PATENT SPECIFICATION (11) 1 568 730

1 568 730

(21) Application No. 40038/77 (22) Filed 26 Sep 1977

(31) Convention Application No's 763301 (32) Filed 27 Sep 1976
771060 25 Mar 1977 in

(33) Norway (NO)

(44) Complete Specification Published 4 Jun 1980

(51) INT. CL.[3] E04B 1/16

(52) Index at Acceptance E1W 11 CVL



(54) METHOD OF ERECTING A BUILDING STRUCTURE SUCH AS A HOUSE

(71) I, WALTER NILSEN, a subject of the Kingdom of Norway, residing at Prins Oxcarsgate 32, N-3000 Drammen, Norway, do

hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a method of erecting a building structure such as a house, and to a building structure made by such a method.

A large number of ways of making reinforced walls or foundations, using suitable formworks and concrete castings which are preferably reinforced are already known. Similarly, it has been proposed to use suitable block elements, possibly in combination with panels on one or both sides.

A method has also been proposed where a formwork made from a plate material forming the inner panel of a foundation is erected and supported. At the outside of this formwork and adjacent thereto, a wall of suitable blocks is erected, the blocks being positioned to form vertical columns having spaces therebetween which define vertical free channels between the columns. A suitable reinforcing structure is then introduced into these columns and the channels are thereafter filled with settable material such as concrete to form vertical supports. The blocks used may be of light-wight concrete material or its equivalent, and the inner formwork is made from unitary plates of porous plastics material having a panelling made from gypsum. Over the top of the array of columns, reinforcing elements are positioned and embedded into a continuous horizontal concrete beam which is integral with the vertical columns. The blocks are erected on a base of reinforced concrete, preferably integral with the concrete in the columns and the beam, and the reinforcings in the base, the columns and the top beam are mutually connected.

Building of houses by means of self-supporting plates has also been proposed. With such houses, it may, however, be necessary to have a high foundation owing to the environment or terrain around the house and/or a simultaneous wish to have a large cellar under the house. It has previously been common pratice to cast such foundations by means of double-faced formworks before the remaining portion of the house is built or put into position. Alternatively, the foundations are built from blocks of concrete or the like.

The present invention provides a method of erecting a building structure such as a house, the method comprising the steps of forming a wall supporting foundation, assembling a plurality of panels on the foundation, assembling a plurality of panels on the foundation at a lower level of the building structure, disposing a reinforcing structure spaced form the exterior surfaces of the panels, mounting a floor and upper level walls upon the upper edges of the panels, and thereafter incorporating the reinforcing structure with the panels to form lower level walls by applying a settable mass thereto, the panels having a predetermined thickness, the upper level walls having a similar thickness, the upper level walls being disposed above, and being offset outwardly from, the panels, wherein the settable mass is applied to the panels to a thickness whereby the finished surfaces of the settable mass are contiguous with the outer surfaces of the upper level walls.

The invention will now be described in greater detail, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view, partially

broken away, of part of a reinforced wall or foundation;

Figure 2 is a cross-section through a portion of the structure of Figure 1;

Figure 3 is a perspective view of a completely erected house made from self-supporting plates; and

Figure 4 is a cross-section through a lower portion of the house of Figure 3.

Referring to the drawings, Figure 1 shows a structure made from a plurality of panels each of which is of the type having a core 1 of porous plastics material which on both sides is covered by gypsum or gypsum plates 2, 2'. These panels form the inner wells of the structure. The panels are on their outer sides, that is to say on the gypsum boards 2', provided with plates 3 made, for example, from rigid foamed plastics material, the plates 3 bieng fixed to the gypsum boards 2' by adhesive or other suitable means. The plates 3 preferably have a height which is somewhat less than that of the corresponding panel 1, 2 and 2'. The plates 3 are fixed at equal intervals in the longitudinal direction of the corresponding panel, as will appear from Figure 1. Thus, openings are formed between adjacent plates 3. Moreover, horizontal spaces are also formed at both the upper and lower edges of the plates 3, as will appear from Figure 1. These spaces and openings form guides for steel reinforcements 4, as will appear from Figure 1.

Outside the exposed surface of the plates 3, a reinforcing network 5 is positioned, as will appear from Figure 1. This reinforcing network 5 lies at a fixed distance from the plates 3. Concrete 6 is then sprayed onto the structure so as to enter the guides and enclose both the steel reinforcements 4 as well as the reinforcing network 5, as will appear from Figure 2.

Figure 3 illustrates a completed house which incorporates self-supporting panels 14 of the type shown in Figures 1 and 2. At the lower end of the house, a low base 11 of, for example, concrete blocks, is formed. Alternatively, the base 11 could be formed by casting. From Figure 4 it is seen that the vertical self-supporting panels 14 are positioned upon the base 11, the panels 14 forming an inner formwork for the lower level walls and simultaneously having sufficient strength to support the overlying stresses from the house. The panels 14 further provide thermal insulation for the space inside the lower level walls. At the upper edges of the panels 14, there is arranged a horizontally-positioned self-supporting panel 13, and vertically-standing self-supporting panels 12. The panel 13 forms, for example, a floor in the house and the panels 12 a wall in the house. The panels 12 are, as will appear from Figure 4, offset outwardly relative to the panels 14, the portions not resting on the upper edges of the panels 14 being intended to rest on the concrete 15 when cast as will be described below. A reinforcement 15', made from iron network or netting or the like, is arranged at a fixed distance from the outer sides of the panels 14, whereafter concrete 15'' is sprayed onto the reinforcement and the panels 14 to provide a reinforced surface 15 made from concrete. After the concrete has hardened the lower level walls will have full supporting capacity.

With the method described above, it is possible to use a quick-drying sprayable concrete which makes it simple for non-experts to make a reinforced lower level wall, or in particular a foundation, which can sustain both high vertical and horizontal stresses, for example from earth masses on the outside of the wall or foundation.

It is, of course, possible to arrange, before spraying on the concrete, openings in the lower level wall or foundation to provide for windows, doors and ventilation ducts.

The self-supporting panels described above can be of the type consisting of two gypsum plates or the like between which a layer of insulating material such as polyurethane foam is sandwiched.

As will appear from the description above, the house consisting of the self-supporting panels is mounted directly on the foundation base, whereafter the casting of the lower level walls can be made simultaneously with, or after any other craftsman's work, for example, electrical or painting work, on the house has been carried out. Thus, the invention yields a substantial time saving and rationalisation in house building, which naturally yields a lower over-all price on the house.

With the present invention there is thus no demand for any outer formwork. Moreover, the lower level walls are easy to make, and the consumption of concrete is reduced relative to normal lower level walls since the guides for the steel reinforcements 4 form beams and columns respectively in an otherwise unitary structure.

It will be understood that the examples shown in the drawings and described above may be modified in many ways. Thus, panels need not be gypsum plates having sandwiched therebetween porous plastics. Moreover, the choice of material is free as regards the plates 3 in Figure 1.

WHAT I CLAIM IS:-

1. A method of erecting a building structure such as a house, the method comprising the steps of forming a wall supporting foundation, assembling a plurality of panels on the foundation at a lower level of the building structure, disposing a reinforcing structure spaced from the exterior surfaces of the panels, mounting a floor and upper level walls upon edges of the panels, and thereafter incorporating the reinforcing structure with the panels to form lower level walls by applying a settable mass thereto, the panels having a predetermined thickness and the upper level walls having a similar thickness,

the upper level walls being disposed above, and being offset outwardly from, the panels, wherein the settable mass is applied to the panels to a thickness whereby the finished surfaces of the settable mass are contiguous with the outer surfaces of the upper level walls.

2. A method as claimed in Claim 1, wherein the reinforcing structure is a reinforced network.

3. A method as claimed in Claim 1, or Claim 2, wherein prior to the positioning of the reinforcing structure, a plurality of plates are fixed at spaced intervals between the exterior surfaces of the panels and the reinforcing structure, the plates being so positioned as to define vertical guides therebetween.

4. A method as claimed in Claim 3, wherein the plates being so positioned as to define vert-guides at their upper and lower edges.

5. A method as claimed in Claim 4, wherein further reinforcements are arranged within said further guides at fixed distances from the plates.

6. A method as claimed in any one of Claims 3 to 5, wherein the plates are made of plastics material.

7. A method as claimed in any one of Claims 1 to 6, wherein the settable mass is concrete.

8. A method as claimed in any one of Claims 1 to 7, wherein each panel is formed from two gypsum plates between which an insulating material is arranged.

9. A method as claimed in Claim 8, wherein the insulating material is polyurethane foam.

10. A method as claimed in any one of Claims 1 to 9, wherein the settable mass is applied to the panels by spraying.

11. A method of erecting a building structure substantially as hereinbefore described with reference to the accompanying drawings.

12. A building structure whenever erected by the method of any one of Claims 1 to 11.

BROOKES & MARTIN,
Chartered Patent Agents,
High Holborn House,
52/54 High Holborn,
LONDON W.C.1

Agents for the Applicants

Printed for Her Majesty's Stationery Office by MULTIPLEX techniques ltd., St. Mary Cray, Kent. 1980. Published at the Patent Office, 25 Southampton Buildings, London WC2 1AY, from which copies may be obtained.

1568730 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1.

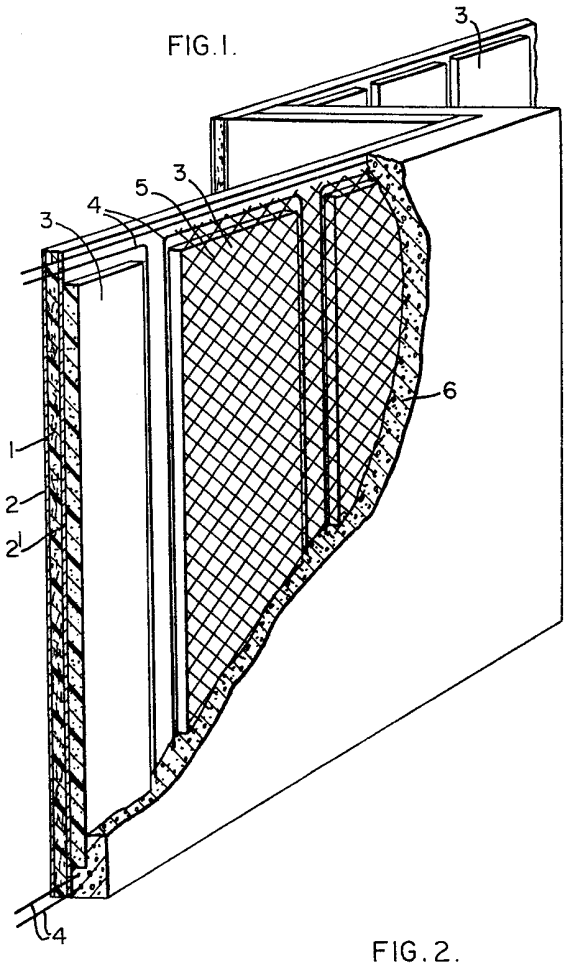


FIG.2.

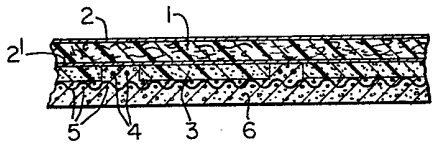
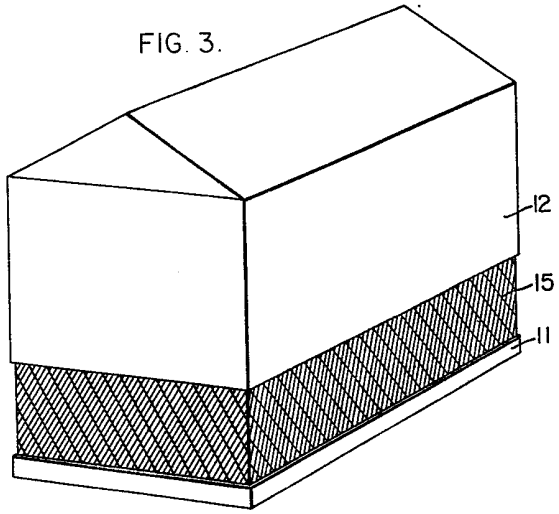


FIG. 3.



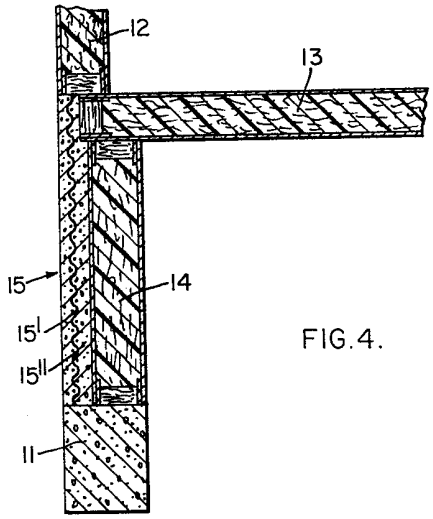


FIG. 4.