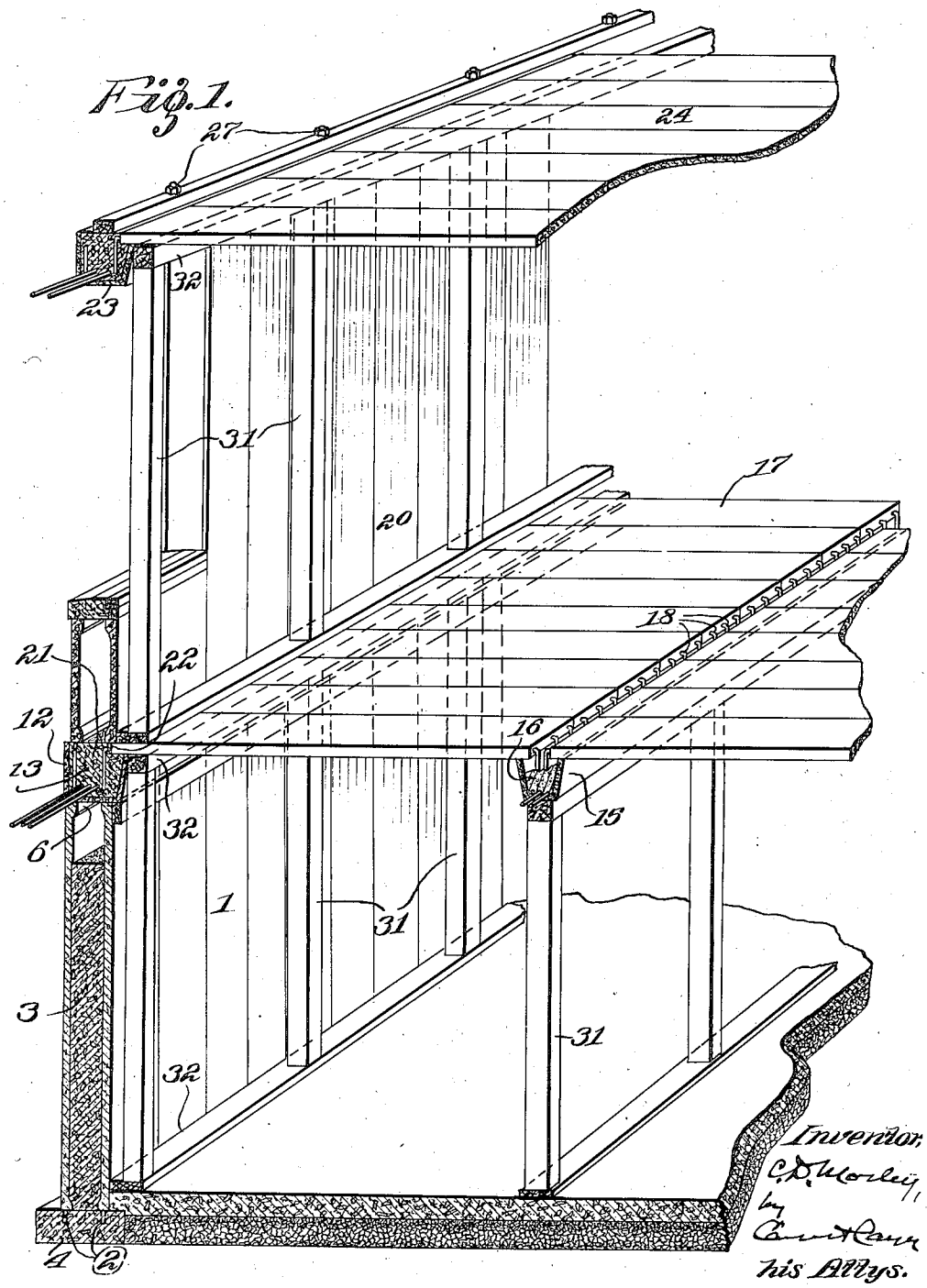
July 15, 1924. 1,501,288

C. D. MORLEY

CONCRETE STRUCTURE

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Fig. 1.



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C. D. MORLEY

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Fig. 3.

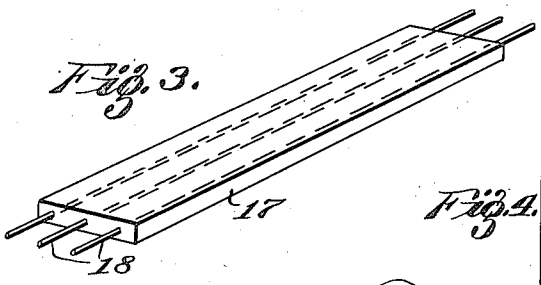


Fig. 5.

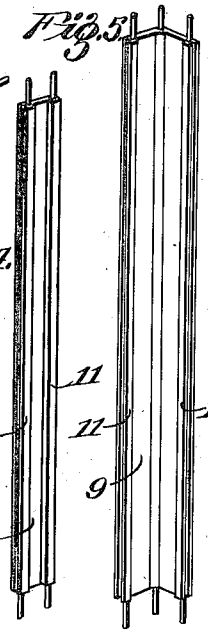


Fig. 6.

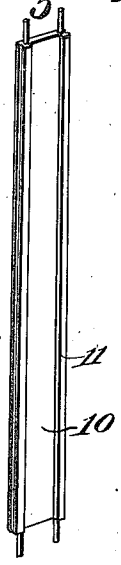


Fig. 7.

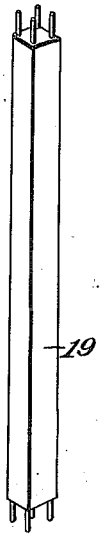


Fig. 4.

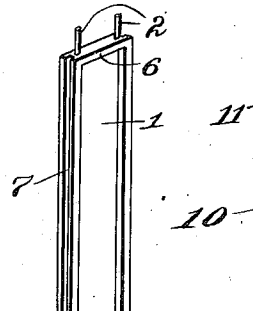


Fig. 2.

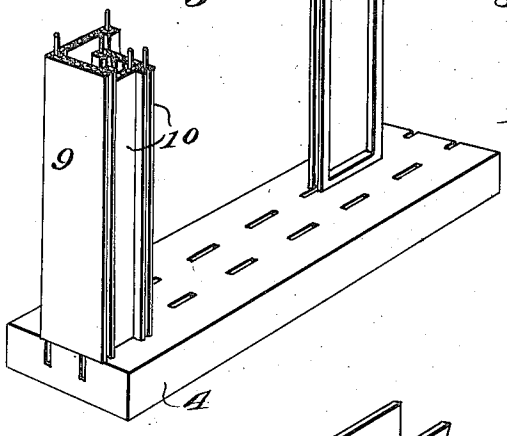


Fig. 8.

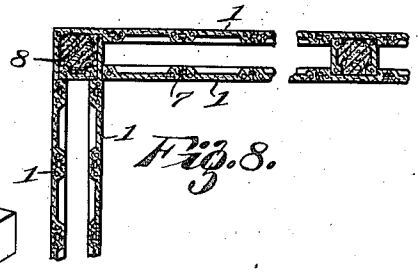


Fig. 10.

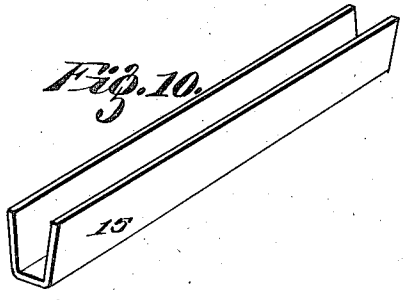
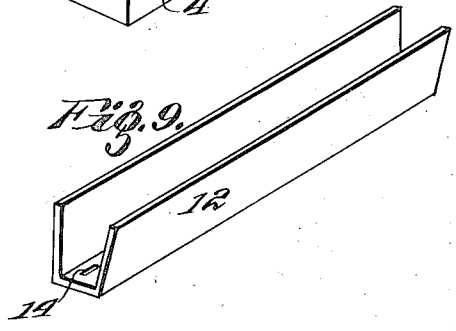


Fig. 9.



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Charles D. Morley,
by Cameron & Cameron,
his Attys.

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UNITED STATES PATENT OFFICE.

CHARLES D. MORLEY, OF ST. LOUIS, MISSOURI.

CONCRETE STRUCTURE.

Application filed April 5, 1920. Serial No. 371,201.

To all whom it may concern:

Be it known that I, CHARLES D. MORLEY, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Concrete Structures, of which the following is a specification.

My invention relates to reinforced structures such as dwelling houses and to processes of building them. It has for its principal objects to dispense with the use of much of the elaborate and expensive temporary form work heretofore commonly used in building concrete structures, to adapt structural members to serve as forms during the building of the structure and as component parts of the finished structure, and to simplify and cheapen the process of building such structures. My invention consists principally in using for forms for the concrete to be cast in situ reinforced concrete members suitable for such use and adapted to constitute permanent structural elements of the finished structure. My invention further consists in the process and in the parts and combinations of parts hereinafter described and claimed. In the drawings, which form part of this specification and wherein like reference characters indicate like parts wherever they occur,

Fig. 1 is a perspective view showing in an early stage of construction a building made according to my invention.

Fig. 2 is a perspective view showing a portion of a concrete footing with a precast wall unit and precast column units arranged thereon.

Fig. 3 is a perspective view of a precast floor slab.

Figs. 4, 5 and 6 are perspective views of the precast column members.

Fig. 7 is a perspective view of a precast column.

Fig. 8 is a horizontal sectional view showing a typical wall and column construction.

Fig. 9 is a perspective view of a typical girder form, and

Fig. 10 is a perspective view of an inside beam form.

The structure illustrated in the drawings is a dwelling house which comprises footings, walls and columns on the footings, beams or girders and floors, all made of concrete. The footings, beams, some of the columns and part of the walls are all cast in situ; but the forms in which the beams and columns are molded in situ are precast and adapted to become permanent and effective parts of said beams and walls respectively. The floors are also made of precast slabs adapted to be integrated with the beams that support them.

The basement walls of the structure comprise precast slabs 1 of reinforced concrete, portions of the reinforcing bars 2 of said slabs projecting from the ends thereof. Said slabs are disposed vertically on edge and parallel with each other to form hollow walls; the space between them may be filled to about the level of the ground with reinforced concrete 3. The walls rest on concrete footings 4. The reinforcing bars 2 of the precast wall slabs and the reinforcing bars 5 of the concrete filling project into the footings 4. The precast wall slabs 1 preferably have smooth outside surfaces. The inner surfaces have raised marginal portions 6 to furnish a good bond between said precast slabs 1 and the concrete filling 3 and also to provide relatively large joints between said precast slabs. The edges of said slabs have grooves therein adapted to receive cement 7 to form a key for abutting slabs. The outside concrete columns comprise precast members arranged to constitute a hollow column form and a filling 8 of concrete in said form whereby said form members and said concrete cast in situ together constitute a column which has substantially the character of a monolithic construction. Preferably, said precast column slabs are of the kind illustrated in Figs. 2 and 5, comprising an angular slab 9 adapted to constitute two sides of the column and slabs 10 adapted to cooperate therewith to constitute a column form. Said precast column slabs have raised portions 11 on the sides facing inwardly of the column so that they will be firmly bonded to the reinforced concrete filling 8. Girders or beams comprising reinforced concrete forms 12 filled with reinforced concrete 13 are supported by said columns and rest on the upper edges of the precast wall slabs 1. Said girder forms 12 are of channel shape and preferably have one side wall shorter than the other. The bottoms of said girder forms have holes 14 therein at intervals to permit the reinforcing bars of the precast wall slabs and of the columns to extend into the girder.

Intermediate beams comprise precast channel shaped reinforced concrete members

15 and reinforced concrete 16 therein. The floor comprises precast reinforced concrete slabs 17 having portions of their reinforcing bars 18 projecting at each end. Said slabs 17 are supported on the walls of said beam forms 15 and said previously mentioned girder forms 12. The ends of the reinforcing bars 18 of said floor slabs project into the beams 13 and girders 16 respectively. The intermediate beams may be supported on precast columns 19.

Precast wall slabs 20 like those above described constitute the walls of the upper stories of the building. These slabs are disposed vertically on edge and parallel to each other along the margins of the girders 21, thus forming hollow curtain walls extending from column to column. The ends of the reinforcing bars 22 of said precast wall slabs extend into the girders 21 as above described in the case of the basement walls and footings. The beams 23 and floor slabs 24 are the same as those above described.

Partitions between rooms are formed by precast slabs or units similar to those used in the outside walls. Said units are provided with suitable nailing blocks, furring strips and the like cast therein. Doors, windows and other openings are preferably made as wide as a wall unit or a multiple thereof. Units adjoining said doors and windows have suitable provision for securing them.

The upper beams 26 are adapted to support a roof of any desired type. The building may have a flat roof, in which case a wall of precast hollow units may be formed along the upper outside beams at the front and sides of the building.

If the building is to have a pitch roof, bolts or dowel pins 27 are embedded in the upper outside beams. Wooden plates 28 are secured to the beams by means of said bolts and the roof supporting members are suitably secured to said wooden plates.

The process of erecting buildings according to my invention is as follows: The concrete footings for the walls and columns are poured first and their upper surfaces carefully smoothed and levelled, and while the concrete is still soft, slots or holes are formed therein of suitable size and in proper position to receive reinforcing bars projecting from the lower edges of the precast wall slabs or units. Before the concrete footings harden, the lower ends of the vertical reinforcing bars for the walls and columns are worked into position in the footings by which they are firmly held in vertical position when the concrete hardens. The slots in said footings are then filled with suitable cement or concrete and the inside row of precast wall units is arranged in position edgewise along the margins of the footings, the lower ends of the reinforcing bars of said wall slabs extending into the cement in said slots. Preferably, a temporary wooden false-work is arranged to support the structure while the concrete cast in situ is hardening, as shown in Fig. 1, said false-work comprising vertical struts 31 and horizontally arranged braces and beam supports 32. After the inner wall units have been positioned, the precast units for the inner sides of the corner columns are arranged in position. The outer wall units and column members are arranged in similar manner and suitably braced so as to be held in position while the concrete cast therein is hardening. The window sills and door frames are arranged in position as desired, the spaces between the frames and the concrete units preferably being filled with a plastic oil cement so as to make weather proof joints. Concrete is then poured into the space between the precast slabs, the concrete preferably extending above the ground level.

The precast girder forms are then placed in position resting on the columns and on the upper edges of the precast wall units. A suitable layer of mortar or cement is arranged between the tops of the wall units and the bottoms of the beam forms. Precast reinforced concrete members constituting forms for intermediate beams are then arranged on the temporary wooden false work or on precast concrete columns and the precast floor slabs are placed in position as above described. After the floor slabs have been laid, beam reinforcement is placed in the beam forms, and the beam and column forms are filled with concrete. The process of building additional stories is similar to that above described and the partitions between rooms, doors, windows and transoms and the like may be arranged as desired.

The floors and walls may be finished as desired. The floor slabs and the precast wall units can be made under factory conditions and can thus have a uniform finish and appearance and a quality much superior to that of concrete members cast in situ under ordinary working conditions. It is further noted that the precast concrete forms constitute component parts of the finished structure, thus cheapening the cost and lessening the difficulty of erecting buildings and that the process of construction is such that the precast members can be easily positioned by ordinary workmen without danger of being misplaced thus injuring the structure. What little temporary false work is needed is very small and cheap and can be used over and over. The precast members can be economically made and can be given special treatment to obtain any desired finish. It is possible

to give these units their final finish in the factory so that when the building is erected, no additional treatment is needed for the walls or floors. My process is applicable to concrete structures generally and not merely to dwellings of the kind described.

The units for the basement walls may be made heavy enough to withstand the earth pressure and these walls may be hollow like the upper walls. In many buildings it is unnecessary to use the poured columns above described and the load is borne by the precast wall members. It will be understood that any desired kind of reinforcement may be used and that other modifications may be made without departing from my invention.

What I claim is:

1. A reinforced concrete structure comprising vertically disposed precast slabs of reinforced concrete constituting hollow walls and column forms, a filling of reinforced concrete in said column forms and integrated therewith, precast reinforced concrete floor slabs, precast concrete beam forms filled with reinforced concrete to constitute beams, reinforcement projecting from said walls, column forms and floor slabs into said beams, said columns and beams constituting the load carrying members of said structure.

2. In a concrete structure, a hollow wall comprising a reinforced concrete footing and precast reinforced concrete wall members arranged in parallel rows endwise on said footing, and a beam along the top of said wall, the reinforcement of said wall members projecting at the bottom into said footing and at the top into said beam.

CHARLES D. MORLEY.