Nov. 11, 1941. E. R. WOLF 2,262,127

MASONRY BUILDING STRUCTURE

Filed Jan. 5, 1939

FIG. 1

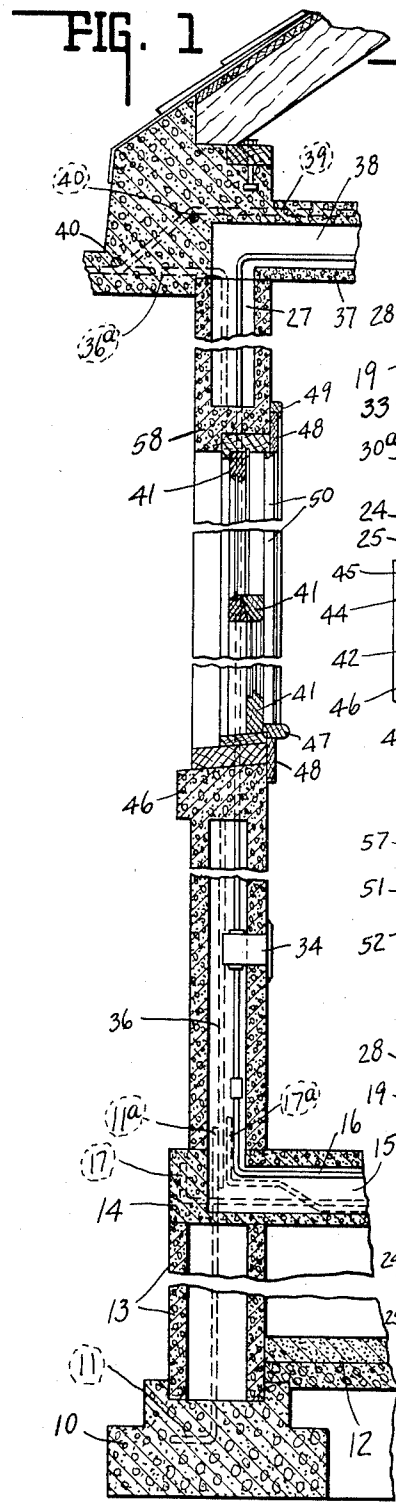


FIG. 2

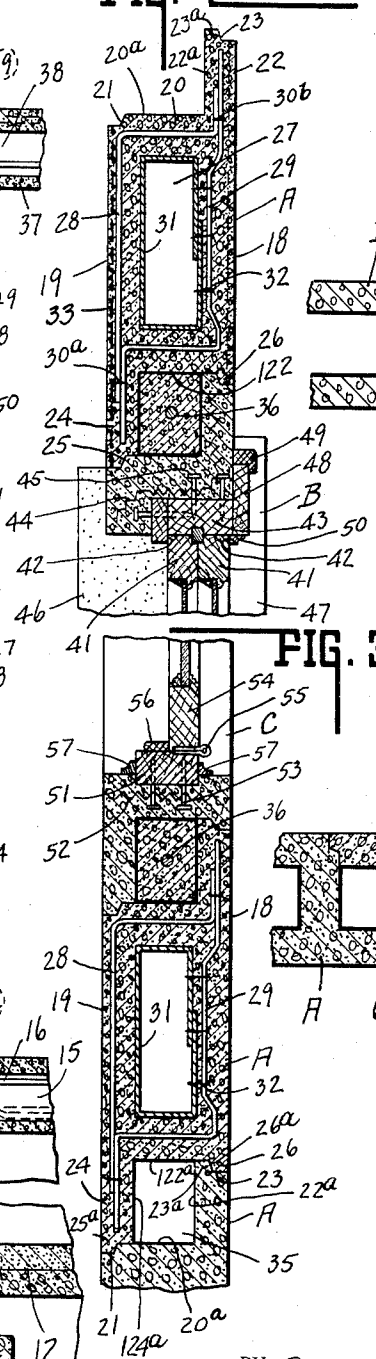


FIG. 4

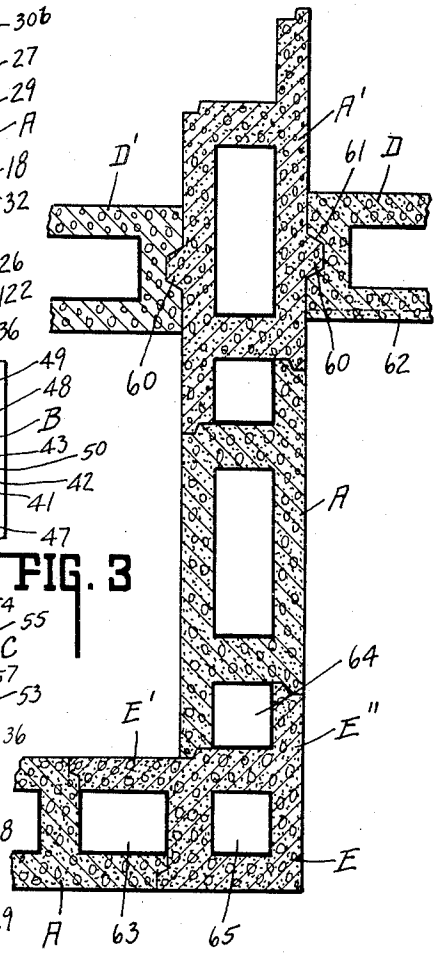


FIG. 3

INVENTOR.
EDWARD R. WOLF.
BY Lockwood Goldsmith & Galt
ATTORNEYS.

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MASONRY BUILDING STRUCTURE

Edward R. Wolf, Indianapolis, Ind.

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2 Claims. (Cl. 72—1)

This invention relates to a semi-precast building structure.

The chief object of the invention is to provide precast independent wall units of a building structure which have an interlocking edge-to-edge arrangement and which when associated together are adapted to form a form for wall columns which support a ceiling structure and more especially the beams thereof.

The chief feature of the invention consists in the formation of the several units whereby the aforesaid object is accomplished.

Another feature of the invention is that the aforesaid structure permits the beam arrangement of the ceiling to be integrally connected to the column arrangement, so that opposite walls are connected by the beam arrangement of the ceiling structure.

Another object of the invention is to arrange certain precast units with elongated passages therethrough whereby the latter may serve as ducts for heating, ventilating, air conditioning purposes, as well as ducts for plumbing and lighting connections.

One feature of a unit of this tubular character is that its weight is materially reduced.

Another object of the invention is to so form the precast unit that the exterior thereof may be of any desired characteristic or ornamentation, as will hereinafter be pointed out.

Each exterior wall unit is so fabricated as to lend itself to the incorporation of reenforcement therein and/or waterproofing material during formation.

Various other objects and features will be set forth more fully hereinafter in the following description.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims.

In the drawing,

Fig. 1 is a vertical, transverse sectional view of a building structure through a window incorporated wall unit thereof.

Fig. 2 is an enlarged transverse, horizontal sectional view through a standard wall unit, a portion of a window unit operatively associated therewith and a column included therebetween.

Fig. 3 is a similar view of a standard wall unit associated with a door unit and the included column therebetween.

Fig. 4 is a diagrammatic, transverse horizontal sectional view of a wall arrangement including a standard unit, a corner unit, a partition unit, and a lateral wall connecting unit.

In the drawing 10 indicates a footing arrangement provided, if desired, with an upwardly directed metallic reenforcement 11. 12 indicates a basement floor or the like. 13 indicates the basement wall structure which may be of the character hereinafter set forth, or of the ordinary cement block character, or may be of ordinary concrete formation—that is, poured in place. 14 indicates generally the main floor and basement ceiling structure and herein there is illustrated a tubular formation 15 which has included therein the conduit 16 that serves as a protection for electric wiring. In a similar manner this or another duct portion 15 may serve as a passage for a heating or ventilating system or for the reception of plumbing etc., not shown.

Suitably supported on the structure 14 and rising vertically therefrom is the wall unit which in Fig. 1 is shown as embodying a window arrangement. The reenforcement 11 not only extends through the floor 14 but projects upwardly into the column forming space between units, the projecting portion being indicated in Fig. 1 by the numeral 11*a*. The floor may be reenforced as at 17 and part of the reenforcement as at 17*a* may also project upwardly into the subsequently formed column.

Reference will now be had more particularly to Figs. 2 and 3, and in said figures A indicates a standard unit, B indicates a window unit and C indicates a door unit.

Fig. 2 relative to the standard unit, 18 indicates the interior face, 19 the exterior face, 20 one end wall, and 122 an opposite end wall. The wall 20 is recessed as at 21 at one corner and from the opposite corner there is a projecting interior wall forming portion or wing 22, the interior corner of which is recessed or notched as at 23. The wall 22 at one corner and the exterior corner includes an exterior wall extension or wing 24 having its interior corner recessed as at 25. The opposite corner of the wall 122 includes a smaller projecting portion 26. All of the units have this exterior arrangement along their vertical side edges except such partition units as are illustrated in Fig. 4. The standard unit shown in Fig. 2 may, if desired, and preferably the same is so provided, with a duct extending entirely therethrough forming a passage 27. It may also include reenforcements 28 and 29 secured together as at 30*a* and 30*b*. The duct 27 may be formed of sheet metal or of metal lath 31 and the latter is secured as at 32 to reenforcement 29.

For an understanding of the manufacture of

this unit, the interior wall 18 is the bottom thereof during the formation and after the side wall forms are placed on a platen or plate, concrete is poured into the same after the reenforcement 28—29 and the member 31 are mounted therein. The form, if no integral waterproofing is to be incorporated in the unit, is then completely filled and the top mold plate is applied thereto and this may be provided with a complementary surface of ornamentation forming type, such that it can represent block formation or brick formation, or any other formation type of ornamentation. Previous to completely filling the mold, the waterproofing material may be incorporated as a layer 33, shown dotted in unit A in Fig. 2 only, the same being omitted from the other figures and other portions of this figure solely for clearness.

Whenever it is desired to incorporate an electric outlet in the interior wall, the outlet box or junction box, such as illustrated in Fig. 1 and indicated by the numeral 34 therein, is mounted in proper position on the bottom mold plate and is molded therein in the formation of the precast unit. The metal lath 31 is cut out for box reception and the two are secured together.

In Fig. 3 two units A are illustrated in adjacent aligned relation and it will be observed that the two units interfit or interlock, the projecting portion 23*a* seating in the recess portion 26*a* and the recess 23 receiving the tongue portion 26 of the adjacent aligned wall portions. In similar manner, the projecting portion or wing 24 has its tongue portion 25*a* seated in the recess 21 of the adjacent wall unit. There is thus formed between units, a tubular space that extends the full length of the wall unit—that is, from top to bottom when the units are erected and placed, and this tubular portion is indicated by the numeral 35.

Previous to such erection, the surfaces 124*a*—122*a*—20*a*, and 22*a* are coated with waterproofing, such as pitch, tar, or the like. After the units are erected, there may be inserted therein column reenforcement, such as indicated at 36 in Figs. 2 and 3. This also is shown in Fig. 1. This reenforcement extends from the floor to the ceiling and the end, or ends, thereof, if more than one reenforcing rod is employed, may be directed laterally into the ceiling beam or into the cantilever roof supporting beam, as shown at the upper end of Fig. 1, and indicated by the numeral 36*a*.

Concrete is then poured into this tubular form and the units are thus locked together and this column is brought to the lower ceiling line with the column reenforcements projecting upwardly and/or laterally as described. Following complete erection of the entire wall arrangement, both interior and exterior, ceiling forms are placed which provide beam forming spaces extending from wall to wall and then when the beams are poured, the entire wall arrangement is locked together.

In explanation at this point, it may be stated that the ceiling forms are the subject matter of another invention, and are relatively light weight and include the ceiling forming material and the like, so that they are not required to be removed after the beams have been formed. However, the beams may be formed in the usual manner, as herein illustrated in Fig. 1. The ceiling 37 includes the duct arrangement 38 which communicates with the duct 27 and it may also include longitudinal reenforcement 39. The roof supporting portion may be longitudinally reenforced as at 40 and this would be poured at the same time that the ceiling beams are poured. The reenforcement 39 may be welded or otherwise secured to the rod 36 which is common practice in reenforcement of poured concrete structures. This is true also with respect to the other end of rod 36 and the reenforcement 17*a*.

Reference will now be had to Figs. 1 and 2 with regard to the unit B—to-wit, the window unit. It is to be understood the ends of said unit or vertical side walls thereof are the same as a standard unit, although the width may be that desired or required in order to incorporate therein the selected size of window. Herein 41 indicates two guillotine type windows slidable in the grooves 42 of the window frame, indicated generally by the numeral 43. Said frame is held in place in the mold by being suitably anchored, for example, to the metal lath section 44 by the nails 45, the said metal lath constituting a reenforcement for the wall forming material. The top form member includes a recess which provides the window ledge 46 in the unit.

In this particular unit, it will be noted that the window opening occupies the space ordinarily occupied by the central duct or tubular passage 27, so that this unit may not be utilized for ventilation purposes or electrical or water supply purposes, except for that portion which is below the sill 46, such as shown in Fig. 1. The window unit after formation, is provided with the inside sill 47 and the trim 48 and 49 as well as the inner sash stop 50. When this wall unit is associated with a standard unit, there is again formed the tubular opening therebetween that is subsequently to be filled with concrete and reenforced, if it is desired to form a reenforced column.

In Fig. 3 there is illustrated, as before mentioned, a door unit C which is similarly formed—that is, its side edges are complementary to the side edges of a standard unit or to a window unit, and cooperates therewith to form the tubular opening which is an integral form for the column therebetween. This unit C includes the door frame 51 suitably secured in place by being anchored to wire mesh or metal lath reenforcement 52 by means of the nails 53 or equivalent structure. The door is indicated by the numeral 54 and is hinged to the frame as at 55, the stop being indicated by the numeral 56 and the ornamental molding or trim by the numeral 57. The threshold may be incorporated in the door frame as a part thereof. It will be understood the top of the unit is closed in substantially the same manner that the window unit is closed immediately above the window, as indicated at 58 in Fig. 1. The bottom of the unit may be constructed in substantially the same manner as indicated at 56 in Fig. 1, although, of course, it would be of lesser elevation, if employed, and at the floor line of the unit.

Reference will now be had to Fig. 4. In this figure, the letter A again indicates a standard tubular wall unit of precast character. The unit A' shown therein is a junction unit. It is similar to the unit A, except it includes one or more longitudinally extending, laterally directed extensions 60. Wall unit D is similar to wall unit A, except that one end is recessed as at 61 to receive tongue 60. Wall unit D may differ from wall unit D' as indicated at 62, wherein there is incorporated integrally the waterproofing corresponding to same at 33 in Fig. 2, since

this unit D is an exterior wall forming member while the unit D' is an interior or partition wall forming member.

In this figure, these is also illustrated a corner unit E which has two ends E' and E'' that are similar to the opposite ends of the side wall portions of a standard unit, except they are arranged at 90°, and when associated with the adjacent complementary ends of standard units A form the column forming openings **63** and **64**, respectively. If the corner unit is of tubular character, as indicated at **65**, the corner arrangement may include three column formations. The corner unit E illustrated herein, it is believed, is a sufficient illustration of a corner arrangement broadly so that an interior corner forming unit need not be illustrated.

The special interior corner formation illustrated at the upper right hand portion of Fig. 4 is utilized when the main wall is to be continued beyond the offset arrangement, as illustrated at the immediate top center of Fig. 4. When such an arrangement is not to be utilized, then the unit E would replace unit A', D and D', and would be associated with the unit A, illustrated in the central portion of Fig. 4, and then another unit A will be associated with the portion E'' and extend at right angles to the unit A shown centrally in said figure, and to the left thereof.

The foregoing thus briefly describes the formation of a masonry type structure wherein the same is composed of ornamented, reenforced, hollow concrete panel units, which may be fabricated at any time and place and assembled at the building location in wall formation, the adjacent edges of the units having an interlocking relation and simultaneously forming molds for columns for superstructure support and simultaneously anchoring the several walls together in rigid relation.

It is also to be understood these units are made in any number of standard widths and lengths. For example, the units may be made 16'', 2 ft., 2½ ft., 3 ft., and 3½ ft., in width and 7 ft., 7½ ft., 8 ft., and 8½ ft., in height. Special units, of course, may be made for such purposes as the inclusion of wider doors and wider windows and higher lengths than those customarily employed. The corner units may have less width. The wall thickness may be from 4'' to 12'' for example.

It will be quite apparent that prefabrication of these units at one location will permit of continuous production at a location where aggregate material is readily and cheaply available and the desired number of units required for any designated building structure required by architectural design can be readily transported to the building site. In view of the standard practice of transporting ready mixed or premixed concrete, it will be quite apparent that no mixing of concrete at the building location is required. Likewise, the requirement for the use of skilled workmen such as carpenters, plumbers, electricians, brick masons, and the like, is substantially eliminated so far as the erection of the building structure is concerned, reference being had particularly to the "roughing in" thereof. Final trimming and utility connections, however, will require the services of these skilled workmen but this is but a minor item in the erection of a building structure.

It will thus be apparent also there is provided a building structure, the walls of which may be of waterproof character, may be suitably ornamented as desired, and which has all the advantages of a finished masonry structure, and all these advantages together with built-in ducts and the like, may be obtained through the utilization of this invention.

While the invention has been described in great detail in the foregoing description and similarly illustrated in the drawing, the same is to be considered as illustrative only and not restrictive in character. The aforesaid modifications as well as others which will readily suggest themselves to persons skilled in this art, are all considered to be within the broad scope of this invention, reference being had to the appended claims.

The invention claim is:

1. An integrated hollow-like masonry structure comprising a longitudinally reenforced ceiling and a longitudinally reenforced floor, a plurality of walls, each formed of a series of interconnected story heighth panels in side by side relation, each of said panels having a hollow central section and a pair of diagonally opposed wings coextensive with the length thereof, the adjacent wings of adjacent panels defining tubular spaces therebetween, and a column of cementitious material in each of said spaces, said column being provided with reenforcing elements tying in at the foot thereof with the means reenforcing said floor and at the top with the means reenforcing said ceiling.

2. An integrated masonry structure comprising a longitudinally reenforced ceiling and a longitudinally reenforced floor, a plurality of walls each formed of a series of inter-connected story heighth panels in side by side relation, each of said panels having a pair of diagonally opposed wings coextensive with the length thereof, adjacent wings of adjacent panels defining tubular spaces therebetween, and a column of cementitious material in each of said spaces, said column being provided with reenforcing means tying in with the means reenforcing said ceiling and said floor.

EDWARD R. WOLF.