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(54) CONSTRUCTION METHOD USING BAGS OF MATERIAL

(57) A method for the construction of dwellings by means of the use of bags refilled of material, conformed by the following stages: **I)** cleaning the ground; **II)** preparing and improving the ground; **III)** preparation and placement of foundation slab, **IV)** building the walls of the dwelling using bagged material, wherein the construction of said walls is made in two parts, where the first part includes the steps of: a) providing the bags already filled and sealed; b) placing an aviary mesh; c) stowing the bags longitudinally up to an intermediate height, wherein the storing of said bags is done in an interleaved manner, and in such a way that the ends of the bags abut each other, d) compacting the bags of each row, and perforating them to release moisture, and wherein every two courses of bags the aviary mesh is secured on both sides of the wall, wherein once reached the intermediate height e) securing the upper ends of the aviary mesh to the upper part of the wall and the lateral ends of the same to the castles, at the ends of the walls there are jagged spaces, so that when the castle is casted the wall is embedded in the castle; and f) placing a metallic structure of an intermediate girder on the upper end of said wall, g) placing and securing a second aviary mesh to said metallic structure, so that said second mesh is aligned with the first mesh, h) pouring concrete on the structure of the girder and on the first half of the castles to form a single element, and to secure the lower ends of the second mesh to said intermediate girder; wherein the second part comprises the steps of: i) repeating steps a), b), c), d), e) f), g) and h) until reaching a final or enclosure height, and j) placing a closing girder on the upper end of the second part of the wall, k) pouring concrete on the structure of the enclosure girder and on the second half of the castles to form a single element, **V)** placing the hydraulic, sanitary and electrical installations on the finished walls, applying the final finishings, and **VI)** placing the roof of the house.

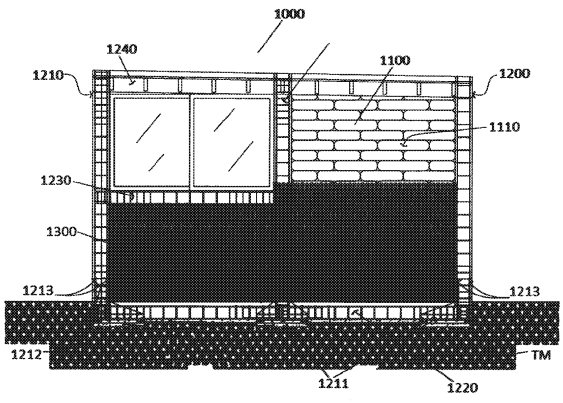

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention is related to the sector of the construction industry. Particularly, the present invention refers to a method for building houses of social interest through the use of bags filled with sand, earth or the like, which are used instead of conventional bricks.

BACKGROUND OF THE INVENTION

[0002] At present, in the prior art, there are several construction processes and systems for building dwellings or houses of social interest, among which are the conventional methods or processes, wherein bricks are used which are joined by a bonding solution known as "mixture". This type of procedures has several drawbacks among which are the high cost of the construction materials such as brick, partition or block that depending on the area where the homes will be built, a specific type of brick should be used, a particular type of cement as well as sand and / or gravel, which together with the labor force, considerably increases the cost of each house, which makes them too expensive for an average inhabitant. In the same way, there is the problem of the rigidity of the walls, which in case of an earthquake or by the movements of the ground, causes the walls to break or crack, thereby reducing considerably the lifetime of the houses.

[0003] On the other hand, there are the construction systems with prefabricated elements made of light materials, which present the problems of also having a low resistance to the movements of the ground due to earthquakes or the movements of the same. In addition, the materials used in this type of process do not have any thermal or acoustic insulation, so it is necessary to use additional thermal and acoustic insulation, which increases the cost of the prefabricated blocks or plates. Another problem presented by houses manufactured with this type of process is the low load supported by the walls compared to a wall made with bricks.

[0004] Similarly, a common problem in houses manufactured with the above mentioned methods or processes is the generation of moisture or saltpeter in the walls, which is impossible to avoid with such methods. In the same way, one more problem of the conventional methods or processes is the time in which the construction is finished, which is very long.

[0005] In this sense, in the prior art there are references on alternative construction processes, such as the document MX2008011228 which discloses a modular construction system of walls with refillable formwork having an integrated finishing. The process disclosed in this document presents the disadvantages of manufacturing walls that are not load walls, but only dividing walls with an integrated finishing to avoid the use of additional surface finishings.

[0006] Likewise, the document US2007041793 discloses a method of reinforcing filler with fine grain, which refers to the manufacture of a reinforcing means in the anchoring of a construction structure such as retaining walls, rods, beams, switches, roads and highways, elevated roads, and the like.

[0007] Equally, the document KR101131556 discloses a method to build walls using soil bags, wherein once the wall is built, bags filled with soil and seeds are placed at the base of the walls, so as to provide reinforcement to the same, and once the bags are placed, they have the double function of serving as ornamental or mural garden media, since the bags have holes for the germinated plants of the seeds go out outwards.

[0008] Finally, there are the documents US2009304458 and EP1171668, which disclose systems of union and retention of walls made with bags filled with earth or similar, the walls made with these methods have the problem of being only dividing walls, that is to say, they do not support large loads, likewise, in order that these walls can be manufactured it is necessary to use tie plates between each bag, which stiffens the wall and reduces resistance to ground movements.

[0009] Therefore, there is not any method in prior art for the construction of houses of social interest by using bags filled with sand, earth or the like, which does not use means of union between the bags, and which is low cost and a short time of construction.

OBJECTS OF THE INVENTION

[0010] It is, therefore, an object of the present invention to provide a method for the construction of dwellings by using bags filled with material, which does not use joining means between the bags.

[0011] A further object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the time to finish the houses is reduced from 70 to 80% in relation to the conventional methods.

[0012] Another object of the invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the houses built by said method are totally thermally and acoustically isolated.

[0013] A further object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the houses constructed by said method are bulletproof and impact proof.

[0014] Still another object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the houses constructed by said method absorb the telluric movements.

[0015] Still another object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein

there is a saving in construction materials of 68 to 70%

[0016] Another additional object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the generation of humidity and salt in the walls of the houses is completely eliminated.

[0017] A further object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the houses built by said method have a lifetime of 250 to 300 years.

[0018] A further object of the present invention is to provide a method for the construction of dwellings by means of the use of bags refilled of material, wherein the walls of the houses built by said method bear loads of 1.2 to 1.5 Ton/cm^2.

BRIEF DESCRIPTION OF THE INVENTION

[0019] These and other objects are achieved through a method for the construction of dwellings by means of the use of bags refilled of material, which is mainly conformed by the following stages: **I)** cleaning the ground wherein the construction will be built; **II)** preparing and improving the ground, wherein said preparation and improvement comprises the steps of: a) digging until finding a firm floor, b) placing a homogeneous filter layer conformed of stone or gravel, c) placing a banding layer conformed by gravel-sand in a ratio of 70-30, d) mechanically compacting the ground until reaching a PROCTOR of 98, and e) tuning and punctuating the ground; **III)** placing sanitary registry and installation; **IV)** preparation of foundation slab, wherein the preparation of the foundation slab includes the steps of: a) locating dentils, b) digging the pile caps or ditches where footings, girders, and castles will be placed, c) placing a plastic membrane with a caliber of 200 to 600 on the surface where the foundation slab will be placed and on the pile caps, d) placing the metallic structure of the foundation slab on said plastic membrane wherein said metallic structure is conformed by said footings, girders, castles and electro-welded mesh, e) placing the hydraulic and electrical pipes within said girders and castles, f) placement of the perimeter of the foundation slab; pouring the concrete, which is a concrete F'C250 Kg/cm2; once the slab has been set, **V)** building the walls of the dwelling using bagged material, for which, the construction of said walls is made in two parts, where the construction of the first part includes the steps of: a) providing bags made with the same plastic membrane used in stage IV), b) filling said bags with a mixture of thin stone material and lime, c) sealing the bags; d) placing an aviary mesh so that the bags wall is placed in the middle thereof symmetrically; e) stowing or stacking the bags longitudinally up to an intermediate height, wherein the storing of said bags is done in an interleaved manner, and in such a way that the ends of the bags abut or meet each other, f) compacting the bags of each row, where once compacted, the bags are perforated to release moisture, and wherein every two rows or courses of bags the aviary mesh is secured on both sides of the wall, with wire ties at every 0.50 meters of distance in the horizontal direction, wherein once reached the intermediate height g) securing the upper ends of the aviary mesh to the upper part of the wall and the lateral ends of the same to the castles, with wire, wherein at the ends of the walls that intersect with the castles, they are jagged spaces, so that when the castle is casted the wall is embedded in the castle; and h) placing a metallic structure of an intermediate girder on the upper end of said wall, which is connected to the castles, i) placing and securing a second aviary mesh to said metallic structure, so that said second mesh is aligned with the first mesh, j) pouring concrete on the structure of the girder and on the first half of the castles to form a single element, and so that the lower ends of the second mesh are drowned in said intermediate girder; wherein the construction of the second part comprises the steps of: k) repeating steps a), b), c), e), f) and g) until reaching a final height or enclosure, and l) placing a metallic structure of a closing girder on the upper end of the second part of the wall, which is connected to the castles, j) pouring concrete on the structure of the enclosure girder and on the second half of the castles to form a single element, repeating the stage V) for each wall of the house, wherein once completed the walls **VI)** placing the hydraulic, sanitary and electrical installations on the finished walls, applying a final or finishing layer to the walls to hide the bags, mesh and said hydraulic, sanitary and electrical installations, and **VII)** placing the roof of the house.

[0020] The additional features and advantages of the invention should be more clearly understood by the detailed description of the preferred embodiment thereof, given by way of non-limiting examples with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE FIGURES

[0021]

Figure 1 is a cross sectional view of a house or dwelling constructed by the method of the present invention.

Figure 2 is a lateral cross-sectional view in detail of the foundation of a house or dwelling constructed by the method of the present invention.

Figures 3 to 8 graphically show the steps of cleaning and preparation of ground, of the method for the construction of dwellings using bags refilled of material, of the present invention.

Figures 9 to 12 graphically show the stage of preparation of the foundation slab, of the method for the construction of dwellings using bags refilled of material, of the present invention.

Figures 13 to 20 graphically show the stage of manufacturing the walls of the house and the final finishes thereof, of the method for the construction of dwellings using bags refilled of material, of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] Referring to Figures 1 and 2, the building, house or dwelling made with the method of the present invention already completed is shown in a general manner, wherein it can be appreciated in a clear and precise manner, all the components conforming it, whose assembly and placement will be explained in detail below. According to the present invention, said dwelling, which is generally numbered in 1000, is conformed by a plurality of walls 1100 which are composed of two sections made of bags 1100 filled with a mixture composed of a stony material and lime in a proportion of 70/30. As can be seen in said Figures 1 and 2, the filled bags 1110 are placed on a foundation slab LC, longitudinally, and are positioned in such a way that the ends thereof abut or meet with each other in order to avoid the leakage of material. Likewise, it can be seen in Figure 1 that the filled bags 1110 are stowed in lines or rows in an "interleaved" manner to prevent the wall from collapsing.

[0023] Said home is additionally comprised of a load and stability structure 1200, composed of a metallic structure consisting of castles 1210, footings, 1211, reinforcing girders 1220, intermediate girders 1230 and enclosing girders 1240, as well as various metallic reinforcements 1212, which are placed with concrete to provide adequate rigidity and stability to the dwelling.

[0024] Referring again to Figure 2, the conformation of the reinforcement structure and its placement with respect to the walls and the improved ground can be seen in detail.

[0025] With reference now to Figures 3 to 20, each and every one of the stages and steps that conform to the method of the present invention will be shown graphically.

[0026] With respect to Figures 3 to 8 the cleaning and preparation stages of the ground are described, which are conformed by the steps of:

Digging to dislodge the organic material until the firm floor is found, to supply in its place, improved stone material, as shown in Figure 3.

[0027] Placing, as shown in Figure 4, a first homogenous layer of stone (filter) duly compacted, and on this, placing a second layer of moistened gravel with sand in a proportion 70/30, crossing said layers with vibro-compactor in layers of 20 cm thick. Subsequently, as shown in Figure 5, compacting the ground mechanically, until reaching a PROCTOR of 98, and as suggested by the soil mechanics study, tuning, as shown in Figure 6, the surface of the ground with fine aggregates or "tepetate" in layers no greater than 20 cm thick, until achieving the compaction suggested by said soil mechanics study. Subsequently, as shown in Figure 7, the punching of the ground is performed, wherein once the ground is leveled, cement and lime are sprinkled, achieving a stable monolithic piece, free of moisture, and granular stone material, which will prevent break the plastic membrane.

[0028] Once this is done, the excavation is carried out with a thread-based blowout for the placement of a sand bed and then placing on this the PVC sanitary pipe, centering the current to the registry and thus compacting the excavated surface with lightweight material, as shown in Figures 8 and 9.

[0029] Referring now to Figures 9 to 12, the step of preparation of the foundation slab LC is described, wherein said slab is made of concrete F'C = 250 kg/cm^2 reinforced with electro-welded mesh 6-6/10-10, insulated footings reinforced with rod n° 3 (3/8"/0.952 cm), reinforcing girders with armex, chains of garter with armex, anchoring with rods of 3/8" (0.952 cm) in the armex castles, rod canes n° 3 (3/8"/0.952 cm) @ 0.40 m. in the longitudinal direction of the reinforcing girders of walls, with a thickness of 0.10 m. in clearing interiors, the thickness in the girders is 0.25 m. for a section of 0.50 m. Although in the preferred embodiment the components are provided with the indicated materials and dimensions, it will be apparent that other types of materials and dimensions may be used without departing from the scope of the present invention.

[0030] Said step of preparation of the foundation slab comprises the steps of: manually digging with fine edges, on the improved ground, to fix the foundation slab and prevent the sliding thereof. Placing a plastic membrane with a caliber of 200 to 600 on the excavations of dentils, footings and surface where the foundation slab will be placed, to prevent moisture from affecting the structure of the building, see Figure 9. Subsequently, placing the metallic structure 1200 of the house, conformed by reinforced concrete footings 1211, armed with rod in both directions, and tied with annealed wire, armex girders 1220 of section of 0.20 X 0.25 m, reinforced with stirrups in castle crossings; armex castles of 1210 of 0.15 X 0.20 m and 0.10 X 0.20 m of section, reinforced with stirrups at intersections with said girders, at a radius of 0.50 m from the horizontal and vertical intersections; reinforcements with stirrups at the intersections with the girders, at a radius of 0.50 m from the horizontal and vertical intersections, all located within the pile caps and on the plastic membrane; and an electro-welded mesh 1400 of 6-6/10-10, located on the plastic membrane of the ground for the foundation slab, see Figures 2 and 10. Subsequently, placing wood on the perimeter of the foundation slab, previously anchored in the contact surface, the previous treatment of the wood will have to be based on burned oil, to avoid its adherence to the concrete; and placing or laying the hydraulic and electrical pipes into the metal structure, and above the plastic membrane, leaving outputs on the castles, see Figure 10.

[0031] According to the present invention, the plastic membrane can be made of a material selected from the

group consisting of low density polyethylene, high density polyethylene, poly paper, and polypropylene. Also, depending on the needs of the user, can be used any plastic known in the prior art with which bags can be made.

[0032] After this, as shown in Figure 11, we proceed to pour the concrete F'C=250 Kg/cm^2, on the surface delimited by the perimeter wood and on the base of the metallic structure. Once said concrete has been set, the wood is removed from the perimeter of the foundation slab, in order to proceed to the curing of the slab, and thus preventing the wood from being damaged by moisture, see figure 12.

[0033] Referring now to Figures 13 to 20, the stage of fabrication of the walls of the dwelling and the final finishings thereof is described, wherein the walls are constructed with plastic bags, filled with thin stony material of the place, screened and treated with a little lime, this mixture allowing to avoid moisture saturation and the creation of possible germs. Once the bag is filled, it is sealed with adhesive plastic tape, at the two ends of the bags, then the filled bags are superimposed in the horizontal direction in interleaved stowage, hit with a wooden shovel so that the inert material finds its natural rest, and we proceed to drill the bags to let the moisture out. Said wall is stabilized by means of aviary mesh, which is fastened to the castles and to the chains of rebar, garter or intermediate and enclosure chains, with wire rod tensors. Two ties with annealed wire will be made every two rows or courses, holding the aviary meshes in the horizontal direction at each 0.50 m, without perforating the bags, at medium height a garter chain or intermediate girder will be cast; and the wall will continue until it is finished. At the termination of each section of the walls at the top, it will be closed, the mesh with zigzag annealed wire. The, electrical, hydraulic and sanitary pipes will be drowned in walls, castles and girders.

[0034] According to the previous, said stage of manufacture of walls and finishings comprises the steps of: providing the bags made of the same plastic membrane with a caliber of 200-600, wherein said bags are made at the construction site, that is to say, *in situ;* filling the bags 1110 with the treated material, see Figure 13, either by shovel, or with funnel or even mechanically, the filling is done until the bag can stand on its own, which must be shaken so that the material is compacted; sealing the ends of the bags by means of adhesive tape, wherein the corners should be bend, this will allow that when the bags are placed on the walls, the plaster material will give body and stability. In additional embodiments wherein bags made of thin calibers are used, two reinforcing belts will have to be placed in the center in an equidistant manner.

[0035] As the bags 1110 are filled, they are placed in rows on the foundation slab LC and aligned with the castles 1210.

[0036] Said stage of manufacture of walls and finishings comprises the additional steps of: placing a galvanized aviary mesh, wherein in the axis of the wall to be constructed the meshes will be superposed symmetrically, which in turn will be fastened and anchored to the foundation slab LC, by means of sheaves and nails, for which previously the thickness of the wall to be constructed will be traced; stowing the bags, as if they were bricks or blocks, in a interleaved way, and compacting them with small strokes, with a wooden shovel and they should keep the lead and the thread, see Figure 13. Likewise, the rows should not exceed 10 rows of height, or they should not exceed the middle section of the wall. Equally, while the wall is constructed, at every two courses, it should be secured both sides of the mesh with an annealed wire tie without drilling yet the bags and these ties will be separated at 0.50 m of distance in the horizontal or transverse direction, as shown in Figure 14.

[0037] The wall is displaced until reaching an intermediate height of the same, wherein the upper girder will be placed on the top, preventing the walls from collapsing on the sides, and wherein at the ends of the walls there are jagged spaces at the intersections with the castles, achieving with this that when casting the castle the wall is embedded to the castle, planking the heads of the walls, see Figure 15. Once reached the middle section of the wall, the upper ends of the mesh are secured to the top of the wall, by means of a zigzag tie with galvanized wire, and the lateral ends of the aviary mesh are tensioned in the castles with wire rod, in each stirrup of the structure of said castle, with this the wall becomes encased, and preventing said wall from moving when the intermediate and closing girders are cast, see Figures 15 and 16.

[0038] Placing an intermediate girder to bind the structure and minimize the section in the height of the walls, said intermediate girder is formed by an armex metallic structure integrally joined to the castles, and to which the lower ends of a second mesh are secured, so that this is aligned with the first mesh, said metallic structure and the first half of the castles is cast with concrete with a F'C=200 kg/cm^2, leaving the aviary mesh drowned, to later hold the bags wall as in the first section of the wall, wherein for said casting, said intermediate girder is formworked with wood previously cured with burned oil to avoid adhesion on concrete, see Figure 16.

[0039] Once set said intermediate block and disengaged the formwork, it proceeds to the construction or displacement of the second section or part of the wall, for which the previous process is repeated, with the exception of the fixation of the aviary mesh, which has already been secured to be drowned in the cast of the intermediate girder.

[0040] Therefore, once the final height of the wall is reached, we proceed to place an enclosure girder, to bind the structure of the first section with the second section, said intermediate girder is conformed by an armex metal structure integrally joined to the castles, said metal structure and the second half of the castles is cast with concrete with a F'C=200 kg/cm^2, wherein for said casting, said intermediate girder is formworked with wood previ-

ously cured with burnt oil, to avoid adhesion on concrete, see Figure 17.

[0041] Once this is done, the laying of: PVC pipe, the discharges of the sanitary furniture to internal PVC register, internal registers, and toilet drain, which are drowned in foundation slab; electrical and hydraulic pipes which are held between the aviary mesh and the bags, leaving outputs on the castles, see Figure 18.

[0042] Subsequently, once this is done, the finishings of the walls are performed by covering the wall with a mixture of cement, lime, sand of regular granulometry, to homogenize the walls, having an average thickness of 2.5 cms. per face, covering mesh, bags and installations; and the flattening or fine-tuning of said wall is performed by means of a mixture based on cement, lime, fine grain sand, at rule and lead of 0.8-1.2 cm thickness per face, providing a fine finishing with flat of wood, see Figures 19 and 20.

[0043] Finally, once the finishings are finished, it is proceeded to the placement of the roof of the house, which can be made by slab of concrete, wood, sheet or the like and to give the final touches to the walls as a texturized with paste with color included, grated finishing at 45° or vertical worm, or any finishing to the end user's taste.

[0044] According to the previous, it will be evident to those skilled in the art that with the method of the present invention there is a saving in the construction time in a range between 70 to 75%, as well as a saving of material in a range from 65 to 70%, compared to conventional construction methods.

[0045] Likewise, it will be evident to those skilled in the art that the walls of the houses manufactured with the method of the present invention are all load-bearing walls, which bear loads in a range of 1.2 to 1.5 Ton/cm2, and that said walls in turn, due to the form of stowing of the filled bags, are bulletproof and impact proof, since when a bullet is fired towards said walls, it is stuck in the compacted sand of the bags. Also, due to said form of stowage and to the plastic membrane, the walls of the present invention are totally thermal insulating, that is to say they stabilize the temperature like the blocks called "sun-dried brick"; and they are completely acoustically isolated, avoiding likewise the reverberation of the sound.

[0046] Additionally, due to the fact that the bags are not joined to each other by any means of union, they do not form a monolithic block like conventional houses, thus, it causes that the dwellings manufactured by the method of the present invention to absorb the telluric movements, and which makes the houses manufactured with the method of the present invention have a lifetime of 250 to 300 years, unlike the 40 to 50 years that a conventional house lasts.

[0047] Finally, with the method of the present invention it is possible to build houses in any type of environment and climate, since due to the metallic structures are encapsulated by the plastic membrane, said structures are not exposed to climatic and environmental conditions, therefore, the houses manufactured with the method of the present invention are free of moisture and saltpeter.

[0048] Since several aspects of various embodiments of this invention were described, it should be noted that various alterations, modifications and improvements can be made by those skilled in the art. Such alterations, modifications and improvements are intended to be part of this description and are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description and drawings are by way of example only.

Claims

1. A method for the construction of dwellings by means of the use of bags refilled of granulated material, comprising the stages of:

I) cleaning the ground wherein the construction will be built;

II) preparing and improving the ground, wherein said preparation and improvement comprises the steps of: a) digging until finding a firm floor, b) placing a homogeneous filter layer conformed of stone or gravel, c) placing a banding layer conformed by gravel-sand in a ratio of 70-30, d) mechanically compacting the ground until reaching a PROCTOR of 98, and e) tuning and punctuating the ground;

III) placing sanitary registry and installation;

IV) preparation of foundation slab, wherein the preparation of the foundation slab includes the steps of: a) locating dentils, b) digging the pile caps or ditches where footings, girders, and castles will be placed, c) placing a plastic membrane with a caliber of 200 to 600 on the surface where the foundation slab will be placed and on the pile caps, d) placing the metallic structure of the foundation slab on said plastic membrane wherein said metallic structure is conformed by said footings, girders, castles and electro-welded mesh, e) placing the hydraulic and electrical pipes within said girders and castles, f) placement of the perimeter of the foundation slab; pouring the concrete, which is a concrete F'C250 Kg/cm2; said method **is characterized in that** once the slab has been set,

V) building the walls of the dwelling using bagged material, for which, the construction of said walls is made in two parts, where the construction of the first part includes the steps of: a) providing bags made with the same plastic membrane used in stage IV), b) filling said bags with a mixture of thin stone material and lime, c) sealing the bags; d) placing an aviary mesh so that the bags wall is placed in the middle thereof symmetrically; e) stowing or stacking the bags longitudinally up to an intermediate height, wherein the storing of said bags is done in an

interleaved manner, and in such a way that the ends of the bags abut or meet each other, f) compacting the bags of each row, where once compacted, the bags are perforated to release moisture, and wherein every two rows or courses of bags the aviary mesh is secured on both sides of the wall, with wire ties at every 0.50 meters of distance in the horizontal direction, wherein once reached the intermediate height g) securing the upper ends of the aviary mesh to the upper part of the wall and the lateral ends of the same to the castles, with wire, wherein at the ends of the walls that intersect with the castles, they are jagged spaces, so that when the castle is casted the wall is embedded in the castle; and h) placing a metallic structure of an intermediate girder on the upper end of said wall, which is connected to the castles, i) placing and securing a second aviary mesh to said metallic structure, so that said second mesh is aligned with the first mesh, j) pouring concrete on the structure of the girder and on the first half of the castles to form a single element, and so that the lower ends of the second mesh are drowned in said intermediate girder; wherein the construction of the second part comprises the steps of: k) repeating steps a), b), c), e), f) and g) until reaching a final height or enclosure, and l) placing a metallic structure of a closing girder on the upper end of the second part of the wall, which is connected to the castles, j) pouring concrete on the structure of the enclosure girder and on the second half of the castles to form a single element, repeating the stage V) for each wall of the house, wherein once completed the walls;
VI) placing the hydraulic, sanitary and electrical installations on the finished walls, applying a final or finishing layer to the walls to hide the bags, mesh and said hydraulic, sanitary and electrical installations, and
VII) placing the roof of the house.

2. The method according to claim 1, further **characterized in that** the plastic membrane is made of a material selected from the group consisting of low density polyethylene, high density polyethylene, poly paper, and polypropylene.

3. The method according to claim 1, further **characterized in that** the plastic membrane can be made of any plastic known in the prior art with which bags can be made.

4. The method according to claim 1, further **characterized in that** the granulated material is a thin stone material from the place or any type of sand or earth, which is screened and treated with a little lime in a proportion 70/30, this mixture avoids the saturation of humidity and the creation of possible germs.

5. The method according to claim 1, further **characterized in that** the compaction of the bags is done by striking them with a wooden shovel so that the inert material finds its natural rest.

6. The method according to claim 1, further **characterized in that** the step of securing the upper ends of the aviary mesh to the upper part of the wall with wire is done by means of a zigzag tie.

7. The method according to claim 1, further **characterized in that** the construction time is reduced in a range of 70 to 75%, compared to conventional construction methods.

8. The method according to claim 1, further **characterized in that** there is a saving of material in a range of 65 to 70%, compared to conventional construction methods.

10. The method according to claim 1, further **characterized in that** it completely eliminates moisture and saltpeter.

11. The method according to claim 1, further **characterized in that** it is possible to build houses in any type of environment and climate, since due to the fact that the metal structures are encapsulated by the plastic membrane, these structures are not exposed to the climatic and environmental conditions.

12. A room house **characterized in that** is conformed by: a plurality of walls, which are composed of two sections made of bags filled with a mixture composed of a stony material and lime in a proportion 70/30, wherein the filled bags are placed on a foundation slab, longitudinally, and are positioned in such a way that the ends thereof abut or meet with each other to avoid in this way the leakage of material, wherein said filled bags are stowed in lines or courses in an interleaved way to prevent the wall from collapsing; a structure of load and stability, composed of a metallic structure consisting of castles, footings, construction girders, intermediate girders, and closing girders, as well as various metallic reinforcements, which are placed with concrete to provide adequate rigidity and stability to the house, wherein each wall, of the plurality of walls, is constituted by an intermediate section and an enclosure section, wherein each section is made up of ten courses of filled bags, and wherein each intermediate section is closed by an intermediate girder and each enclosure section is closed by an enclosure girder; and wherein the courses of each section are encapsulated by an aviary mesh to give stability and rigidity to the same.

13. The room house according to claim 12, further **characterized in that** said walls are all load bearing walls, which bear loads in a range of 1.2 to 1.5 Ton/cm^2.

14. The room house according to claim 12, further **characterized in that** due to the way of stowing the filled bags, said walls are bulletproof and impact proof.

15. The room house according to claim 12, further **characterized in that** said walls are fully thermally insulated, that is to say they stabilize the temperature inside said house as the sun-dried bricks.

16. The room house according to claim 12, further **characterized in that** said walls absorb telluric movements.

17. The room house according to claim 12, further **characterized in that** it has a lifetime of 250 to 300 years.

18. The room house according to claim 12, further **characterized in that** said house is totally free of moisture and saltpeter.

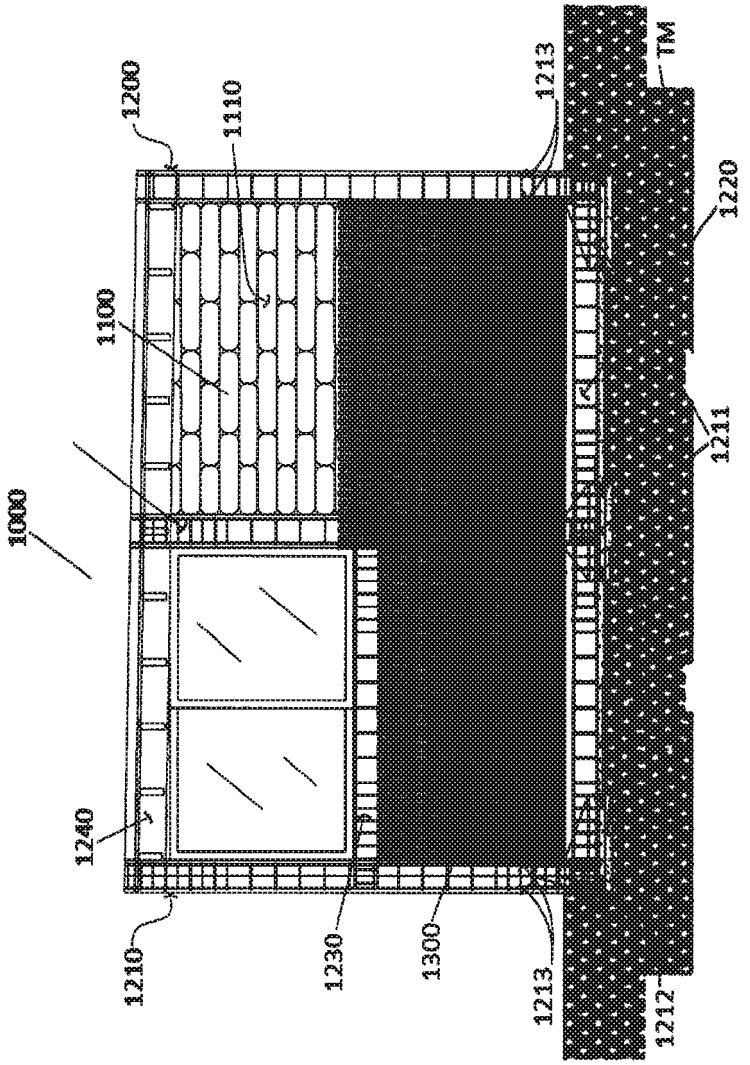
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FIG. 1

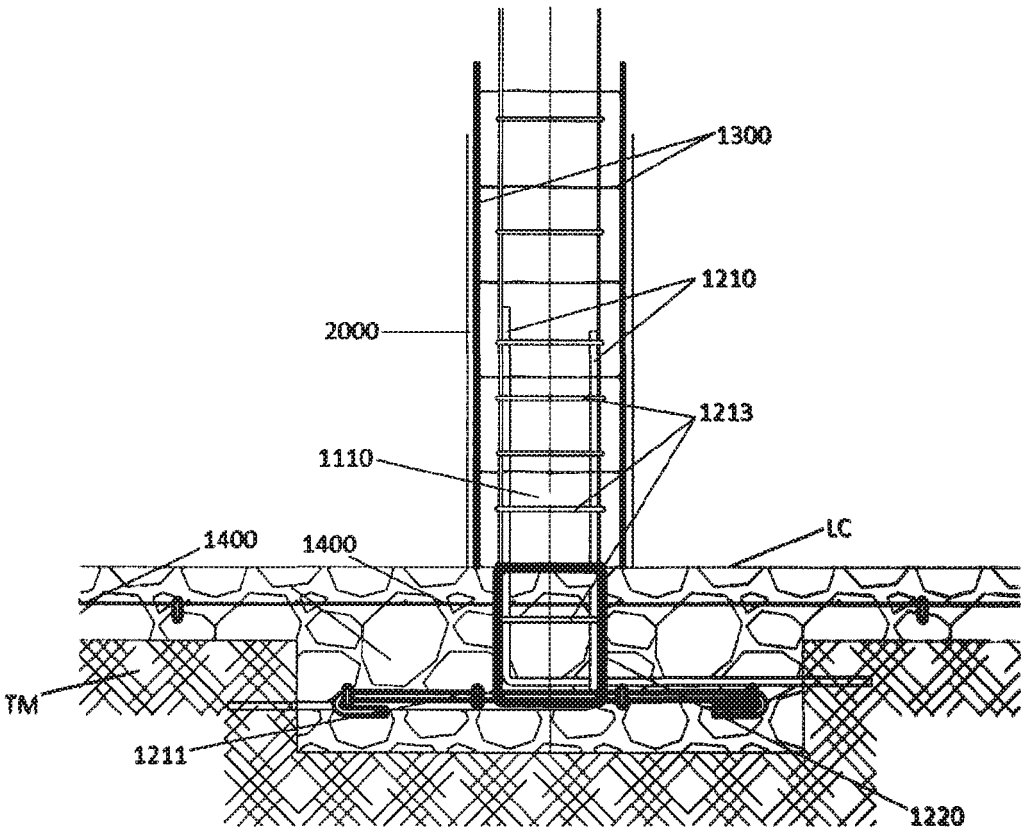

FIG. 2

FIG. 3

FIG. 4

FIG. 5

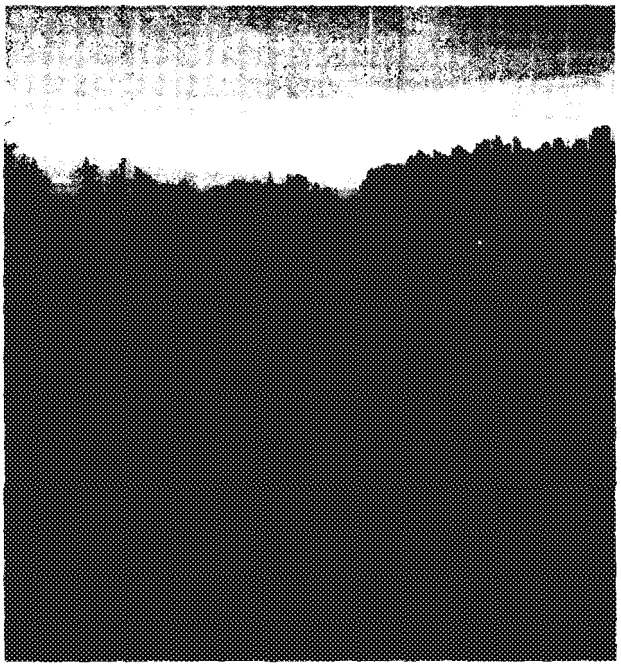

FIG. 6

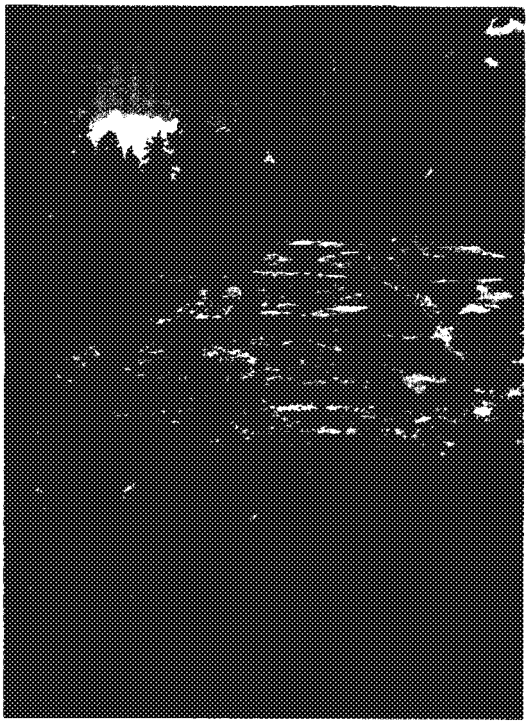

FIG. 7

FIG. 8

FIG. 9

FIG. 10

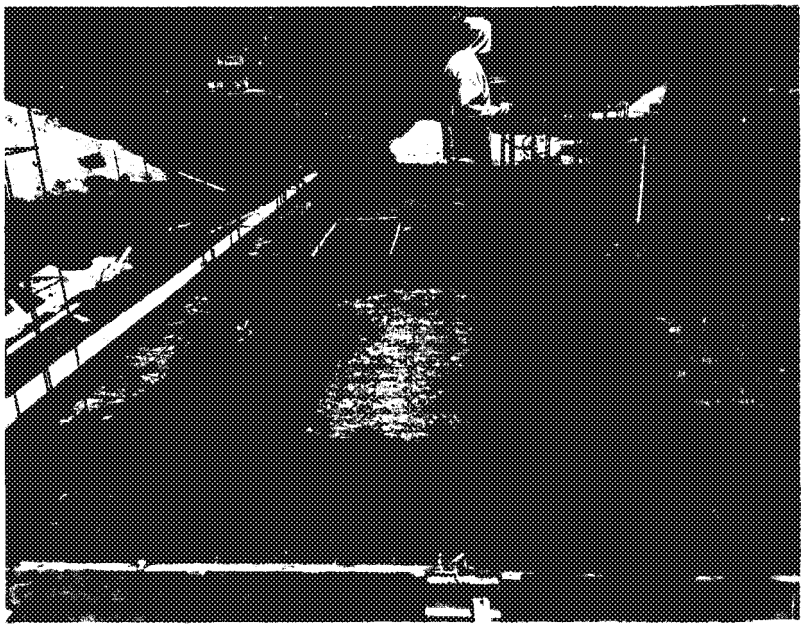

FIG. 11

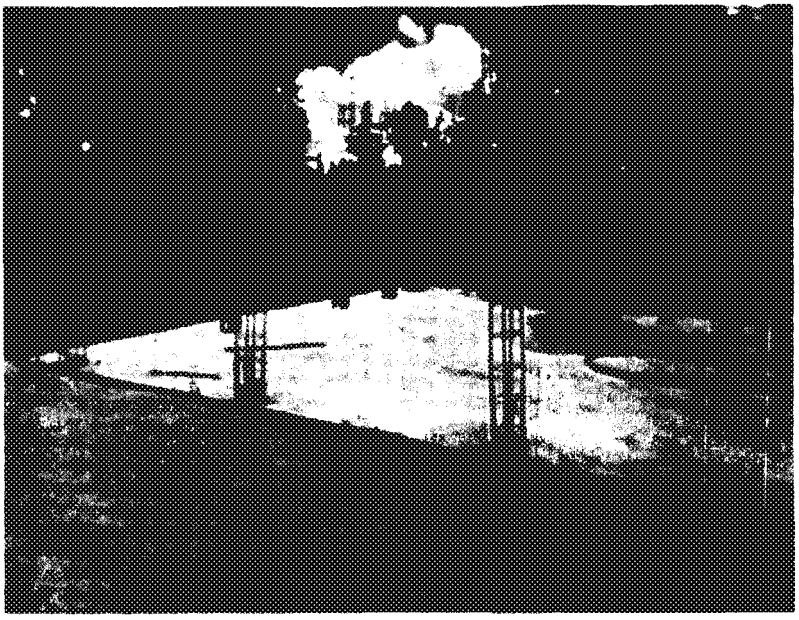

FIG. 12

FIG. 13

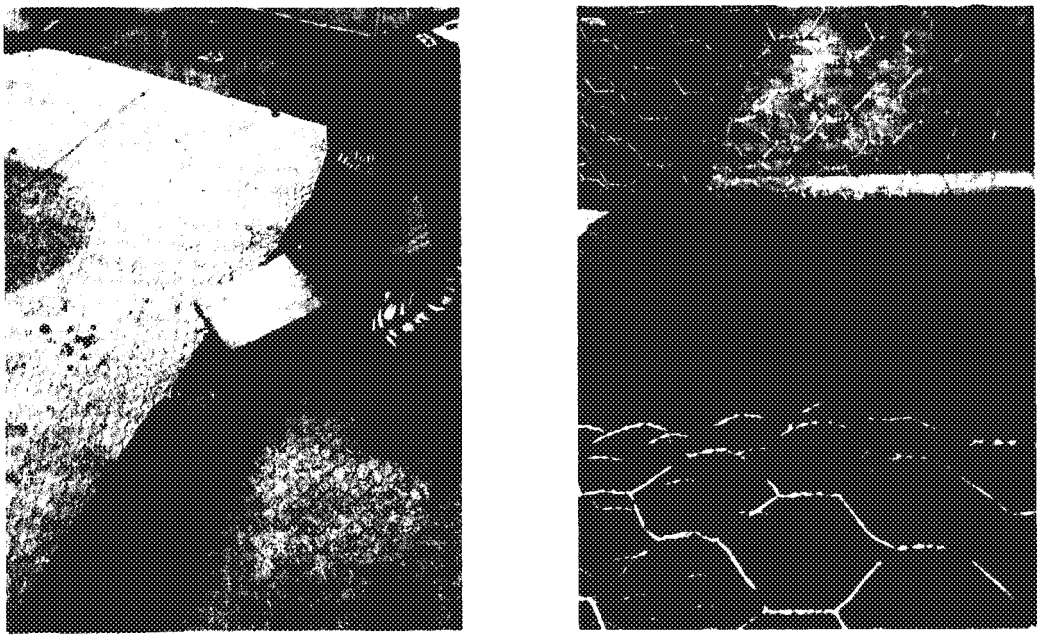

FIG. 14

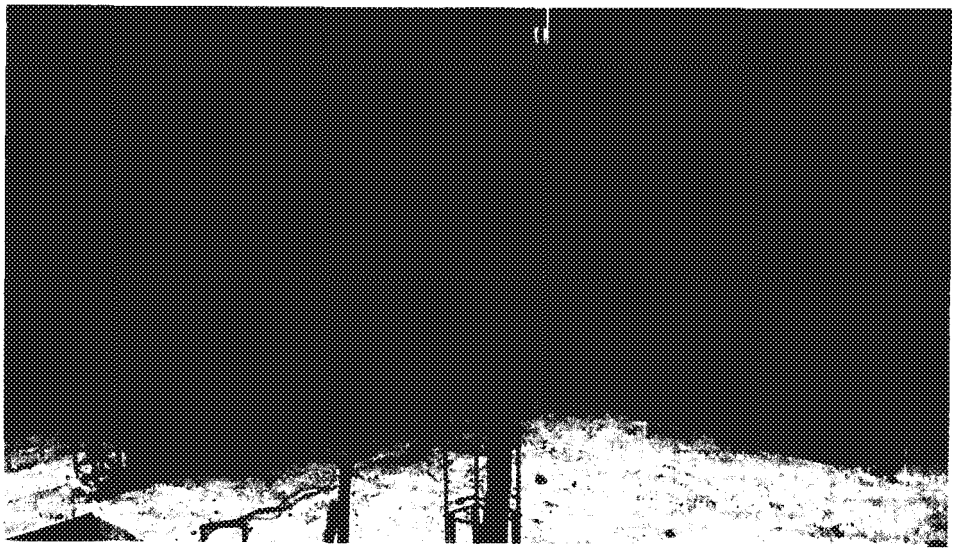

FIG. 15

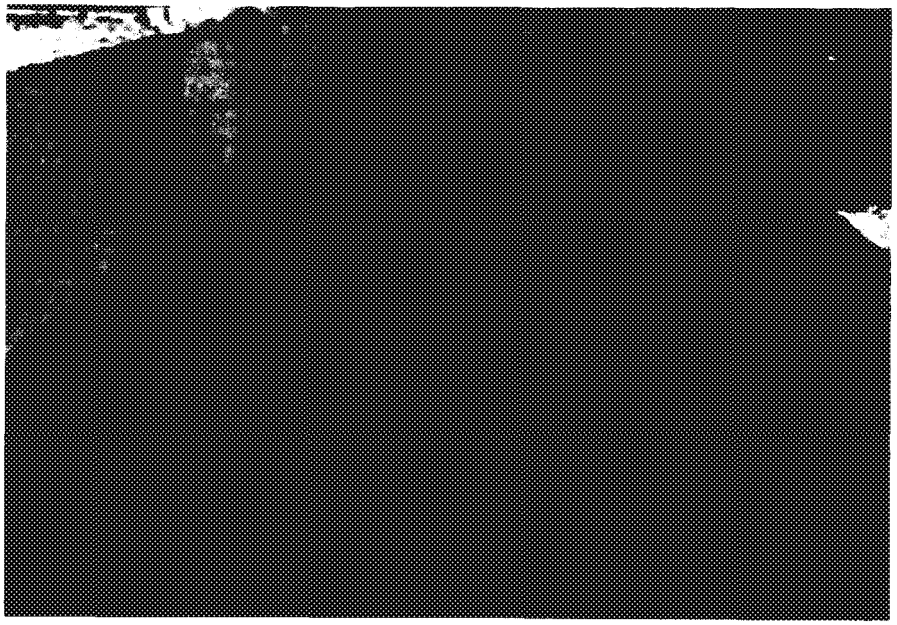

FIG. 16

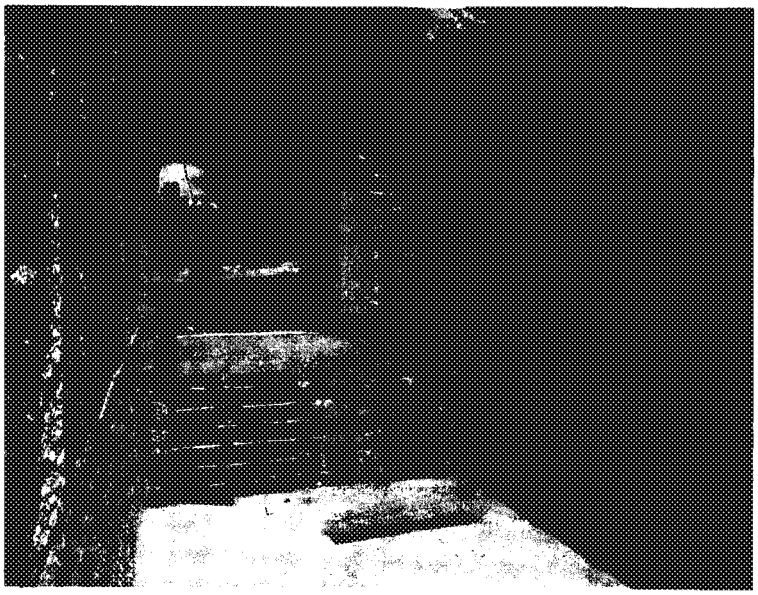

FIG. 17

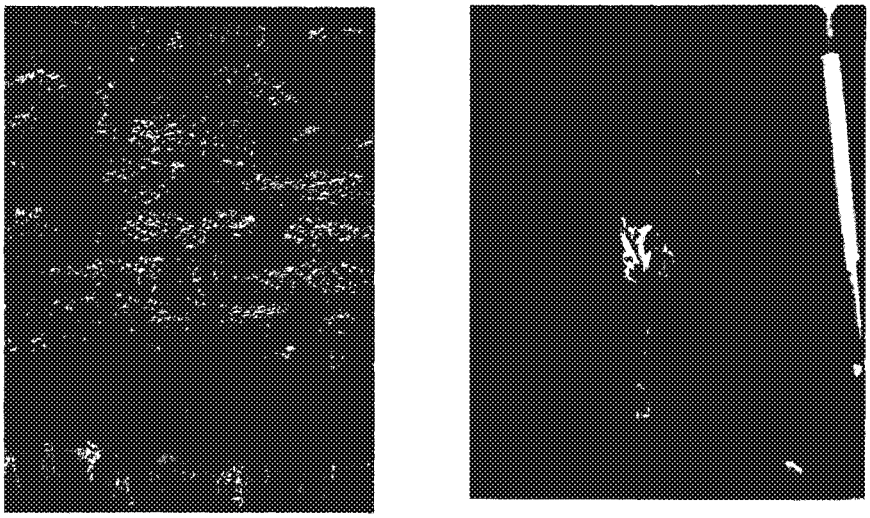

FIG. 18

FIG. 19

FIG. 20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/MX2017/000062

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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, E04H

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)

EPODOC, INVENES, INTERNET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SANDBAG. SANDBAG HOUSE GALLERY . 05/08/2011 [on line][retrieved on 11/10/2017]. Retrieved of Internet <URL: http://web.archive.org/web/20110805235318/ http://sandbaghouse.com/Fotos/Seiten/In_One_Week.html>	1,2,4-6,13,14
Y	ONE COMMUNITY. Earthbag Construction Footers, Foundation, and Flooring. 20/04/2014 [on line][retrieved the 11/10/2017]. Retrieved from Internet <URL: https://www.onecommunityglobal.org/?s=earthbag+foundation&submit=Go>	1,2,4-6,13,14
Y	EARTHBAGBUILDING.COM. Sharing information and promoting earthbag building. 23/12/2015 [on line][retrieved on 13/10/2017]. Retrieved of Internet <URL: http://web.archive.org/web/20151230232213/ http://www.earthbagbuilding.com/faqs/sand.htm>	1,2,4-6,13,14

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Date of the actual completion of the international search	Date of mailing of the international search report
16/10/2017	**(25/10/2017)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer M. Hernández Agusti Telephone No. 91 3495553

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/MX2017/000062

CLASSIFICATION OF SUBJECT MATTER

E04B1/35 (2006.01)
E04H1/02 (2006.01)
E04B2/12 (2006.01)

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 2007041793 A **[0006]**
- KR 101131556 **[0007]**
- US 2009304458 A **[0008]**
- EP 1171668 A **[0008]**