

Jan. 28, 1936.

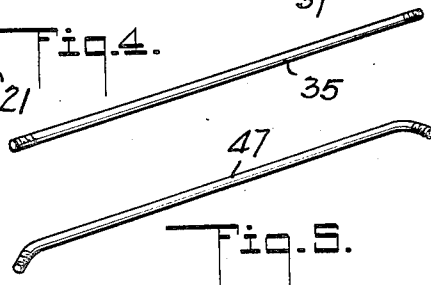
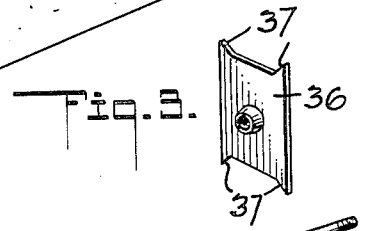
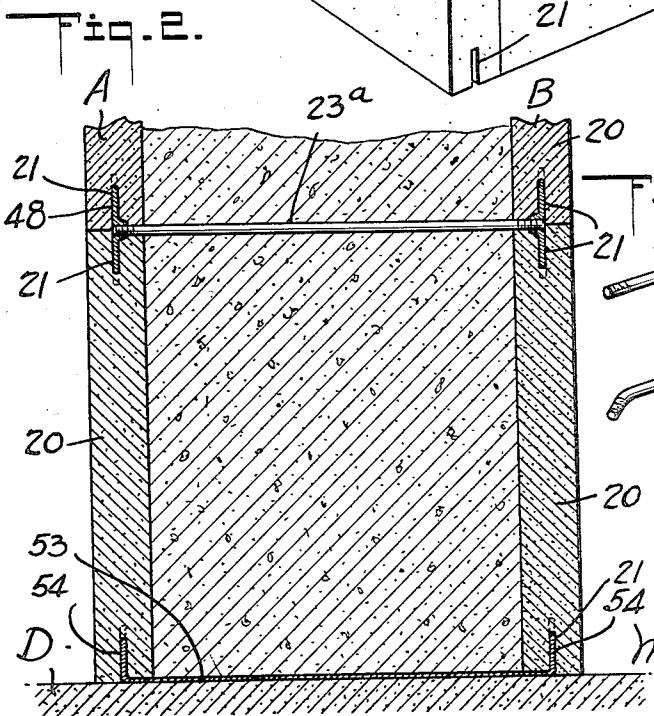
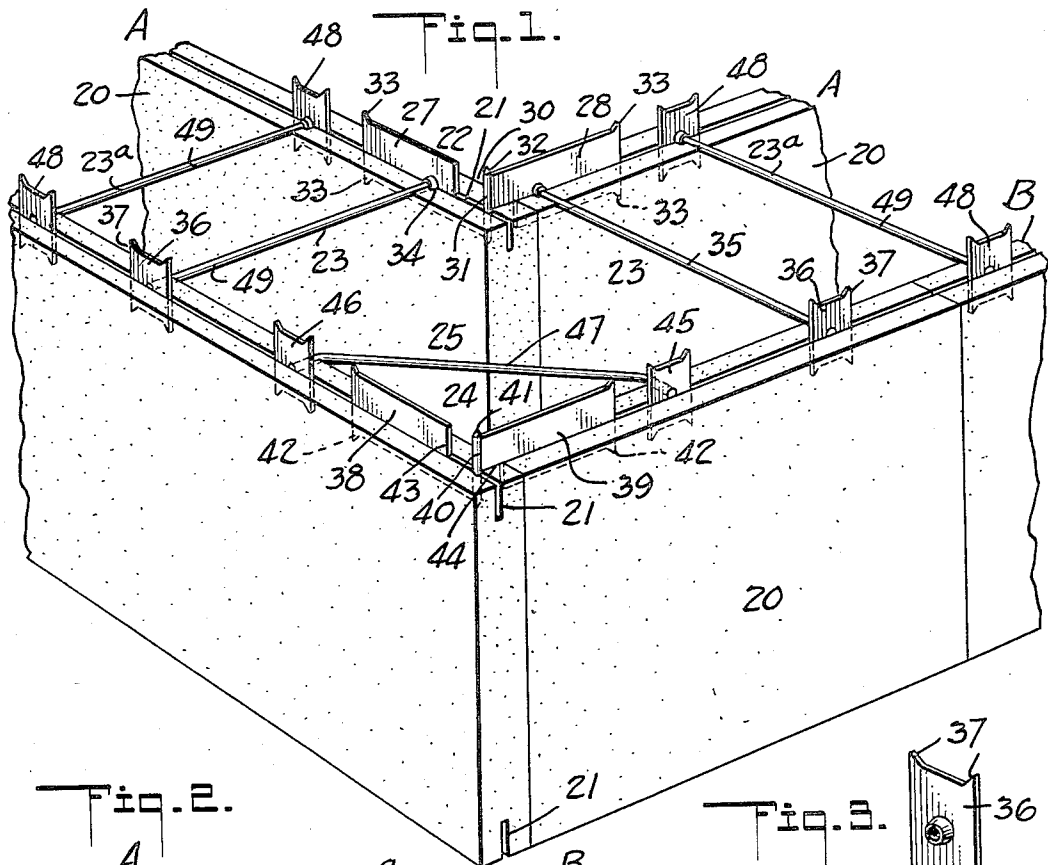
C. H. ODAM

2,029,082

WALL CONSTRUCTION

Filed Sept. 22, 1934

3 Sheets-Sheet 1



INVENTOR.
CHARLES H. ODAM
BY
Munn, Anderson & Liddy
ATTORNEYS.

Jan. 28, 1936.

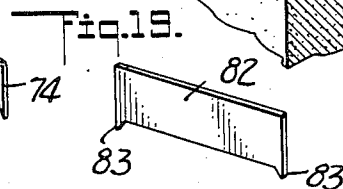
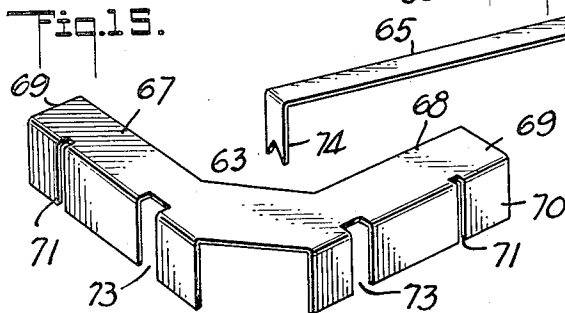
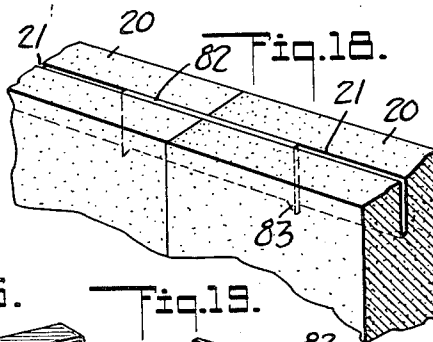
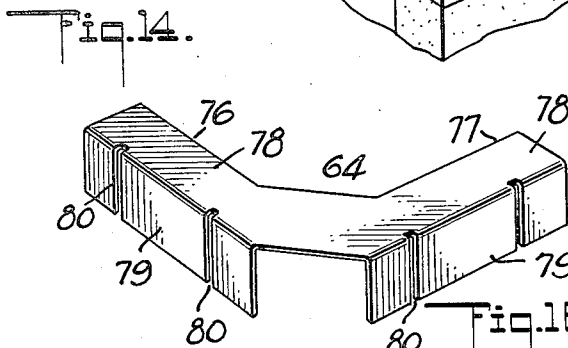
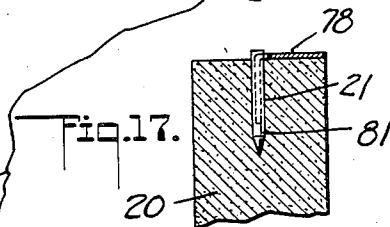
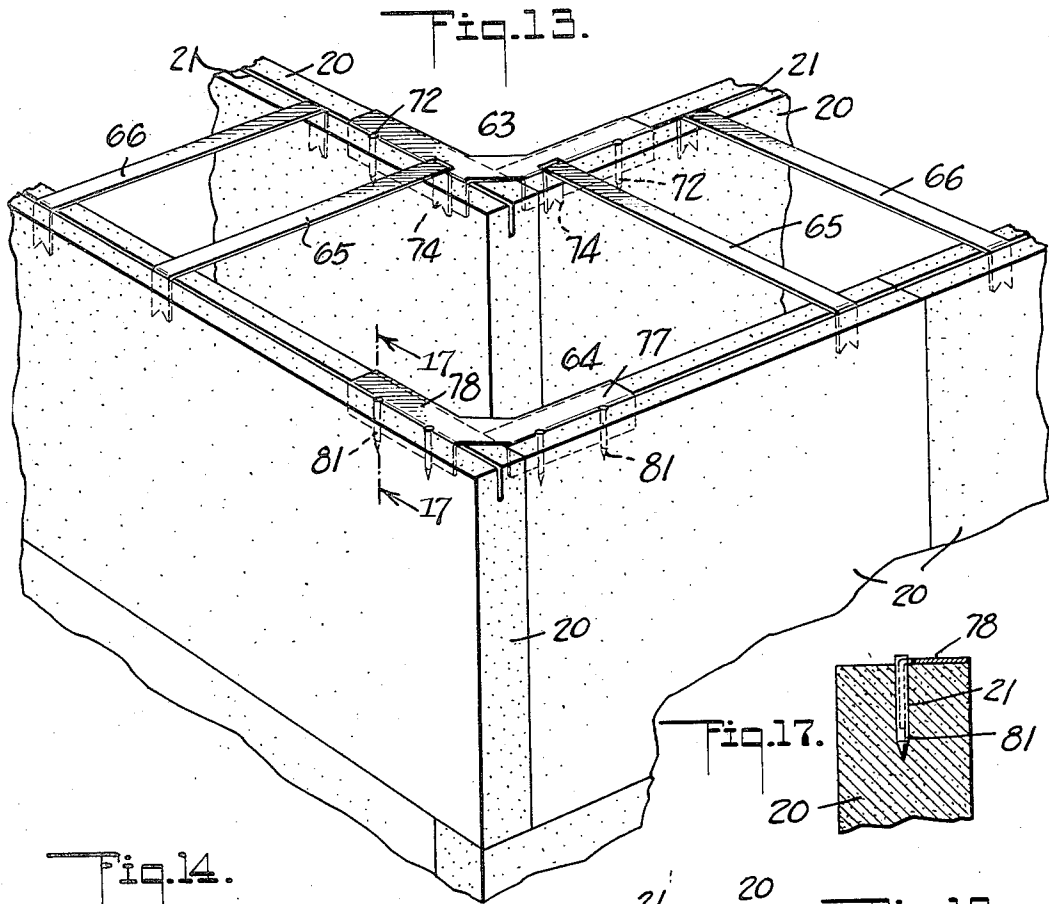
C. H. ODAM

2,029,082

WALL CONSTRUCTION

Filed Sept. 22, 1934

3 Sheets-Sheet 3



INVENTOR.
CHARLES H. ODAM
BY
Munn, Anderson + Liddy
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,029,082

WALL CONSTRUCTION

Charles H. Odam, Tucson, Ariz.

Application September 22, 1934, Serial No. 745,154

10 Claims. (Cl. 72-30)

This invention relates generally to wall construction, and more particularly to walls of the type which are made up of substantially similar interrelated slabs, and an object is to provide novel and positively acting means whereby the slabs can be tied together in a highly effective manner to give great strength and solidity to the walls when the slabs are completely set up.

A further object resides in the use of tie members which can be handled with speed and facility and readily incorporated in the slabs during the process of progressively placing the slabs one above another in horizontal course formation and which will aid very materially in the work of co-ordinating the complementary edges of the slabs or when placing same in edge-to-edge relation to each other.

The invention is designed particularly for use in wall construction consisting of inner and outer spaced apart walls, and a further object of my invention is to provide a system wherein tie members are employed, the forms, constructions and arrangements of which will serve not only to tie the slabs of each wall together, but so connect the slabs of one wall with those of the other wall in a manner that will give to the finished building great lateral stability and which will bond together the slabs at the corners of the building and uniformly and very rigidly hold the slabs of one wall spaced apart from those of the other wall.

A still further object is to provide in wall construction, slabs formed at their upper and lower edges with continuous longitudinal grooves and a system of tie members in which some thereof can be operatively associated with the slabs at any place between the ends thereof and which will embody the use of metallic plates adapted to be accommodated in the grooves and firmly secured to the slabs in a manner to hold same against slipping from their intended positions.

Another object is to provide tie members whose co-operable parts may be readily set up as their use is desired and which can be compactly packaged for shipment and storage to facilitate handling.

My invention also comprehends other features of construction which, together with those above specified, are fully described hereinafter and specifically recited in the claims.

My invention will be better understood by reference to the accompanying drawings, in which

Figure 1 is a perspective of inner and outer walls showing the manner of connecting the slabs of each wall together and the manner of tying

the slabs of one wall to those of the other wall;

Figure 2 is a vertical section through the inner and outer walls, showing the slabs thereof tied together laterally and illustrating the manner of connecting the slabs of the outer wall to those of the inner wall at the bottom of the structure;

Figure 3 is a perspective view of one of the tie plates;

Figure 4 is a perspective view of the form of spreader rod used with the plate shown in Figure 3;

Figure 5 is a perspective view of the form of spreader used at the angle between the adjoining slabs at the corner of the wall;

Figure 6 is a perspective view of the tie member for the inner corner of the inner wall and the lateral spreaders between the slabs of the inner wall and the slabs of the outer wall;

Figure 7 is a view similar to Figure 6 of the outer corner tie member for the slabs of the outer wall;

Figure 8 is a sectional perspective view of a portion of the wall showing the manner of tying a partition slab to an adjacent wall slab;

Figure 9 is a vertical section through the structure showing the tie member fully connected with superimposed wall slabs and superimposed partition slabs, as distinguished from partial association of said member with just two such slabs, as shown in Figure 8;

Figure 10 is a perspective view of a slightly modified form of corner tie member, the same connected with two right-angularly disposed corner slabs;

Figure 11 is a perspective of the form of tie member shown in Figure 10;

Figure 12 is a section through two wall slabs showing the manner of adjustably connecting the spreader rod therewith to effect relative lateral adjustment of the inner and outer facings whereby the slabs can be rigidly related to each other;

Figure 13 is a sectional perspective view of the wall showing another modified form of the invention;

Figure 14 is a perspective view of the outer corner member of the form shown in Figure 13;

Figure 15 is a view similar to Figure 14 of the inner corner member;

Figure 16 is a perspective view of the transverse spreader bar shown in Figure 13;

Figure 17 is a section on line 17-17 of Figure 13;

Figure 18 is a sectional perspective view of

two confronting top slabs, showing the application of the bottom slab tie member thereto;

Figure 19 is a perspective view of the bottom slab tie member.

In carrying the invention into practice, and with particular reference to Figures 1 to 9, inclusive, I employ inner and outer walls A and B, each consisting of substantially identical slabs 20 formed of any suitable well-known material and each provided in its upper and lower edges with continuous longitudinal grooves 21, whereby when the slabs of one wall are placed edgewise on each other, as shown in Figure 2, the groove 21 of one slab will vertically coincide with the corresponding groove of the other slab. The slabs of each said wall are arranged in horizontal rows or courses with their vertical edges abutting each other. But at the extreme corners of the wall being constructed, the vertical edges of the slabs of one wall abut flatwise the adjacent side faces of the slabs of the next adjacent wall, as shown in Figure 1.

The means employed for tying together the slabs 20 of the wall A and slabs 20 of the wall B consists of an inner corner tie member 22, transverse or lateral tie members 23; intermediate transverse tie members 23a; an outer corner tie member 24; angle tie member 25 and the partition tie member 26. All of these members, except member 26, are clearly illustrated in Figure 1.

As the inner corner tie member 22 and the lateral tie members 23 directly co-act with each other, a detail description of these parts will be first made. The member 22 consists of two right-angulantly disposed plates 27 and 28, formed preferably of thin gauge sheet steel, the plate 27 having formed therein a downwardly opening U-slot 30, the bottom wall of the latter being horizontally aligned with the top wall of slot 29. Each plate is of a width to extend half-way into the slot 21 of the slab 20 with which it co-acts whereby to expose from the upper edges of the slabs the remaining portions of these plates for insertion thereof into the corresponding slots of the next slabs to be erected. At the point of integral connection of the plates 27 and 28 with each other are vertical hard-metal pins 31 having sharp-pointed end extensions 32. The extreme outer corners of these plates are formed with sharp-pointed barbs 33, the vertical distance from one barb 33 to the other of each plate being the same as the distance from one point 32 to the other thereof of the pin 31. It thus follows, the width of each plate being the same as the combined depth of two vertically aligned or confronting slots 21, that the points 32 of the pin 31 and the points 33 of plates 27 and 28 may be firmly embedded in the slabs beyond the closed walls of said grooves 21, as clearly illustrated in Figure 2. It is because of this construction that the plates will be securely confined against longitudinal slippage in the groove when the plates are applied as intended. When the plates are applied as shown in Figure 1, the slot 29 straddles a portion of the slab 20 at one side of the groove 21 of said slab. The slot 30 in the plate 27 faces in an upward direction and will, in like manner, straddle a portion of the next slab to be erected at this corner of the wall structure. When applied as first stated, the two plates 27 and 28 function to maintain close abutment of the adjacent faces of the right-angulantly related slabs with which they are now an integral part. The plates 27 and 28 are each formed with a

threaded boss 34 and the transverse spreader rods 35 of members 23 are removably connected therewith as shown both in Figures 1 and 6. The outer ends of these rods 35 have secured thereto plates 36, the effective groove width of which is the same as that of the plates 27 and 28 whereby they will be accommodated in like manner in the grooves 21 of the slabs 20 of the outer wall B at opposite sides of the outer corner, and in positions parallel to the plates 27 and 28. Each of these plates 36 is formed at all four corners with barbs 37 which function in the same manner as the barbs 33 and the points 32.

The outer corner tie member 24 is a substantial duplicate of the inner corner tie member 22, and same connects with the right-angulantly related corner slabs 20 of the outer wall B. It will doubtless suffice to say that this member consists of right-angulantly related plates 38 and 39, rigidly secured together by the pin 40 which is like the pin 32 and pointed at its ends at 41. At their outer ends, these plates are formed at their corners with oppositely extended barbs 42. The plate 38 has a slab receiving recess 43 and the plate 39 has a similar, but downwardly opening, recess 44.

The angle tie member 25 comprises two identical plates 45 and 46 which are detachably connected together by the spreader rod 47. As these plates are the same as the plates 36, it is believed that the description of the latter will suffice for the former.

The intermediate transverse tie members 23a consist of plates 48—48b, the same as plates 36 connected, together by detachable rods 49. There may be as many of these intermediate transverse tie members employed as desired.

The partition tie member shown in Figures 8 and 9 consists of right-angulantly disposed plates 50 and 51 of respectively graduated lengths. The plate 51 extends into the co-incident grooves 21a of the superimposed partition slabs C, and same has barbs 52 which are embedded in the slabs below the depth of the grooves 21a, as shown in Figure 9. The plate 50 extends, respectively, into the confronting grooves 21 of the wall slabs 20 and same has barbs 50a which are embedded in the slabs below the depth of the grooves 21.

On the foundation D are placed transverse spreaders 53 whose upwardly extending angular ends 54 are extended into the grooves 21 of the lower slabs 20 of the inner and outer walls A and B, as shown in Figure 2.

The single plate corner connection shown in Figures 10 and 11 comprises a plate 55 of the same width as any one of the similar plates theretofore described. It is formed at one end with a pair of oppositely extending barbs 56—56 and at its opposite end with a pin 57 like the pins 31 and 40. The plate has a downwardly opening U-recess 59. As this plate functions the same as plate 28, no further description thereof seems necessary.

In some instances, it may be desired to form the lateral spreaders in a manner to draw the confronting slabs of the opposite walls in greater rigid relationship to each other, and in order that this may be accomplished the plate 60 shown in Figure 12 carries a threaded spreader rod 61 on which a nut 62 is adjustably mounted so as to engage against the inner faces of the slabs 20 as shown in Figure 12.

In Figures 13 to 19, inclusive, of the drawings, I show an inner corner tie member 63, an outer corner tie member 64, transverse tie members 65, 75

and intermediate transverse tie members 66. These may be used at the top of the wall, the bottom of which is shown in Figures 1 and 2. The aforementioned member 63 is struck from sheet steel to provide angular branches 67 and 68, each including a top horizontal flange 69 of one half of the width of the edge of the panel 20, and a vertically depending flange 70, the width of which latter is the same as the depth of the slab groove 21. The flanges 69 and 70 are slotted at 71 to receive vertical pins 72 which are driven firmly into the slabs below the closed walls of the grooves 21. They function the same as the pins 31 and barbs 33. The flanges 69 and 70 are also slotted at 73 and into these slots are driven the barbed ends 74 of the tie members 65, the barbs being formed for embedment in the slabs in the same manner as the pins 72. The opposite barbed ends 74 of the members 65 are adapted to enter the grooves 21 at the opposite walls A and B, as shown in Figure 13.

The outer corner tie member 64 is very much the same as member 63, both structurally and functionally. It is formed with angular branches 75 and 77, each having a horizontal flange 78 and a vertical groove-engaging flange 79. These flanges are slotted at 80 and driven therinto and into embedment with the slabs are pins 81.

The intermediate tie members 66 are the same as the members 65, and the description of the latter will suffice for the former.

At the joints between the top slabs 20, as shown in Figure 18, are tie plates 82 adapted to be driven into the grooves 21 so as to span the joint between the adjacent slabs, the upper edge of the plate being flush with the upper edges of the slabs when the plate is fully driven into its intended position where the corner barbs 83 thereof engage firmly in the slabs below the bottoms of said grooves 21.

After the inner and outer walls of the structure have been erected, the space between said walls may be supplied with the usual concrete filler as shown in Figure 2.

I am particularly concerned with a system of wall construction wherein means are employed for retaining the facing slabs 20 of the opposite walls A and B rigidly tied together during progressive erection of the slabs and in a manner that will eliminate the necessity for employing wooden forms. The means therein disclosed not only makes this possible, but it provides for greater metallic reinforcement of the finished wall than was possible heretofore. It also serves to more securely anchor one wall to the other and to equidistantly space them apart from each other and to add greater strength to the corners of the finished structure.

In some of the hereto appended claims, I shall employ the term "butt joint" at the intersection of one angular course of slabs with another angular course. This shall be understood to mean those vertical joints which are formed by the vertical edges of the slab or slabs of one course abutting flatwise the adjacent side face or faces of the angularly related slabs of another one of the courses. In connection with this feature of my invention, I wish particularly to stress the novel features of the plates 27 and 28 or the plates 30 and 39 or the vertical flanges of the top inner and outer corner members 63 and 64, whereby when applied as aforesaid to the angularly related slabs, the said "butt" joints will be uniformly closed and the slabs rigidly connected

together. For the purpose of the said claims, the vertical flanges of the members 63 and 64 shall be considered as plates in that they function the same as the plates 27, 28, 38 and 39. They function in like manner as the plates 50 and 51. It will be noted that the plates 50 and 51 are right angularly related to each other and that the inner flat face of plate 50 is spaced apart from the vertical edge of plate 51 a distance sufficient to enable another one of the slabs to be erected upon the lower similar slab and the upper exposed portion of plate 50 inserted in the groove of said other slab. To this extent, the arrangement is structurally and functionally like the arrangement of the plates 27 and 28 and 38 and 39, whose recesses 29 and 30 and 43 and 44 are designed to straddle the slabs, as hereinbefore referred to.

While I refer to the walls A and B as inner and outer walls, it is to be understood for the sake of the claims that each said wall embodies courses which are angularly related to each other. Each of said angular courses shall be taken to mean a wall which is complete in itself.

A system such as the one herein set forth simplifies the building of walls, provides means for spacing the slabs together or from one wall to another in double-wall construction, allows for progressive application of the tie elements as the wall is being erected, and is such that all the various tie elements become an integral part of the finished wall.

Having now described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is:

1. In wall construction, spaced apart walls, each comprising vertically disposed rectangular slabs laid in corresponding courses and arranged so that the vertical edges of the slabs of each course abut each other and so that the horizontal edges of the slabs of one course engage the corresponding edges of the slabs of the next adjacent course, the horizontal edges of the slabs of each course having confronting vertical grooves, and a tie member connecting one wall with the other and including means extending into the aforementioned confronting grooves and having portions embedded in said slabs, whereby to secure the member against longitudinal movement.

2. In wall construction, spaced apart walls, each comprising angularly related courses of slabs in which the end slab of one course of each wall abuts the side face of the end slab of the adjacent angular course of the same wall, the horizontal edges of the slabs of each course having vertical grooves, angularly related plates connecting the angularly related courses of each wall together, said plates being rigidly connected to each other and having portions disposed in the confronting grooves of the end slabs of said courses.

3. In wall construction, spaced apart walls, each comprising angularly related courses of slabs in which the end slab of one course of each wall abuts the side face of the end slab of the adjacent angular course of the same wall, the horizontal edges of the slabs of each course having vertical grooves, angularly related plates connecting the angularly related courses of each wall together, said plates being rigidly connected together and having portions disposed in the confronting grooves of the end slabs of said courses, and means co-acting with said plates and with the slabs for anchoring the plates to the slabs.

4. In wall construction, spaced apart walls, each comprising angularly related courses of slabs in which the end slab of one course of each wall abuts the side face of the end slab of the adjacent angular course of the same wall, the horizontal edges of the slabs of each course having vertical grooves, angularly related plates connecting the angularly related courses of each wall together, said plates being rigidly connected together and having portions disposed in the confronting grooves of the end slabs of said courses, means contacting with said plates and with the slabs for anchoring the plates to the slabs, metallic spreaders connected with the plates of the courses of one wall, and plates carried by the spreaders and mounted in the grooves in the slabs of the courses of the other wall.
5. In wall construction, inner and outer spaced apart walls, each comprising angularly related courses of slabs, and a system of tie members comprising an inner corner tie member having plates joining together the angular slab courses of the inner wall and secured to the meeting slabs of said courses at the point of intersection thereof with each other, a similar corner tie member joining together the slab courses of the outer wall and having angularly related plates secured to the meeting slabs of said slab courses of the outer wall at the point of intersection of said courses with each other, and spreaders extending from the respective plates of the inner corner member to oppositely disposed slabs in the respective slab courses of said outer wall at the respective sides of the corner of said outer wall.
6. In wall construction, inner and outer spaced apart walls, each comprising angularly related courses of slabs having horizontal edges formed with linear grooves, and a system of tie members for rigidly connecting the inner wall with the outer wall and comprising an inner corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said inner wall, a similar corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said outer wall, and spreaders extending transversely of the space between both walls and having their inner ends secured to the plates of the inner corner member and provided with portions at their outer ends disposed in the grooves of the slabs of the respective courses of said outer wall at points at the respective sides of the corner of said outer wall.
7. In wall construction, inner and outer spaced apart walls, each comprising angularly related courses of slabs having horizontal edges formed with linear grooves, and a system of tie members for rigidly connecting the inner wall with the outer wall and comprising an inner corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said inner wall, a similar corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said outer wall, spreaders extending transversely of the space between both walls and having their inner ends secured to the plates of the inner corner member and provided with portions at their outer ends disposed in the grooves of the slabs of the respective courses of said outer wall at points at the respective sides of the corner of said outer wall, and means for effecting fixed embedment of all of said plates in the slabs with which they are associated.
8. In wall construction, inner and outer spaced apart walls, each comprising angularly related courses of slabs having horizontal edges formed with linear grooves, and a system of tie members for rigidly connecting the inner wall with the outer wall and comprising an inner corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said inner wall, a similar corner tie member comprising angularly related plates disposed in the grooves of the meeting end slabs of the angular courses of said outer wall, spreaders extending transversely of the space between both walls and having their inner ends secured to the plates of the inner corner member, and provided with portions at their outer ends disposed in the grooves of the slabs of the respective courses of said outer wall at points at the respective sides of the corner of said outer wall, and means for effecting fixed embedment of all of said plates in the slabs with which they are associated and comprising portions on the plates adapted to be driven into said slabs.
9. In wall construction, inner and outer walls, each comprising angularly related courses of similar vertically disposed slabs having linear grooves in their horizontal edges, and a system of tie members for tying the inner wall to the outer wall and including substantially similar metallic plates extending into the grooves of the slabs of the respective walls and including integrally connected angularly related plates at the respective corners of said walls, a pair of plates at the opposite sides of the corner of the outer wall, a spreader rigidly connecting the last said plates together, pairs of oppositely disposed plates, and spreaders rigidly connecting the oppositely disposed plates together.
10. In wall construction embodying two walls each comprising rectangular slabs arranged vertically in corresponding courses, the confronting horizontal edges of adjacent slabs having horizontally narrow and vertically deep aligned grooves; and a tie member rigidly connecting said walls and including flat plate-like portions snugly fitting flatwise in said grooves to seat endwise against the bottoms thereof, and rods threadedly connected with said portions to enable said portions to be spaced apart a predetermined distance from each other; and nuts threaded on said rods for engagement against the inner faces of said walls so as to rigidly clamp the slabs between the nuts and said plate-like parts of said rods.