W. J. VOLZ.

HOLLOW TILE AND TILE STRUCTURE.

APPLICATION FILED MAY 8, 1914.

1,168,583. Patented Jan. 18, 1916.

Fig. 1.

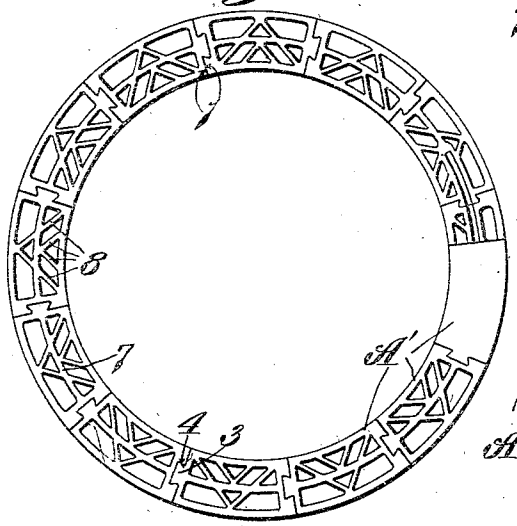


Fig. 2.

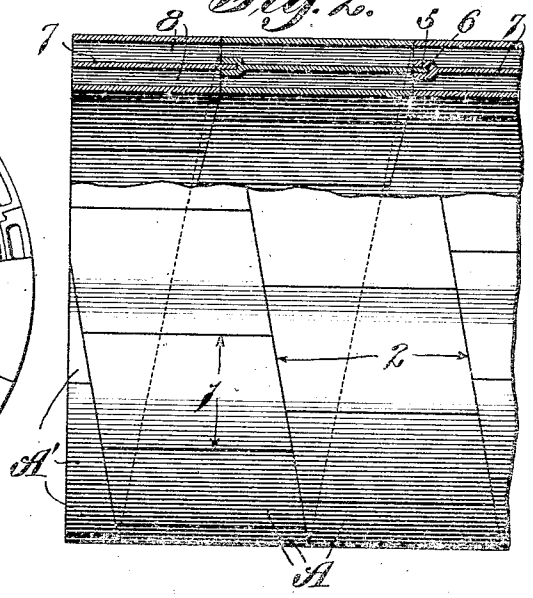


Fig. 3.

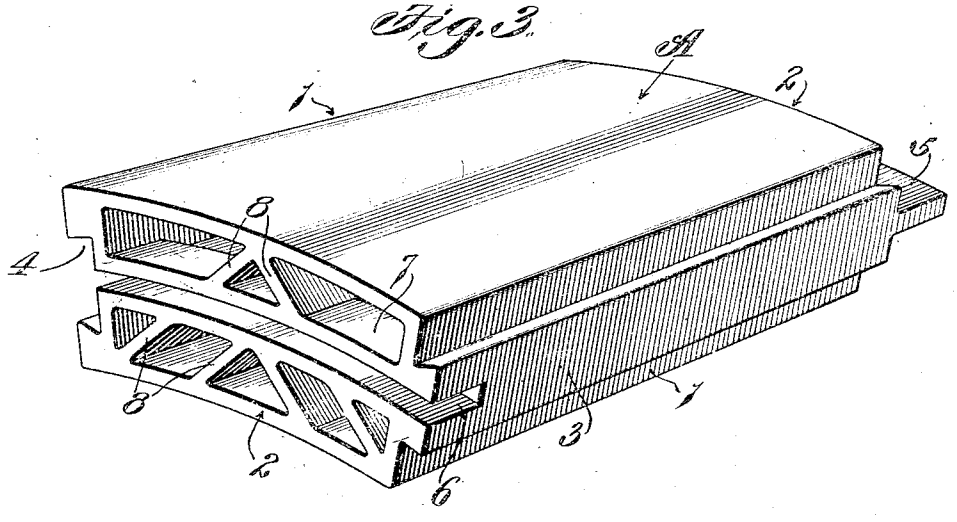
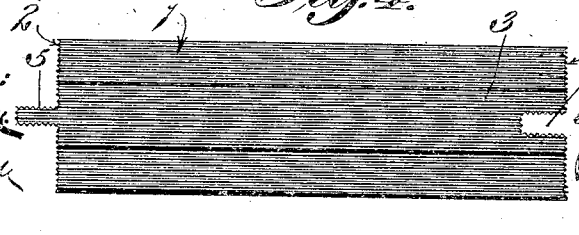


Fig. 4.



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UNITED STATES PATENT OFFICE.

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HOLLOW TILE AND TILE STRUCTURE.

1,168,583. Specification of Letters Patent. Patented Jan. 18, 1916.

Application filed May 8, 1914. Serial No. 837,289.

To all whom it may concern:

Be it known that I, WILLIAM J. VOLZ, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Hollow Tile and Tile Structures, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to tubular-shaped structures, such, for example, as sewers, tunnels and chimneys which are built of hollow tile. The hollow tile that are now generally used for building structures of the type referred to are oblong and rectangular-shaped in outline, and are arranged in parallel courses that extend at right angles to the longitudinal axis of the structure. In other words, each course of the structure is a separate and distinct section composed of a certain number of tile, and all of these separate sections lie parallel to each other. In tunnels, sewers and other horizontally disposed structures the separate sections lie in vertical planes, and in chimneys and other vertically disposed structures the separate sections lie in horizontal planes, one above the other. Owing to the fact that each course or section of the structure has a certain diameter, it is generally necessary to chip or cut the last tile that is inserted in each course, so as to fit properly between the tiles on each side of same, because the tiles often vary slightly in size after they have been fired or burned, even when they are made in the same mold, some of the tile often being over-sized and others under-sized. In tapered structures, such, for example, as chimneys, the last tiles that are inserted in the courses have to be cut and chipped more than in a straight tubular structure, because the courses diminish gradually in diameter from the base to the top of the structure.

The main object of my invention is to provide a hollow tile structure of tubular form, which is built in a novel manner from tiles which are so designed that it is not necessary to chip or cut the tile in order to make them fit together properly during the operation of building the structure.

Another object is to provide a hollow building tile that is of substantially rhomboidal shape in outline, thereby enabling the tile to be laid up in the form of a continuous course that extends helically from one end of the structure to the other.

Another object is to provide a tile which is equipped at one end with a groove or slot and at its opposite end with a tongue or rib that projects into the groove in the end of an adjacent tile, so as to securely interlock the end portions of the tile of the structure, these grooves and ribs being separate and distinct from the coöperating interlocking devices that are generally formed on the side edges of hollow tile; and still another object is to provide a hollow tile which comprises internal strengthening webs which are so disposed that they form a truss or trusses that preferably extend longitudinally of the tile. Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 is an end view of a cylindrical shaped sewer or tunnel formed from tile constructed in accordance with my invention. Fig. 2 is a side elevational view of same partly broken away. Fig. 3 is a perspective view of one of the tile; and Fig. 4 is an edge view of the tile illustrating a slight modification of the invention.

Briefly stated, my invention consists in a tubular-shaped structure formed from hollow tile which are so shaped or designed that when they are laid up they form a continuous course that winds helically around the structure from one end of same to the other end, each tile being substantially rhomboidal shaped in outline; or, in other words, provided with parallel side edges and ends that are inclined with relation to the side edges, instead of disposed at right angles to same.

Referring to the drawings, which illustrate the preferred form of my invention, A designates a hollow tile which is provided with parallel side edges 1 and inclined ends 2 that are parallel to each other and disposed at a greater or less angle than a right angle with relation to the side edges 1, thus forming a rhomboidal-shaped tile which is preferably oblong-shaped, although, if desired, the length and width of the tile can be equal. The tile herein shown is adapted to be used for building a cylindrical-shaped structure, and therefore is curved or approximately segmental-shaped in cross section, but I wish it to be understood that my invention is not limited to a tile of segmental shape in cross section, for the tiles

can be flat instead of curved in cross section, and can thus be used for building rectangular-shaped tubular structures. In building a cylindrical-shaped tubular structure from tiles of the character illustrated in Figs. 1 to 3, the tiles are arranged side by side in the usual manner, but in a helical line, instead of a line at right angles to the longitudinal axis of the structure. At the point where the structure is started special tile A' of the form shown in Fig. 2 are used, the first tile that is laid being substantially wedge-shaped in outline, the next tile also wedge-shaped but a trifle longer at one side, and so on, until one helix has been formed. Thereafter tiles A of the form shown in Fig. 3 are used for the balance of the structure, until the opposite end of the structure is reached, the structure being completed with special tile of substantially wedge-shape in outline similar to the tile A', shown in Fig. 2.

In view of the fact that the tiles are laid up in the form of a continuous course that extends helically from one end of the structure to the other end, it is not necessary to chip or cut certain tiles in order to make the tiles fit together properly, and consequently, the structure can be built quickly and with no breakage of material due to imperfect chipping or cutting of the tile. Furthermore, such a structure is stronger than a structure in which the tile are arranged in separate and distinct courses that are disposed at right angles to the longitudinal axis of the structure, owing to the fact that one helix of the structure braces the adjacent helix between which it is arranged, and thus resists lateral strains or thrusts at right angles to the longitudinal axis of the structure, or, stated in another way, a pressure or strain exerted on one section of the structure at approximately right angles to the longitudinal axis of the structure will be taken up and resisted by the adjacent sections, because the dividing lines between the helical-shaped sections of the structure are disposed at an angle to the direction in which the thrust or strain is applied.

Each tile is provided on its side edges with devices that coöperate with devices on the side edges of adjacent tile, so as to securely lock the side edge portions of the tile together, and in the form of my invention herein shown, said devices consist of a rib 3 on one side edge of the tile and a groove 4 on the other side of the tile, said rib and groove being preferably dove-tail shape in cross section. In addition to the interlocking devices on the side edges of the tile, my improved tile is provided at its ends with devices for interlocking the end portions of abutting tiles, said interlocking devices preferably consisting of a flange or rib 5 on one end of the tile and a slot or recess 6 in the opposite end of the tile that is adapted to receive the rib 5 of an abutting tile. I am aware of the fact that it is old to provide one end of a hollow tile with a flange that fits in a cut out portion or laps over a flange on the end portion of an abutting tile, but such a construction does not interlock the end portions of the tiles together and is not so efficient as the means herein illustrated for connecting the end portions of abutting tile which consist of a rib on the end of one tile that is snugly embraced by the walls of a slot or recess in the end of an adjacent tile.

Another feature of my improved tile, which, I believe, is novel, is the internal strengthening webs of the tile which are so disposed that they form one or more trusses, which preferably extend longitudinally of the tile. In the embodiment of my invention herein illustrated a horizontally disposed web 7 extends longitudinally of the tile intermediate the top and bottom walls of the tile, as shown in Fig. 2, and a number of angularly disposed webs 8 are arranged between said intermediate web 7 and the top wall of the tile and between said intermediate web and bottom wall of the tile so as to form trusses that extend longitudinally of the tile, as shown in Fig. 3, said angularly disposed webs 8 being preferably so arranged that they form a deep inverted V-shaped truss of approximately the same height as the depth of the tile, and a shallow inverted V-shaped truss arranged inside of said deep truss and positioned between the intermediate web 7 and the bottom face of the tile.

While I prefer to reinforce and strengthen the tile in the manner above described, I do not wish it to be understood that my invention is limited to such a construction, for my broad idea consists in a hollow tile which is substantially of a rhomboidal shape in outline so that the tile can be laid up to form a continuous course that extends helically, or in the form of a cylindrical spiral from one end of the structure to the other end. If desired, the edge portions of the tile which engage or bear upon the edge portions of adjacent tile can be corrugated so as to obtain a strong bond with the cement and mortar used to lay up the tile, and in Fig. 4 I have shown a tile constructed in this manner, wherein corrugations are formed on the outer surface of the rib 5, on the walls of the pockets 6 and on the side edges of the tile.

Having thus described my invention, what I claim is:

1. A new article of manufacture consisting of a hollow tile of substantially rhomboidal shape in outline and segmental shape in cross section, a dove-tailed rib that extends longitudinally along one edge of the tile, a dove-tail shaped recess formed in the other longitudinal edge of the tile, a flange

projecting from one end of the tile and having one of its ends terminating flush with the top face of said rib, a slot formed in the other end of the tile and intersecting the opposite end of said rib, and webs arranged inside of the tile intermediate the top and bottom walls of same to reinforce and strengthen the tile.

2. A new article of manufacture consisting of a hollow tile of substantially rhomboidal shape in outline and approximately segmental shape in cross section, a dove-tailed rib that extends longitudinally along one edge of the tile, a dove-tail shaped recess formed in the other longitudinal edge of the tile, a flange projecting from one end of the tile and having one of its ends terminating flush with the top face of said rib, a slot formed in the other end of the tile and intersecting the opposite end of said rib, and angularly-disposed webs arranged inside of the tile between the top and bottom walls of same so as to form two inverted V-shaped trusses that extend longitudinally of the tile, one within the other.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this sixth day of May, 1914.

WILLIAM J. VOLZ.

Witnesses:
WELLS L. CHURCH,
GEORGE BAKEWELL.