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(54) **Partitioning masonry structure having insulating properties**

(57) A partitioning masonry structure (1) provided with two opposite faces (1a, 1b) substantially parallel to each other; the masonry structure (1) further comprising at least one substantially horizontal layer (s) of thermal insulating material inserts (4), which is formed by at least a first (g) and a second row (g) of thermal insulating material inserts (4), which rows are parallel to each other and extend on a same laying plane side-by-side and reciprocally spaced; the first (g) and second rows (g) of

thermal insulating material inserts (4) being both formed by a respective number of thermal insulating material inserts (4) which are aligned and spaced from one another in a comb-like arrangement; the first (g) and second (g) rows of thermal insulating material inserts being further reciprocally offset so that the thermal insulating material inserts (4) forming the aforesaid first row (g) of inserts are substantially in a quincunx-like arrangement with respect to the thermal insulating material inserts (4) forming the aforesaid second row (g) of inserts.

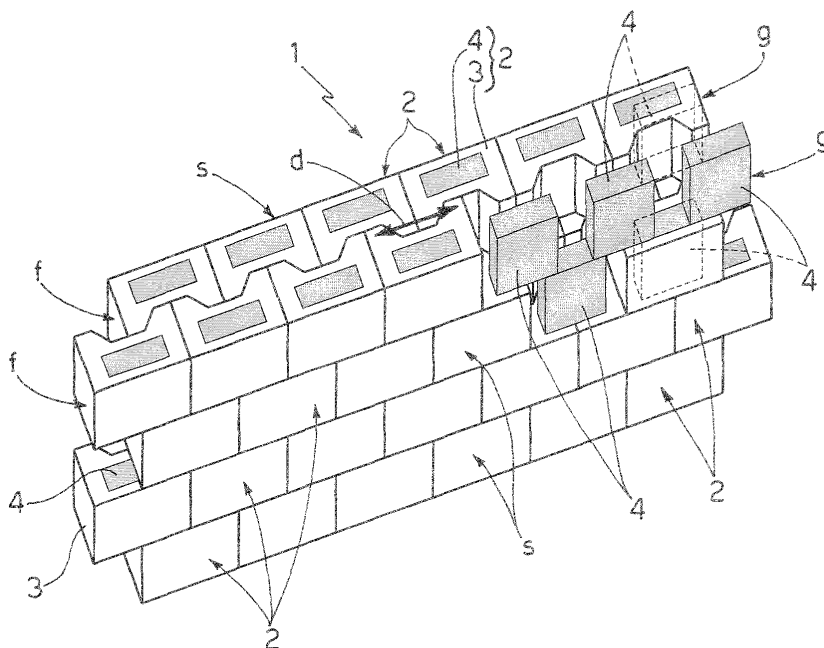


Fig. 1

Description

[0001] The present invention relates to a partitioning masonry structure having insulating properties.

[0002] As known, a progressive increase in the average thickness of peripheral walls of new buildings has been observed over the past years. Such an increase has been dictated by the need to meet the progressive decrease of the maximum thermal transmittance value of the external walls of new residential buildings determined by new regulations.

[0003] The increase of the average thickness of peripheral walls has not obviously created major problems in the building of small-sized housing units, where the thickness of the peripheral masonry walls has reached, and in some cases widely exceeded, 50 centimeters, while it has instead created considerable difficulties in the building of large-sized buildings, where the peripheral walls must combine high thermal insulation capacity and very light weight, so as to prevent the load-bearing structure of the building made of reinforced concrete from overburdening.

[0004] In fact, in case of large-sized buildings, as normal extra-thick masonry walls may not be used due to the excessive increase of weight bearing on the load-bearing structure of the building, planners have been forced to decrease the walls thermal transmittance by applying, on a traditional reduced-thickness masonry wall, a compact layer of thermal insulating material with very low thermal conductivity (such as closed-cell polystyrene foam), which seamlessly extends along the entire wall.

[0005] More in detail, according to manufacturing needs, the layer made of insulating material may be placed either between two layers of bricks, thus forming a sandwich structure, or directly on the external surface of the masonry wall, thus forming an external protective casing having high thermal insulating capacity, traditionally named overcoat, which covers the entire building.

[0006] Unfortunately, even if the layer of thermal insulating material is made of high-quality materials, in both solutions a noticeable reduction of the wall thermal inertia and of the wall capacity of thermally regulating the rooms inside the building has been found, as well as a drastic reduction of wall transpiration, with all the drawbacks that this implies in terms of proliferation of moulds and fungi.

[0007] It is the object of the present invention to make a partitioning masonry structure with a high insulating capacity, which is free from the aforesaid drawbacks.

[0008] In accordance with these aims, according to the present invention there is provided a partitioning masonry structure as disclosed in claim 1 and preferably, though not necessarily, in any one of the dependent claims.

[0009] The present invention will now be described with reference to the accompanying drawings, which show a non-limitative embodiment thereof, in which:

- figure 1 is a perspective view of a masonry partition-

ing structure made according to the teachings of the present invention;

- figure 2 is a section view of the partitioning masonry structure shown in figure 1; whereas
- figure 3 is an exploded perspective view of the brick used for making the partitioning masonry structure shown in figures 1 and 2.

[0010] With reference to figures 1 and 2, number 1 indicates as a whole a partitioning masonry structure preferably, though not necessarily, with a vertical development, which is particularly suitable for being used for making the peripheral walls of any building, even of large size.

[0011] The masonry structure 1 has two opposite faces 1a and 1b which are locally parallel to each other, and is formed by a series of horizontal layers s of bricks 2 arranged overlapped, each of which is formed by at least two horizontal rows f of bricks 2 parallelly and closely side-by-side arranged, which are appropriately offset one another so as to form, within the layer s, a quincunx-like arrangement of the bricks 2.

[0012] In addition to the above, the layers s of bricks 2 are horizontally offset one another, so that the two rows f of bricks 2 of a layer s are substantially coplanar and horizontally offset with respect to the two rows f of bricks 2 of the layer s immediately above or beneath, so that the bricks 2 forming the two faces 1a and 1b of the masonry structure 1 are arranged according to a quincunx-like arrangement.

[0013] With reference to figures 1, 2 and 3, the bricks 2 which form the single layers s of the masonry structure 1, consist of a substantially parallelepiped-shaped blockwork 3 having a load-bearing function, and a preferably, though not necessarily, parallelepiped-shaped insert 4 which is made of a very low thermal conductivity material, and which is firmly inserted into a seat 3a appropriately realized in the middle of the blockwork 3.

[0014] More specifically, in the example shown, the insert 4 consists of a substantially parallelepiped-shaped lap 4 of closed-cell polystyrene, while the blockwork 3 is provided with a series of rectangular-section through holes which extend into the body of the blockwork 3, perpendicularly to the two bases of the latter, so as to form a series of air chambers or gaps locally parallel to the surfaces of the larger lateral faces of the blockwork 3 itself.

[0015] Unlike the currently known masonry structures, however, the width l_1 of the insert 4 is smaller than the nominal width l_0 of the blockwork 3 (coinciding with the nominal width of the brick 2), both measured parallelly to the directrix d along which the bricks 2 of a same row f are aligned, and a depth p_1 smaller than the nominal depth p_0 of the blockwork 3 (coinciding with the nominal depth of the brick 2), both measured perpendicularly to the directrix d along which the bricks 2 of a same row f are arranged, so as to form, inside each layer s of bricks 2, two horizontal rows g of inserts 4 made of thermal

insulating material, which extend parallelly and reciprocally spaced, and which are both formed by a number of appropriately and reciprocally spaced inserts 4.

[0016] More in detail, with particular reference to figures 1 and 2, the two rows g of thermal-insulating material inserts 4, which are realized inside a layer s of bricks 2, lay on a same, substantially horizontal plane; are formed by a number of inserts 4 aligned one after the other along the directrix d according to a comb-like arrangement; and are horizontally offset one another so as to form a quincunx-like arrangement of the inserts 4 in the layer s. In this manner, each insert 4 is aligned and facing a respective opening or space, laterally delimited by two immediately facing, consecutive inserts 4 of the row g.

[0017] In particular, in the example shown, the width l_1 of the insert 4 is larger than half the nominal width l_0 of the blockwork 3, while the height of the insert 4 rounds down the nominal height h_0 of the blockwork 3, in turn coinciding with the nominal height of the brick 2. As a consequence, each insert 4 has a larger width than the width l_2 of the openings or spaces which are formed between two consecutive inserts 4 of a same row g, and is thus dimensioned so as to completely shield the immediately facing opening or space.

[0018] In addition to the above, with reference to figures 1 and 2, since the two rows f of bricks 2 of a layer s are substantially coplanar and horizontally offset with respect to the two rows f of bricks 2 of the layer s immediately above or beneath, the rows g of inserts 4 are distributed within the masonry structure 1 on two different, parallel and reciprocally spaced laying planes P' and P'', which lay on opposite sides of the vertical middle plane of the masonry structure 1, while the rows g of inserts 4 which lay on a same laying plane P', P'' are reciprocally arranged according to a quincunx-like arrangement, so that the inserts 4 are distributed on the laying plane P', P'' according to a substantially chessboard-like spatial arrangement.

[0019] As regards instead the shape of the blockworks 3, with reference to the figures 1, 2 and 3, in the example shown each brick 2 is formed by a parallelepiped-shaped blockwork 3 which has a longitudinal groove 3b on one of the two larger vertical faces, having a cross section substantially shaped as a downward converging isosceles trapezoid; whereas the two lateral sides 3c of the blockwork 3 which flank and delimit the longitudinal groove 3b, have a cross section substantially shaped as a right-angled trapezoid having dimensions complementary to those of the longitudinal groove 3b, so as to be able to engage the aforesaid longitudinal groove 3b in pairs.

[0020] In other words, the height of the right-angle trapezoid is substantially equal to the height of the isosceles trapezoid, while the width of the larger/smaller base of the right-angled trapezoid is substantially equal to half the width of the larger/smaller base of the isosceles trapezoid, so that the lateral sides 3c of the blockworks 3 of two consecutive bricks 2 of a same row f may fill up, one

beside the other, the longitudinal groove 3b of the brick 2 of the adjacent row f.

[0021] Operation of the masonry structure 1 is similar to that of a traditional partitioning masonry structure used for building the peripheral walls of a building, with the difference that the positioning of the inserts 4 on two different, reciprocally parallel and spaced laying planes P' and P'', according to a substantially chessboard-like spatial arrangement in which the inserts 4 of a laying plane P', P'' are aligned with the openings or spaces delimited by the inserts 4 on the other laying plane P'', P', allows to obtain a partitioning wall with thermal transmittance values capable of fully meeting the new building specifications, and with a good transpiration capacity.

[0022] Furthermore, the masonry structure 1 substantially preserves the typical thermal inertia and thermal regulation capacity of a masonry structure without a continuous layer made of thermal insulating material, with all the advantages that this implies.

[0023] Clearly, changes may be made to the masonry structure 1 as described above, without however departing from the scope of the present invention.

[0024] For example, in a different embodiment (not shown), the bricks 2 which form the masonry structure 1 do not integrate the inserts 4 made of thermal insulating material therein, but are instead arranged overlapped so as to create a series of closed recesses or cavities, between the two faces 1a and 1b of the masonry structure, into which the inserts 4 made of thermal insulating material are inserted.

[0025] Obviously, for preserving the same spatial arrangement of the inserts 4 inside the masonry structure 1, the recesses or cavities are obviously distributed on two different laying planes which are arranged reciprocally parallel and spaced on opposite sides of the middle plane of the masonry structure 1. The recesses or cavities which lay on a same laying plane, are further distributed on such a plane according to a substantially chessboard-like spatial arrangement, and are offset with respect to the recesses or cavities which lay on the other laying plane, so that each closed recess or cavity is aligned with a respective opening or space between two adjacent recesses belonging to the other laying plane.

[0026] As regards instead the inserts 4, rather than being formed by laps of closed-cell polystyrene foam, each one may be possibly formed by a mass of cork granules, perlite granules, "laterlite" granules or other bulk insulating material, appropriately compacted into the seat 3a in the blockwork 3 or in the recess directly obtained in the masonry structure 1.

Claims

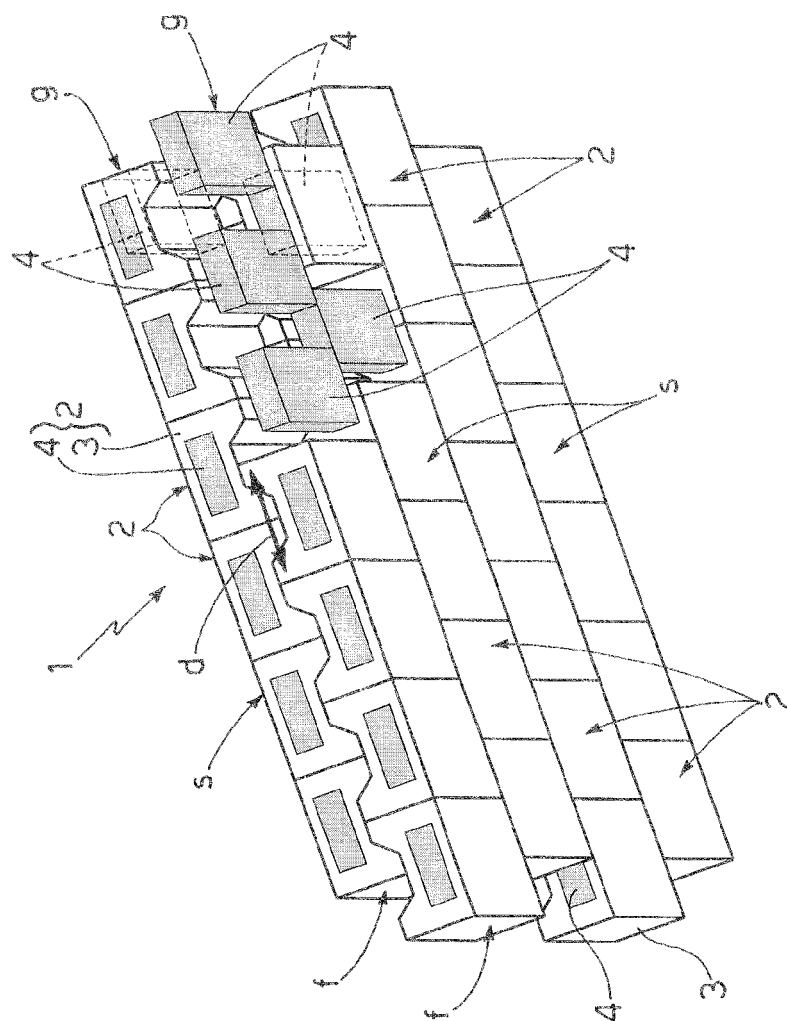
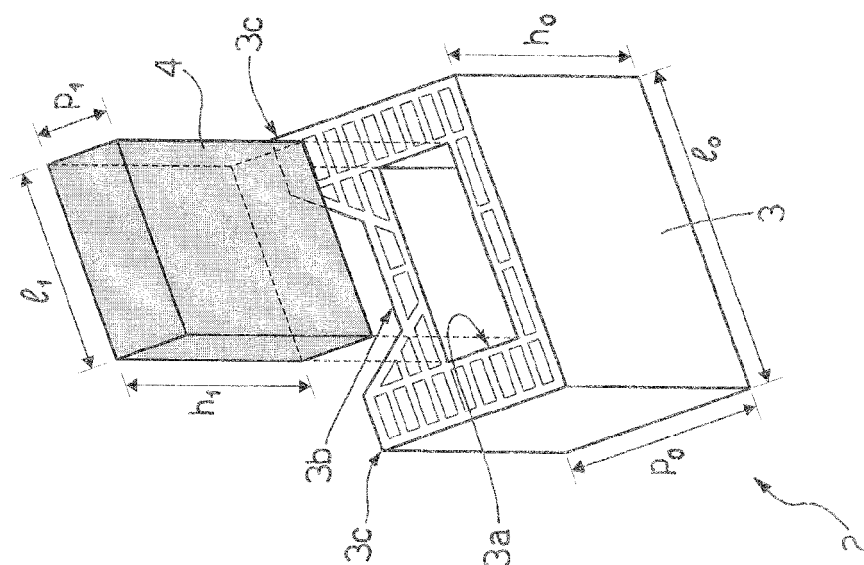
1. A partitioning masonry structure (1) provided with two opposite faces (1a, 1b) substantially parallel to each other; the masonry structure (1) being **characterized in that** it comprises at least one layer (s) of

thermal insulating material inserts (4), which is formed by at least a first (g) and a second row (g) of thermal insulating material inserts (4) extending side-by-side and reciprocally spaced on a same laying plane; said first (g) and second (g) rows of thermal insulating material inserts (4) being both formed by a respective number of thermal insulating material inserts (4) which are aligned and spaced out one after the other, according to a comb-like arrangement; the first (g) and second (g) rows of thermal insulating material inserts being furthermore reciprocally offset so that the thermal insulating material inserts (4) forming said first row (g) of inserts are substantially in a quincunx-like arrangement with respect to the thermal insulating material inserts (4) forming said second row (g) of inserts.

2. A masonry structure according to claim 1, **characterized in that** each thermal insulating material insert (4) is aligned with a respective opening formed by two consecutive, immediately facing thermal insulating material inserts (4) belonging to the other row (g) of inserts.
3. A masonry structure according to claim 2, **characterized in that** each said thermal insulating material insert (4) has a larger width than the width of said opening formed by the two consecutive, immediately facing thermal insulating material inserts (4) belonging to the other row (g) of inserts.
4. A masonry structure according to any one of the preceding claims, **characterized by** being formed by a series of overlapped layers (s) of thermal insulating material inserts (4); said layers (s) of inserts being reciprocally aligned so that the first rows (g) of thermal insulating material inserts (4) belonging to each layer (s) lay all on a first reference plane (P'), and that the second rows (g) of thermal insulating material inserts (4) belonging to each layer (s) lay all on a second reference plane (P''), locally parallel and spaced from said first reference plane (P').
5. A masonry structure according to claim 4, **characterized in that** the first/second rows (g) of thermal insulating material inserts (4) belonging to two consecutive layers (s) are reciprocally offset, so that the thermal insulating material inserts (4) laying on said first/second reference plane (P', P'') and belonging to the lower layer (s) of inserts, are substantially arranged in a quincunx-like arrangement with respect to the thermal insulating material inserts (4) laying on said first/second reference plane (P', P'') and belonging to the higher layer (s) of inserts.
6. A masonry structure according to any one of the preceding claims, **characterized by** comprising at least one layer (s) of bricks (2) which is formed by at least

two reciprocally parallel rows (f) of bricks (2) arranged side-by-side, with the bricks (2) of one row (f) in a quincunx-like arrangement with respect to the bricks (2) of the other row (f); each brick (2) accommodating one said thermal insulating material insert (4) therein.

7. A masonry structure according to claim 6, **characterized in that** each said brick (2) comprises a substantially parallelepiped-shaped blockwork (3) serving a load-bearing function, and a thermal insulating material insert (4) firmly inserted into a seat (3a) specifically obtained in the middle of said blockwork (3).
8. A masonry structure according to claim 7, **characterized in that** the body of said blockwork (3) has a longitudinal groove (3b), on one of the two larger vertical faces, having a cross section substantially shaped as a downward converging isosceles trapezoid, while the two lateral sides (3c) of the blockwork (3) which flank and delimit said longitudinal groove (3b), have a cross section substantially shaped as a right-angled trapezoid having dimensions complementary to those of the longitudinal groove (3b), so as to be able to engage said longitudinal groove (3b) in pairs.
9. A masonry structure according to any one of the preceding claims, **characterized in that** said at least one layer (s) of thermal insulating material inserts (4) is substantially horizontal.



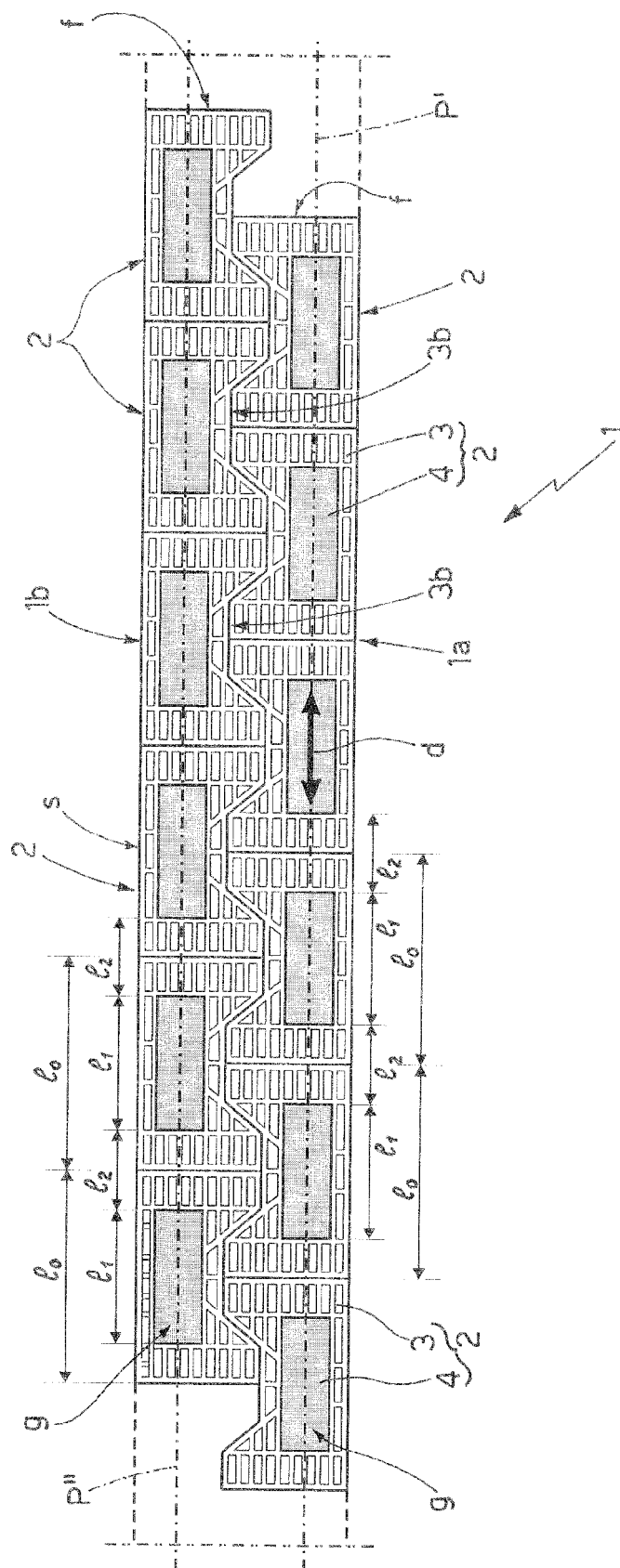


Fig. 2