

May 9, 1939.

L. C. SMITH

2,157,992

BUILDING BLOCK AND ASSEMBLY THEREOF

Filed Dec. 16, 1936

2 Sheets-Sheet 1

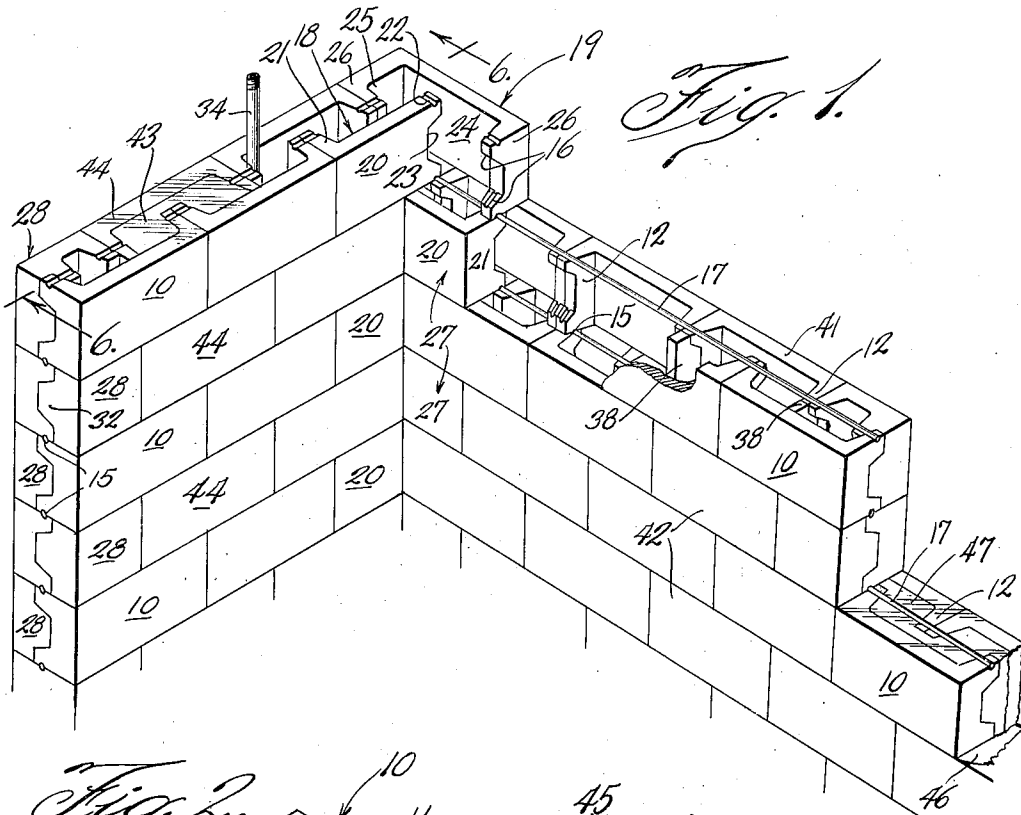


Fig. 2.

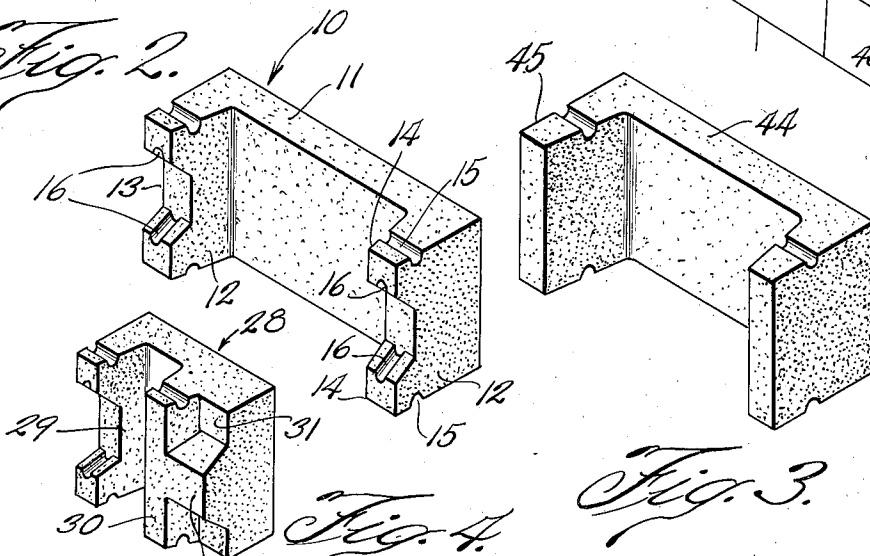


Fig. 3.

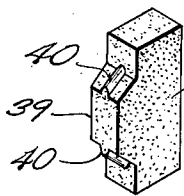


Fig. 4.

Fig. 5.

Inventor:
Leonard C. Smith
By Eugene M. Giles atty.

May 9, 1939.

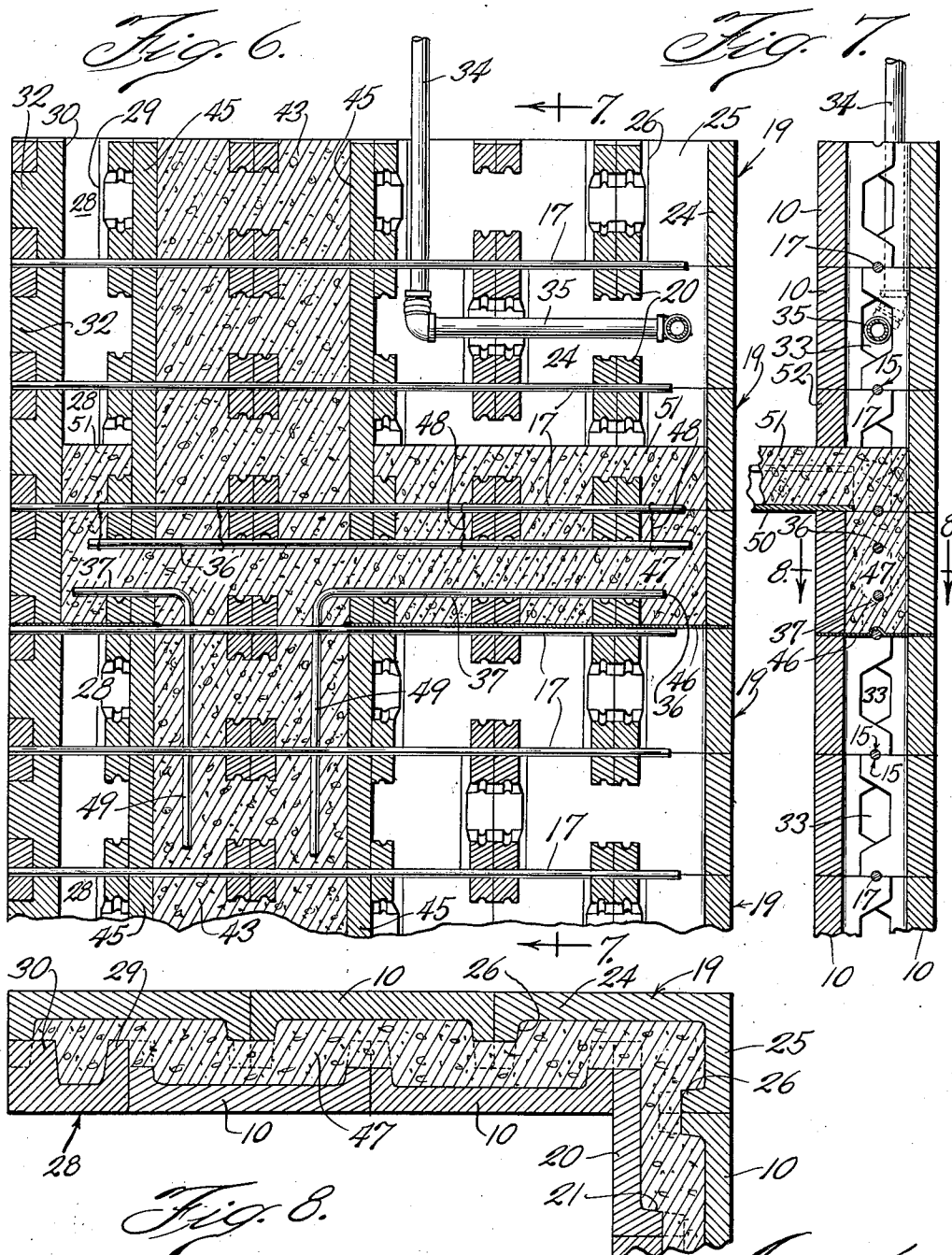
L. C. SMITH

2,157,992

BUILDING BLOCK AND ASSEMBLY THEREOF

Filed Dec. 16, 1936

2 Sheets-Sheet 2



Inventor:
Leonard C. Smith
By Eugene M. Giles
att'y.

UNITED STATES PATENT OFFICE

2,157,992

BUILDING BLOCK AND ASSEMBLY THEREOF

Leonard C. Smith, East Chicago, Ind.

Application December 16, 1936, Serial No. 116,047

8 Claims. (Cl. 72—30)

My invention relates to building blocks such as are usually made of concrete or similar material and refers more particularly to molded blocks of the type adapted to be used in the construction of walls and partitions having air spaces therein.

In building construction it is important to minimize the conductivity of heat and moisture through the walls, this being preferably accomplished by providing dead air spaces between inner and outer portions of the wall. It is essential, however, that the inner and outer portions of the wall be united through the intervening air spaces to assure adequate structural strength and without providing avenues for heat or moisture conductivity between the inner and outer wall portions which would appreciably impair the effectiveness of the insulating air space therebetween, and this has not been accomplished satisfactorily heretofore in walls made up of building blocks as the prevailing practice is to construct such blocks with openings which are cored out between the inner and outer portions of the block, so as to leave connecting webs through which heat and moisture are quite readily communicable from the outer face to the inner face of the block.

The principal objects of my invention are to provide building blocks of an improved form for making hollow walls which are effectively insulated against communication of heat or moisture therethrough; to provide a simple form of block which is easily manufactured and with a minimum of material; to utilize separate blocks for the inner and outer portions of the hollow wall; to interlock the inner and outer blocks and in a manner to eliminate any appreciable communication of heat or moisture through the wall; to interlock the blocks at the outer side of the wall, and likewise the blocks at the inner side thereof, by the same means which interlock the blocks of one side with the blocks of the other side; to utilize the interlocking means not only to assure accurate spacing of the blocks at one side of the wall from the blocks at the other side of the wall but also to facilitate and insure accurate alignment of the blocks at each side of the wall; to avoid direct connection between opposed inner and outer blocks by arranging the interlocking between courses in such a manner that the blocks of each course or tier at either side of the air space is interlocked with the courses or tiers of blocks thereabove and therebelow at the opposite side rather than with the

course or tier directly opposite; and to provide chases which will accommodate vertical and horizontal pipes in the wall as well as permit utilization of selected portions of the air space for air ducts, or for vertical or horizontal filling, reinforcing and floor connections; these and other objects being accomplished as pointed out hereinafter and as shown in the accompanying drawings in which:

Fig. 1 is a perspective view, with portions cut away, of two intersecting walls made up of building blocks constructed in accordance with my invention;

Fig. 2 is a perspective view of my building block showing the inner side thereof;

Fig. 3 is a similar view of a modified form of my building block;

Fig. 4 is a perspective view of a special end block;

Fig. 5 is a perspective view of a special filler block;

Fig. 6 is an enlarged vertical section of a portion of the wall structure of Fig. 1 taken on the line 6—6 of Fig. 1, but showing connections for a floor which is omitted in Fig. 1;

Fig. 7 is a vertical transverse section of the wall of Fig. 6 showing a floor connected therewith; and

Fig. 8 is a horizontal section on the line 8—8 of Fig. 7.

Referring to the drawings, the reference numeral 10 indicates as a whole the standard form in which I prefer to construct my block, as distinguished from special forms which may be required for wall ends, corners and other purposes, said standard block 10 consisting of a rectangular panel portion 11 having a lateral extension 12 at each end, both extensions being preferably notched at their outer ends as indicated at 13 so that each of said lateral extensions 12 terminates in spaced upper and lower lugs 14. These lateral extensions 12 are of the same width as or vertically commensurate with the panel portion 11 of the block, and each extension 12 is provided with two semi-circular grooves 15 in the top and bottom edge faces respectively thereof, the grooves 15 at the top being in alignment as are also the grooves 15 at the bottom and all of the grooves 15 being equally distant from the plane of the outer face of the panel 11, all as shown particularly in Fig. 2 which illustrates my preferred standard form of block. Preferably also each notch 13 is formed with grooves 16 in the opposite side walls for interlocking engagement

with a filler member which may be used with the standard form of block to close off selected areas of the air space within the wall to provide air ducts, pier molds and the like as will be more fully explained hereinafter.

In assembling a wall therefrom these blocks 10 are laid up in successive superposed courses with cement or mortar between the ends of adjoining blocks and between the superposed courses thereof, each course consisting of two opposed rows of blocks 10 which are arranged end to end in staggered relation with the lateral extensions 12 of the adjoining blocks of each row in side by side relation and projecting inwardly toward the center of a block 10 at the opposite side of the wall, but terminating at a distance therefrom, the relative location of the two opposed rows of blocks 10, as shown in Fig. 1, being such that the outer ends of each adjoining pair of extensions 12 at the contiguous ends of adjoining blocks 10 extend under and support the inner ends of a pair of extensions 12 of adjoining blocks at the opposite side of the wall in the next succeeding course with the top grooves 15 of the supporting extensions 12 in matching relation with the bottom grooves 15 of the supported extensions, to accommodate at the top and bottom of each course, rods 17 which insure proper alignment of the blocks of each row and proper spacing thereof from the opposite row of blocks and interlock the blocks of the two rows. These rods seat only to a depth of approximately one-half their thickness in the grooves 15 so that as each course is laid and the rod 17 placed in the top grooves 15 thereof, approximately one-half of the rod projects above the top surfaces of the blocks, and by fitting the bottom grooves 15 of the next succeeding course of blocks thereon accurate location of such succeeding course of blocks is facilitated and insured and an interlocking of the successive courses is also provided.

Special blocks for corners, wall ends and other purposes may be provided to cooperate with the blocks 10, as for example, there are shown in Fig. 1 inner and outer corner blocks 18 and 19 respectively for joining two wall sections at right angles to one another, the former of which said corner blocks comprises a panel 20 with a lateral extension 21 at one end in all respects like the extensions 12 of the standard blocks 10, and at the other end the panel 20 itself is formed with grooves 22 in the top and bottom edge faces and with an end notch 23 like the grooves 15 and notches 13 respectively of the extensions 12 of the standard blocks, the length of the panel 20 being such that when the lateral extension 21 thereof is located, as shown in Fig. 1, against the end of the appropriate standard block of an inside row of blocks 10 of one of the angular wall sections the other end of the panel 20 is suitably positioned within the other wall section to have the lateral extension 12 of an inside block of that wall section positioned thereagainst with a pair of the rods 17 of the latter section engaged in the grooves 22 of the panel 20. The outside corner block 19 comprises long and short panel portions 24 and 25 arranged at right angles to one another and each provided at its outer end with a lateral extension 26 in all respects like the extensions 12 of the standard blocks, the length of the panel portions 24 and 25 being such that when located at the outside of the corner as shown in Fig. 1 the extensions 26 thereof will fit respectively against corresponding extensions 12 of standard blocks 10 of the two angular sections of the wall. It is to be understood that in each succeeding

course the arrangement of the special blocks 18 and 19 is reversed in the respect that in the courses immediately above and below the course in which the blocks 18 and 19 appear in Fig. 1, the block 18 is located as shown at 27 in Fig. 1 with the lateral extension 21 thereof within the wall section at the right of the wall juncture of Fig. 1 and the other end of the panel 20 projecting into the other wall section whereas the outside corner block 19 in said courses above and below has the long panel portion 24 at the outer side of the wall section at the left of the wall juncture and the short panel 25 thereof in the right wall section of the Fig. 1 structure.

Fig. 4 shows a special block 28 for wall ends which is half the length of a standard block 10 and has spaced lateral extensions 29 and 30 both similar in all respects to the lateral extensions 12 of the standard blocks 10 except that the extension 30 is not provided with a notch 13 and is set back from the end of the block which is formed at that end with a thickened portion 31 having a central hump 32 at the inner side to fit in a notch 13 of a standard block. Obviously, on account of the staggered arrangement of the blocks in the inner and outer rows of each course the standard blocks of certain rows will terminate half way back from the ends of the blocks of other rows and these special blocks 28 are employed as shown in Fig. 1 to continue out to the wall end those rows wherein the blocks terminate half way back as aforesaid, the formation 31-32 of said special blocks serving, as shown in Fig. 1, to fit the notched ends of the end extensions 12 of the blocks 10 of the opposed row which extend to the end of the wall. The rods 17 may extend to the wall end if desired but in cases where the wall end is at a window or door opening, it is preferred to terminate the rods in the grooves of the lateral extension 30 of the half block 28 to leave therebeyond openings which are unoccupied by the rods and may be plugged or otherwise filled to receive nails or other fastenings for attaching the door or window frame to the wall end.

It will be observed that with the wall structure above described the blocks of opposed rows are entirely separated from one another except at the wall ends, thereby providing an air space between the entire inner face of each standard block and the standard blocks opposed thereto, the only connections between inner and outer standard blocks being at the top and bottom faces of the extensions 12 where they overlap or are overlapped by reversely extending extensions 12 of blocks at the opposite side of the wall in the next adjoining courses above and below, the amount of overlap being insufficient to afford any material communication of heat or moisture from either side of the wall to the other side. Moreover, such overlapping faces are preferably coated with a waterproofing and heat insulating composition, which may also, if desired, be applied to the entire inner surface of the blocks or waterproof cement with heat insulating properties may be employed, either of which alternatives alone or if used together substantially prevents heat or moisture communication from either side of the wall to the other. Moreover increased heat insulation may be obtained by filling the space between the inner and outer portions of the wall with insulation material, preferably in granular, nodular or other loose form in which it may readily be poured, and the filling of this wall space is readily accomplished in view of the freely inter-

communicating arrangement of all portions thereof.

The notches 13, are not essential to free lateral intercommunication throughout the wall, since the extreme ends of the extensions 12 are spaced a substantial distance from the inner faces of the opposed blocks, but these notches not only increase the intercommunication passageways but also provide horizontally aligned openings, as indicated particularly at 33 in Fig. 7, throughout the wall to accommodate horizontal pipes for plumbing or electric work or for other purposes as well as reinforcing rods that may be required, such piping being shown in Figs. 1, 6 and 7 with a vertical portion 34 installed between the inner and outer blocks of the wall and having a horizontal lead 35 extending laterally therefrom through the openings 33 while reinforcing rods are shown at 36 and 37 extending through said openings 33.

The blocks composing the wall may be made of any desired material and in any desired manner, preferably being molded from a material such as a cement composition and may be faced to provide any desired finish. Preferably, however, the blocks for the outside portions of walls are of waterproof concrete and the inner blocks may also be of the same material or if this is not necessary for load bearing or other purposes, the inner portion of the wall may be of cinder blocks or other light weight or porous types which may be used for both sides of inside walls unless inadequate for the loads that may be imposed thereon.

With this wall construction closed vertical chases may readily be provided at any desired place or places by providing filler blocks for continuing selected extensions 12 to the opposite side of the wall, one form of such filler block being shown at 38 which as indicated in Fig. 5 is merely a small block of suitable length and thickness to provide a continuation of a block extension 12 and has a central hump 39 to fit in the notch 13 of a standard block 10, said hump 39 being provided at opposite sides with ribs 40 to fit in the side grooves 16 of the notch 13 of the standard blocks to hold the filler block 38 against lateral displacement.

In using this block to close off a selected air space of a width corresponding to the length of a standard block, blocks 38 are applied to the ends of the extensions 12 of a block 10 at the selected location, as for example the block 41 of Fig. 1 which has filler blocks 38 at both ends thereof closing the space between said ends and the blocks at the other side of the wall, and said blocks are applied to the ends of corresponding blocks above and below the block 41 to the full length of the desired chase, it being understood that there are between such corresponding blocks intervening courses which have reversed blocks 42 at the opposite side of the wall to the ends of the extensions 12 of which filler blocks 38 are also applied to close the sides of the chase through the courses between which the blocks 41 are located. Thus a closed chase may be provided of any desired length which may be used for a hot or cold air duct or for any other purpose, for example as a form in which to pour cement to form pier members such as shown at 43 to give added strength to the wall at selected locations for supporting load bearing members thereon.

Instead of using filler blocks 38 with standard blocks 10 to provide the chases above mentioned, special blocks 44 may be provided which are the

same as the standard blocks 10 except that such special blocks 44 have elongated lateral extensions 45 at the ends of sufficient length to close the space between that block and the opposite side of the wall. These blocks may be substituted for the standard blocks 10 and filler blocks 38 as indicated at 44 in Fig. 1 to provide vertical chases in the wall which may be used in like manner to provide hot or cold air ducts, pier forms or other purposes, the pier 43 being shown herein in association with such blocks 44 rather than the standard blocks 10 and fillers 38.

Horizontal beam members may also be readily provided at selected elevations in the wall, as for example to provide reinforcement at the floor supporting level, by closing off the bottom of a selected course of blocks and filling the space therebetween with concrete. A strip 46 of sisal kraft paper, for example, may be used for closing the bottom of the selected course, which after the course immediately below has been laid is placed over the top of that course and over the top rod 17 thereof as shown in Figs. 6 and 7 after which the next course is laid thereon and filled with concrete as shown at 47. This cement filler or beam member 47 may be reinforced by reinforcing rods 36 and 37 in the openings 33, the lower one 37 of which may rest on the bottoms of the openings 33 while the upper one 36 may be held at the top of the openings 33 in position for pouring by suspending same by wires 48 from the rod 17 immediately thereabove. Preferably if there are pier members 43 in the wall extending up to the level of the beam member 47, the rods 37 are bent as shown in Fig. 6 to provide portions 49 which extend downwardly into the chase in which the pier member 43 is located and the sisal kraft paper 46 is omitted at the top of that chase as shown in Fig. 6 so that the upper portion of the pier 43 may be poured at the same time as the beam member 47 to provide a reinforced monolithic intersection of the beam 47 and pier 43.

Any desired form of floor may be built onto the assembled block wall structure and at any selected level, an I-pan type of floor being shown in Fig. 7 wherein the inverted pans 50 are secured together in side by side relation in the usual manner with their ends projecting over the inner blocks of the course occupied by the filler 47 and after an outer block course has been laid therearound, concrete is poured over the pans 50 as indicated at 51 to form the floor, this concrete being extended outwardly over the beam member 47 to the outer course of blocks 10 therearound to the same level as the floor as shown in Fig. 7. Blocks 52 of half width or of other necessary width are then laid over the floor 51 to match with and bring the inner portion of the wall up to the level of the outer course around the floor after which the wall is continued upwardly thereon in the manner of assembling hereinbefore described.

While I have shown and described my invention in a preferred form, I am aware that various changes and modifications may be made therein without departing from the principles of my invention, the scope of which is to be determined by the appended claims.

I claim as my invention:

1. The combination with a building block of the class described, comprising a relatively flat elongated panel having at one side thereof a corresponding lateral extension at each end, at least one of said extensions having a notch in the end

face thereof remote from the panel of an auxiliary member having a notch fitting portion for engagement with the notched end of said extension.

2. The combination with a building block of the class described, comprising a relatively flat elongated panel having at one side thereof a corresponding lateral extension at each end, at least one of said extensions having a notch in the end face thereof remote from the panel of an auxiliary member having a notch fitting portion for engagement with the notched end of said extension, and means whereby the notch fitting portion of said auxiliary member is interlocked with said extension against displacement laterally therefrom.

3. The combination with a building block of the class described, comprising a relatively flat elongated panel having at one side thereof a corresponding lateral extension at each end, at least one of said extensions having a notch in the end face thereof remote from the panel of an auxiliary member having a notch fitting portion for engagement with the notched end of said extension, said auxiliary member comprising a panel with a pair of lateral extensions at one side thereof of one of which said extensions of the latter panel has the aforesaid notch fitting portion at the side thereof.

4. A wall structure of the class described, comprising opposed rows of blocks at the opposite sides respectively of the wall, the blocks of each row being arranged in staggered relation to the blocks of the opposed row and having at each end thereof portions vertically commensurate therewith which extend laterally therefrom toward the blocks of the opposite row, and insert members adapted to be interposed between ends of said laterally extending portions and the blocks of the opposed row and said ends of said portions and said insert members having an interlocking engagement with one another.

5. A wall structure of the class described, comprising blocks arranged in courses each of which includes opposed rows of blocks at the inner and outer sides respectively of the wall wherein the blocks of each row are spaced throughout from and arranged in staggered relation to the blocks of the opposite row and means at the ends of se-

lected blocks extending to the blocks opposed thereto for laterally closing a selected portion of the space between the opposed rows of blocks to provide a vertical chase within the wall.

6. A wall structure of the class described, comprising superposed courses of blocks, each course including two opposed rows of blocks and the blocks of each row having spaced upper and lower projections at their ends which extend inwardly therefrom between projections of the blocks of the opposed row and between projections of the blocks above and below said opposed row, said projections being arranged to leave a straight opening through and extending lengthwise of the course between the opposed blocks thereof, and a monolithic filler extending throughout said straight opening and localized at an elevation spaced from the top and bottom of the wall structure.

7. A wall structure of the class described, comprising superposed courses of blocks, each course including two opposed rows of blocks and the blocks of each row having spaced upper and lower projections at their ends which extend inwardly therefrom between projections of the blocks of the opposed row and between projections of the blocks above and below said opposed row, said projections being arranged to leave a straight opening through and extending lengthwise of the course between the opposed blocks thereof, and a monolithic filler extending throughout said straight opening and containing reinforcing members that are straddled by the upper and lower projections of the opposed blocks of said course.

8. A wall structure of the class described, comprising superposed courses of blocks, each course including two opposed rows of blocks and the blocks of each row having spaced upper and lower projections at their ends which extend inwardly therefrom between projections of the blocks of the opposed row and between projections of the blocks above and below said opposed row, said projections being arranged to leave a straight opening through and extending lengthwise of the course between the opposed blocks thereof, sheet material at the bottom of said course and a monolithic filler on said sheet material and extending throughout said straight opening.

LEONARD C. SMITH.