

Sept. 3, 1968

P. COMMENT

3,399,505

PROCESS OF CONSTRUCTING A BUILDING

Filed March 22, 1966

2 Sheets-Sheet 1

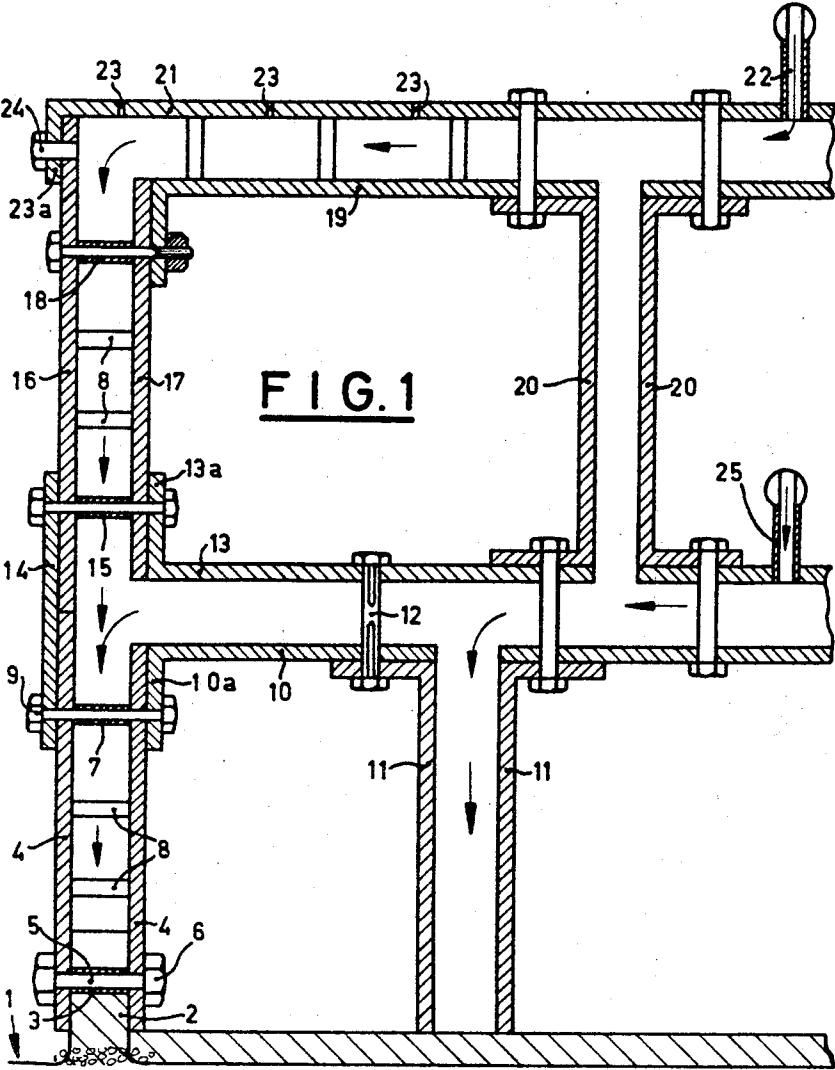
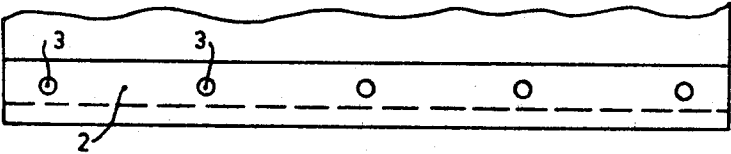


FIG. 2



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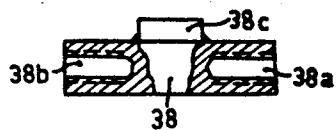
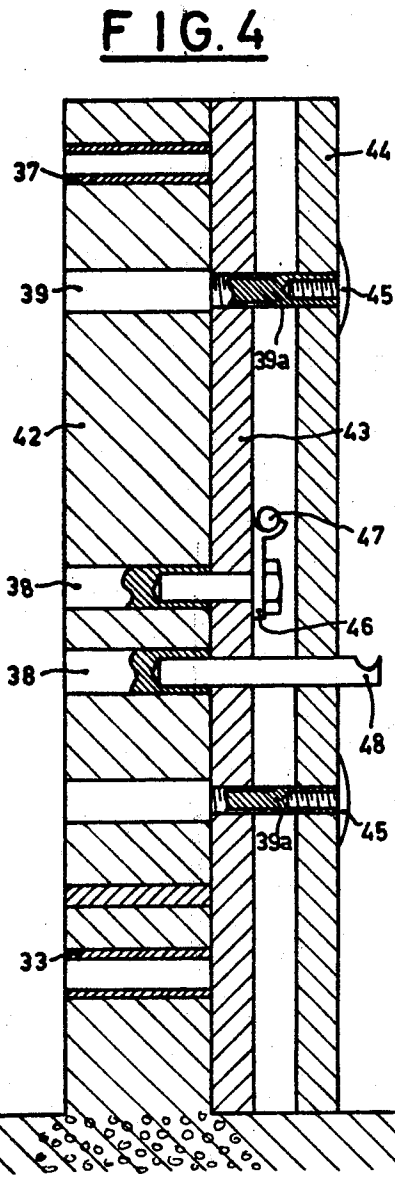
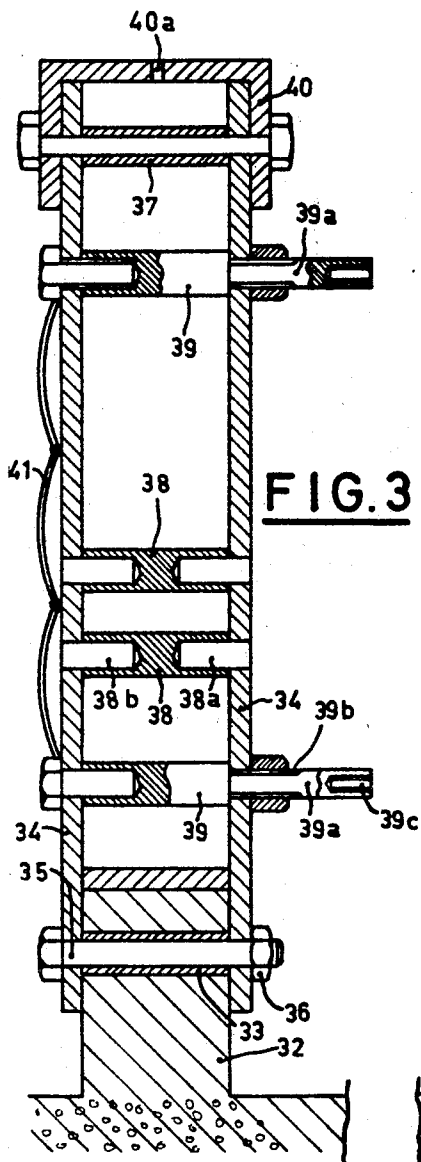
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## PROCESS OF CONSTRUCTING A BUILDING

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### ABSTRACT OF THE DISCLOSURE

A method of building a construction at least one story high by pouring a foundation wall, embedding therein hollow cylindrical sleeves disposed horizontally and square with the vertical faces of the wall, removably securing a number of inner and outer vertical channels on the foundation so as to leave a channel between them; securing these panels together through these hollow sleeves and through a number of braces placed horizontally between the panels; then removably fastening a number of upper and lower horizontal panels to the inner vertical panels while leaving a longitudinal space between communicating with the channels for forming the floors of the construction; providing openings in the uppermost of the horizontal panels and pouring concrete through one of the openings and causing the concrete to pass through the channels and the spaces; allowing the concrete to set and removing the removably secured panels so as to leave behind the shell of a building having the desired number of stories.

The present invention has for its object a process for constructing a building for example a house or an office building of several stories, in a reduced time and with the minimum of specialised manual labour.

Construction processes are already known using a metal framework constituted by panels of sheet metal in which the concrete is poured, the framework being dismantled after the setting of the concrete and re-used for another construction. Nevertheless, the assembling of the framework, as well as of numerous variants proposed, exacts specialised manual labour and a whole exterior frame is necessary to fix rigidly the panels of the framework.

The present invention is concerned with a method of building a construction at least one story high, which comprises pouring a foundation wall having therein hollow cylindrical sleeves disposed horizontally therein and square with the vertical faces of said wall; removably securing a plurality of inner and outer vertical panels on said foundation so as to leave a channel between them; removably securing said panels together through said hollow sleeve; fixing a number of braces horizontally between the panels; removably securing a plurality of upper and lower horizontal panels to the inner vertical panels while leaving a longitudinal space therebetween in communication with the channels for forming floors of the construction, providing openings in the uppermost of the horizontal panels and pouring concrete through one of said openings, causing the concrete to pass through said channels and said spaces, allowing said concrete to set and removing said removably secured panels.

This process can permit the building of a house by molding in the same manner that one molds metal or plastic pieces.

The accompanying drawings show, by way of example, an installation for carrying out the process according to the invention.

FIGURE 1 shows a vertical section through a metal framework mounted for the injection of a house of one story.

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FIGURE 2 shows a detail of the securing of the framework on the wall of the foundation.

FIGURE 3 shows a detail of an assembled framework before injection of the concrete.

FIGURE 4 shows the wall obtained by means of the framework of FIGURE 3.

FIGURE 5 shows a type of brace used in the framework.

After having dug a foundation 1, a foundation wall 2 is poured by a conventional process, the wall 2 having previously embedded hollow metal cylindrical sleeves 3 disposed horizontally and perfectly square with its vertical faces. These sleeves 3 constitute the means of securing the entire framework in which the concrete or an analogous material will be injected in a single operation to form the skeleton of the house. First of all the metal panels 4 are fixed on the foundation wall 2, by means of bolts 5 and nut 6 passing through the sleeves 3. In the upper part of the panels 4, a sleeve 7 is disposed constituting a brace permitting the other elements of the framework to be fixed by means of bolts 9. A certain number of other braces 8 are provided for the stiffening of the framework. The braces 8 are naturally left in the concrete and will be used for the interior finishing of the house and for the securing of the piping as will be described later. On the vertical panels 4 of the framework are fixed then horizontal panels 10 having a part 10a folded at right angles permitting them to be connected by means of bolts to the panels 4. The horizontal panels 10 are supported on the other hand by vertical panels 11 for the pillars and partitions of the basement. On the horizontal panels 10 are fixed braces 12 having at each of their ends threaded holes for securing them to the panels by means of screws. On these braces 12 are then screwed the horizontal panels 13 constituting with the panels 10 the framework of the lower slab. The joining elements 14 permit the panels 16 of the framework of the ground floor to be rigidly fixed to the adjacent panel 16 by means of bolts and of braces 15 analogous to the braces 7. These bolts and braces 15 also secure the panel 17 to a wing 13a at right angles to the panel 13. Between the panels 16 and 17 are fixed the braces 8 identical to those fixed between the panels 4, as well as a brace 18 for securing the panels 19 of the upper slab. The horizontal panels 21 forming part of the framework of the upper slab can be fixed either by a wing by means of a bolt passing through the brace 18, or as is the case shown in FIGURE 1, by means of a wing 23a at right angles screwed directly on the panel 16 by means of a screw 24. The interior partitions of the ground floor are lined by means of panels 20 having at each of their ends wings turned at right angles for securing them to the panels 13 and 19 of the framework of the lower and upper slabs. The stiffening of the framework constituted by the panels 20 is assured in the same manner as the stiffening of the framework of the exterior walls by means of braces 8 not shown in the figure. Once the framework is completely assembled, concrete is injected through the injection mouths 22 fixed to the upper panel 21. The air compressed during the injection of the concrete escapes by the openings 23 made in the upper panels 21. To facilitate the injection of concrete in the lower parts of the framework, it is advantageous to provide an injection mouth 25 in one of the panels of the lower slab. In this case, concrete is first injected through the injection mouth 25 so as to fill the lower part of the framework, before injecting the concrete by the mouth 22 for the molding of the upper parts.

FIGURE 3 shows in more detail the elements of one embodiment of a part of the framework. On a wall

32 of the foundation, in which a sleeve 33 perpendicular to the surfaces of the foundation wall was embedded during the pouring of this wall, two plates 34 of metal or of plastic material are fixed by means of a bolt 35 passing through the sleeve 33 and held by a nut 36. Three different types of braces 37, 38 and 39 are provided for assembling rigidly the two plates 34, each of the said braces corresponding to a different ulterior use. The brace 37 is constituted by a sleeve analogous to the sleeve 33 permitting to fix by bolting the other plates of the framework, here a U-shaped element 40 closing the framework, and provided with an air hole 40a. The bolt passing through the brace 37 will serve, after dismantling the framework, to fix a new framework in the same manner as one has fixed the plates 34 to the foundation wall 32. The braces 38 are constituted by solid cylinders of which the ends have axial tapped holes 38a and 38b, permitting to screw the braces to the plates 34 of the framework. A third type of brace 39 is prolonged towards the interior of the building by a rod 39a having a thread 39b permitting to fix this brace to the lower plate 34 by means of a nut, and a tapped hole 39c at its end. The plates 34 can be made of relatively thin sheet metal reinforced by means of a corrugated sheet 41 spot welded to one of the plates 34 or to both of these plates.

FIGURE 4 shows the wall obtained after the injection of the concrete and the dismantling of the element represented in FIGURE 3. The braces 37, 38 and 39 are left in the concrete 42. It is then possible to fix an insulating plate 43 on the interior face of the wall 42 by means of screws engaging in the braces 38. At a certain distance from the insulating plate 43, the interior wall 44, which can be chosen, for example, in wood or in a wood conglomerate is fixed with the aid of a round headed screw 45 screwed into the end 39a of the braces 39. The screw 45 can have a decorative effect, but can naturally be replaced by a screw having a sunk head. All that remains is to veneer or to paper the wall 44. In the space included between the insulating plate 43 and the wall 44, it is then possible to dispose the different pipes for heating, water and electricity. These pipes 47 are fixed by means of supports 46 maintained by the screws fixing the insulation 43 on the braces 38. It is naturally possible to screw other elements in the tapped holes of the braces 38, for example supports 48 for radiators, sinks, wardrobes, shelves or any other element being maintained or suspended at the interior of the room or of the building.

Frames for the windows and doors can be formed either by leaving part of the framework in place to serve as these frames, or by securing conventional frames to the openings by means of the braces after the framework has been removed.

It is naturally necessary that the braces be fixed very solidly in the concrete and cannot be displaced around their axis. To this effect, FIGURE 5 shows how the braces can be anchored by soldering a wing 38c on their middle part.

The foundation wall can also be constituted with separate contact studs obtained by the process of injection described.

The framework can be fixed on the foundation wall by means of sleeves disposed vertically in the framework, or of a U-shaped iron of which the wings project slightly above the level of the foundation wall so that the plates of the framework can be fixed to these wings.

Instead of bolts, in order to eliminate the threads becoming easily spoiled, rods locked by means of pins can be used.

The interior walls 44 can also be suspended non-rigidly from hooks fixed to the braces 38.

As has already been mentioned, the plates of the framework, and even the braces, can be made in plastic material as well as in metal. The process described permits houses to be constructed in mass production with the minimum of specialised manual labour. This process can be used for the construction of buildings of several stories, as there are pumps available for the injection of concrete at a height of 30 metres.

What is claimed is:

1. A method of building a construction at least one story high, which comprises pouring a foundation wall having therein hollow cylindrical sleeves disposed horizontally therein and square with the vertical faces of said wall; removably securing a plurality of inner and outer vertical panels on said foundation wall so as to leave a channel therebetween; removably securing said panels together through said hollow sleeves; fixing a number of internally threaded braces horizontally between said panels; removably securing a plurality of upper and lower horizontal panels to said inner vertical panels while leaving a longitudinal space therebetween in communication with said channels for forming floors of said construction; providing openings in the uppermost of said horizontal panels and pouring concrete through one of said openings; causing said concrete to pass through said channels and said spaces; allowing said concrete to set, removing said removably secured panels, and securing insulating plates and interior panelling, after removal of said panels, to said braces, said plates and said interior panelling being spaced apart so as to leave a space for the introduction of household piping therebetween.

2. Method according to claim 1, wherein corrugated sheets are spot welded to at least some of said vertical panels to reinforce the same.

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