WALL UNIT WITH PLURAL LAYERS AND TRANSVERSE TIE

Fig. 3

Fig. 4

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In the erection of buildings it is known in the art to manufacture pre-fabricated ready-to-erect wall units or elements in a factory from bricks and the like which are joined by mortar in courses in about the same way as bricks laid in brick works or wall bonds. Such a wall unit is intended to be transported as a ready unit to the building site where the wall units are erected and joined together to make a complete wall having the appearance of a conventional wall surface made by hand by normal brick-laying. Said wall units are preferably made in full story height and in a suitable width, for instance one metre or other convenient size. The erection of walls with the help of such pre-fabricated and relatively large wall units is less expensive and more rapidly done than conventional brick-laying of separate bricks on the building site.

The present invention has for its object to improve said type of ready-to-erect wall units, particularly wall units for external walls, comprising at least three layers viz. an outer or facade layer of building stones pre-joined in courses or wall bonds with wall joints, an inner layer or supporting body spaced from said facade layer and preferably comprising building stones or slabs likewise joined in wall bonds, and an intermediate insulating layer all of said three layers being joined together by means of one or several connecting members to a combined supporting and heat insulating unit with a ready facade. In respect to the costs such a pre-fabricated and combined wall unit is very advantageous since the labour costs at the building site are reduced and a considerable time-saving is obtained.

The connecting members interconnecting said layers preferably comprise reinforcing iron for instance in the form of a lattice, a net, a frame work, or the like which is joined or secured for instance to the outer layer, preferably in grooves in the same and subsequently the inner layer after said layer has been spaced at the desired distance from the outer layer. The reinforcement may of course also be secured firstly to the inner layer and then to the outer layer or the reinforcement may at the same time be inserted into grooves in both the outer and the inner layer. The intermediate insulating layer which may comprise mineral wool, sponge plastic material, fibre material or other insulating material may for instance in the form of sheets or slabs be inserted into the space between the outer and the inner layer.

One embodiment of a wall member according to the invention is shown in the accompanying drawings, in which:

FIG. 1 shows one embodiment with parts broken away, FIG. 2 shows the different layers in separated position, FIGS. 3 and 4 show two wall units during their joining together.

The facade layer 1 comprises a number of building stones 2 (such as bricks or other material) joined in wall bonds with side or vertical joints and bed joints 3 and 4 respectively. The wall units are made in a factory by placing the stones, for instance facade bricks, by means of guiding or spacing members in the pattern desired in a box or a jig, for instance on a bed of sand, plastic material or the like and then joining the stones by means of concrete or the like. It will be seen that in the illustrative embodiment alternate courses of the building stones are staggered, that is, the joints formed by the spaced planar end surfaces of the building stones in any one course are staggered or offset relative to the corresponding joints between the building stones forming the courses adjacent said one course. The edges of the outer stones are preferably bevelled as shown at 5 to facilitate a later joining of the wall element with an adjoining element.

In grooves or channels 6 on the inside of the facade layer thus formed the under side of one or more iron reinforcement ladders 7 or the like are fastened by casting concrete in said grooves the end part of said reinforcement being firmly held by said box. The reinforcement ladders extend along the height of the unit. The grooves 6 may for instance be formed by providing the bricks or the like with channels or recesses extending partly through the thickness of the stone, said channels or recesses corresponding to equivalent recesses in adjacent courses. The last mentioned recesses are preferably formed by the vertical joints 3a by arranging the bricks at a normal joint distance from each other. The grooves 6 may have a dove-tail-shaped cross section.

The facade or outer layer is now covered by insulating slabs 8 or the like fastened to the outer layer 1 and/or to the reinforcing ladders. Said reinforcements ladders are allowed to extend somewhat beyond the outside of the insulating layer 8, and they are preferably arranged close together at their edges although the drawings shows a slight interspace.

The inner layer 9 of the wall unit may be attached in different ways. According to one method which calls for the use of relatively stiff insulating slabs 8 the bricks or building stones 11 are laid in course directly on said slabs 8 and the upper part of the reinforcement ladders 7 are inserted into grooves and/or between said stones 11. The stones are then interjoined by means of mortar introduced into the joints and also joined to the reinforcing ladders. At last a layer of gypsum 10 or the like is poured over the assembly.

According to a modification the layers 1 and 9 are produced separately and erected on edge in the desired spaced relationship. The reinforcing members 7 which previously have been attached to one of said layers are then inserted into grooves, channels or the like in the other layer, and subsequently the two layers are interjoined by pouring mortar or the like into the grooves. The insulating slabs are inserted when convenient.

A rubber tape strip or the like may possibly be inserted into the grooves of respective layers to form a sealing around the respective reinforcing ladders before mortar is applied to join the layers 1 and 9. After the layers 1 and 9 together with the insulating layer 8 having been firmly secured to each other in the manner described said layers form a ready unit with facade bricks on the outside and a gypsum layer 10 on the inside.

The reinforcing ladders may at one end be provided with ears 12 (FIG. 1) or the like for the insertion of lifting hooks when the pre-fabricated wall unit is to be lifted by means of a crane or the like.

As illustrated in FIG. 1 the inner layer 9 does not extend over the full height of the wall element but leaves a shoulder 13 which may function as a seat for a beam or the like when mounting the wall units.

The joining of adjacent wall units may for instance be accomplished by pouring mortar into the vertical channels 14 formed by the chamfered edges 8 of adjacent layers 1. Said joining, however, may be effected in different ways. For instance, the joining channel 14 may be sealed at the outside and/or the inside by means of an elastic strip, e.g. of sponge rubber or sponge plastic, in order to prevent the mortar from flowing out during its pouring into the joint. The strip may be removed after
setting of the mortar. The shallow channel left by the removal of the sealing strip may be filled with mortar.

Different examples of joining are illustrated in FIGS. 3 and 4 showing the joining channel clearly.

Other modifications may be effected within the scope of the invention. Thus, for instance the inner layer 9 may be made entirely by pouring concrete or the like.

What I claim is:

1. A prefabricated ready-to-erect wall unit comprising at least three layers, namely a facade or outer layer of building stones arranged in courses and joined together by mortar bonds, the joints formed by the spaced end surfaces in any one course being offset relative to the corresponding joints between the building stones forming the courses adjacent said one course, the building stones in alternate courses having planar end surfaces extending perpendicular to the planes containing the major faces of the stones, an inner or supporting layer spaced from said outer layer and comprising building stones arranged in vertical courses and joined together by mortar bonds including generally straight vertical mortar bonds between successive vertical courses, and an intermediate insulating layer between said inner and outer layer, said outer layer having at least two parallel grooves or channels therein extending the length of said wall unit, each said groove comprising recesses in stones in every alternate one of said courses forming said outer layer and spaces between said planar end surfaces of the stones in the other courses of said outer layer, said recesses and spaces being in vertical alignment to form said grooves, all of said three layers being joined together by means of at least two parallel connecting members, each connecting member comprising metal reinforcing ladder means having two spaced parallel elongated rod members connected by transverse web members, one of said rod members of each connecting member being firmly secured in its respective one of said grooves by means of mortar, said transverse web members of said connecting members extending through said insulating layer and the other rod member of each of the connecting members being firmly connected in the mortar of the aligned vertical joints between the vertical courses of stones forming the inner layer.

2. A wall unit according to claim 1, comprising means on said connecting members adapted for engagement with means for lifting said wall unit.

3. A ready-to-erect wall unit comprising three layers, namely, a first, facade or outer layer of building stones or slabs arranged in plural courses and joined to each other by mortar bonds, an inner layer or supporting body spaced from said first layer, said outer layer comprising building stones or slabs arranged in plural staggered courses and joined to each other by mortar bonds, the building stones in alternate courses having planar end surfaces extending perpendicular to the planes containing the major faces of the blocks, and an intermediate insulating layer, the inner layer comprising building stones arranged in vertical courses and joined together by mortar bonds including generally straight vertical mortar bonds between successive vertical courses, all of said three layers being jointed together by means of metal connecting means having two spaced parallel elongated rod members connected by transverse web members, one of said rod members of each connecting means being secured to said outer layer by means of mortar in grooves in said outer layer, said grooves in said outer layer comprising recesses in stones in every alternate course of said building stones in the outer layer and extending between said planar end surfaces of the building stones in the other courses of said building stones in said outer layer, the other rod member of each of said connecting means being firmly connected in the mortar of the aligned vertical joints between the vertical courses of stones forming the inner layer said transverse web members of the connecting means extending from said outer layer to said inner layer through said intermediate insulating layer.

4. A wall unit according to claim 3 comprising a smooth covering layer applied on the exposed surface of said inner layer.

5. A wall unit according to claim 3, comprising a layer of plaster covering exposed surface of said inner layer.

6. A wall unit according to claim 3, comprising means on said connecting means adapted for engagement with means for lifting said wall unit.

7. A wall unit according to claim 3 wherein said inner layer is shorter than said outer layer, thus forming a seat on the top of said inner layer which is below the upper horizontal edge of the outer layer in an erected position of the wall unit.

8. A wall unit according to claim 3 characterized in that the building stones forming the two vertical edges of the wall unit are chamfered at their inner edges, so the chamfered stones of two adjacent wall units form a vertical joining channel internally of such units for bonding said wall units by pouring a binder in said joining channel.

References Cited by the Examiner

UNITED STATES PATENTS

1,445,713 2/23 Reilly 50—82
1,828,969 10/31 Hoefer 50—533 X
2,053,873 9/36 Niederhofer 50—342 X
2,063,309 12/36 Graef 50—348
2,111,562 3/38 Hughson 50—336 X
2,470,917 5/49 Christensen 50—361
2,691,292 10/54 Roberts 50—348 X
2,720,778 10/55 Okusin 50—368 X
2,881,613 4/59 Taylor et al. 50—373 X
3,000,144 9/61 Kitson 50—348 X

FOREIGN PATENTS

405,994 2/34 Great Britain.

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