C. DIETRICHS.

WALL STRUCTURE.

APPLICATION FILED OCT. 3, 1916.

1,312,309. Patented Aug. 5, 1919.

Fig. 1.

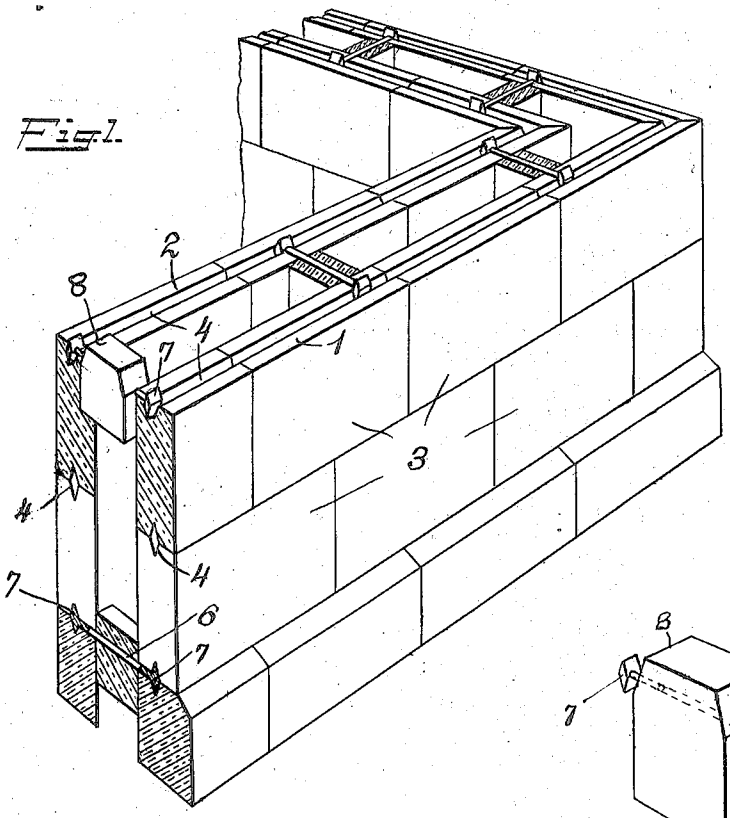


Fig. 2.

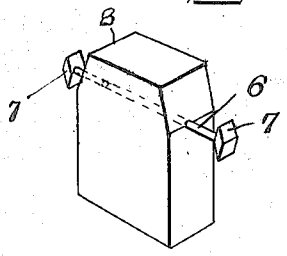


Fig. 3.

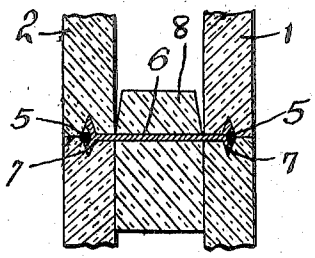


Fig. 4.

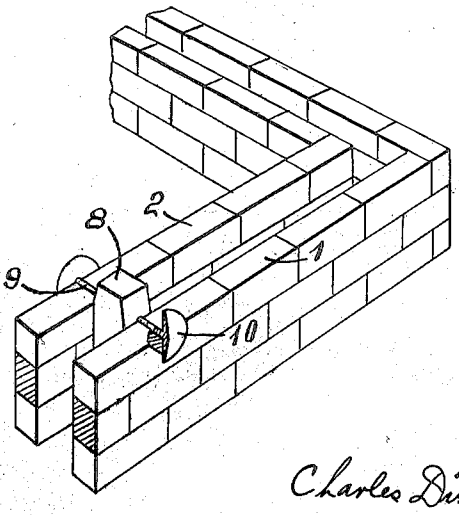
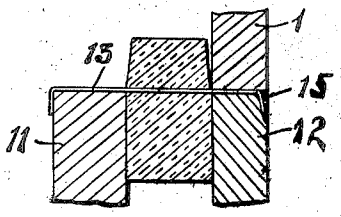


Fig. 5.



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WALL STRUCTURE.

1,312,309. Specification of Letters Patent. Patented Aug. 5, 1919.

Application filed October 3, 1916. Serial No. 123,476.

To all whom it may concern:

Be it known that I, CHARLES DIETRICHS, a citizen of the United States, and a resident of Little Ferry, county of Bergen, State of New Jersey, have invented new and useful Improvements in Wall Structures, of which the following is a specification.

This invention relates to wall structures for masonry or concrete block buildings, and has for its object to provide a wall structure having substantially continuous inner and outer walls forming a dead air space coextensive with the area of the wall to thereby obtain in an unusual degree the advantages of dryness and heat insulation.

Double wall buildings have heretofore been built out of poured concrete and also out of cut stone, brick, artificial stone, etc., but in all such structures of which I am aware, the two walls have not been heretofore satisfactorily bonded so that the two parts of the wall will be maintained in their original position under uneven stresses, settling, expansion, etc. In my improved wall construction I provide a bonding element whereby the two single walls are held together with the full strength of a solid wall of the entire thickness of the two walls. The number of points bonded may be placed more or less close together, according to the desired load to be carried by the wall under the conditions to be met, the bonding element being designed to be placed at any point in the wall without previous modification of the brick or stone blocks from which the wall is constructed.

My improved bonding elements have also the advantage of simplicity and uniformity of construction whereby they may be made up in quantity and set in the wall as the laying of the wall proceeds, by the ordinary mason or bricklayer.

In the accompanying drawings I have illustrated different embodiments of my invention, some showing a wall of concrete block and another a wall of brick, each provided with my improved bonding element holding the two walls in properly spaced relation.

In said drawings,

Figure 1 is a perspective view of a portion of the wall formed of concrete block;

Fig. 2 is a perspective detail of the bonding element detached;

Fig. 3 is a detail view showing the style of anchoring head employed when used in a reinforced wall;

Fig. 4 is a perspective view of a portion of the brick wall; and

Fig. 5 is a detail view showing a further modification of the anchoring rod.

Referring to the drawings, particularly to Figs. 1 and 2, 1 indicates a continuous outer wall and 2 a continuous inner wall forming the double wall structure. Each wall as shown is composed of concrete blocks 3 of rectangular face and cross section set in the usual manner in horizontal courses with the vertical joints staggered.

As shown, the blocks are formed on their horizontal edges with V-shaped grooves 4 for receiving the mortar or cement by which the blocks are bonded together and also for receiving the reinforcing rods 5 if desired, which may extend longitudinally of the wall. The two single walls are held together by means of bonding elements such as shown detached in Fig. 2, comprising a block or brick 8 of concrete or cement having between its middle point and its upper face a transverse metal rod 6 embedded in the block and projecting beyond its smaller vertical faces as shown. The ends of the rod 6 are provided with anchoring heads 7 which may be of any preferred shape, but are preferably shaped to fit in the cavity formed by the meeting of two courses of the wall blocks. The anchoring head may be either of a diamond shaped vertical cross section to completely fill the cavity between the blocks, or may be cut away on its outer face to permit the passage of the reinforcing rod which may, if desired, be laid between the courses of block.

All the faces of the block are not perfectly flat. The faces of the block which engage the two walls are somewhat inclined away from the plane of the wall blocks above the projecting ends of the rod for the purpose of allowing each course of the wall blocks to be independently set with their faces vertical regardless of irregularities in the dimensions of the blocks or bricks. If the spacing blocks of uniform dimensions both above and below the rod 13 are used with blocks or brick of varying dimensions the spacing blocks may be thrown somewhat out of the vertical by the irregularities of the wall blocks engaging the lower part of the spacing block, causing

one side of the upper part to project over the plane of the wall face so that the next tier of blocks or brick cannot be properly set.

In laying the walls, the blocks are laid on a suitable foundation and at intervals, the distance between which will be varied with the contemplated size and strength of the wall. A spacing block or bonding element 8 will be inserted, the block having been first immersed or painted with tar or bitumen or some other suitable water-proof compound. In setting the spacing block in place, the mason will chip out the inside edges of the grooves of the wall blocks to receive the shank of the rod between the head and the block. When the mortar or cement is filled in between the blocks the hole will be filled and the anchoring heads firmly set in the inner and outer walls, thereby holding the two walls against spreading away from each other, while the block itself holds the wall in its properly spaced relation. The effect at each point where the spacing block is located is that of a solid wall, and if the wall be bonded in the manner described at properly spaced intervals, the wall should have ample strength for all purposes even though made of comparatively thin slabs or blocks of material.

In Fig. 3 I have shown a modified form of anchoring head for the tie-rod of the spacing blocks, which is adapted for use when reinforcing rods are laid in the longitudinal grooves of the wall blocks. As here shown, the outer face of the anchoring head is provided with a central notch 7 of a shape corresponding to the cross section of the rod. If a greater hold in the block is desired than afforded by the area of the anchoring head, the anchoring head may be shaped in any desired manner to engage over the rod.

In Fig. 4 I have illustrated my improved wall as constructed of brick. The bonding element for this wall consists, as in the other case, of a molded concrete block 8 having a transverse tie-rod 9 with its ends terminating in anchoring heads 10 adapted to engage the outer face of the outer wall and inner face of the inner wall in the manner shown. The block will be suitably coated with water-proof material before it is set in the wall, and the space between the anchoring head and the face of the block will be just equal to the dimensions of the brick forming the thickness of the wall, whereby the two walls will be rigidly clamped together. The outer anchoring head may be of any ornamental design so as not to present an unsightly appearance. In laying the wall, the blocks may be placed at any desired point, rods no larger than the thickness of the layer of mortar between the courses of brick being quite sufficient. If larger rods are for any reason used, the brick-layer has merely to chip off the corners of the adjacent bricks where the spacing block is to be placed to permit the passage of the rod.

In Fig. 5 I have shown a modified form of block having certain special features of advantage. As here shown the block is interposed between walls of solid cement blocks without the edge grooves, the blocks 11 of the inner wall which supports the load of the building being thicker than the blocks 12 of the outer wall. The anchoring rod 13 in this form of block is formed of heavy wire with its ends bent at right angles to engage over the wall blocks. For convenience in building the rods 13 are not fixed in the blocks 12, that is, they are capable of longitudinal movement in the blocks as in a bearing, so that the extent to which the rod projects on either side of the block may be varied to adjust the space between the face of the block and its hooked end to accommodate variations in thickness of the blocks. The wire may be loosened in the block by simply turning the wire when the block is partially set but not hard. As shown in Fig. 5, the end of the wire 13 is not set into the cement of the block on the inside face, as the inside of the wall is to be plastered or otherwise finished. By having the wire capable of movement in the block it may be adjusted to fit over the inner block and then embedded into the outer block to whatever extent may be necessary, the cavity over the end of the wire being filled with cement, as indicated at 15 when the wall is "pointed up."

My improved bonding element may obviously be used in combination with blocks of other materials than described and may be used also with other forms of concrete blocks. The anchoring heads may be either embedded in the block or project beyond the block in the manner described, or if desired, the head may be so shaped that its outer face lies just back of the face of the wall. In such cases the mason will chip away a portion of the block to receive the anchoring head and when the wall is finished it will be "pointed up" with cement to cover the anchoring head. This construction is especially desirable with solid blocks without the longitudinal grooves such as shown in Fig. 5.

I claim:

1. A wall structure comprising continuous inner and outer walls spaced from each other throughout their extent, said walls being bonded together at intervals by bonding elements comprising a block having a portion of two of its side faces flat and parallel and engaging the adjacent faces of the inner and outer walls, and tie-rods in said blocks, said rods having anchoring heads engaging the material of the inner and

outer walls to hold the walls against expansion away from the blocks, the spacing block above said rod being spaced away from said walls to permit individual leveling of the wall blocks.

2. A spacing block for wall structures comprising a block having a tie-rod extending through the block from side to side with the portions of the side faces of the block containing the ends of the tie-rods parallel to each other on one side of the tie-rod and with the portions of the faces of the block to the other side of the tie-rod slightly cut away, substantially as described.

3. A separator block for wall structures comprising a block having two opposite side faces of substantially rectangular outline, a tie-rod extending through the block with its ends projecting beyond the said faces, the portions of said faces to one side of the projecting ends of said tie-rod being parallel with each other and the portions to the other side of the ends of said tie-rods being inclined toward each other, substantially as described.

4. A separator block for wall structures comprising a block having two opposite side faces of substantially rectangular outline, a tie-rod extending through the block with its ends projecting beyond the said faces, the portions of said faces to one side of the projecting ends of said tie-rod being parallel with each other and the portions to the other side of the ends of said tie-rods being inclined toward each other, said tie-rod being free to move longitudinally in the block, substantially as described.

Signed at Ridgefield Park, in the county of Bergen and State of New Jersey this 2d day of September, 1916.

CHARLES DIETRICHS.