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(54) **PREFABRICATED  
REINFORCED-CONCRETE SINGLE-FAMILY  
DWELLING AND METHOD FOR ERECTING  
SAID DWELLING**

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(57) **ABSTRACT**

The invention relates to a prefabricated reinforced-concrete single-family dwelling and method for erecting said dwelling, the principal components of which, such as pillars (1), enclosing walls (4), slabs (7), roof (9), etc., are prefabricated at the workshop from reinforced concrete. Not only the slabs (7) but also the enclosing walls (4) carry precise installations integrated into their interior. The elements are positioned mechanically in accordance with the dwelling layout. Starting with the foundations, produced in situ, the tie beams and corresponding seatings for supporting the enclosure walls (4) are made, proceeding, in correlative order, to erection of the dwelling with interior and dividing enclosing walls (8), staircases (13), slabs (7) and exterior enclosing walls (4), finishing with the roof (9), in order subsequently to proceed to connecting the various installations between enclosing walls and false ceilings where they are incorporated.

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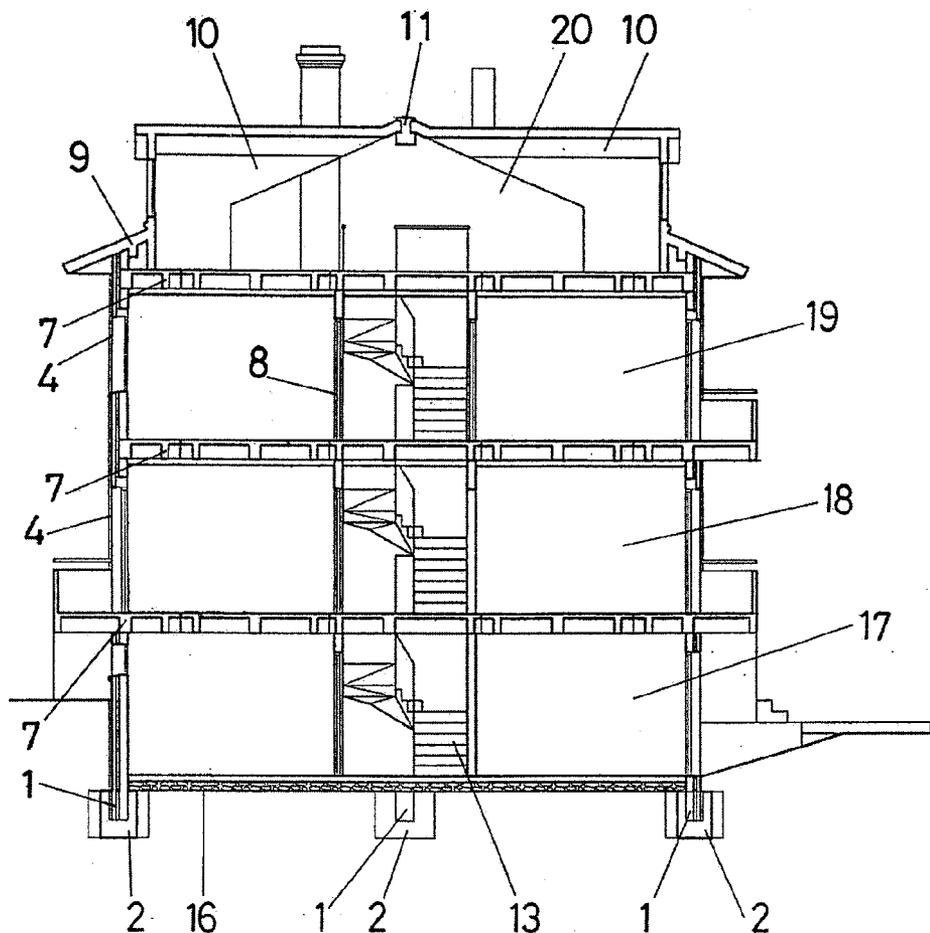
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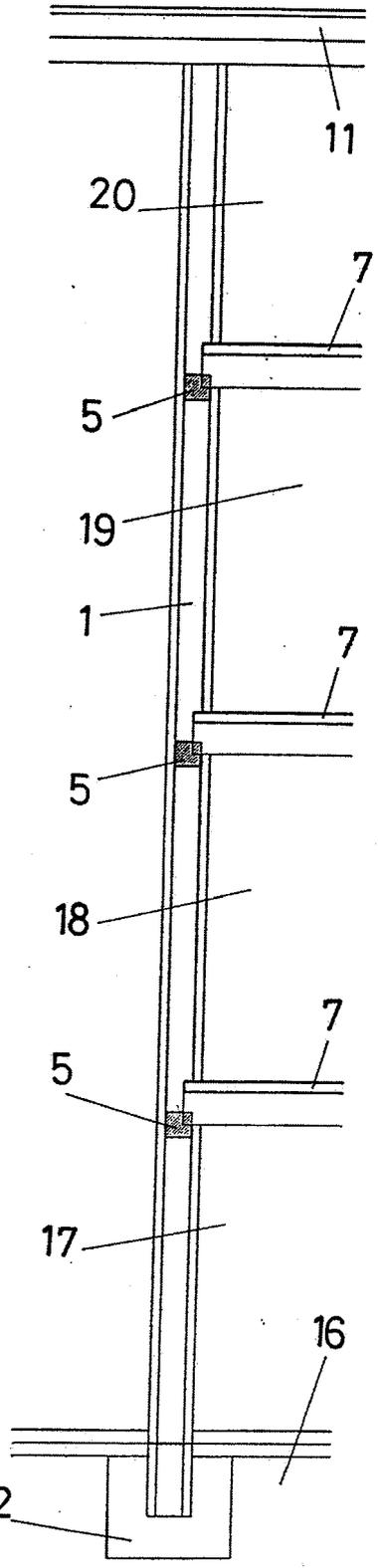
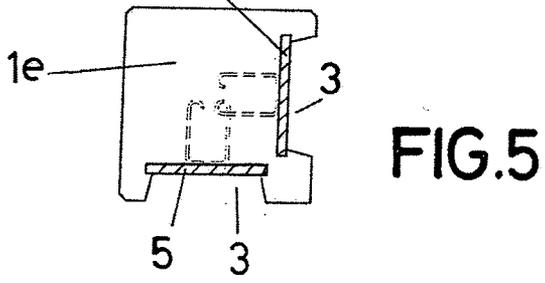
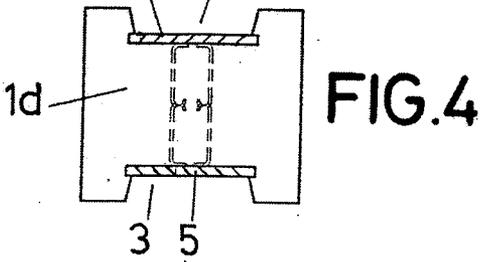
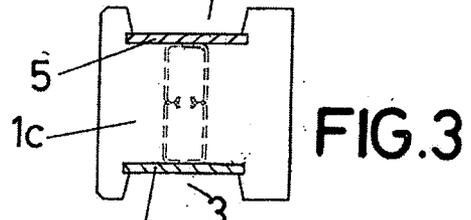
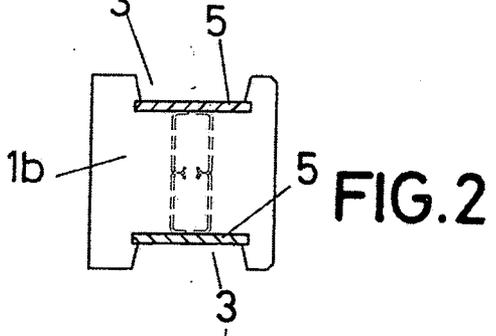
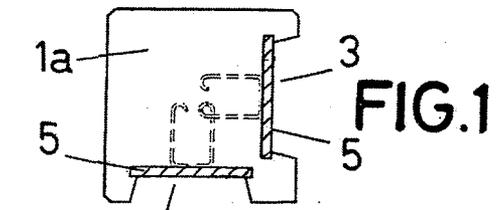
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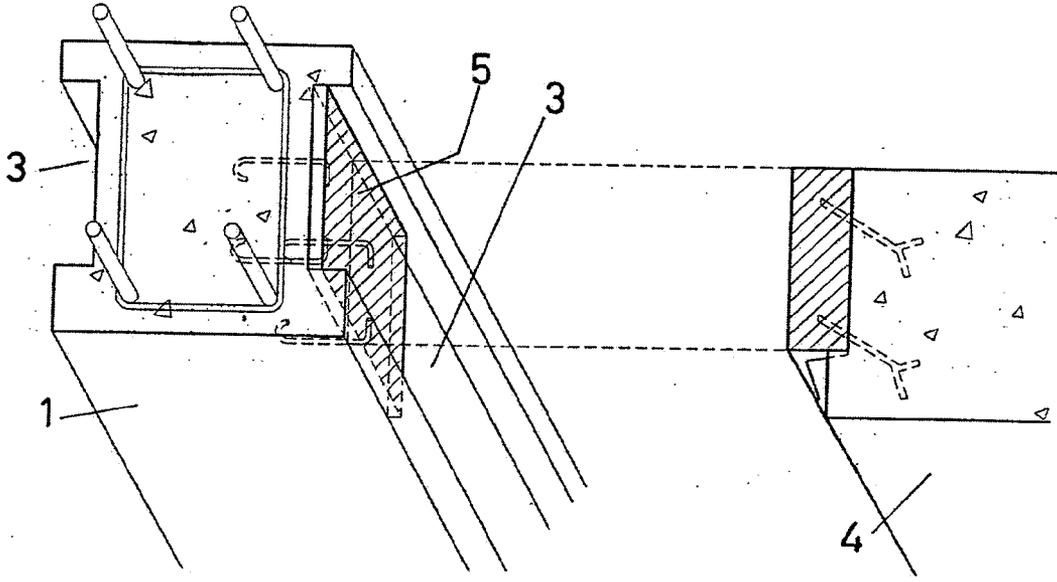
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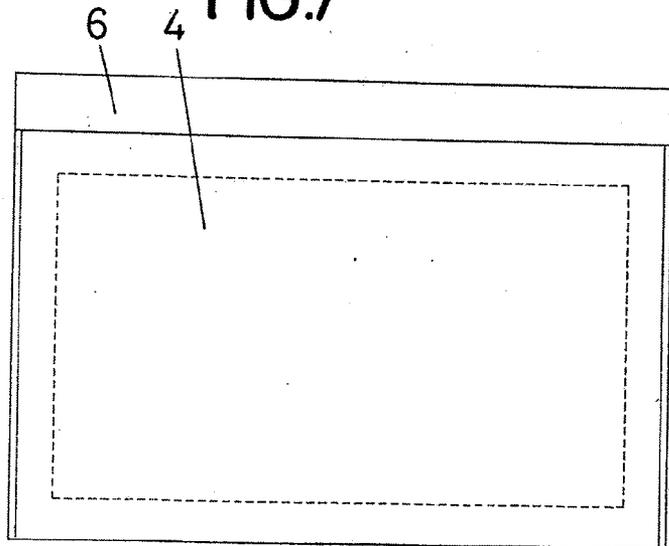
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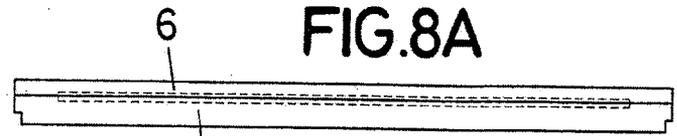




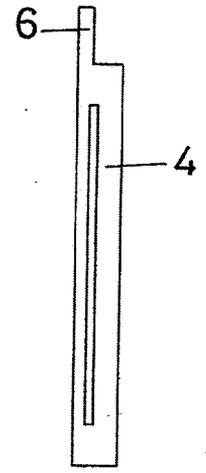
**FIG. 7**



**FIG. 8A**



**FIG. 8B**



**FIG. 8C**

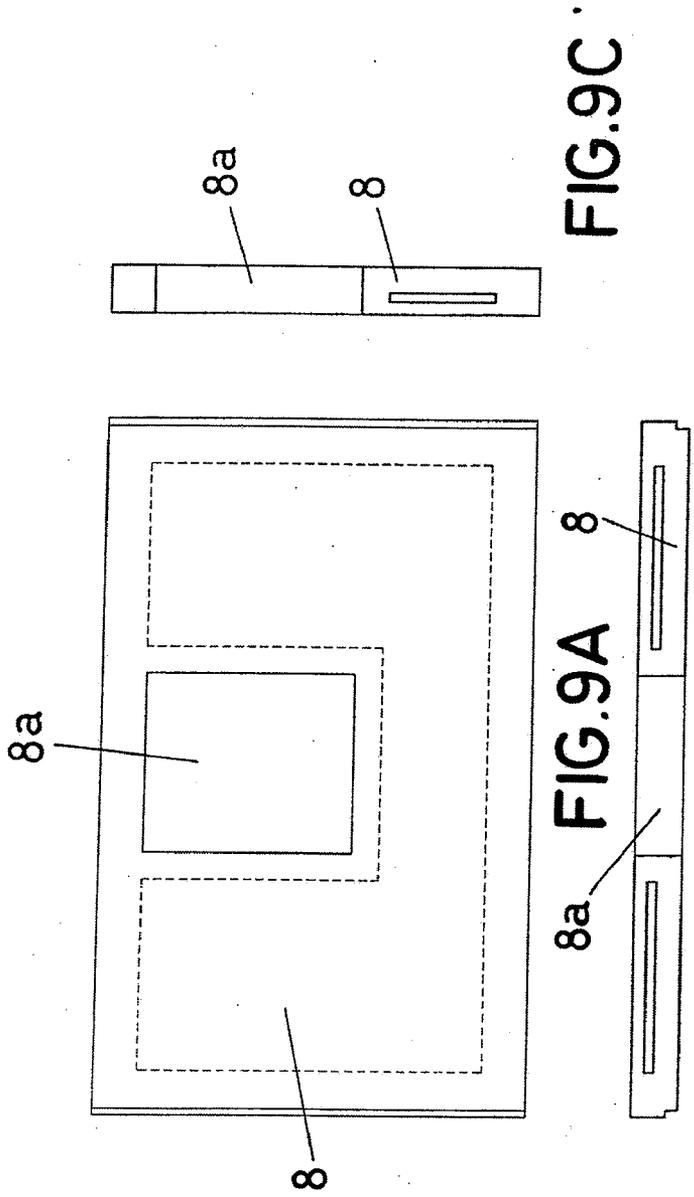


FIG. 9C

FIG. 9A

FIG. 9B

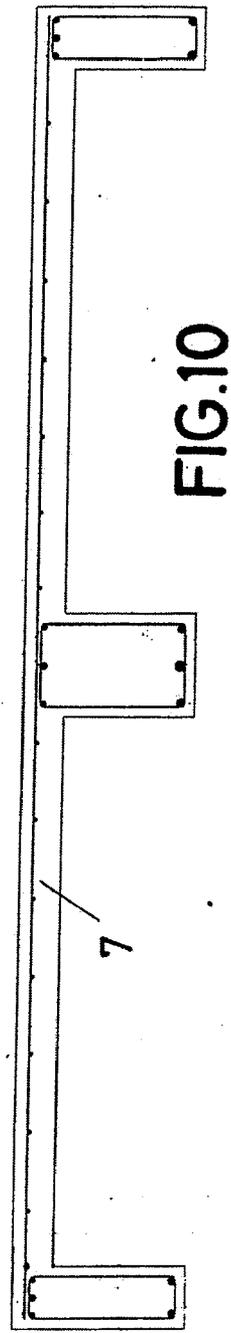
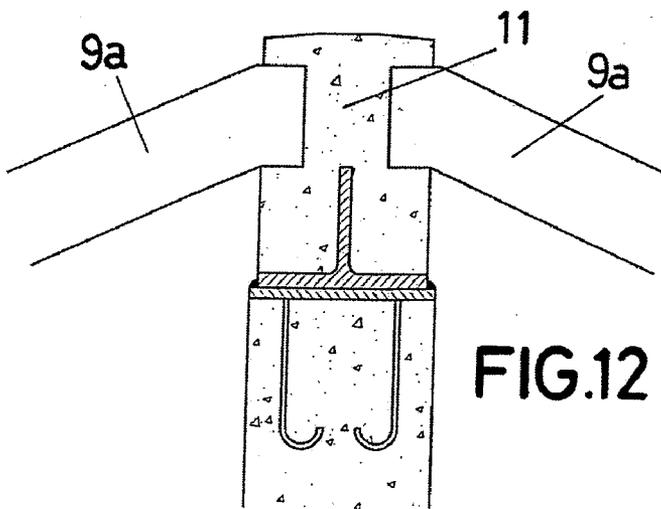
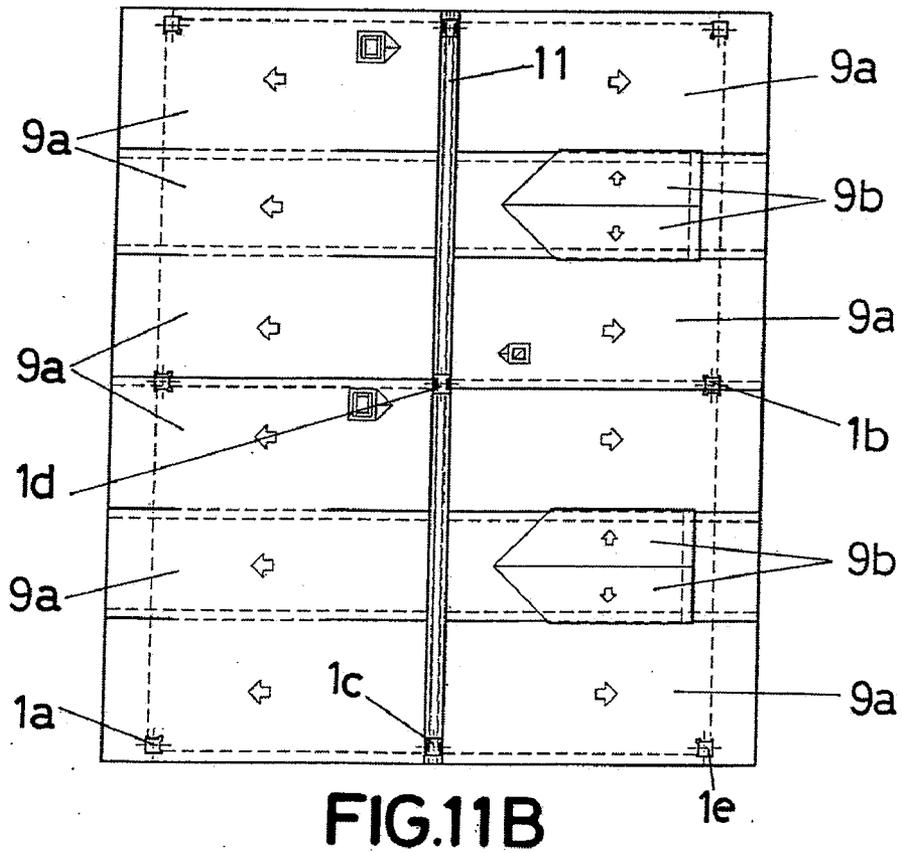
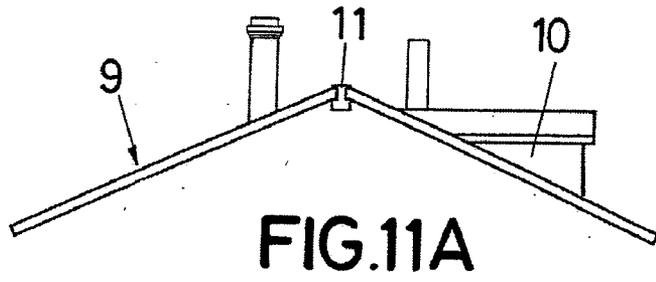
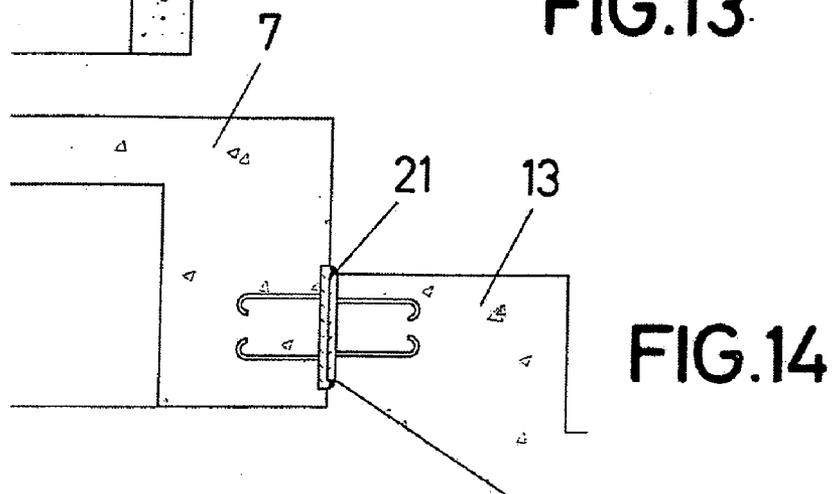
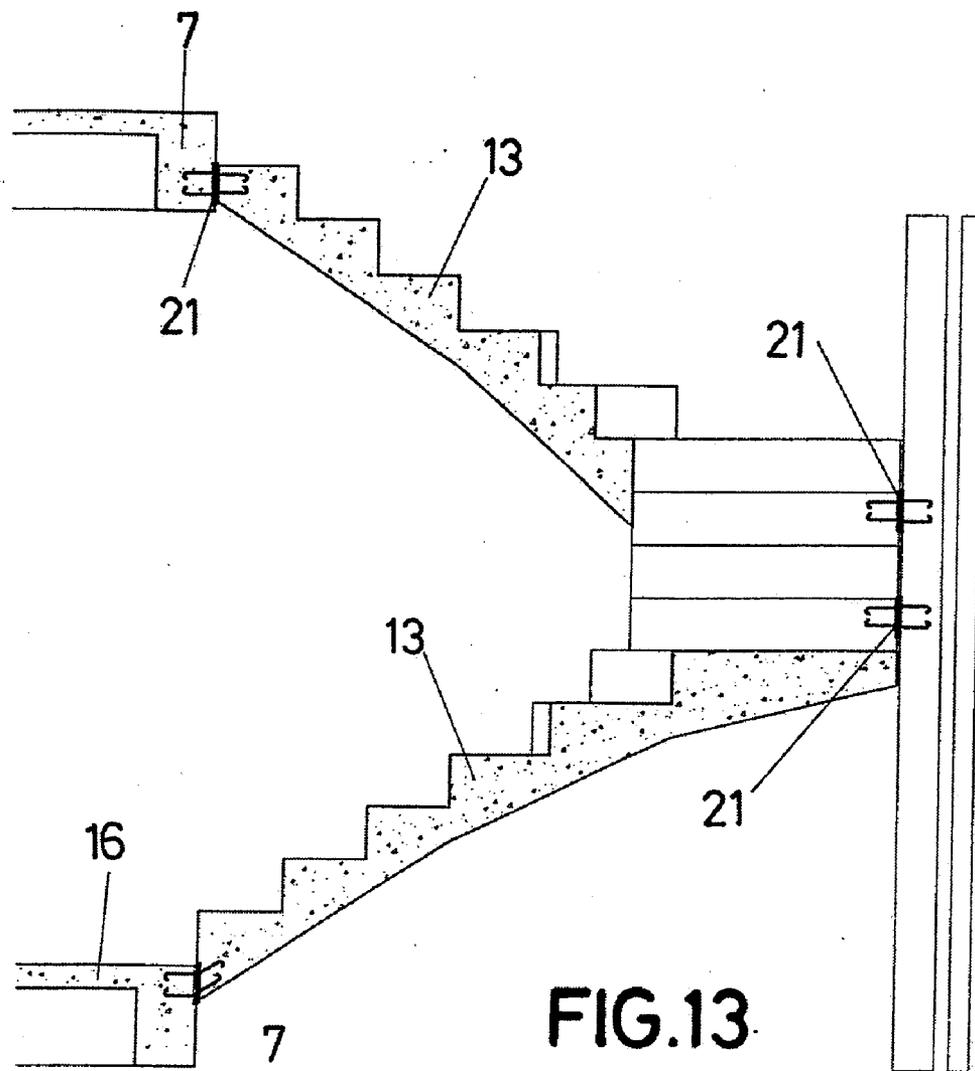


FIG. 10





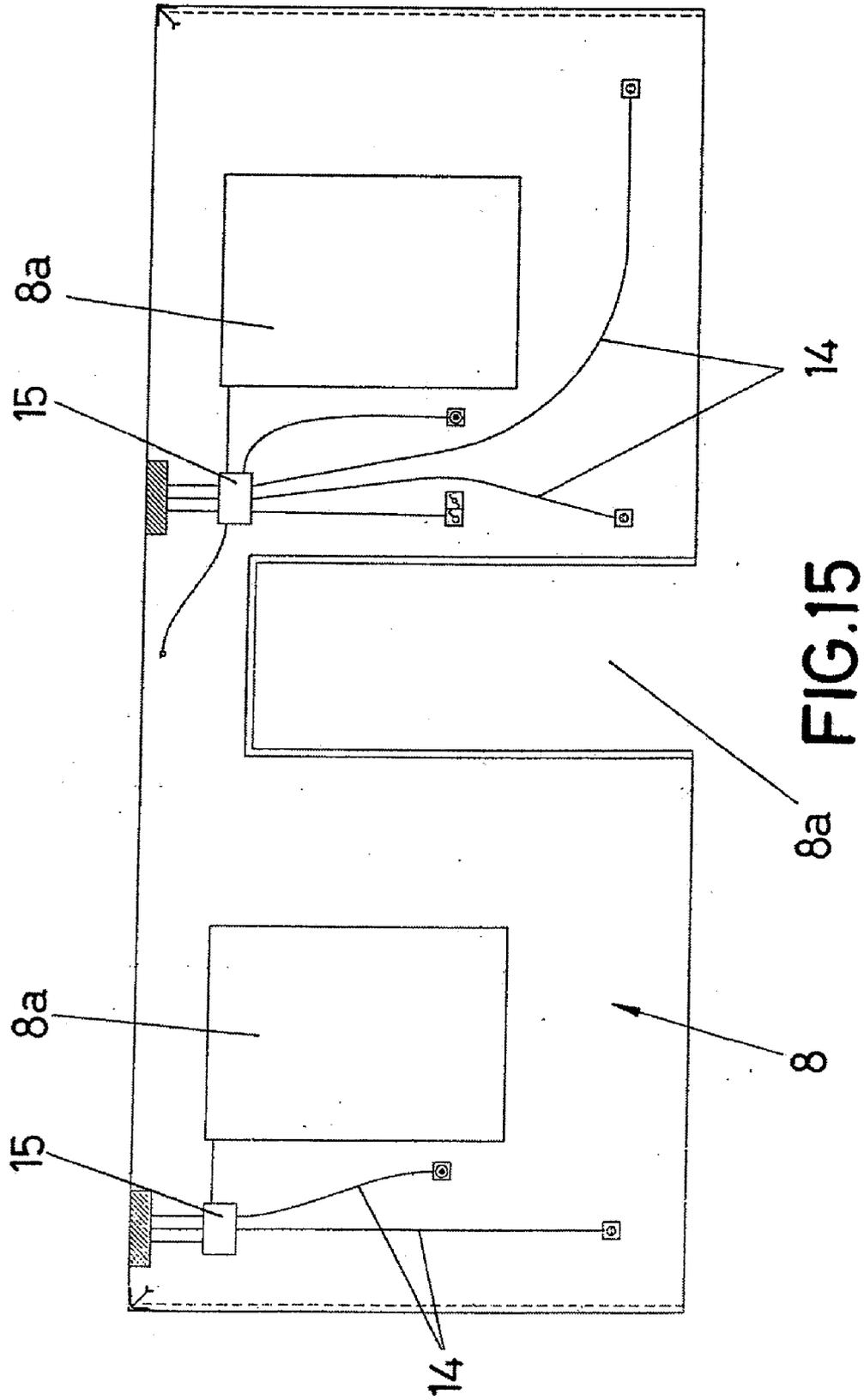


FIG. 15

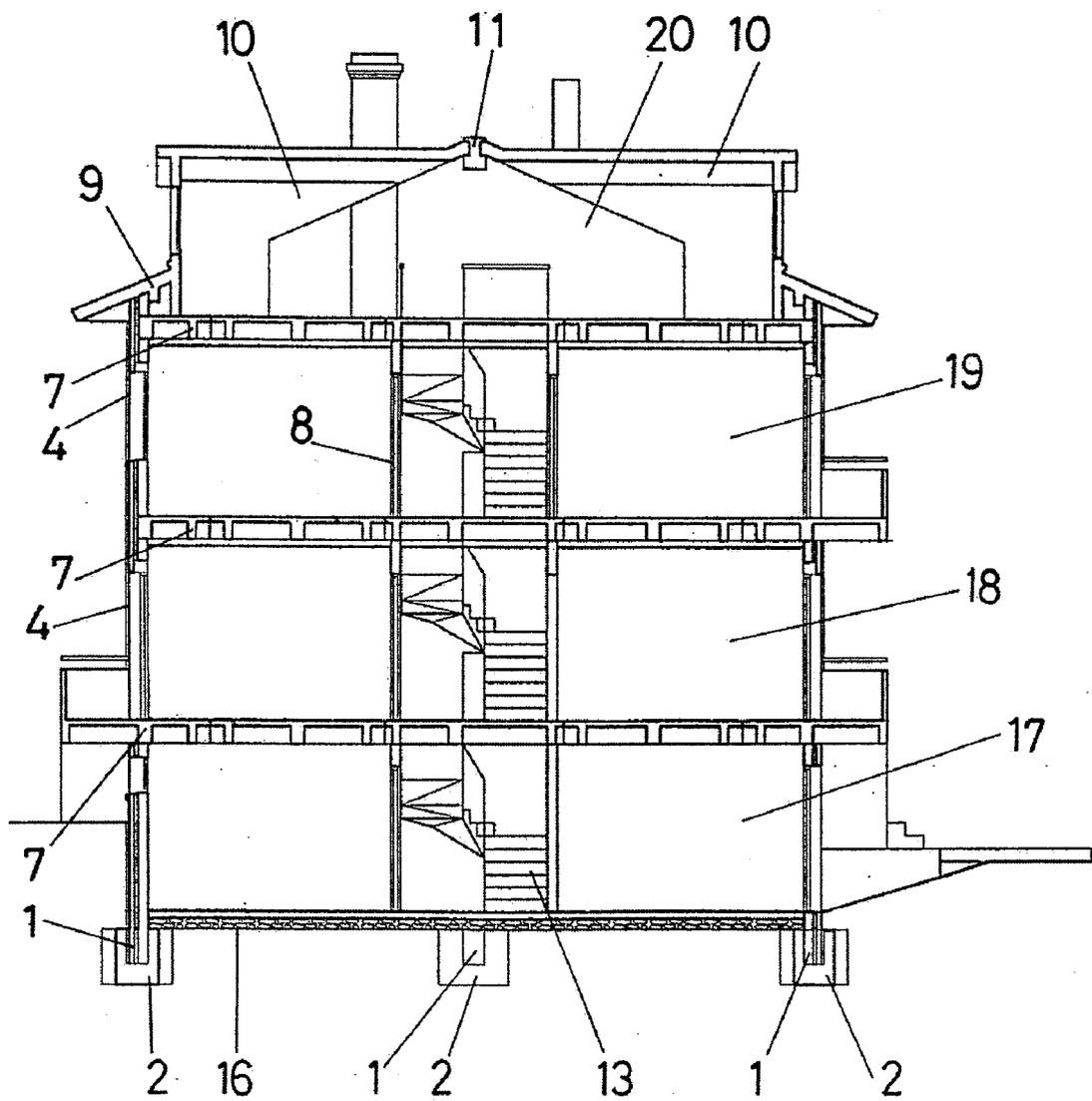


FIG.16

**PREFABRICATED  
REINFORCED-CONCRETE SINGLE-FAMILY  
DWELLING AND METHOD FOR ERECTING  
SAID DWELLING**

BACKGROUND OF THE INVENTION

**[0001]** 1. Field of the Invention

**[0002]** This invention relates to a prefabricated reinforced-concrete single-family dwelling and the method for erecting said dwelling, having a series of advantages and features inherent to its organization and constitution which will be described in detail below, and which involve an innovative alternative to that already known in this field.

**[0003]** The object of the invention relates to a single-family type dwelling (with four walls) constructed based entirely on prefabricated reinforced-concrete. The important elements, such as pillars, enclosing walls, slabs, roof, etc. are fabricated offsite in reinforced concrete, for subsequently installing them on site, structurally positioning them in accordance with the dwelling layout, including both the slabs and the enclosing walls the precise conveniently studied water, plumbing, heating, electricity, communications and domotic installations therein.

**[0004]** 2. Background Of The Invention

**[0005]** It must be mentioned that prefabricated constructions and dwellings are currently known in the state of the art.

**[0006]** However in most cases, said constructions are formed by finished modules which, entirely fabricated in the workshop, are transferred and installed on site, however these types of constructions usually consists of houses or cabin-, bungalow-type modules, etc., with little strength since they are generally made of materials such as wood, metal plates, or different covers.

**[0007]** On the other hand, prefabricated modular elements applied to the construction of houses or dwellings made of reinforced concrete are also known, in this case relating only to certain elements, such as panels, partitions, blocks, etc. which are made in the workshop with different materials such as plasterboard, wood, etc. and which are installed on the site, the rest of the construction being conventionally carried out in situ.

**[0008]** It must be mentioned however, that the applicant is unaware of the existence of a prefabricated reinforced-concrete single-family dwelling having technical, structural and constitutive features similar to that proposed by the present invention.

SUMMARY OF THE INVENTION

**[0009]** The prefabricated reinforced-concrete single-family dwelling proposed by the invention thus constitutes by itself an obvious novelty within its field of application, since it further has a series of structural and advantageous differences in the performance of the elements forming its structure compared to those with a traditional construction.

**[0010]** Thus, apart from the foundations which as in a traditional construction are made of concrete and is carried out as previously mentioned in situ, the rest of the important elements are made in reinforced concrete in the workshop and are erected on site, the main advantages of such elements being the following:

**[0011]** The pillars, which in traditional construction are the elements which are in charge of bearing the loads of the building and transferring them to the foundations, making tie

clamps between pillars for the horizontal stresses, in the dwelling of the invention solely and exclusively bear the loads of the parts of the roof, being used as a guide for the enclosing walls.

**[0012]** The slabs in the dwelling of the invention support the use loads but transmit them to the enclosing walls and not to the pillars as in the traditional construction.

**[0013]** The enclosing walls and walling are faces which provide insulation to the dwelling and create physical rooms, incorporating ornamental elements in the facade, apart from providing insulation, the faces in the new prefabricated dwelling of the invention also being in charge of bearing and transmitting the loads of the dwelling.

**[0014]** Finally and as a notable feature, it must be pointed out that, as well as in the traditional construction, the installations and services are carried out on the site once the enclosing walls and walling are done with the exception of the finishing and plastering jobs, the dwelling of the invention includes all the installations in the process of prefabricating the enclosing walls, integrating therein the electric, water supply, plumbing, heating, telephone, domotic installations, etc.

**[0015]** In addition, the method for its erection starts first of all from the foundations made on site, after having done the lay out and according to the measurements obtained in the plans, the tie beams and corresponding seatings for supporting the enclosing walls being made in said foundations.

**[0016]** Once this is finished, the actual erection is then carried out in a correlative order in the following manner: Interior enclosing walls, dividing enclosing walls, staircases, slabs and exterior enclosing walls which will form a chamber with the interior enclosing walls which in turn will provide the dwelling and its entire facade with the definitive finishing, ending with the roof.

**[0017]** Once all these operations are carried out all the water, heating, bathroom installations, etc. which will go through the false ceiling are then connected.

**[0018]** Subsequently bathroom apparatuses, boiler, windows, doors and other necessary elements will be arranged in order to then seal all the meeting points with enclosing walls, pillars and slabs, etc., finishing it with the finishings and paint.

BRIEF DESCRIPTION OF THE DRAWINGS

**[0019]** To complement the description being made and for the purpose of aiding to better understand the features of the invention, a set of drawings is attached to the present specification as an integral part thereof, in which the following has been shown with an illustrative and non-limiting character:

**[0020]** FIGS. 1 to 5 show respective sectional views according to a cross-section of the different types of pillars incorporated in the dwelling of the invention according to their placement.

**[0021]** FIG. 6 shows an elevational view of some of the pillars once embedded in the footing.

**[0022]** FIG. 7 shows a detail of one of the flat bars incorporated in each of the pillars.

**[0023]** FIGS. 8A, 8B and 8C show respective elevational, longitudinal-section and cross-section views respectively of an example of an enclosing wall panel.

**[0024]** FIGS. 9A, 9B and 9C show respective elevational, longitudinal-section and cross-section views respectively of an example of an interior panel.

[0025] FIG. 10 shows a sectional view according to a longitudinal section of an example of the configuration of the slabs.

[0026] FIGS. 11A and 11B show respective elevational and plan views of the roof of the dwelling.

[0027] FIG. 12 shows a detail of the coupling of the parts of the roof with the ridge beam.

[0028] FIG. 13 shows an elevational view of the parts forming the staircases of the dwelling and the manner of fixing them.

[0029] FIG. 14 is a detail of the joint of the part of the staircase with the slab.

[0030] FIG. 15 shows an elevational view of an example of enclosing wall in which the incorporation therein of the wiring for connecting local installations can be seen.

[0031] FIG. 16 shows a sectional view according to a longitudinal section of the complete dwelling, clearly showing all the elements forming it.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0032] In view of the mentioned figures and according to the numbering used, a preferred embodiment of the prefabricated reinforced-concrete single-family dwelling proposed by the invention can be seen, the depicted example belonging to a project of two paired dwellings and comprising the parts which are indicated and described in detail below.

[0033] The reference numbers applied to the drawings correspond to the parts which are listed below:

- [0034] 1—Pillars: (1a) left corner pillar, (1b) intermediate facade pillar, (1c) intermediate gable pillar, (1d) central pillar and (1e) right corner pillar.
- [0035] 2—Footings
- [0036] 3—Pillar grooves
- [0037] 4—Exterior enclosing walls
- [0038] 5—Flat bars of the pillars
- [0039] 6—Skirt of the exterior enclosing wall panels
- [0040] 7—Slabs
- [0041] 8—Interior dividing enclosing walls
- [0042] 9—Roof: (9a) normal parts (9b) special dormer parts.
- [0043] 10—Dormer
- [0044] 11—Ridge beam
- [0045] 12—Ridge beam groove
- [0046] 13—Staircases
- [0047] 14—Installation wiring
- [0048] 15—Local mains socket
- [0049] 16—Ground plate
- [0050] 17—Semibasement
- [0051] 18—Ground floor
- [0052] 19—First floor
- [0053] 20—Attic
- [0054] 21—Staircase joints

[0055] The proposed construction model thus provides the placement and leveling of the pillars (1) which will be used as guides for the enclosing walls (4) and dividing enclosing walls (8), which adopt different configurations, as observed respectively in FIGS. 1 to 5, according to their placement, in the left corner (1a) (FIG. 1), intermediate facade (1b) (FIG. 2), intermediate gable (1c) (FIG. 3), central (1d) (FIG. 4) and in the right corner (1e) (FIG. 5).

[0056] The pillars (1) are of one-step prefabricated reinforced-concrete and embedded in the foundation with braced footings (2) as seen in FIG. 6, the side pillars being shorter

than the central pillars, with a suitable longitudinal reinforcement and a groove (3) belonging to the tongue and groove jointing mechanism with the enclosing wall panel (4), the measurement of which will vary depending on the pillar.

[0057] As can be seen in the detail of FIG. 7, each of the pillars (1) has a series of metal flat bars (5) coupled in the mentioned grooves (3) which are used for carrying out welded joints between the upper edges of the enclosing wall panel (4) and the actual flat bar (5) of the pillar (1), achieving that the enclosing wall (4) not only works due to gravity, but rather also collaborates in the horizontal direction.

[0058] The prefabricated reinforced-concrete enclosing wall panels (4) in turn provide bearing capacity to the assembly. The enclosing wall panels (4) have, as is observed in FIGS. 8A to 8C, a skirt (6) running along the entire panel, located in the upper area, which only has the function of covering the edge of the slabs (7), since the next enclosing wall which is placed will be supported on the corresponding slab (7). In this case the enclosing wall (4) provides the structural capacity and the slab (7) is in charge of transmitting loads between enclosing walls.

[0059] The enclosing walls (4), as has been previously mentioned, in addition to working due to gravity, also collaborate by means of welded joints with the pillars (1).

[0060] There are also interior panels (8) which do not collaborate with the structure and are only in charge of the inner distribution of the dwelling, as is seen in the example depicted in FIGS. 9A to 9C, both the exterior enclosing walls (4) and the interior dividing enclosing walls (8) having the corresponding gaps (8a) provided for doors and windows.

[0061] FIG. 10 shows an example of the slabs (7), which as with the rest of the elements forming the prefabricated dwelling proposed by the invention, are prefabricated reinforced-concrete and are supported in the enclosing wall panels (4), their edge being concealed by the previously mentioned skirt (6).

[0062] Finally, the roof (9), as is seen in FIGS. 11A and 11B is also made of prefabricated reinforced-concrete, is a gable roof with special parts (9b) for forming the dormers (10).

[0063] The parts (9a) of the roof are supported in two points, one is the ridge beam (11), in which it is inserted into a horizontal groove (12) as seen in the detail of FIG. 12, and the other is in the enclosing wall (4), in which they have a part preventing the movement and at the same time carrying out the function of a beam.

[0064] Said ridge beam (11) is a continuous prefabricated reinforced-concrete beam (one for each dwelling in the depicted example) with two supports in the head of the pillars (1), said supports being joints made by means of weld beads in the sides (FIG. 12).

[0065] The thrust which the roof (9) could cause on the enclosing wall (4) is solved with the welded joints between the pillar (1) and enclosing wall (4) by means of the previously mentioned flat bars (5), since they provide side rigidity to the whole of the structure.

[0066] FIG. 13 shows the staircases (13), which are formed by whole prefabricated reinforced-concrete parts, there being two different types; the first type has two joints (21) welded to the slabs (7), as seen in the detail of FIG. 14, and the second type is the staircase joining the semibasement (17) with the slab (7) of the ground floor (18), which is supported on the ground plate (16) and has a joint (21) welded to the slab (7) of the ground floor (18).

[0067] In order to facilitate erecting the parts of the staircases (13) a series of supports (not depicted) have been placed in the enclosing walls (4) but without any load-bearing capacity.

[0068] It must be pointed out that the lateral forces exerted by the roof (9) are solved by incorporating the welded joints between enclosing walls (4) and pillars (1), therefore the tailings are not only due to gravity but rather there is also a collaboration against side stresses.

[0069] The possible seismic risk is solved in the same way.

[0070] Although there is not a high degree of ductility in the structure, it is not considered as a determining factor since it is a wide building.

[0071] In addition, the invention provides that the pillars (1) be transported and erected by means of two bolts traversing the entire section, erecting and placing the enclosing walls (4) with two securing points which are housed in the upper edge thereof, and that the slabs (7) are placed with four anchors in the upper face, joined to the main framework in the prefabricating process.

[0072] Finally, in the system proposed by the invention, all local installations are advantageously made in the same process for fabricating the part of enclosing wall (4) or interior walling (8).

[0073] In other words, the wiring (14) with its casing is included in the molds in which the enclosing walls (4) and interior panels (8) and interior partitions (8) are made with concrete, being embedded once the concrete has been poured, as is shown in the example depicted in FIG. 15.

[0074] Once the installations are distributed in the enclosing walls (4) and interior panels (8), there is a general concealed network running above the false ceiling which is in charge of being connected to the local mains sockets (15) which are in the upper edge of the enclosing walls.

[0075] Having solved the distribution of each of the floors, there are subsequently passages made in each of the floors of slabs (7) for the distribution in height of all the installations and which will be suitably covered by the false ceiling, which installations consists of hot and cold water, plumbing, heating, electric installation, communications and domotic installations, all complying with the regulation in force for each case.

[0076] Since the prefabricated reinforced-concrete single-family dwelling proposed by the present invention is a modular construction, it is erected in an ordered manner so as to not create a load decompensation, carrying it out increasing in height in the following way:

[0077] First of all foundations are created by means of braced footings (2) braced with one another such that in addition to including the loads of the pillar (1), they are used as support for the enclosing walls (4).

[0078] Then a perfectly level ground plate (16) is extended.

[0079] Once a completely level and strong platform is obtained, the mentioned ground plate (16), and all the prefabricated pillars (1) are embedded in the footings (2), the exterior enclosing walls (4) are erected.

[0080] At the start the enclosing walls of the semibasement (17) will be the first to be placed, embedding the enclosing wall panel (4) through the grooves (3) of the pillars (1) from the head thereof to the support of the foundations.

[0081] The erecting process fulfills two criteria: The erecting is carried out linearly and increasing in height, being divided into repetitive levels of enclosing wall panels (4) and slabs (7).

[0082] In sum, the process is thus the following:

[0083] First Level—Semibasement (17)

[0084] Foundations (footings (2)), ground plate (16), pillars (1), exterior enclosing wall panels (4), interior panels (8), staircase (13).

[0085] Second Level—Ground floor (18) Slabs (7), exterior panels (4), interior panels (8), staircase (13).

[0086] Third Level—First floor (19) Slabs (7), exterior panels (4), interior panels (8), staircase (13).

[0087] Fourth Level—Attic (20) Slabs (7), exterior panels (4), interior panels (8), parts of roof (9).

[0088] Once the structural work has finished, the installation connections, the placement of doors and windows, bathroom fittings are then carried out in order to finally paint.

[0089] Having sufficiently described the nature of the invention, as well as the manner of putting it into practice, it is stated that, within its essential features, other embodiments could be carried out differing in detail from that indicated by way of example, and which will equally reach the protection which is claimed provided they do not alter, change or modify its fundamental principle.

What is claimed is:

1. A prefabricated reinforced-concrete single-family dwelling of the type constructed based on prefabricated reinforced-concrete elements, which are made in a workshop in reinforced concrete, for subsequently putting them on site, mechanically positioning them in accordance with the dwelling layout, characterized by the fact of comprising one-step prefabricated reinforced-concrete pillars (1) embedded in the foundations with braced footings (2), which are used as guides for the enclosing walls (4) and dividing enclosing walls (8), which adopt different forms according to their placement; prefabricated reinforced-concrete enclosing wall panels (4) providing load-bearing capacity to the assembly; prefabricated interior panels (8) which are in charge of the inner distribution of the dwelling; prefabricated reinforced-concrete slabs (7) which are supported on the enclosing wall panels (4); a prefabricated reinforced-concrete gable roof (9) with special parts (9b) for forming the dormers (10); a continuous prefabricated reinforced-concrete ridge beam (11) with two supports in the head of the pillars (1), said supports being joints made by means of weld beads in the sides; and staircases (13), formed by whole prefabricated reinforced-concrete parts.

2. The prefabricated reinforced-concrete single-family dwelling according to claim 1, characterized by the fact that the side pillars (1) are shorter than the central pillars; and in that the pillars (1), with a suitable longitudinal reinforcement have a groove (3) belonging to the tongue and groove jointing mechanism with the enclosing wall panel (4), the measurement of which will vary depending on the pillar.

3. The prefabricated reinforced-concrete single-family dwelling according to claims 1 and 2, characterized by the fact that each of the pillars (1) has a series of metal flat bars (5) coupled in the grooves (3), which are used for carrying out welded joints between the upper edges of the enclosing wall panel (4) and the actual flat bar (5) of the pillar (1), achieving that the enclosing wall (4) not only works due to gravity, but rather also collaborates in the horizontal direction.

4. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 3, characterized by the fact that the enclosing wall panels (4) incorporate a skirt (6) running along the entire panel, located in the upper area, covering the edge of the slabs (7).

5. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 4, characterized by the fact that the roof (9) is formed by parts (9a) which are supported in two points: in the ridge beam (11), where it is inserted into a horizontal groove (12), and in the enclosing wall (4), where they have a part preventing the movement and at the same time carrying out the function of a beam.

6. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 5, characterized by the fact that there are two different types of staircases (13); the first type has two joints (21) welded to the slabs (7), and the second type is the staircase joining the semi-basement (17) with the slab (7) of the first floor (18), which is supported on the ground plate (16) and has a joint (21) welded to the slab (7) of the first floor (18);

and in that a series of supports have been placed in the enclosing walls (4) without load-bearing capacity for facilitating its erecting.

7. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 6, characterized by the fact that the lateral forces exerted by the roof (9) are solved by incorporating the welded joints between enclosing walls (4) and pillars (1), therefore the tailings are not only by gravity but rather there is also a collaboration against lateral stresses, and in that the possible seismic risk is solved in the same way since it is a wide building.

8. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 7, characterized by the fact that the pillars (1) are transported and erected by means of two bolts traversing the entire section, erecting and placing the enclosing walls (4) with two securing points which are housed in the upper edge thereof, and that the slabs (7) are placed with four anchors in the upper face, joined to the main framework in the pre-fabricating process.

9. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 8, characterized by the fact that all local installations are made in the same process for fabricating the part of the enclosing wall (4) or interior walling (8) such that the wiring (14) with its casing is included in the molds in which the enclosing walls (4) and interior panels (8) and interior partitions (8) are made with concrete, being embedded once the concrete has been poured.

10. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 9, characterized by the fact that once the installations are distributed in the enclosing

walls (4) and interior panels (8), there is a general concealed network running above the false ceiling which is in charge of being connected to the local mains sockets (15) which are in the upper edge of the enclosing walls, and in that there are passages made in each of the floors of slabs (7) for the distribution in height of all the installations, which consist of the hot and cold water, plumbing, heating, electric installation, communications and domotic installations, all complying with the regulation in force for each case.

11. A method for erecting a prefabricated reinforced-concrete single-family dwelling, characterized by the fact that it is carried out in an ordered manner so as to not create a load decompensation, carrying it out increasing in height in the following way:

foundations are created by means of braced footings (2) braced with one another such that in addition to including the loads of the pillar (1), they are used as support for the enclosing walls (4),

a perfectly level ground plate (16) is extended on which the pillars (1) are embedded in corresponding footings (2), the exterior enclosing walls (4) are erected, which at the start the enclosing walls of the semibasement (17) will be the first to be placed, embedding the enclosing wall panel (4) through the grooves (3) of the pillars (1) from the head thereof to the support of the foundations,

in that the erecting process fulfills two criteria: The erecting is carried out linearly and increasing in height, being divided into repetitive levels of enclosing wall panels (4) and slabs (7), according to the following process:

first Level—Semibasement (17) Foundations (footings (2)), ground plate (16), pillars (1), exterior enclosing wall panels (4), interior panels (8), staircase (13),

second Level—Ground floor (18) Slabs (7), exterior panels (4), interior panels (8), staircase (13),

third Level—First floor (19) Slabs (7), Exterior panels (4), interior panels (8), staircase (13),

fourth Level—Attic (20) Slabs (7), exterior panels (4), interior panels (8), parts of roof (9).

12. The prefabricated reinforced-concrete single-family dwelling according to claims 1 to 10, carried out by means of the erecting process described in claim 11.

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