

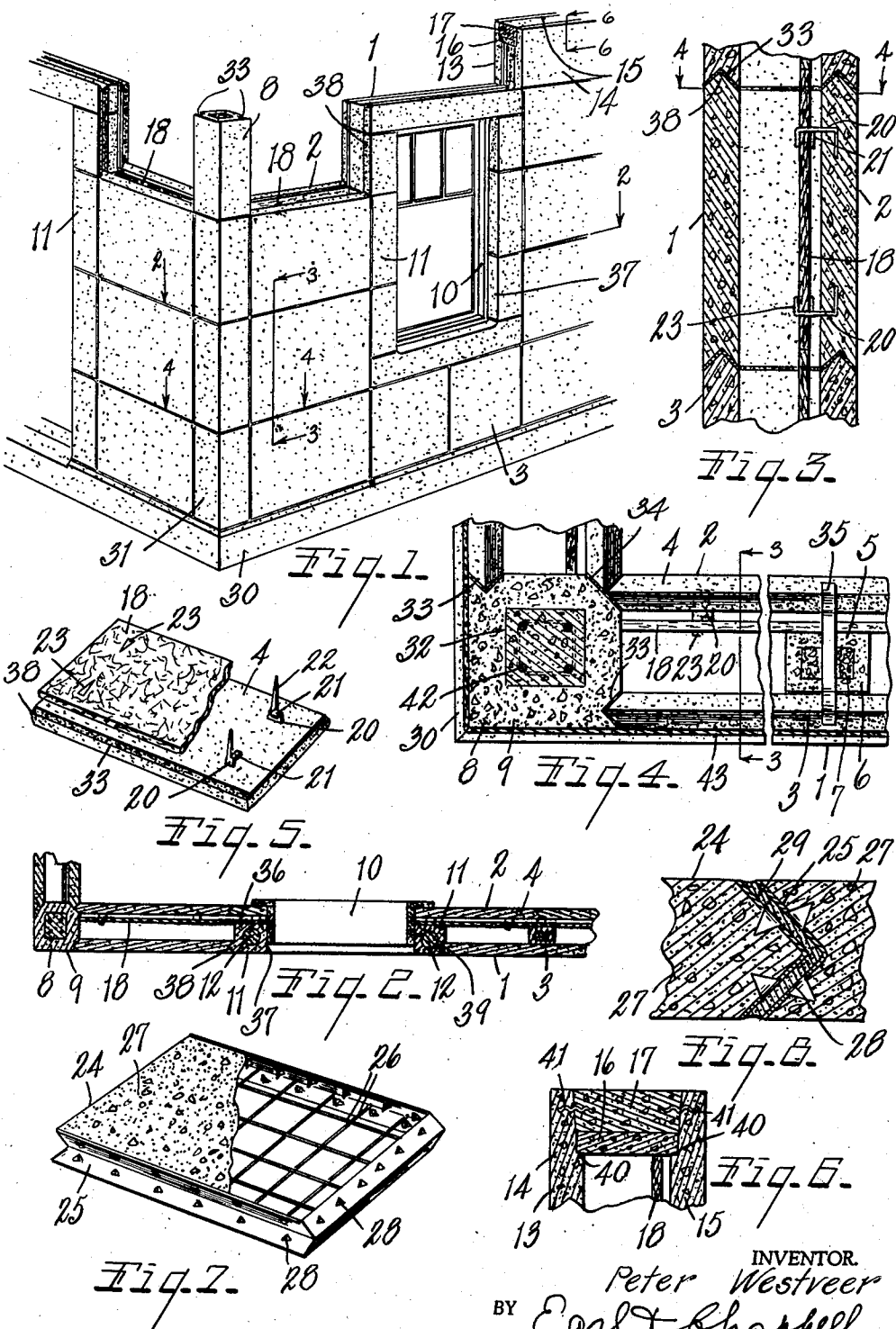
March 20, 1945.

P. WESTVEER

2,372,038

BUILDING CONSTRUCTION

Filed Dec. 2, 1940



INVENTOR.
Peter Westveer
BY Earl T. Chappell
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,372,038

BUILDING CONSTRUCTION

Peter Westveer, Kalamazoo, Mich.

Application December 2, 1940, Serial No. 368,122

4 Claims. (Cl. 72-16)

This invention relates to improvements in building constructions.

The main objects of this invention are:

First, to provide a novel prefabricated concrete building construction which is relatively inexpensive and characterized by the very effective insulating property of the walls thereof.

Second, to provide a building construction of the type described having triple insulated walls, which is formed practically in its entirety of prefabricated concrete slabs and beams to enable the same to be readily and quickly erected on location by relatively unskilled persons.

Third, to provide a building construction which is very strong and rigid notwithstanding the fact that it dispenses entirely with the use of steel or wooden frame or preliminary construction.

Fourth, to provide a building element or slab for a construction of the type described.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

Preferred embodiments of the invention are illustrated in the accompanying drawing, wherein:

Fig. 1 is a fragmentary perspective view illustrating a building wall construction in accordance with my invention during the progress of erection thereof showing the construction and arrangement of various of the component parts.

Fig. 2 is a fragmentary view in section on a line generally corresponding to line 2-2 of Fig. 1, further illustrating the arrangement and method of assembly of the parts.

Fig. 3 is an enlarged fragmentary view in section on line 3-3 of Figs. 1 and 4, illustrating an insulated wall constituted by successive tiers or courses of composite slabs in accordance with my invention.

Fig. 4 is an enlarged fragmentary view in section on line 4-4 of Figs. 1 and 3, particularly illustrating the corner formation of the building and also showing the manner in which the inner and outer walls are tied together.

Fig. 5 is a detail view in perspective partially broken away and illustrating the fabrication of one of the inner wall elements or slabs.

Fig. 6 is a fragmentary detail in section on line 6-6 of Fig. 1, illustrating a detail of the top slab and beam arrangement for the top course of the wall.

Fig. 7 is a perspective view showing the construction of a component slab employed in the walls of the present construction, a portion of the concrete material thereof being removed to

illustrate the reinforced internal structure of the slab.

Figure 8 is a fragmentary sectional view of a mortar joint between slabs of Figure 7.

The present invention relates in general to a concrete building construction which eliminates all necessity of employing preliminary framing steel or wooden members, is erectable practically in its entirety on location using preformed concrete elements, and has a very effective thermal insulating characteristic by reason of its double air space arrangement and the embodiment of insulating material in the slabs so that when assembled a complete insulating wall thereof is provided.

Generally stated, the construction consists of prefabricated wall slabs of reinforced or unreinforced character and hollow post blocks adapted to be erected with the slabs in successive cement banded tiers or courses and united by concrete poured interiorly thereof whereby to bond the blocks into strong rigid posts or beams. The wall construction includes inner and outer slab-like surfaces and an intermediate insulating panel so arranged as to provide an insulating space on either side thereof with the result that the wall has high insulating qualities. The slabs are relatively light, but are rigidly held in place by the reinforced post and beam structure referred to, so that an amply strong and rigid building results. Economy from a cost standpoint is substantially contributed to by the fact that the elements themselves are of relatively inexpensive premolded construction and may be rapidly assembled or erected on the job by relatively unskilled labor, relatively little masonry being involved as compared to the construction of ordinary brick or concrete block buildings. The slabs, posts and the like are quickly but effectively erected and reinforced by anyone having the most elementary knowledge of masonry.

Referring to the drawing, the component parts of the building construction will first be generally described, after which a description of the operation of assembling or erecting the same in a building construction will enable the character and relation of the elements to be more clearly described. These elements consist in general of the outer and inner walls 1, 2 made up respectively of successive vertically arranged courses of the prefabricated outer and inner slabs 3, 4, respectively, braced and maintained in rigid erected position by intermediate posts 5, which are constituted by successive hollow concrete blocks 6 arranged vertically end to end and

strongly bonded and tied together by concrete 7 filling the interior thereof from top to bottom of the posts. At the corners of the construction the walls 1, 2 abuttingly engage the corner posts 8 which, like posts 5, are constituted by hollow concrete blocks 9 arranged end to end and suitably reinforced and bonded interiorly thereof in a manner to be described. For accommodating window frames 10 and the like, I employ the hollow prefabricated post-like blocks 11 differing only slightly from the corner post blocks, which are likewise arranged end to end and reinforced and bonded internally by concrete 12. The top course of the building wall, generally designated 13, includes inner and outer wall slabs 14, 15 of somewhat different construction from the slabs 3, 4, serving to receive and support a top horizontal beam 16 and concrete 17 laid along the same to complete the wall construction.

Referring to Figs. 3 and 5, the inner wall 2 is in reality a composite wall including the slab members 4 and sheets or panels 18 of suitable insulating material, for example, "Celotex" of the same lateral dimensions as the slabs 4, or as shown in Fig. 3 the panels 18 may be of greater lateral dimensions than the slabs 4 so that the fibrous panels are in abutting relationship to provide an air tight connection therebetween when the adjacent edges of the slabs 4 are spaced by the tie members 35 and the connecting bonding cement. The panels 18 are disposed and maintained in spaced relation to the same so as to constitute two air spaces, one on either side of the insulating panel. The inner and outer slabs 3, 4 are, per se, being premolded, internally reinforced or unreinforced blocks of concrete provided with opposed angular or V-channel shaped side and end surfaces, one of each of said side and end surfaces being concave or recessive and the other of each of said surfaces being convex or protuberant. This provides a reach and groove construction of the slabs which enables effective interfitting of the adjacent slabs or blocks with one another or with the corner posts to be described. In the case of the inner composite wall, the blocks have embedded therein the sheet metal spacer or tie pins 20 each provided with a stop or abutment 21 engageable by the insulating panel 18 and a pointed prong end 22 upon which the panel 18 is impaled, following which the prong is bent over as indicated by the reference numeral 23 to lock or secure the parts of each composite inner wall member in place. The laterally bent offset portion or abutment 21 and the pointed prong end 22 are readily formed by an incision inclined to and through one edge of the sheet metal member and for a substantial distance inwardly from said edge, the portion 21 being then bent laterally to form the abutment. The outer slabs 3 are constructed similarly to the inner slabs, save that the members 20 are omitted since no further insulation is associated with the outer slabs.

As an alternative form of slab for the walls I contemplate using a prefabricated reinforced block of the type illustrated in Fig. 7 and generally designated by the reference numeral 24. This consists of a sheet metal outer rectangular frame 25 having opposed, respectively recessive and protuberant V-shaped side and ends and provided with central reinforcing wires 26 spot welded to the frame. This form is filled with concrete 27. It will be noted that the frame or form 25 is preferably provided with apertures or openings 28 struck in the side surfaces to provide

for an effective bond with the mortar 29 employed as illustrated in Fig. 8.

In erecting a building of my invention, a suitable base or footing 30 is first poured, following which the first corner post block 9 is bonded thereto by cement. The construction of this block is clearly illustrated in Fig. 4 and it will be noted that the same has a hollow interior 32 and that the external side edges thereof are V-notched or recessed at 33 and the internal corner 34 is truncated at 45°. The external corner is left square.

With block 31 in place, an external or outer wall slab 3 is cement bonded thereto, disposing the protuberant side of the said slab in the recess 33 of the block referred to above. The said slab is likewise bonded to the base or footing 30. Following this, further side wall slabs are erected in a manner which will be obvious to those skilled in the art, effecting successive interfitted bonded connection of the succeeding slabs to one another so as to constitute a first external course. Successive courses are laid in a similar manner, the joints being broken or staggered if desired although care must be taken that the various respective post or beam blocks 6, 12 may be vertically aligned properly. The vertically arranged slabs of successive courses will likewise have interfitted bonded engagement. The inner wall is next erected or, if desired, may be erected concurrently with the outer wall in a single complete course.

In assembling the inner wall relative to the outer wall, a block 6 is bonded to the inner surface of an outer slab 3 and the inner composite slab is then associated with the side of the insulating panel 18 in abutting relation to the post block 6 in the manner clearly illustrated in Fig. 4. In the case of a slab adjacent corner post 8 the inner slab is set up and bonded to the post block with the protuberant side of the slab engaging the truncated corner of a block 9, thereby providing a V recess for the reception of a further similar composite inner slab disposed at right angles to the one just laid and effecting a mitered joint at the corner of the inner block 9.

In Fig. 4, the reference numeral 35 designates a bendable sheet metal tie strip which is disposed across the space between the inner and outer walls and between successive courses thereof to tie the walls together in proper vertical parallel relation to one another and post 6. As indicated in Fig. 4, the opposite end portions of the tie member 35 are bent to provide inverted V-shaped recesses for receiving the correspondingly shaped protuberances on the upper edges of the outer and inner slabs 3 and 4 respectively. This interfitting engagement of the ends of the tie member with the slabs holds the outer and inner slabs against both inward and outward displacement relative to each other both prior to and after connecting said slabs to superimposed slabs by bonding cement. The tie members 35 in connecting the outer and inner slabs 3 and 4 are disposed between the superimposed blocks 6 of the post 5 and are embedded in the connecting bonding cement therebetween. The posts and inner and outer walls are thereby securely connected to each other and the inner slabs 4 are insulated from posts 5 by an air space and the fibrous panels 18 which are disposed against the posts. Obviously the insulating panels 18 may be apertured or recessed in any suitable manner for passage of the tie members 35 therethrough.

This strip 35 is of course embedded in the cement bonding the two courses.

In Fig. 2 I illustrate the provisions contemplated by my invention for receiving a window or like frame 10. In this case the frame uprights or posts 11 constituted by the vertically aligned hollow blocks 12 have flat inner and side surfaces 36, 37 for engagement by the composite inner panel and window frame, respectively. These blocks 12 are provided, depending upon which side of the window they are disposed, with the V protuberances 38 or V recesses 39 for the dovetailing reception of the outer wall slab members 3.

The erection of the wall is proceeded with in the foregoing manner until the desired height is reached and the top course is to be laid. In doing this I preferably employ the special slabs 13, 14 shown in Figs. 1 and 6, which are provided with the mutually facing ledges or offset shoulders 40 constituting an internal channel for supportingly receiving the flat horizontal prefabricated concrete beam members 16. Following insertion of these beam members, the space above the latter and between the outer and inner slabs is filled by poured concrete 17 which is tied to the slabs by the corrugated tie elements 41 embedded in the concrete. A similar construction may be employed for window tops and the like. In such top beam construction, the beams 16 terminate short of the hollow interior of the posts 8, for a reason to be explained.

Following erection of the various post or beam members to the desired height, in the case of the corner posts having the relatively large central opening therein, steel reinforcing rods 42 suitably tied together in well known fashion are disposed lengthwise of the interior of the post and concrete is poured to reinforce the post and bond the post blocks together. Similarly, concrete is likewise preferably poured in the hollow intermediate wall spacing post 6 and the window frame upright posts 11 to reinforce and bond the same.

A suitable finish surfacing or grouting shown in Fig. 4 and indicated by the reference numeral 43 may be applied to the outside of the walls if desired.

The foregoing structure is one which is extremely economical both in materials and labor involved in the erection thereof. The angled construction of the side surfaces of the various component slabs and blocks employed in the walls not only greatly facilitates the building process by enabling accurate interfitted joints to be quickly formed; it also minimizes possible seepage of water therethrough. The walls include two air spaces, one on either side of the insulating panel 18, plus the said panel, a triple insulation which very effectively prevents heat loss through the walls at all points. This is an important feature of the invention. It will be evident from an inspection of Fig. 4 that the only point wherein there is any space not having at least a dead air space plus insulating panel material is on the diagonal line through the corner post or beam 8. The blocks 9 constituting the corner beams effectively receive and align the wall slabs which are effectively tied together and reinforced by the intermediate posts 6 and window frame uprights 11 to constitute an exceedingly strong and rigid arrangement. The need for prebuilt wood or steel forms is entirely eliminated and the present building can be readily erected by relatively unskilled persons, thus greatly decreasing the cost

of materials and labor involved in the construction.

I have illustrated and described my invention in embodiments which are very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described by invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a building construction of the type described, inner and outer walls arranged in spaced relation to one another, said walls each comprising prefabricated concrete slabs disposed in vertical courses with the slabs of each course in interfitted bonded relation to one another, a bonding cement for connecting the slabs in each wall, tie members separate from the slabs, to be laid independently of the slabs, each tie member adapted to be disposed on the top of a slab in the outer wall and on the top of a spaced opposed slab of the inner wall and having interfitted engagement with the tops of said slabs to hold the same against both inward and outward displacement relative to each other both prior to and after connecting said slabs to superimposed slabs by the bonding cement, said inner wall including panels of fibrous insulating material secured to the slabs thereof prior to erection of the wall in spaced relation to said slabs and on the side thereof adjacent the outer wall, whereby to provide two air spaces between the walls one on either side of the panels, said fibrous insulating panels being of greater lateral dimensions than the inner concrete wall slabs to permit of abutting relationship of said panels in the erected wall when the adjacent edges of said inner concrete slabs are spaced by the connecting bonding cement, and vertical posts disposed between the fibrous panels and the slabs of the outer wall, said posts comprising superimposed blocks and bonding cement connecting said blocks, said tie members being disposed in the bonding cement between said blocks and connecting the posts to the inner and outer slabs, the inner slabs being insulated from the posts by said panels of fibrous material and the air space between said panels and the inner slabs, the slabs of the inner wall being separate from the slabs of the outer wall to permit the slabs in one of said walls to be laid separately and independently from the slabs in the other wall.

2. In a building construction of the type described, inner and outer walls arranged in spaced relation to one another, said walls each comprising prefabricated concrete slabs disposed in vertical courses with the slabs of each course in interfitted bonded relation to one another, a bonding cement for connecting the slabs in each wall, tie members separate from the slabs, to be laid independently of the slabs, each tie member adapted to be disposed on the top of a slab in the outer wall and on the top of a spaced opposed slab of the inner wall and having interfitted engagement with the tops of said slabs to hold the same against both inward and outward displacement relative to each other both prior to and after connecting said slabs to superimposed slabs by the bonding cement, said inner wall including panels of fibrous insulating material secured to the slabs thereof prior to erection of the wall in spaced relation to said slabs and on the side thereof adjacent the outer wall, whereby to provide two

air spaces between the walls one on either side of the panels vertical posts disposed between the fibrous panels and the slabs of the outer wall, said posts comprising superimposed blocks and bonding cement connecting said blocks, said tie members being disposed in the bonding cement between said blocks and connecting the posts to the inner and outer slabs, the inner slabs being insulated from said posts by said panels of fibrous material and the air space between said panels and the inner slabs, the slabs of the inner wall being separate from the slabs of the outer wall to permit the slabs in one of said walls to be laid separately and independently from the slabs in the other wall.

3. In a building construction of the type described, spaced inner and outer walls each comprising concrete slabs arranged in courses with the slabs bonded to one another, slabs of one of said walls having sheets of fibrous insulating material secured in spaced relation thereto and disposed in spaced relation to the other wall to provide a double insulating air space between the walls in erected position of the walls, the sheet carrying concrete slabs having means with end portions embedded in the body of the slabs, said means comprising a sheet metal member having a prong and a laterally bent offset portion, said prong piercingly engaging said fibrous sheets and, said laterally offset portion retainingly spacing the sheets from the sheet carrying slabs the outer end of the prong being laterally bent to retain the sheets on the prongs and against the laterally bent offset portion, said sheet metal member having an incision through one edge and for a sub-

stantial distance inwardly from said edge, providing for said prong and said laterally bent offset portion.

4. In a building construction of the type described, spaced inner and outer walls, each comprising slabs arranged in courses, a bonding cement to connect the slabs in each wall, slabs of one of said walls having sheets of fibrous insulating material secured thereto prior to the erection of said wall and disposed in spaced relation to the other wall to provide a double insulating air space between the inner and outer walls in the erected position thereof, the slabs in the inner wall being separate from the slabs in the outer wall to permit the slabs in one wall being laid separately and independently of the slabs in the other wall, tie members separate from the slabs of the inner and outer walls to permit the same to be positioned independently of said slabs, each tie member adapted to be positioned on the top of a slab in the outer wall and on the top of a slab in the inner wall and embedded in the bonding cement connecting the slabs of the inner and outer walls, vertical posts disposed between and against the fibrous panels and the slabs of the outer walls, said posts comprising superimposed blocks and bonding cement connecting said blocks, said tie members being disposed in the bonding cement between said blocks and connecting the inner and outer walls to said posts, the slabs of the inner wall being insulated from said posts by the panels of fibrous material and the air space between said panels and the inner slabs.

PETER WESTVEER.