Feb. 16, 1971 R. S. GREGOIRE 3,562,988

BUILDING BLOCKS, BRICKS, TILE, PANELS AND THE LIKE

Original Filed July 13, 1967 5 Sheets-Sheet 1

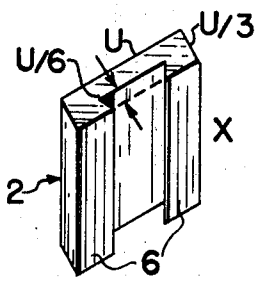


Fig. I

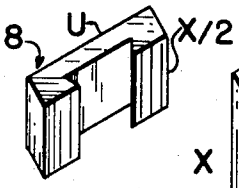


Fig. II

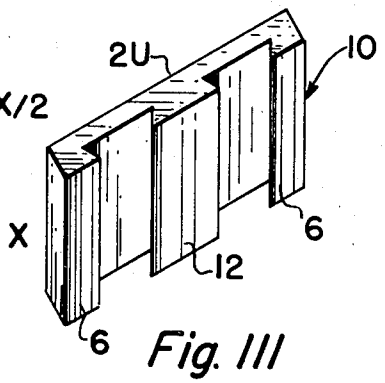


Fig. III

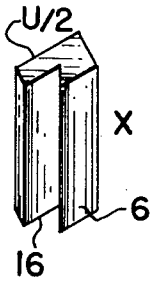


Fig. IV

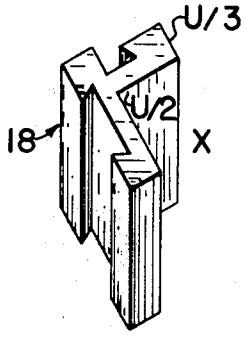


Fig. V

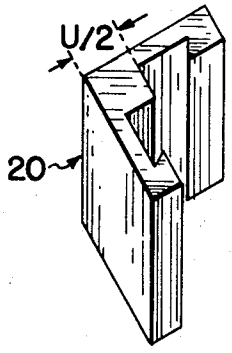


Fig. VI

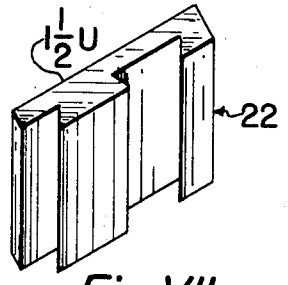


Fig. VII

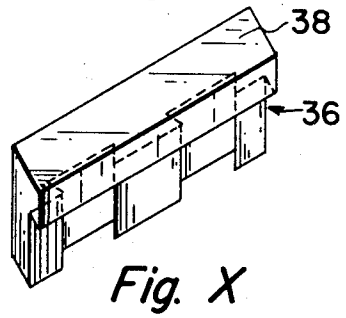


Fig. X

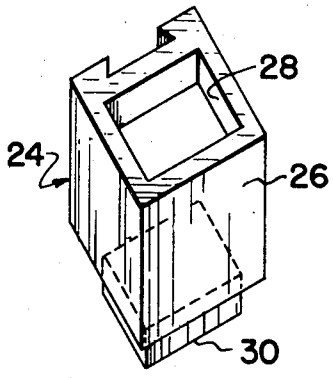


Fig. VIII

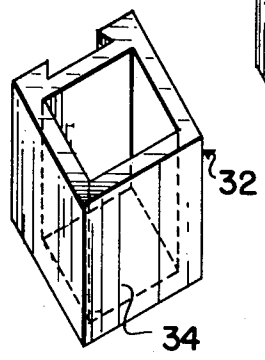


Fig. IX

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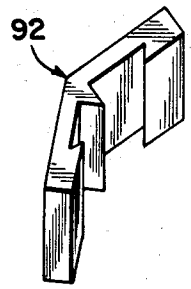


Fig. XVI

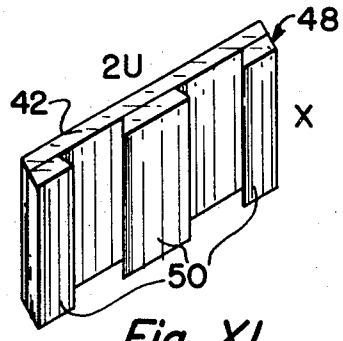


Fig. XI

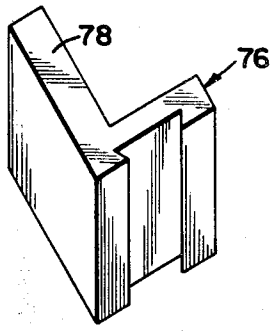


Fig. XIV

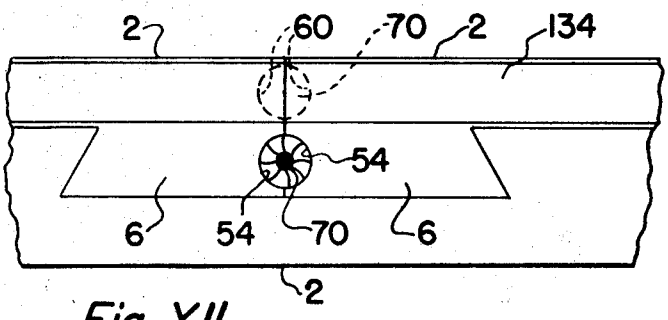


Fig. XII

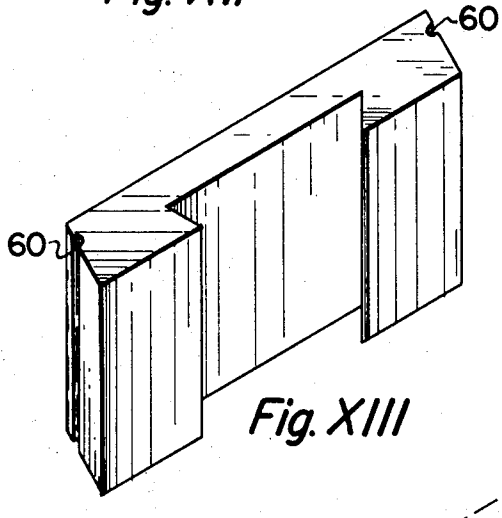


Fig. XIII

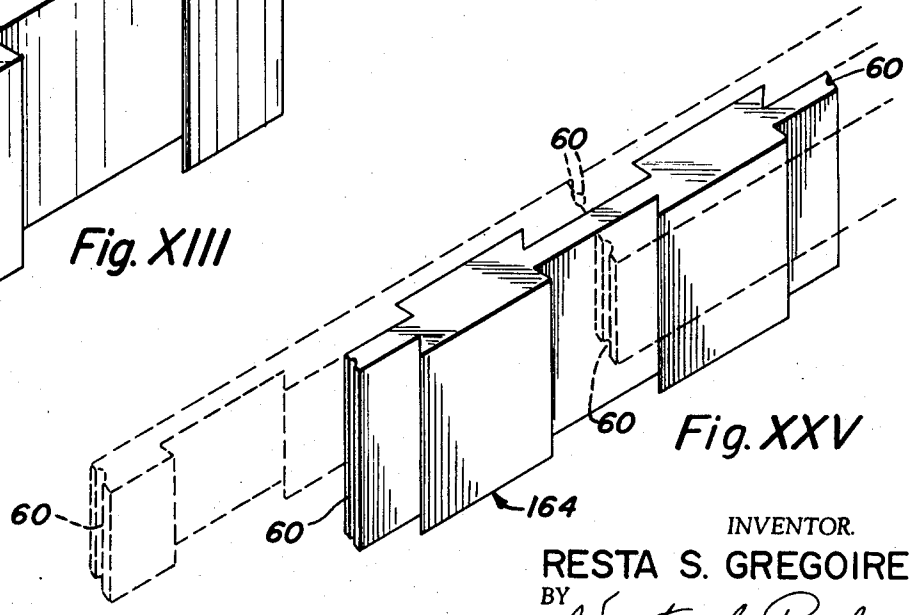


Fig. XXV

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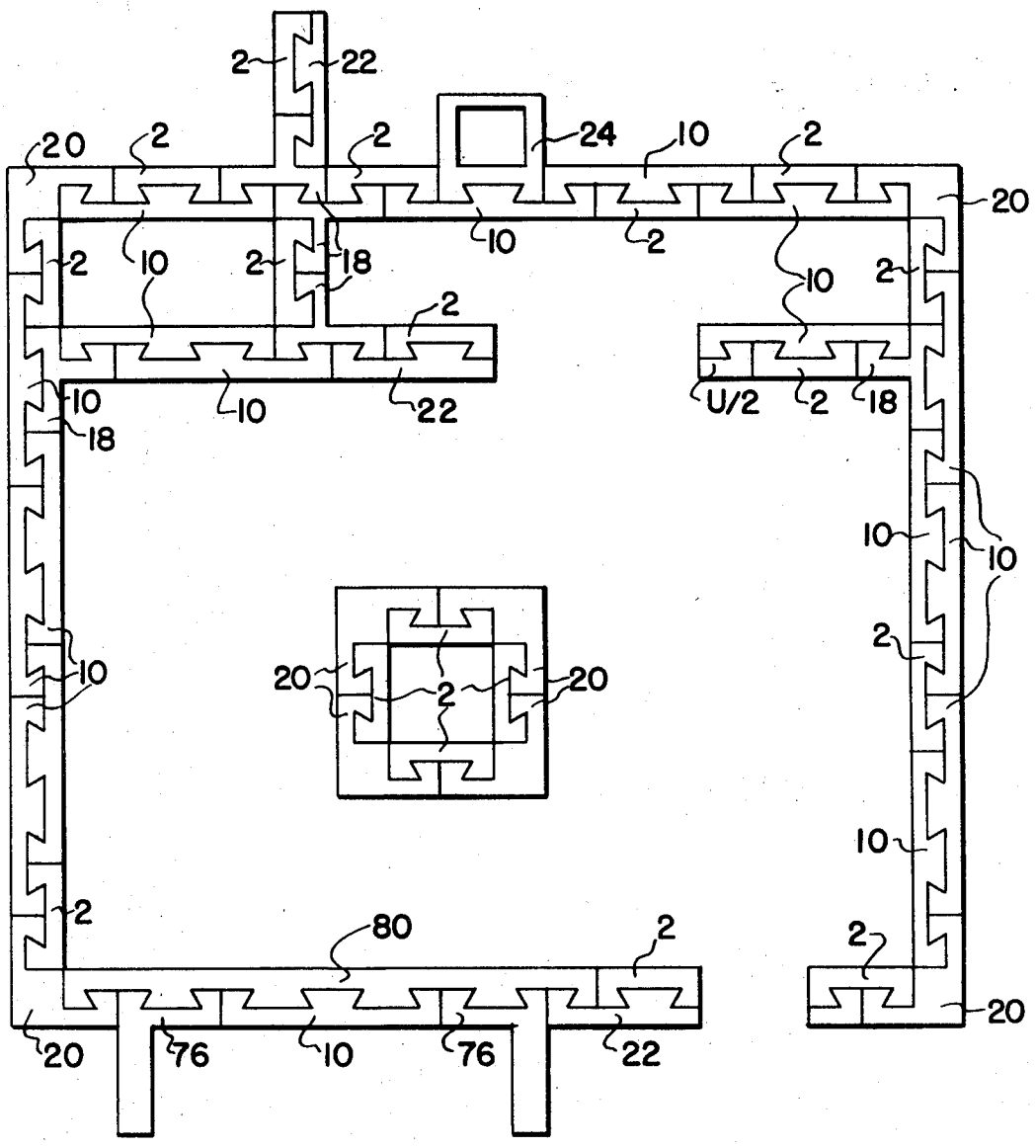


Fig. XV

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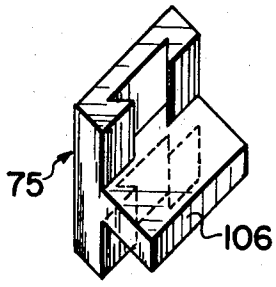


Fig. XVII

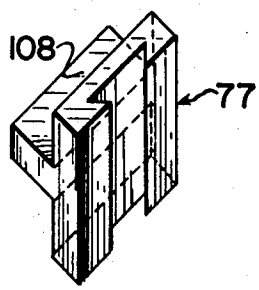


Fig. XVIII

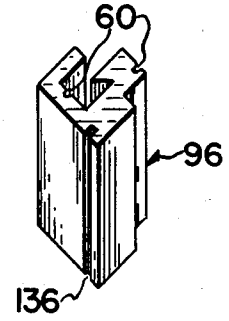


Fig. XIX

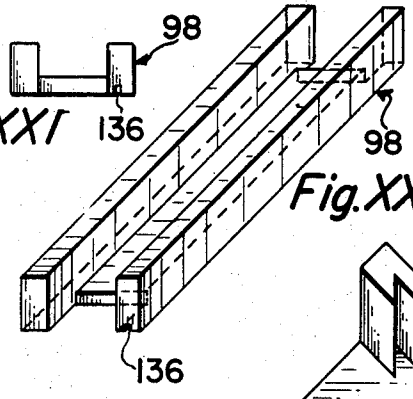


Fig. XXI

Fig. XX

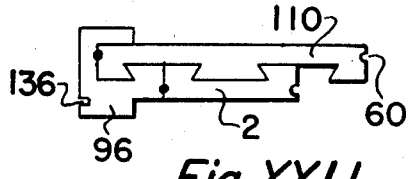


Fig. XXII

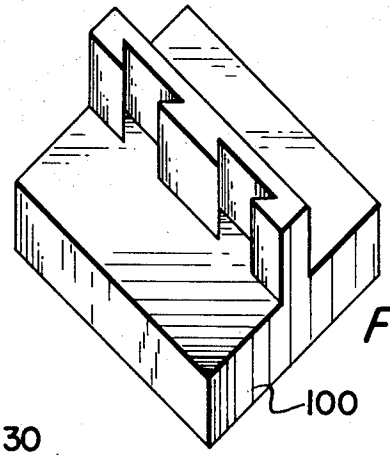


Fig. XXIII

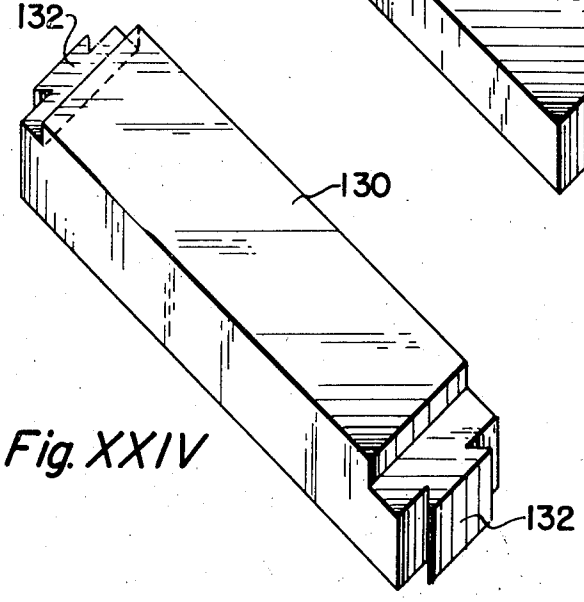


Fig. XXIV

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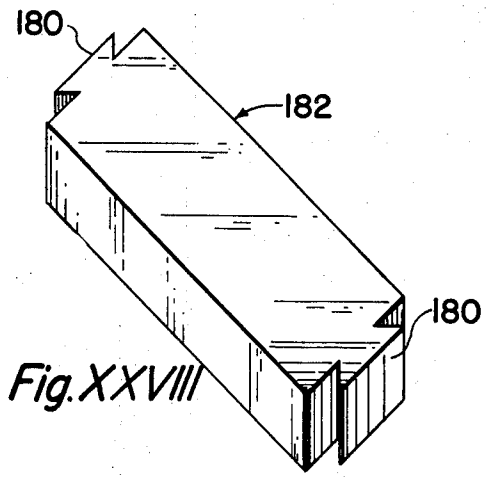


Fig.XXVIII

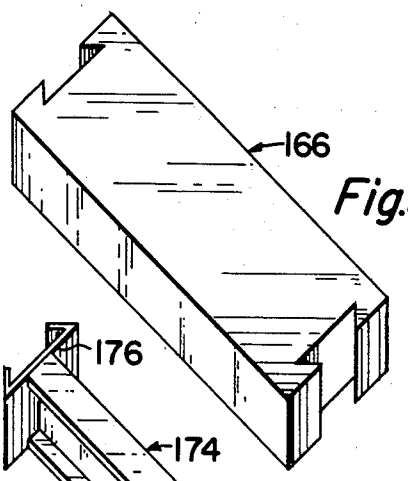


Fig.XXVI

Fig.XXIX

Fig. XXVII

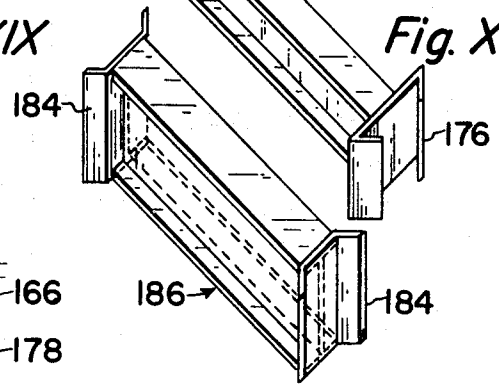


Fig.XXX

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United States Patent Office 3,562,988 Patented Feb. 16, 1971

3,562,988

BUILDING BLOCKS, BRICKS, TILE, PANELS AND THE LIKE

Resta S. Gregoire, Newport, Pa., assignor to Z-Lock Block Co., Newport, Pa., a corporation of Delaware

Application Dec. 6, 1968, Ser. No. 784,282, which is a continuation of application Ser. No. 653,170, July 13, 1967. Divided and this application June 24, 1969, Ser. No. 850,290

Int. Cl. E04b 2/72; E04c 1/10, 2/46

U.S. Cl. 52—279 1 Claim

ABSTRACT OF THE DISCLOSURE

Beams have block interlock faces on their ends for interlocking support in a corresponding wall, and have a counter groove in their upper surfaces for receiving a horizontal ledge portion of ledge blocks which are at a corresponding level in the opposite layer of said wall.

This is a divisional application of Ser. No. 784,282 filed Dec. 6, 1968, now abandoned, which is a continuation of Ser. No. 653,170 filed July 13, 1967, now abandoned.

This invention relates to a building system using interlocking blocks, bricks, tiles, panels and the like, requiring no mortar, cement or other binder materials in the construction of walls, roofs, decks, road beds, side walks, pillars, silos, enclosures, swimming pools, ducts, linings and the like.

The basic unit in a system of this type has a rectangular face area of a suitable unit height and a unit length and has alternate dove-tailed grooves and ridges on its internal face for slidably interlocking with corresponding ridges and grooves respectively, of similar blocks laid in the opposite layer of a double layer wall or slab during its erection, the blocks in one layer being laid in overlapping relation with respect to those in the other layer while lining up the internal faces of the opposite layers to form continuous grooves and ridges in the adjacent blocks, so as to slidably interlock with the ridges and grooves of the overlapping blocks of the opposite layer as it is slid into place to rigidly interlock said adjacent blocks in the direction normal thereto.

The object of this invention is to provide a system of interlocking block forms that require no application of any binding materials to hold the blocks together as they are laid in overlapping interlocked relation in the construction of straight or curved wall structures including floors, roofing and beam structures, and having corners and cross walls at any desired angles as well as openings for doors, windows and the like.

A further object is to provide a basic form of block or panel having alternate dovetail grooves and ridges in at least one face, that may be used in building a multilayer wall, floor, road bed or roof slab, etc. in which the grooves and ridges of the blocks or panels in one layer are interlocked with the ridges and grooves of overlapping adjacent blocks in the adjacent layer, so that no cementing binder material is necessary to hold the blocks in place as they are laid successively in their overlapping relations in the several layers of the wall or slab.

A further object is to make the blocks and panels of formed sheet material or extrusions having axially extending alternate dovetail shaped ridges and grooves on one face to provide the interlock between adjacent blocks or panels in one layer and their overlapping panels in an adjacent layer.

A further object is to make these sheets or extrusions of various multiple unit lengths and/or multi-unit heights, so as to enable the construction of extensive walls with fewer blocks or panels.

A further object is to make these blocks or panels of formed sheet material having limited flexibility in the horizontal direction, whereby curved or circular walls, cylinders or tubes may be built with substantially sealed joints and without using any piercing connections between the blocks or panels, or any welded joints, to hold the walls together.

A further object is to provide interlocking blocks for interior and exterior rectangular corners as well as for T and wall corners.

A further object is to provide blocks for forming interlocked frames in openings in the wall for doors, windows, etc.

A further object is provide matching semi-circular grooves in the side edges of these blocks, forming a circular bore in the vertical joints between blocks for the reception of sealing materials, and circular sectioned sealing strips adapted for insertion in these bores and sealing strips for the horizontal joints between blocks in each layer of the wall.

A further object is to provide blocks of this type having integral ledge portions extending outwardly from their outer faces or inwardly from their internal faces as may be desired.

A further object is to provide blocks for forming an eave corner having a suitable angle with respect to the vertical wall.

A further object is to provide arcuately formed blocks for the inner and outer layers in circular walls having any desired radius of curvature adapted for constructing silos, circular ducts, pipes, etc.

A further object is to provide the grooves and ridges on both faces of each block as to enable the construction of a road bed with with vertically interlocked blocks or a multi-layer wall having more than two layers.

Other and more specific objects will become apparent in the following detailed description of some forms of the invention as illustrated in the accompanying drawings, wherein:

FIG. I is a perspective view of a basic unit block of the present building system, having a substantially square face area,

FIG. II is a similar view of a fractional unit having half the height of this basic unit,

FIG. III is a similar view of a double length unit having twice the length of this basic unit,

FIG. IV is a similar view of a fractional unit having half the length of this basic unit,

FIG. V shows a rectangular corner block of a form that may also be used as a T corner or cross-wall corner connecting or cross block,

FIG. VI shows another form of rectangular corner block,

FIG. VII shows a one and a half length form of this basic unit,

FIG. VIII shows this basic unit with a solid column forming extension on its external face with a nesting rectangular pocket in and projection on the opposite vertical ends respectively of the extension,

FIG. IX shows this basic unit having a hollow rectangular column forming extension on its external face,

FIG. X shows a cap unit having an interlocking portion of half the height of this basic unit for finishing the top of a wall or other slab,

FIG. XI shows this basic unit provided with tongue and groove joining configurations in the top and bottom to provide some sealing as well as more perfect alignment of the external faces of the blocks, and semi-circular grooves in the side ends of the block to form continuous

vertical bores in each wall layer for receiving sealing material in the vertical joints,

FIG. XII is a plan view of the top of a wall portion showing a joint forming a vertical bore with a rod of flexibly resilient sealing material inserted therein having radially extending fins for resilient contact with the sides of the bore, and a flat sealing strip on top of the row of blocks in one layer of the wall ready for laying the next row of blocks,

FIG. XIII shows a block unit with another arrangement of the vertical grooves, locating them nearer to the external face of the block, and no horizontal tongue and groove provisions in the top and bottom of the block,

FIG. XIV shows another form of rectangular ledge projection extending from one side of the external face of the basic unit,

FIG. XV is a top plan view of an enclosure wall illustrating the use of the several different forms of units,

FIG. XVI is a perspective view of an obtuse angle block,

FIG. XVII is a unit block with a ledge projection extending from its internal face,

FIG. XVIII is a unit block with a ledge projection extending from its external face,

FIG. XIX is a vertical frame block for door and window opening integral with a half unit length finishing block for the edge of the wall opening,

FIGS. XX and XXI are perspective and end views of a sill block for mounting over the top or under the bottom of the side frames of a window or door opening,

FIG. XXII is a plan view of a portion of a wall finished off at its vertical edge by a vertical frame block,

FIG. XXIII is a perspective view of a double length half height block having a base footing block extending horizontally at its base for starting a wall and its base simultaneously,

FIG. XXIV is a rectangular beam having its ends formed with dovetail ridges to fit into corresponding grooves of the internal face of the outer layer of a wall over blocks of the inner layer at the desired level,

FIG. XXV is a perspective view of a portion of a wall having a beam end mounted in it under an internally extending ledge portion from a block in the outer layer of the wall,

FIG. XXVI is a perspective view illustrating the use of blocks having the groove and ridge structure on both faces to form a third or middle layer in a three layer wall,

FIG. XXVII is a perspective view of a beam having dovetail groove in its ends for engaging corresponding ridges in the internal face of a layer of blocks of a wall,

FIG. XXVIII is a perspective view of skeleton form of beam of this type,

FIGS. XXIX and XXX are similar views of solid and skeleton beams having dovetail ridges in their ends.

Referring now to the drawings, FIG. I shows the basic unit block **2** having a rectangular face area of any suitable unit dimensions U and X and a thickness substantially ⅓ of said unit length dimension U of the rectangular face, the depth of the groove **4** or height of the ridge portions **6** being about half this thickness or *U*/6. The thickness of a wall would be ½ of this unit length dimension. Obviously, these unit length and height dimensions U and X and the relations of the other dimension may be varied to suit material weight and strength requirements of any particular system.

FIG. II shows a fractional block **8** having the same configuration and dimensions except its height which is substantially ½ of a basic unit block **2**. This block may be used in the first course in one layer at the base of the wall so as to start the vertical overlaps of the courses in the two layers as they are alternately built up by adding the successive courses.

FIG. III shows a multi-unit block **10** having a length of two units with a complete ridge **12** in the middle of the

internal face, flanked by two grooves **4**, leaving two ridge portions **6** at the sides of the internal face. Other multi-unit blocks may be made having unit length increments beyond this two unit length to any length desired, and/or unit height increments over the unit height of the basic unit block to any height desired. For small thicknesses and/or light materials, it may be preferable to use larger multi-unit blocks within suitable weight limitations for easy handling.

FIG. IV shows a fractional unit block having half the length of the basic unit block with only portions **16** and **6** of a groove and a ridge respectively, which block may be used to fill in a horizontal overlap at the end of a course of blocks to square off the end of a wall.

FIG. V shows one form of corner or cross block **18** comprising a basic unit block having a half length block extending from one side of the external face of the unit block to provide the first block in the inner layer of the wall on each side of the corner or corners.

FIG. VI is an alternate form of corner block **20** having a square corner post whose square cross-section has a dimension of ½ of a unit, and a half length block extending therefrom on each side of the corner to provide the first block in the outer layer of each wall extending from the corner.

FIG. VII shows a multi-length unit block **22** having a length of 1½ units.

FIGS. VIII and IX show unit blocks **24** and **32** with a solid rectangular pillar portion block **26** and a like hollow block **34** respectively extending from the external faces of said unit blocks. The solid block **26** may be provided with a nesting pocket **28** in one end of said block and a corresponding projection **30** at its other end.

FIG. X shows a half unit height cap block **36** having a cap **38** extending from the top of said half unit height block portion to fill out the vertical overlap of the top course in one layer and simultaneously provide a cap over the entire thickness of the wall.

FIG. XI shows a unit block **52** provided with semi-circular grooves **54** in the outer sides of its ridge portions **6**. The circular bores formed by these grooves in the vertical joints between blocks may be filled with sealing means, such as **70**. Tongue and groove means **56** and **58** may be made at top and bottom of the block to provide a weather seal in the horizontal joints as well as to improve alignment of the faces of the blocks.

FIG. XII is an enlarged detail plan view of a portion of a wall, showing portions of three interlocked blocks **2**, two of which, in the one layer, have vertical semicircular grooves **54** forming the bore at the joint between the two ridge portions **6**, into which a sealing material **70** has been inserted to form a good water tight seal at the joint. These sealing grooves **60** may be moved close to the external face of the block as shown in the enlarged view of block **8** in FIG. XIII to form the bore shown in dotted lines in FIG. XII which shows a sealing strip **134** placed over the ends of the sealing means **70** in the vertical bores to provide continuous water tight seals throughout the vertical and horizontal joints in each layer of the wall.

FIG. XIV shows another form of useful block **76** comprising a basic unit block with a rectangular projection **78** extending from the external face of the block to provide a flat column fixed to the side of the wall, or just a projecting portion thereof wherever desired.

FIG. XV illustrates the use of the several different forms of blocks in building walls with rectangular corners, T's and crosses, including rectangular stacks, and attached solid and hollow pillars, etc. The use of a multi-unit block **80**, having a length five times that of the basic unit block, is illustrated in the lower left portion of this figure.

A 135° angle corner block **92** is used at one end of the wall. Block **92** is shown in FIG. XVI in perspective view.

Integral ledge portions **106** and **108** may be formed extending from the blocks internally as in block **75** or externally as in block **77**. Block **96** is a half length block

of a height suitable for framing the vertical edge of an opening in a wall left open for a window or door. This block is inserted over each side edge of the opening as shown in FIG. XXII only after a sill block **98** (FIGS. XX and XXI) is inserted over the bottom edge of the opening, and another sill block **98** is then placed over the tops of the vertical frame blocks **96** to form a base support for the upper edge of the wall opening.

The half height row of blocks used for starting one of the layers of the wall at the bottom may be formed integrally with their base portions **100** as shown in FIG. XXIII, so that they may be laid simultaneously as the footing for the wall.

A solid beam such as **130** may be made with dovetail ridged ends **132** for interlocking with corresponding dovetail grooves on the internal faces of the outer layers of a wall when the beam is mounted over an upper edge of a block in the inner layer.

A flexible resilient sealing strip **134** may be used in horizontal joints between blocks or between blocks and sills, to provide good waterproofing along with the vertical seals **70** in the bores formed between the side edges of the blocks by the semicircular grooves **60**. The frame and sill blocks **96** and **98** may be provided with a rectangular groove **136** for receiving rectangular sealing strips to provide sealing between the window or door not shown) and the frame of its opening.

For a multi-layered wall having more than two layers, the intermediate layers may be formed of blocks such as **164** with ridges and grooves on both faces to match the internal faces of adjacent layers. These blocks may be provided with the semicircular grooves **60** in their vertical side edges. These blocks may also be laid in any direction across a whole road bed of any width and length. Obviously, it is immaterial whether the grooves and ridges on one of the faces of these blocks are lined up as shown in FIG. XXVI) or uniformly reversely offset with respect to those on the opposite faces not shown), so as to form continuous matching ridges and grooves on the opposite faces of each layer as the blocks are laid therein.

Beams **166** for mounting horizontally between walls of the present type may be made with their end faces **168** formed like the internal face of a unit block, so that they may be mounted in place of a unit block in the inner layers **170** of the respective walls in interlocked relation with the internal faces of their outer layers **172** as may be seen in FIG. XXXI.

Instead of a solid beam, an I-beam **174** may be made with a skeletonized groove member **176** at its ends for mounting in the respective walls in interlocked relation with the corresponding ridges **178** formed in the internal faces of the outer layers of the walls.

Instead of forming grooves in the end faces of some of the beams, corresponding ridges or ridge sides may be formed thereon, such as **180** on the solid beam **182**, or **184** on the ends of the I-beam **186**. This provides a selectivity in the horizontal spacing of the beams in their supporting wall of half of a unit length.

The flexible resilient sealing strips **134** and rods **66** may be made of an impervious foam urethane or vinyl material. Another suitable material is a foam urethane with bituminous which has a somewhat better memory retention characteristic.

As may be readily understood from the above detailed dscriptions, this system lends itself very well to building other than straight wall structures, including artistic and architectural design uses as well as toy building blocks. Miniature size unit blocks would be very useful to architects and engineers for making sample models of their various architectual and engineering designs. Also artistic mosaic designs could be created by artists and amateurs, embryo building architects and structural engineers, who could readily try out their skills and incidentally acquire more interest to experiment with different arrangements and structural forms without necessarily resorting to expensive full size materials.

Many other obvious modifications in the detail forms and arrangements of parts in this building system may be made without departing from the spirit and scope of the present invention, as defined in the appended claim.

What is claimed is:

1. A wall construction of concrete units assembled without a binder therebetween and comprising a plurality of linear wall segments each comprising a double layer of blocks with the blocks in one layer overlapping the blocks in the other layer both horizontally and vertically, said blocks having identical horizontal sections with the inner faces of blocks in one layer having alternate and equal vertically co-extensive dove-tail grooves and ridges slidably interlocked with similar vertical coextensive dove-tail grooves and ridges in the inner faces of the blocks in the other layer, a corner wall segment comprising a corner block having a plurality of angularly extending block portions joined to the linear wall segments, the corner block portions each having an identical half groove and half ridge interlocked in a running fit with the inner faces of the end blocks of a layer of blocks, two spaced wall segments having a beam supported between them at points normally provided for a block in each of said wall segments, said beam having end faces formed like the interlocking inner faces of the blocks which they replace at their points of support in the respective wall segments, the dove-tail grooves and ridges on said blocks having planar faces which are positioned in face-to-face relationship when interlocked to define a close yet free fit without any noticeable play between interlocked blocks so that the wall is assembled without a binding agent between blocks.

References Cited

UNITED STATES PATENTS

707,444	8/1902	Moses	52—568
950,140	2/1910	Lucke	52—586
1,780,086	10/1930	Linn	52—568
2,563,703	8/1951	Bonney	52—586
3,132,443	5/1964	Kuhn	46—19

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