Sept. 19, 1939. P. J. MAUL 2,173,213

BUILDING UNIT

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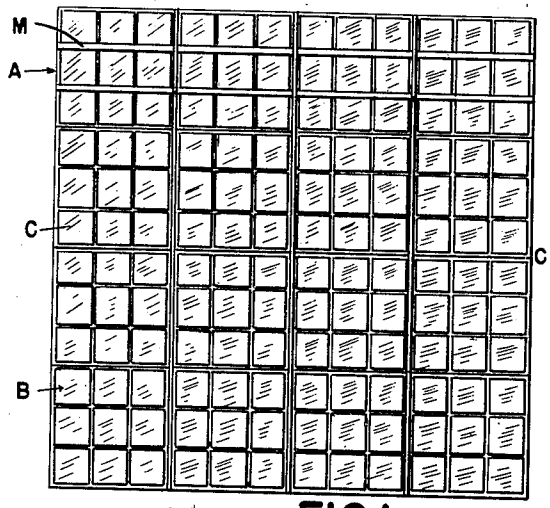


FIG.1.

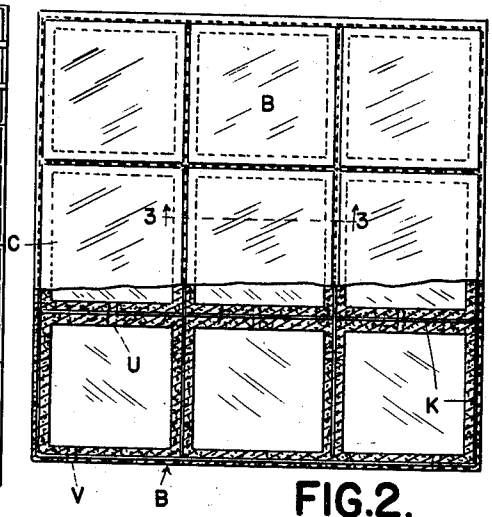


FIG.2.

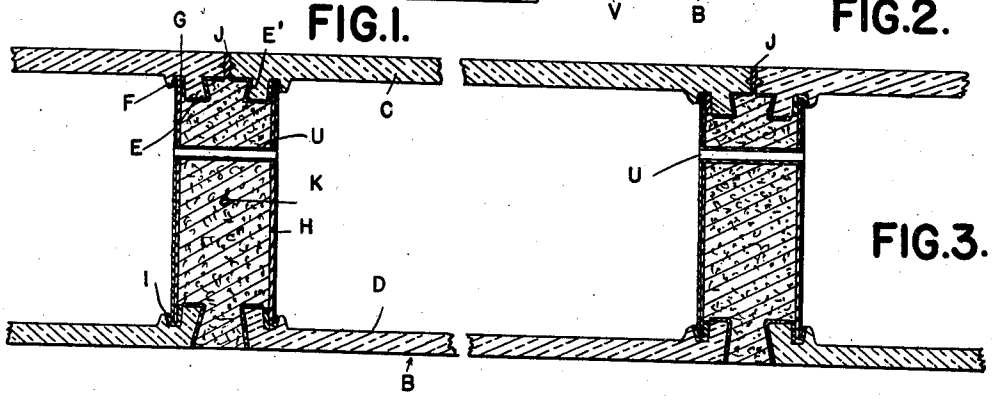


FIG.3.

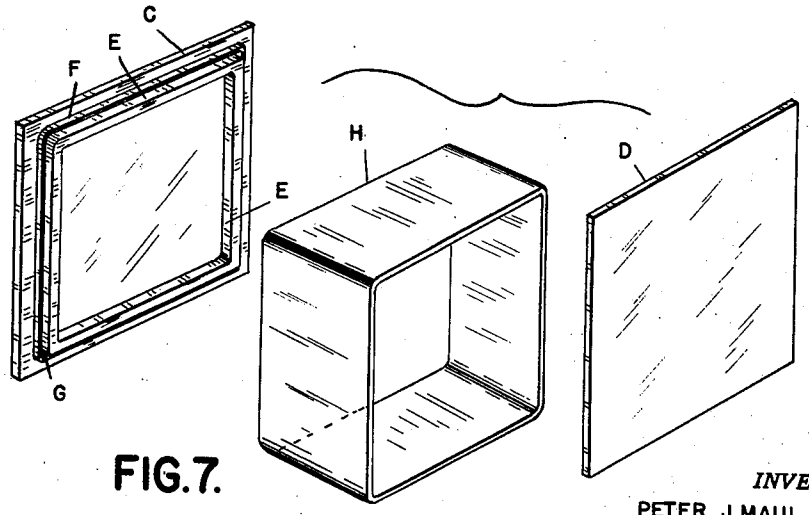


FIG.7.

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FIG.4.

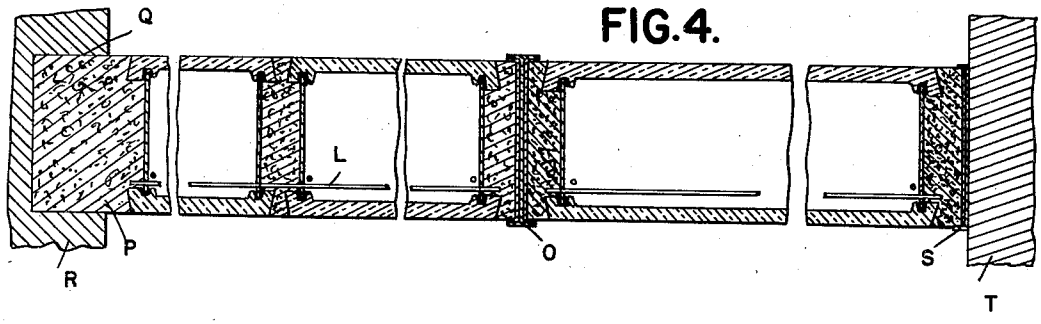
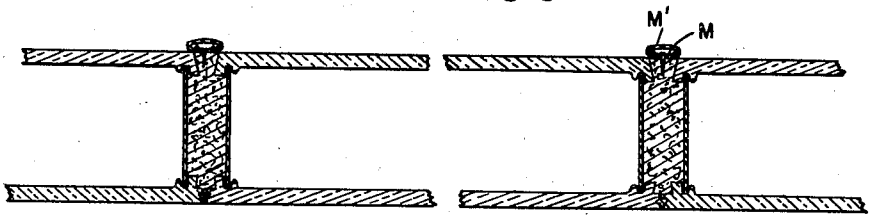


FIG.5.



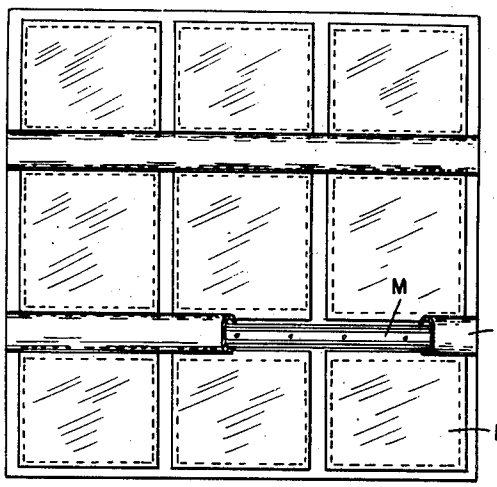


FIG.6.

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BUILDING UNIT

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Application May 17, 1937, Serial No. 143,213

4 Claims. (Cl. 72—44)

The invention relates to building units of the type comprising transparent or translucent blocks which when built into a wall, permit the passage of light therethrough. One type of such construction which has heretofore been used consists of hollow glass blocks, the front and rear faces of which are transparent, while the edge portions are united by mortar to adjacent units. Inasmuch as mortar does not readily adhere to glass, these edge portions must be pre-treated to form a somewhat roughened surface. Also, as the units are of comparatively small dimensions the labor in building the same into a wall is proportionally increased. It is the object of the present invention to obtain a construction which while retaining the transparent or translucent character of the structure above referred to, is formed in units of considerably greater dimensions so as to lessen the labor of erection on the field. It is a further object to dispense with the necessity of forming the units completely of glass, using this material only for the transparent panels and other material for taking care of the mechanical stresses. With these and other objects in view, the invention consists in the construction as hereinafter set forth.

In the drawings:

Figure 1 is a front elevation of a portion of a building wall constructed of my improved units;

Figure 2 is an elevation, partly in section, of a single unit;

Figure 3 is a cross section on line 3—3 of Figure 2;

Figure 4 is a similar view illustrating a modified method of reinforcement;

Figure 5 is a view similar to Figure 4 showing a modification;

Figure 6 is a view similar to Figure 2 showing another modification;

Figure 7 is a perspective view of the several parts of the sub-unit.

Where building units of the transparent type are formed entirely of glass they are of relatively small dimensions, and as above described, must be united to each other by mortar or other cementitious material. Furthermore, the glass walls must transmit all of the mechanical stresses from one unit to another incident to an extended wall area. With my improved construction I form each unit of a series of sub-units, the latter comprising front and rear glass panels separated from each other by annular spacers or hollow core members of slightly smaller dimensions so as to form in effect a hollow block. The sub-units are arranged in groups and the spaces between adjacent annular spacers are filled with cementitious material, thereby binding the sub-units to each other and forming thereof the main unit. These spacers or hollow core members can be formed of any suitable material which has sufficient rigidity to hold the cementitious material while in fluid state and to prevent the same from seeping into the space between the transparent panels. However, after the completion of the structure, the mechanical strength is due to the hardened cementitious material, together with any suitable reinforcement therefor.

As specifically illustrated in Figures 1 to 3, A are the building units, each comprising a series of sub-units B shown as a group of nine, but which may be of any suitable number. Each sub-unit includes transparent front and rear panels C and D, preferably formed of molded glass and which, if desired, may be ribbed or patterned in any suitable way. These panels are preferably of rectangular form and are provided on their inner faces, spaced inward from the margins thereof, with parallel ribs E and F with a groove G therebetween. H is a spacer of annular form the opposite ends of which engage the groove G between the ribs E and F of the panels C and D. This spacer may be formed of any suitable material which is waterproof and has sufficient rigidity to retain its form under the pressure of the cementitious material between sub-units. A suitable material for such purpose is a strip of paper or fiber board having one or both surfaces thereof waterproofed and being bent into the annular form with its opposite ends united to each other. This will form a substantially rectangular hoop the opposite ends of which are inserted in the groove G and sealed therein by a mastic, such as I. The sub-units thus formed are then arranged adjacent to each other in a group of the desired size, after which the cementitious material is introduced to fill the spaces between the annular spacers H. As shown in Figure 3, the outer panels C extend into close proximity to each other with only sufficient space therebetween for filling with a cushioning material J, such as a mastic, the edges of the panel having grooves to hold this material. The inner panels may be of smaller dimensions with sufficient space between the edges thereof for the introduction of a cementitious material. However, if desired, both inner and outer panels may be the same in construction and in dimensions, as shown on the

left of Figure 3, and the spaces between the spacers filled from the margin of the unit. The glass panels are held in position by suitable keys, and as shown these are formed by inclining the outer faces of the ribs E, as indicated at E'. The margin of the unit is surrounded by a ring of the cementitious material, similar to that between adjacent spacers and to impart the necessary tensile strength reinforcing members extend through the unit in transverse directions. These, as shown in Figure 2, are formed of bars K embedded in the cement between the spacers, while in Figure 4 bars L extend through apertures in the walls of the spacers and across the space therebetween. The ends of the reinforcing members are bent or otherwise fashioned to form anchors in the marginal portions of the unit.

A unit constructed as just described has sufficient intrinsic strength to be safely shipped from the factory to the field, and the erection of the building is simplified and the cost reduced in proportion to the increased dimensions of the main unit over those of the sub-units. The construction is also one which is capable of being variously modified to produce desired ornamental effects. For instance, the inner faces of the spacers may be of any desired color or may be covered with a metallic foil which will reflect the light and increase the quantity of access to the interior of the building. The marginal portions of the transparent panels which cover the cementitious material between the spacers may, if desired, be painted or otherwise colored on their inner faces, or on the other hand may be left transparent and the proper color imparted to the cementitious material adjacent thereto.

Another modification is shown in Figure 5 where the margins of the inner panels are spaced from each other and a holding strip M is anchored to the cement and covered by a snap-on molding M'. Also, the design may be modified by changing the dimensions of the sub-units to form oblongs instead of squares, as indicated at N, Figure 6. The units may be assembled in relation to each other to cover an area of the desired size by the use of mullion bars O of channel, H-shaped or other suitable cross section, while at the ends of the area the cement border P may be suitably secured to the adjacent non-transparent wall. Thus, as shown, this marginal portion may engage a recess Q in the wall R or a channel S secured to the surface of the wall, such as T.

For the cementitious material I preferably employ a concrete, using Portland cement and any suitable aggregate. Steel bars may be used for the reinforcing members.

Where air is trapped within the unit and there is subsequently a fall in temperature to below the dewpoint of this entrapped air, then there may be a condensation of moisture upon the glass. To avoid any such result, I preferably provide restricted ventilation to the air spaces within the unit and the several sub-units thereof. This is shown in Figures 2 and 3, in which U are small tubes extending between the spaces or core members H and embedded in the concrete therebetween. These tubes will provide for exchange of air between the sub-units and by placing one or more tubes V through the outer wall of the unit, this will provide communication with the external atmosphere. As a consequence, should there be any condensation upon the glass the exchange of air will soon result in the absorption of this moisture to clear the glass.

What I claim as my invention is:

1. A building unit comprising a group of light penetrable hollow sub-units having the marginal edges thereof slightly spaced from each other, cementitious material filling the spaces between said sub-units and binding the same to each other, tubes embedded in said cementitious material and connecting adjacent sub-units to provide ventilation therebetween, and one or more tubes for connecting one or more of said sub-units with the external atmosphere.

2. A building unit comprising a group of light penetrable hollow sub-units, each including transparent panels and a hollow spacer between said panels; cementitious material filling the spaces between adjacent spacers and surrounding the margin of the group, and tubes extending through the walls and in-between adjacent spacers embedded in the cementitious material and providing ventilation between the spaces within said sub-units, there being one or more of said tubes providing ventilation with the external atmosphere.

3. A building unit comprising a group of light penetrable sub-units each including a pair of transparent panels and a hollow core member therebetween and adjacent to the margins thereof and cementitious material filling spaces between adjacent hollow core members and surrounding the margin of the group to bind said units to each other, said panels having anchor portions embedded in said cementitious material.

4. A building unit comprising a group of light penetrable sub-units each including a pair of transparent panels and a hollow core member therebetween adjacent to the margins thereof, cementitious material filling spaces between adjacent hollow core members and surrounding the margin of the group, said transparent panels being anchored in said cementitious material and reinforcing members for said cementitious material.

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