

June 8, 1926.

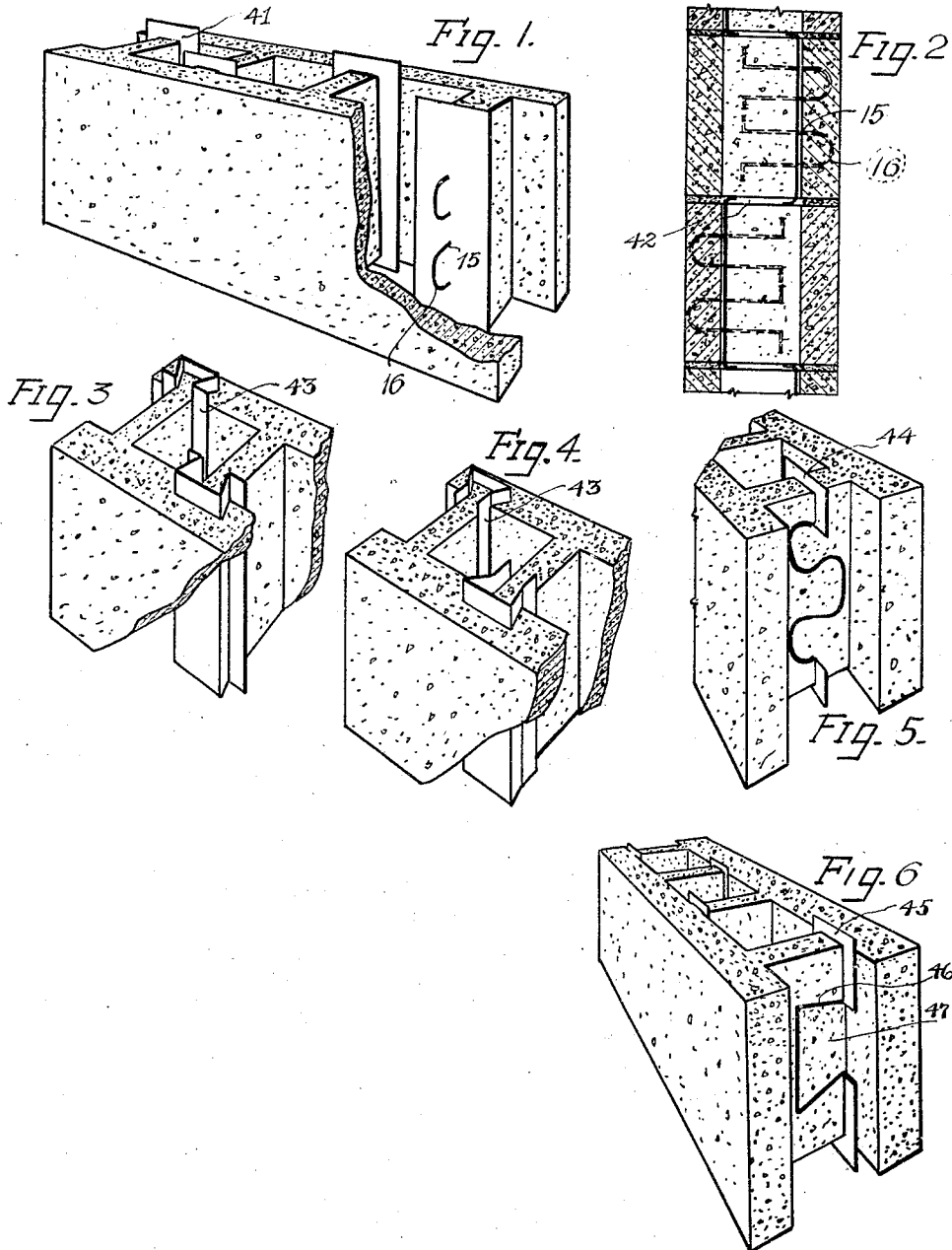
R. C. BLACKMAN

1,587,500

CONCRETE CONSTRUCTION

Filed Jan. 20, 1921

2 Sheets-Sheet 1



Witnesses.
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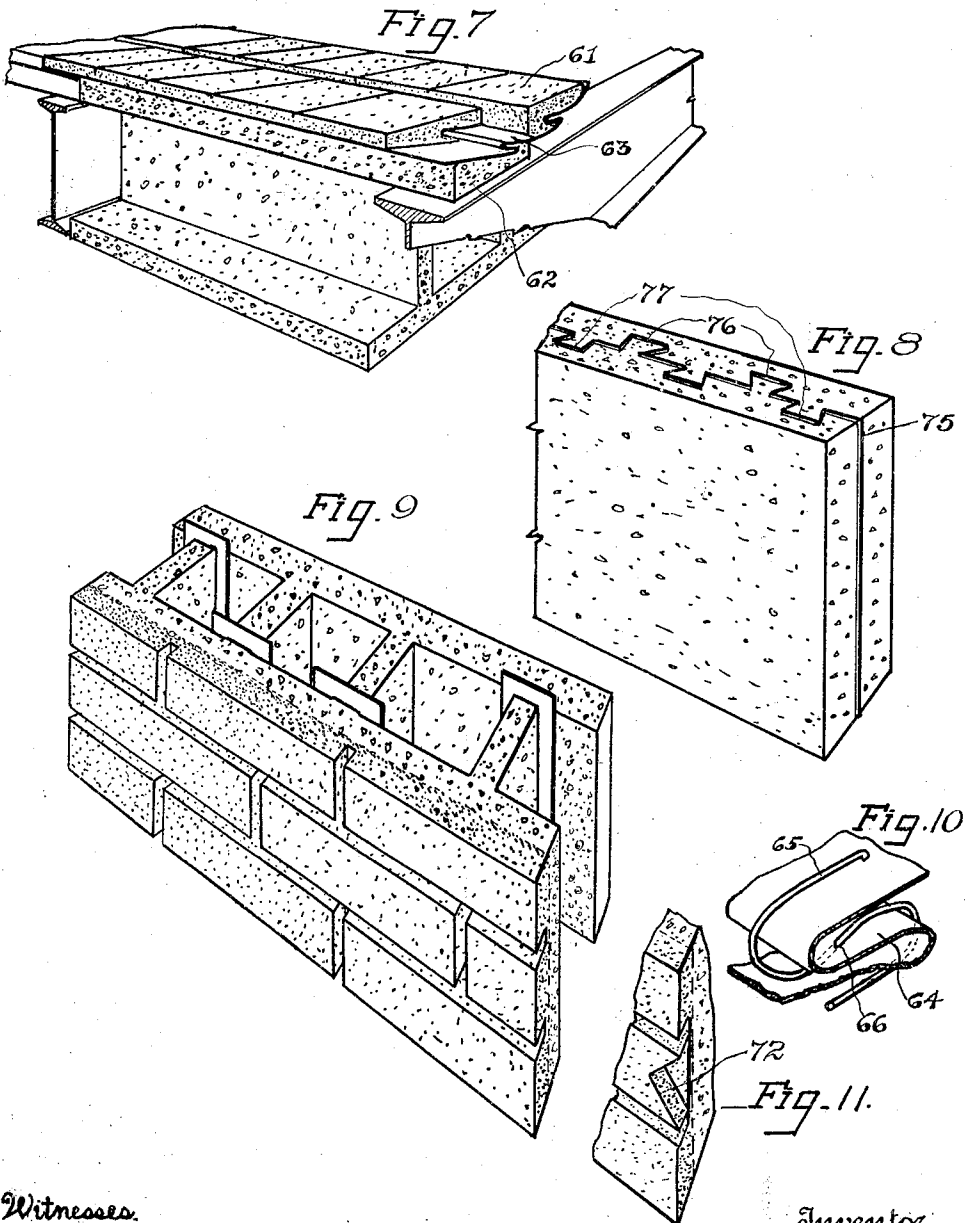
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UNITED STATES PATENT OFFICE.

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CONCRETE CONSTRUCTION.

Application filed January 20, 1921. Serial No. 438,650.

This invention relates to a concrete construction for buildings, wherein an insulating web is interposed between the inner and outer wall sections so as to prevent cold and moisture passing through the more or less porous concrete. In its more specific form, the invention relates to a concrete construction wherein a plurality of vertical air spaces are provided, the separating webs whereof have interposed therein a special waterproof material, such as prepared roofing, hard felt, rubberized fabric or the like, which is held in position by wire reinforcements passed through such insulated sheet and imbedded in the concrete material at either side thereof.

Heretofore, in concrete construction, various expedients have been made use of, such as the coating of the surface of the block or wall structure with some material impervious to moisture and most often this process has followed the actual construction of the building. Such procedure frequently involves many difficulties in the way of insuring the covering of the entire surface and entails considerable expense in following the original work with a series of finishing steps.

Through the use of my invention, the insulating construction is formed as an integral part and when the concrete building itself is completed, it will be provided with its final insulating and waterproofing arrangement.

Accordingly, the principal objects of my invention are to avoid the disadvantages of a piece-meal method of insulating and waterproofing concrete structures, to simplify and lessen the cost of effectively insulating such structures, and to facilitate the work of installing the insulation at the same time that the actual building is being formed.

While I have referred to a building as an entirety, my invention is likewise applicable to the various units used in assembling a building, such as wall sections or individual blocks. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain specific embodiments of my invention, such disclosed constructions, however, constituting but sev-

eral of the various ways in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a perspective view of a single concrete block formed in accordance with the principles of my invention, a portion thereof being broken away to show the means employed for tying together the abutting concrete faces, anchoring the insulating material therebetween and reinforcing the entire block structure;

Fig. 2 is a vertical transverse sectional view illustrating the method in which a series of individual blocks have the insulating material and the bonding and reinforcing elements applied thereto;

Figs. 3, 4, 5 and 6 are perspective views in enlarged detail showing several modified forms of applying the insulating material between the inner and outer sections of concrete structures;

Fig. 7 is a perspective view illustrating the application of my invention to the insulation of a roof formed of concrete units;

Fig. 8 illustrates a solid type of concrete construction, wherein my insulating material is interposed in interlocked relation with the several sections;

Fig. 9 is a perspective view of a concrete structure formed in accordance with the principles of my invention and having an outer imitation brick face, of colored cement of finer grade, integrally united therewith.

Fig. 10 is an enlarged detail view illustrating the means whereby the insulating material employed in the roof construction shown in Fig. 7 is positioned between the adjacent concrete sections, the apertures in the insulating material for the bonding elements being positioned in the intermediate portion thereof so that water will not flow therethrough; and

Fig. 11 is a detail view in perspective showing a construction of the type illustrated in Fig. 9 modified to provide an ornamental effect at the point in the subdivided block face where the junction lines between adjacent blocks would cut across an individual brick outline.

As shown in Figs. 1 and 2, I may employ reinforcing means with the insulating sheets. In the form shown in Figs. 1 and 2, a series of U-shaped rods 16 are forced through apertures 15 in the sheet of insulating material and the ends thereof are then bent out-

wardly at right angles so that the ends of the adjacent U-shaped members are turned toward one another. Obviously, any shape which will provide a firm anchorage may be formed at the ends of the bonding members, or thereafter, a single long wire may be bent back and forth to form a series of inwardly and outwardly positioned U-shaped sections, which are connected with the insulating strips by being inserted through apertures spaced centrally thereof and of a size to admit alternate U-shaped portions there-through. Pitch or tar should be preferably applied to the junction points of the insulating strips and the bonding rods or wires so as to make the insulation complete and waterproof throughout.

The insulating strips disclosed in Figs. 1 and 2 are plain vertical strips supplied with reinforcing elements. In Figs. 3 and 4, I have shown constructions wherein the use of reinforcing elements may be dispensed with. In these forms of my construction, the insulating strips are folded so as to provide interlocking faces upon their sides. The poured concrete in said constructions will exhibit a mortise and tenon connection alternating between different sides of said structures with each adjacent web formed therein.

In Fig. 1 of the drawing, I have illustrated a concrete block exhibiting the preferred arrangement of insulating strips and reinforcing elements as the wall construction, and in Fig. 2, I have shown the manner in which a series of these blocks when superposed upon one another are insulated along their horizontal contact faces. Thus, the edges 41 of the insulating strips which extend beyond the surface of the block, as clearly shown in Fig. 1, are turned inwardly at the point of contact of adjacent blocks. These extensions have been shown of small extent and in the form shown in Fig. 2, the central portions of the web members of the several blocks define an air space 42 of a height corresponding to the thickness of the mortar interposed between adjacent blocks. I may vary this construction by making the extensions of greater size, so that the extensions from opposite sides of the blocks are overlapped and the cement between said blocks may be then made continuous, giving greater rigidity to the structure than where air spaces between the web sections are provided. Where I employ the interlocking type of insulating member, I may turn the lateral edges 43 parallel to the wall, as shown in Fig. 3, or parallel to the web elements, as shown in Fig. 4.

As an alternative type of interlocking construction, I may use a flat insulating strip 44 and wind it back and forth in sinuous fashion, as is clearly shown in Fig. 5, or I may use a single plain strip 45 of insulating

material and position it so as to provide horizontal keying faces, as shown in Fig. 6, in place of the vertical faces of that character shown in Figs. 10 and 11. In this way, the mortise and tenon construction 46, 47 will be formed entirely in the web members and adjacent web sections may have their keyways faced in opposite directions, as in the construction disclosed in Fig. 13.

The form of my invention illustrated in Fig. 7 is particularly suited for the construction of a concrete roof. As is clearly shown, the roof is made of superposed sections 61, 62 having an interposed web or sheet 63 of insulating material therebetween, said web being sinuously curved so as to provide an intermediate section 64 of insulation through which reinforcing rods may be inserted. The manner of inserting such reinforcing elements is clearly disclosed in Fig. 10, each such rod 65 being passed through an aperture 66 in the intermediate portion 64 of the web and having its ends bent to conform to the curvature of the adjacent insulating sheet. I, preferably, coat the reinforcing rods with pitch or tar to make the junction thoroughly waterproof at the points where they pass through the insulating sheet. By providing a construction whereby the reinforcing rods pass through the intermediate portion of the web or sheet from below, any moisture penetrating the outer concrete sections will be prevented from flowing through the apertures so formed. The outer face of the roofing structure may be given a stepped or blocked-off appearance in imitation of shingling or tiling, as desired, and colored cement or plastic material of a finer grade than the ordinary concrete used for the body of the structure may be employed so that a very durable as well as artistic finish can be given to the construction in the manner illustrated in Fig. 9.

The block thus will be formed integrally with such colored surface, which may be made in imitation of brick having channeled portions by using a pan having raised partitions of suitable height. These channels may be filled with mortar of the same color as that used to join the several blocks in forming a wall. Ordinarily, three courses of bricks are so shown, and where the ends of two abutting blocks come together, the outlines of the central course of brick markings will be interrupted by the joint. To conceal this joint between the blocks and make the brick courses appear continuous, I may introduce an ornamental effect by providing a notch 72 in the block face at the point where an incomplete brick outline appears, as is shown in Fig. 11. Thus, when the blocks are placed in a wall, the notches in adjoining blocks will form a squared recess within which may be placed small or-

namental squares embedded in the mortar at this point.

My invention is also applicable to the insulation of solid concrete structures, as is shown in Fig. 8. In this form of my construction, I use a large sheet of insulating material 75 and form it into a double series of keyways 76, 77 faced in opposite directions along a plane centrally of such construction. In this manner, the insulating material is securely and permanently held within the concrete construction, which will be thoroughly insulated in a transverse direction. A series of blocks of this type may be superposed upon similarly insulated blocks so that practically no moisture will pass therethrough along the horizontal faces of adjacent blocks.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the method herein disclosed, provided the step or steps stated by any of the following claims or the equivalent of such stated step or steps be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A concrete structural unit of substantially rectangular outline, comprising two permanently assembled sections of concrete having abutting faces in a plurality of transverse planes, an insulating means interposed between said sections, and means interlocking said sections.

2. A concrete structural unit of substantially rectangular outline, comprising two permanently assembled sections of concrete having abutting faces in a plurality of transverse planes, an insulating means interposed between said sections at every point of contact, and means interlocking said sections and retaining said insulating strips in position.

3. A structural unit of substantially rectangular outline, comprising two perma-

nently assembled sections of concrete each having transverse webs projecting toward the companion section, insulating means interposed between said webs and the body of said companion section, and means interlocking said sections.

4. A structural unit of substantially rectangular outline, comprising two permanently assembled sections of concrete each having transverse webs projecting toward the companion section and having abutting faces in a plurality of transverse planes, an insulating means interposed between said sections, and means interlocking said sections.

5. A structural unit of substantially rectangular outline, comprising two permanently assembled sections of concrete each having transverse webs projecting toward the companion section and having abutting faces in a plurality of transverse planes and insulating means interposed between said sections at every point of contact, and means interlocking said sections and retaining said insulating strips in position.

6. In a concrete structure comprising two sections of concrete having abutting faces in a plurality of transverse horizontal and vertical planes, an insulating means interposed between said sections at every point of contact, and means interlocking said sections and retaining said insulating strips in position.

7. In a concrete structure comprising two sections of concrete having abutting faces in a plurality of transverse vertical and horizontal planes, an insulating means interposed between said sections at every point of contact and following a sinuous course both vertically and horizontally, and means interlocking said sections and retaining said insulating strips in position.

Signed by me, this 15th day of January, 1921.

ROY C. BLACKMAN.