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V. A. BARNHART

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BUILDING UNIT

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Fig. 1.

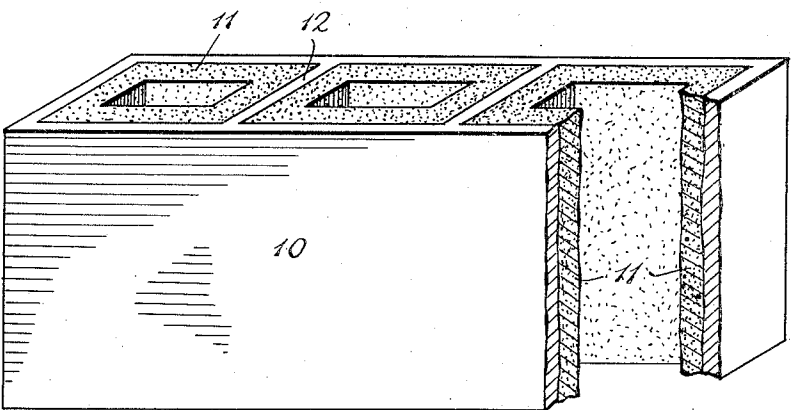


Fig. 2.

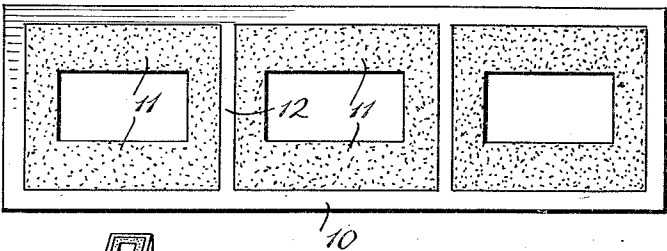


Fig. 3.

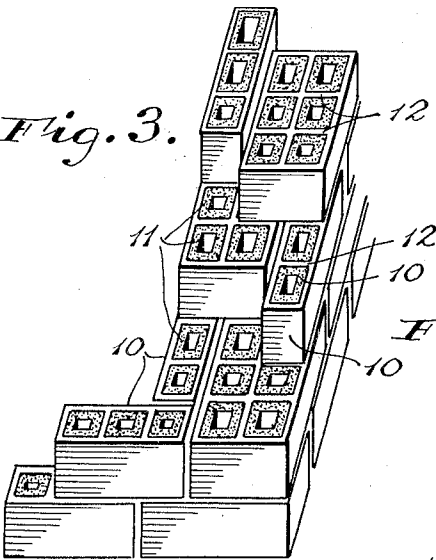


Fig. 4.

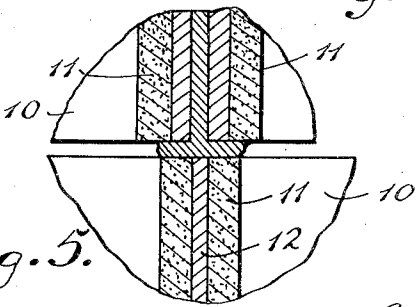
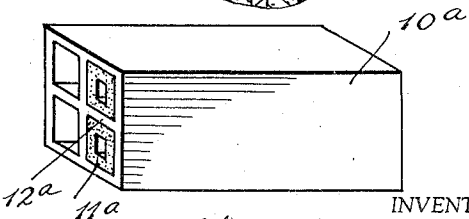


Fig. 5.



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BUILDING UNIT

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Application October 23, 1935, Serial No. 46,247

1 Claim. (Cl. 72—41)

My invention relates to building units of the so-called hollow tile type and more particularly to burned-clay building units of a hard, vitreous nature. While properly burned-clay units are highly resistant to fire, include highly impervious surfaces, and present other material advantages, said units at the same time include disadvantages such as little absorption and consequent inability to properly grip the associated mortar beds, and lack of insulating properties against sound, heat and cold, which reduce the utility thereof to a considerable extent.

The object of my invention is to provide building units and particularly burned-clay building units which retain all of the advantages of existing forms of such units, and in which the disadvantages inherent in existing units are entirely avoided and overcome.

The invention contemplates essentially the provision of building units the surfaces of which present the appearance of finished walls and require no coating or other treatment to secure this result, which intimately and efficiently grip the associated mortar beds, which provide effective insulation against sound, heat and cold, and which are of reduced weight and consequently economical to produce and easy to handle.

Other more specific objects will appear from the description hereinafter and the features of novelty will be pointed out in the claim.

In the accompanying drawing, which illustrates examples of the invention without defining its limits, Fig. 1 is a perspective view, partly broken away, of one form of the novel unit; Fig. 2 is a plan view thereof; Fig. 3 is a perspective view showing the novel building unit in use; Fig. 4 is a fragmentary section on an enlarged scale, and Fig. 5 is a perspective view of another form of the novel unit.

In describing the novel building unit it will be assumed that the shell or body thereof is constructed of a material which, in the finished condition of the block, is inherently deficient in absorption properties and which likewise is inherently deficient in temperature and sound insulating properties; that is to say, the shell or body of the unit may be constructed of vitrified clay which, in the finished condition of the unit, is hard and dense and does not develop an efficient grip upon the associated mortar when incorporated in a masonry structure such as a wall or the like, and in addition does not rate very highly in the matter of providing insulation against heat, cold and sound. Such building units provide finished faces which enable said

units to be used to form the exposed faces of walls or the like, either interior or exterior, and which are highly impervious to the action of the elements. It will be understood, however, that the above explanation is not intended to define the limits of the invention and that the novel features are capable of being embodied in other types of building units which in such case are improved thereby.

In its simplest form the building unit comprises a hollow open body or shell 10 of conventional shape and dimensions provided interiorly with a separate material 11; as shown in Figs. 1 and 2 the shell or body 10 includes internal webs 12 which divides said body or shell interiorly into open ended cells located adjacent to each other as illustrated. In the type of unit for which the novel features are particularly adapted the shell or body 10 in its finished condition is inherently deficient in absorption properties and in addition, because of the thinness of its walls and the thinness of the webs 12, does not include efficient mortar gripping surfaces. To overcome this deficiency the material 11 is provided, this material having a natural affinity for mortar and being united with predetermined inner faces of the cells and preferably with opposite inner faces of said cells so as to constitute internal layers or linings for said faces of the cells and thereby retaining the open ended characteristics of the latter. In any case, the material 11 lies flush with the mortar engaging surfaces of the walls and the webs of the unit to supplement the thickness thereof, or in other words, to increase the surface area of said mortar engaging surfaces to thereby insure an efficient gripping of the mortar when the units are set in place in a wall or other masonry structure. The material of which the units are constructed may be such that in the finished condition the units will be deficient in temperature and sound insulating properties, this being the case for instance when the units are made of vitrified clay. In such case the material 11 may have inherent insulating properties against temperature and sound transmission and may accordingly comprise gypsum, cork, cinders, light-weight concrete and other materials possessing the insulating qualities desired. The material 11 may be applied to the interior of the shell or body 10 in any convenient manner so as to properly unite with the inner faces of said body or shell, which inner faces may in some instances be suitably roughened to insure a more intimate bond be-

tween the material 11 and the body or shell 10 and the webs 12 thereof if they are included.

In practice it is a well-known fact with particular reference to burned-clay building units that such units must have certain wall thicknesses and must be burned to the proper hardness in order to meet the requirements of different building codes for strength and absorption and to provide mortar beds sufficient to make the unit practical for the mason. In existing types of such building units the mortar beds have always been of questionable value as bonding means, because of the fact that properly hard-burned units have little inherent absorption and not enough suction to efficiently grip the mortar when the units are embodied in masonry structures. It has been found that under such conditions the units often slip and break the slight bond existing, this constituting a problem being debated and discussed by interested parties in the building industry and by engineering and testing authorities. While building units having highly impervious faces for protection against the elements on their exposed surfaces are highly desirable, it is at the same time required that such units be capable of being bonded together with existing types of mortars. The novel arrangement provides such a building unit which includes highly impervious faces and very substantial mortar gripping faces of proper depth and absorption.

It is further well-known that existing burned-clay units, because of their dense hard-burned vitreous nature, do not rate very highly in the matter of insulation against the transmission of sound, heat and cold. Such existing units rely entirely on their hollow construction for insulation and accordingly building units made of porous materials such as gypsum, cork, cinders, light-weight concrete and like materials are always given preference when the aforesaid qualities are desired. The latter type of building units however do not provide the finished faces of the burned-clay units and invariably require some more or less costly coating, plaster finish or paint to provide the desired finish particularly in the case of interior walls. The present novel type of building unit as will readily be seen, combines all of the good qualities of the vitrified clay unit with the insulating properties of other types of building units and in addition provides for substantial and efficient union with mortar beds. At the same time the weight of the novel unit is materially reduced to provide a more economical unit which may be used for instance to construct a completely finished insulating wall or other masonry structure at a reduced cost.

Up until within a comparatively recent period manufacturers have been obliged to make the walls and webs of hollow building units considerably thicker and heavier than necessary for strength requirements in order to get the green clay column to hold together and produce good smooth surfaces. Due to more or less recent improvements referred to in the industry as "de-airing", manufacturers have been enabled to reduce the walls and webs of such units to less than one-half the previous thickness and to provide building units of far greater strength than those formerly in use. This results in a much more highly impervious unit than heretofore and although the quality of the finished faces in such units is greatly improved, the resulting further reduction in the absorption properties makes the combination of such blocks with the mortar still more in-

efficient and at the same time still further reduces the insulation value of the units in question. The present invention overcomes these disadvantages and enables the manufacturer to take full advantage of the new process and permits units with walls and webs of maximum thinness to be run which results in decreasing the handling and mining of clay per M. blocks, reduces the drying and burning time to a minimum, and increases the plant production; the introduction of the material 11 into such building units provides the desired insulation qualities and at the same time insures mortar gripping surfaces of maximum efficiency.

Another important feature of the instant novel building unit resides in its resistance to fire. It is a well-known fact that fire tests have proven that the faces of hollow vitreous clay units when subjected to heat of fires crack and fall off, thus weakening the wall or other masonry structure; this objection is magnified when cold water strikes the hot walls constructed of such building units and causes a still further disintegration thereof. The material 11 in the instant form of units provides a non-pervious fire-proof core which holds the walls in place even if the bodies or shells 10 should crack or otherwise disintegrate as the result of a fire or contact of cold water with the heated units.

In addition to the previously mentioned faults, bricklayers have always objected to the above-mentioned existing units because the mortar gripping surfaces thereof are so thin as to make the placing of the mortar for the beds and vertical joints in position a difficult and tedious operation; this is particularly true of thin walled units because if the mortar falls from place while setting, fresh mortar unless very stiff and in such case very unsatisfactory will not remain in position. The instant type of building unit overcomes the bricklayer's main objection to end set units by providing relatively thick or wide absorption mortar gripping surfaces.

Hollow building units derive a large part of their value from their saving in transportation charges as is illustrated for instance by the fact that a standard 5x4x12" unit weighs ten pounds and is the equivalent of three ordinary bricks which weigh approximately fifteen pounds. It will be quite obvious from this that there is a considerable saving in transportation charges on ordinary hollow building units over the brick equivalents. In the instant case the novel building unit when constructed in the dimensions 5x4x12" will comprise a shell or body weighing for instance five pounds while the material 11 will weigh approximately one pound so that the total weight of the finished unit will be six pounds. Obviously this material reduction in weight will result in much savings in transportation charges and at the same time will enable the unit to be handled much easier by the bricklayer. The cores of material 11 in addition will also tend to materially reduce breakage in handling and shipping.

The illustrations in Figs. 3 and 4 of the drawing show examples of a masonry structure in which so-called 4" and 8" units are used in combination with each other to build up a masonry structure such as a wall. The illustrated examples clearly show how the addition of the material 11 to the building units by increasing the width of the mortar gripping surfaces enables the building units in the adjacent courses to be easily laid in a manner to provide efficient mortar beds and effective bonds.

In Fig. 5 the building unit comprises a body or shell 10^a corresponding to the previously mentioned body or shell 10, and is provided with intersecting webs 12^a extending longitudinally of the body or shell 10^a to provide longitudinal cells opening at their opposite ends in the opposite end faces of the building unit. Building units of this type are generally laid in the position illustrated with the webs 12^a and the interior cells extending in horizontal directions. In this type of building unit two of the cells may be provided with a lining 11^a or its equivalent while the other two cells are without such material 11^a. When thus constructed the units 10^a may be so laid that the cells containing the material 11^a are located adjacent to the forward face of the unit which in such case may serve as an insulating unit in the manner previously set forth herein. In addition the opposite end faces of the unit 10^a are provided with mortar gripping surfaces of increased width throughout at least a part of their dimensions so that the vertical mortar joints between adjacent units are adequately and efficiently gripped thereby.

In addition to all of the other advantages recited hereinbefore it will be obvious that the material 11 and 11^a will serve as internal reinforcements for the building units to resist fracture of the walls thereof; this is of particular interest when it is kept in mind that the walls of the novel form of building unit, that is the walls of the shells or bodies thereof, may be made so thin that a hammer blow or other impact will cause

fracture thereof. As previously stated, the cells of the units may in some instances be completely filled with the material 11 or 11^a to provide a two part block consisting for instance of vitreous material and insulating substance; such an arrangement in other words provides an insulating block with finished outer surfaces.

While the novel features as set forth hereinbefore are particularly adapted for use in connection with vitreous building units, said features may be efficiently combined with building units of other types and in such case will add to the efficiency and improve the construction thereof in approximately the same manner as set forth herein.

Various changes in the specific forms shown and described may be made within the scope of the claim without departing from the spirit of the invention.

I claim:

A building unit comprising a hollow open ended body inherently deficient in absorption properties and having walls the end faces of which are too narrow to provide efficient mortar gripping surfaces and linings of separate material located within said hollow body upon predetermined inner faces thereof, said linings having a natural affinity for mortar and terminating substantially flush with said end faces of said walls to supplement the width thereof and thereby provide efficient mortar gripping surfaces without destroying the hollow open character of said body.

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