective view of the installation for the manufacturing of a panel by extrusion.

**Detailed description of an embodiment**

Figure 1 shows a structure of the partitioning, or wall, composed of a core and a coating.

The core is made up of prefabricated panels 1 of a tubular extruded structure, made of thermoplastic materials with or without the addition of any reinforcing elements. On the other hand, the coating 2 is achieved by using mortars or any other traditional coating materials.

The prefabricated panel 1, as it can be better seen in Figures 2 and 3, is made up of longitudinally overlapping cells 3, of polygonal section, with a common wall 4 between each two consecutive cells 3.

In the example represented by Figures 1 and 2, the cells are of hexagonal section and from their outer side walls, coinciding with the edges and angles defined between consecutive adjacent walls of the same cell and of consecutive adjacent cells, some tabs 5 protrude outwardly extending in parallel to the cells, and which in the example shown are topped off with transversal wings 6 along their longitudinal unattached end, thus adopting each tab 5 a 'T'-like shaped profile.

The tabs 5, along with their wings 6 serve as reinforcement elements for the panel and also as fastening means for the coating 2, figure 1.

The free walls in the end cells, which delimit the longitudinal edges of the panel, have longitudinal male and female conformations couplable to each other in consecutive panels. The male conformations comprise a longitudinal protrusion 7, whereas the female conformation comprises a longitudinal channel 8. The protrusion 7 is limited by flat, longitudinal walls 9 and the longitudinal channel 8 is limited inwardly by longitudinal walls 10 which are also flat, and opposable to one another when coupling the protrusion 7 defining the male confrontation to the channel 8 defining the female conformation. The protrusion 7 has a groove along its free edge 11. For its part, the channel 8 comprises a longitudinal groove 12 at the bottom.
The channel 8 has a greater depth than the height of the protrusion 7 and comprises plateaus or lateral steps 13 which will limit the penetration of the protrusion 7, all of it as it is further explained later on with reference to Figure 14.

As it can be seen in Figure 2, the side walls of the cells 3 comprise access openings 14.

In Figure 4 the panel 1 comprises two end cells 3 of hexagonal section and two intermediate cells 3' of square section, thus allowing to reduce the thickness of the panel in its central area, so as to enable the introduction of boxes 15, controls or elements pertaining to the utility services passing through the cells 3-3'.

The reduction in thickness of panel 1 can be done on either faces of the panel, as it is shown in Figure 4, or only on one of its faces.

In all the cases described so far, the cells 3-3' are limited by flat walls. However, as it is shown in Figure 5, the external side walls 16, Figure 5, can be of a curved-convex shape. Furthermore, the cells may comprise intermediate support partitions 17, which may be coincident with some protruding tabs 5.

As it is shown in Figure 6, the intermediate cells 3' could comprise flat side walls, maintaining the end cells their curved-convex shape 16.

Figure 7 shows another possible embodiment for the cells, in which the end cells comprise curved-convex walls 16 in both sides, whereas the intermediate cells 3' comprise flat walls in one face and curved-convex walls in the opposing face.

Figure 8 shows another possible embodiment, in which the end cells 3 have hexagonal section, whereas the intermediate cells 3' are limited by flat walls 18 on one face and slanted walls 19 on the opposing one, which follow the arrangement of the end walls 3.

Furthermore, the panels shown in Figures 5 to 8 include the same components as the panels described with reference to Figures 2 and 3.

Figure 9 shows the arrangement and connection of two panels 1 overlapped through their longitudinal edges, taking a complanate position in which, as it can be better observed in Figure 14, the protrusion 7 constituting the male conformation of one of the panels sits in channel 8 defining the female conformation of the other panel, thus being the grooves 11 and 12 opposed and separated by a space 20 together defining a longitudinal cavity to house an intermediate connecting element, which, as can be seen from Figure 10, can comprise two end bars 21, of a section coinciding with the grooves 11 and 12, and a central bar 22 of a section approximately coinciding with that of the intermediate cavity 20.
As it can be seen in Figures 10 and 14, the plateaus or steps 13 in the channel 8 limit the penetration of the protrusion 7, defining the intermediate cavity 20.

In the example presented by the drawings, the grooves 11 and 12 are of circular layout, of a slightly larger amplitude than 180°, having the bars 21 a circular section of a radius coinciding with the radius of the grooves 11 and 12. On the other hand, the intermediate bar 22 is of rectangular section, coinciding with that of the intermediate cavity 20.

The bars 21 and 22 may make separate pieces or form a single one, as it is presented in Figure 13.

In this way, the connection between consecutive panels is achieved through the coupling of the protrusion 7 to the channel 8, thus conforming the tongue and groove means and through the inclusion of the bars 21 and 22.

The bars 21 and 22 can also serve as a means of connection between panels belonging to partitions or structures that cross each other. For example, as it is shown in Figures 11 and 12, the bars 21 y 22 can be used as a connecting means between partitions 23 and 24 belonging to walls or structures that impact or meet each other at a right angle.

As it can be seen in Figure 14, the opposing walls 9 and 10 of the protrusion 7 and channel 8 which define the male and female conformations, respectively, may comprise longitudinal ribs 25 and 26 in coincident number, position and section, determining interlocking means between the protrusion 6 that forms the male element and the channel 8 that forms the female element, by consecutively coupling panels 1, as it is shown in Figure 9.

Thus, the connection between overlapping or consecutive panels 1 is defined by the tongue and groove effect achieved by the protrusion 7 and the channel 8, with the bars 21 and 22 which make up the intermediate connecting elements, and by the longitudinal ribs 25 and holes 26 acting as a blocking means to prevent the separation of the tongue and groove elements.

As it can be understood, each of the opposing walls 9 and 10 may comprise more than one rib 25 and one hole 26 each and, besides, said ribs and holes may be made at inclinations going in the same or different direction.

The panels 1, are achieved by extrusion of plastic materials of mixed composition, for example by using recovered plastics, either mixed or virgin, and also reinforced plastics made up of standard fibers, or any other type of fibers, through a process by which the raw material is placed within a hopper and dosed from the storage
hopper through the end of a barrel 27, Figure 15, which is fitted with a small spindle 28, which, by rotating, pushes the raw material outside of the barrel 27, from where it reaches an extruding nozzle 29. The barrel 27 is golden on the outside, and provided with a heating resistor for the raw material being manipulated, which is also heated until reaching the necessary temperature of extrusion, as soon as it exits the barrel 27.

From the nozzle 29 the extruded panel 1 comes out, still at a high temperature, and it is then moved onto and passed through a caliper 30, whose main functions are those of cooling and rectifying the shapes of the panel and its components. As soon as it leaves the caliper 30 a panel 1 is already obtained with enough hardness and structural rigidity. The following step involves cutting the panels in the desired lengths, depending on the requirements.

As it can be understood, the panel may be formed by a number of cells different to that of the panels depicted and described, also being it possible for the cells to have different configurations to those depicted here.

The openings 14 in the walls of the panels, Figure 1, apart from enabling the installation of service utilities in the inside, allow for good air circulation, thus preventing humidity acquired, and reduce weight an cost of raw materials.
CLAMS

1. Partition for construction, comprising a core and an outer coating, characterized in that the core is made up of prefabricated panels of a tubular extruded structure, made of plastic materials, consisting of a series of longitudinally overlapping cells, of polygonal cross section, whose opposing side walls comprise external fastening means for the attachment of the outer coating, and whose end cells have, —in the walls defined by the edges of the panels— some longitudinal male and female conformations, couplable to each other between consecutive panels.

2. Partition according to Claim 1, characterized in that the cited interlocking means comprise small tabs protruding the walls of the cells, in parallel to said cells.

3. Partition according to Claim 2, characterized in that said tabs protrude along edges and/or angles determined by the intersection of two walls of the same cell and/or consecutive cells.

A. Partition according to Claim 1, characterized in that the cells comprise inner longitudinal intermediate partitions, for strengthening purposes, arranged in parallel to the male and female conformations.

5. Partition according to Claim 4, characterized in that some longitudinal tabs, coinciding with the strengthening intermediate partitions, protrude from the walls of the cells.

6. Partition according to Claims 3 & 5, characterized in that the longitudinal tabs are topped off by some transversal wings, adopting a T profile.

7. Partition according to Claim 1, characterized in that all of the walls of the cells are flat.

8. Partition according to Claim 1, characterized in that at least part of the side walls of a face of the cells is of vertical curved-convex section.

9. Partition according to Claim 1, characterized in that the male and female
conformations comprise a longitudinal protrusion and a longitudinal channel, respectively, of approximately equal thickness, which are limited by opposable flat side walls, and which comprise, in the edge and base of the protrusion and the channel, two opposing grooves which determine, by coupling the male piece to the female piece, a longitudinal accommodation slot for an intermediate connecting element.

10.- Partition according to Claim 1, characterized in that the channel defining the female conformation is of bigger depth than the height of the protrusion defining the male conformation, and it comprises lateral steps restricting the penetration of said protrusion and which define, when coupling a male conformation to a female conformation, an intermediate cavity between the opposing grooves of said conformations.

11.- Partition according to Claim 1, characterized in that the opposing side walls of the protrusion and the channel which define the male and female conformations, include longitudinal ribs and holes, in coincident number, position and section.

12.- Partition according to Claim 1, characterized in that the side walls of the cells have access openings.

13.- Partition according to Claim 9, characterized in that the connecting elemento intermedio de conexion está constituido por barras de seccion coincidente con las de las acanaladuras de las conformaciones y del hueco que separa dichas acanaladuras.

14.- Partition according to Claim 13, characterized in that que todas las barras constituyen una sola pieza.

15.- Partition according to Claim 13, characterized in that the intermediate connecting element comprises three independent bars, of coincident sections with those of the grooves included in the male and female conformations as well as that of the intermediate cavity separating said grooves.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. E04B2/84
ADD. E04B1/61

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)
E04B

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>FR 2 937 660 AL (TETAUD FRANCIS [FR]; RANTI ERE DAVID [FR]; HERAULT CHRISTIANE [FR]) 30 April 2010 (2010-04-30) page 7, line 5 - line 30 page 12, line 29 - page 13, line 8; figures 1-5 page 3, line 3 - line 31</td>
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<td>US 2009/308001 AL (WU SHAOBING [US] ET AL) 17 December 2009 (2009-12-17) paragraphs [0037], [0055] - [0058], [0134], [0143]; figures 1-3, 11, 12</td>
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Further documents are listed in the continuation of Box C. 

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