C. H. FROST.

HOLLOW INTERLOCKING BRICK.

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1,197,815.

Patented Sept. 12, 1916.

Fig. 1.

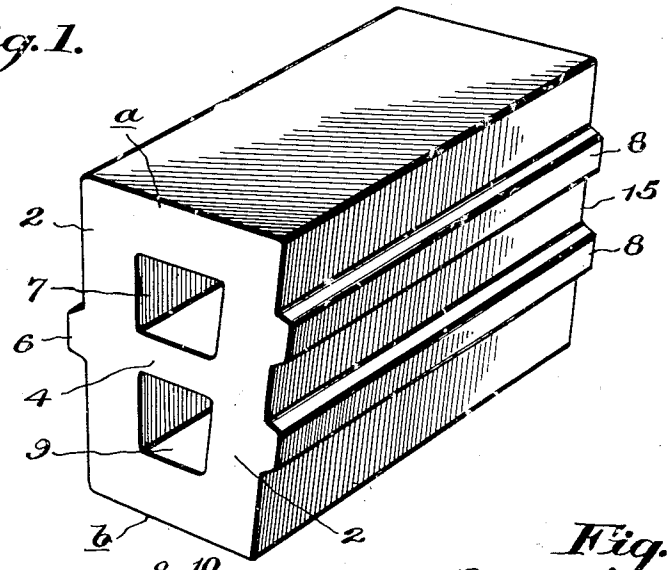


Fig. 2.

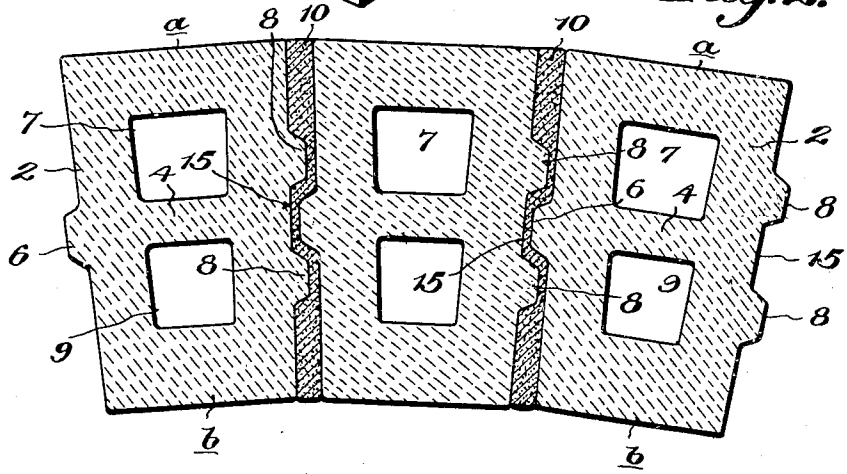
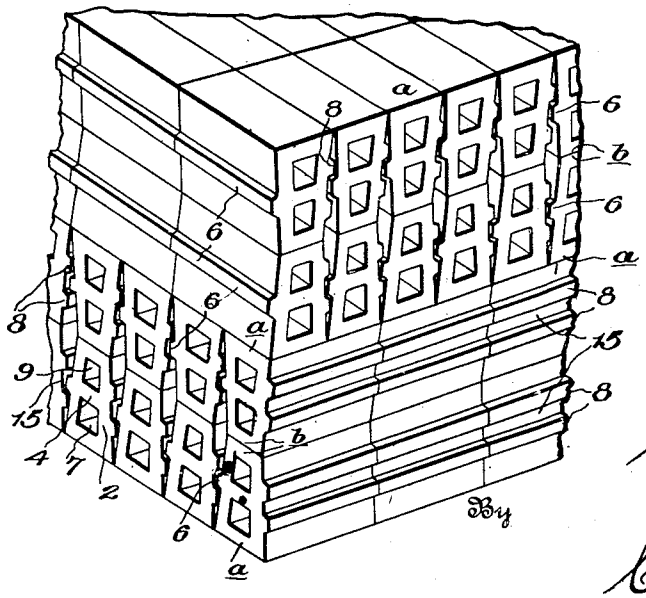


Fig. 3.



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UNITED STATES PATENT OFFICE.

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HOLLOW INTERLOCKING BRICK.

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To all whom it may concern:

Be it known that I, CHARLES H. FROST, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Hollow Interlocking Bricks, of which the following is a specification.

This invention relates to bricks, and more particularly to bricks of a design which is especially useful in building circular conduits, such as sewers and manholes, although the novel features of the invention may with advantage be applied to bricks which are designed for use in building other structures.

The brick herein illustrated is a substantially hollow brick, tapering or wedge-shaped in cross section, and has formed upon one of its sides ribs and a space between the ribs and has a rib upon its other side, to cause the interlocking of adjacent bricks.

The brick of the present invention embodies certain improvements upon that shown, described, and claimed in my prior application, Serial No. 44,874, filed August 11, 1915.

It is known among brick manufacturers that solid bricks are so heavy that when they are set in the kiln, wherein the bricks are ordinarily stacked about thirty bricks high, the bricks will exert so much pressure that the lower bricks will be liable to distortion, and if these bricks are provided with tongues and grooves in their side walls the grooves will be squeezed together, thereby preventing the tongues from entering and interlocking fully. This difficulty was largely overcome by forming the interlocking bricks with hollow spaces, running from end to end, which materially reduced the weight of the bricks and their consequent distortion when stacked in the kiln. Forming the bricks hollow in the manner stated also had the advantage of preventing the bricks from twisting or warping out of shape, and thus becoming irregular, in the drying and burning process. The brick described in my prior application above referred to was designed to overcome this tendency to warping and twisting, as well as the other disadvantage, namely, the closing of the grooves in the side walls of the brick.

While the brick in my prior application had many advantages, and has proved to be very desirable for many reasons, it was found that the groove in the side wall of each brick, which received the rib in the side wall of the adjacent brick when the bricks were laid in courses to form a sewer or other structure, was frequently contracted by the pressure due to the weight of the bricks stacked in the kiln, although this was, of course, not as noticeable as it was in the case of solid bricks, which were heavier.

To overcome entirely the tendency of the stacked bricks to close the grooves, in my former construction, is one of the principal objects of the present invention.

With this object in view, an important feature of the invention consists in providing a brick of that type which is made hollow by having channels running from end to end of the brick, with two longitudinal ribs arranged in parallel relation upon one side of the brick and set in from the adjacent edges of the brick so as to form a groove therebetween whose bottom wall is flush with the outer wall of the brick, and in providing the opposite side of the brick with a longitudinal rib which is positioned to enter the groove formed by the two ribs of the adjacent brick in a course so as to interlock with said groove. By this construction the two side walls of the hollow brick may be made of equal thickness throughout, and as the bottom wall of the groove is flush with the side wall of the brick there is no weakening of the wall such as would be present where the groove lies below the surface of the brick; on the other hand, the ribs serve to strengthen the brick, and make it better able to withstand the pressure due to the weight of the superincumbent bricks when stacked in a kiln during the burning operation, as well as the pressure to which these bricks are subjected when they are used in a sewer which is laid many feet under ground.

While possessing the above advantages, the brick of the present invention has all of the known advantages of hollow bricks over solid bricks, for example, the ends of the hollow portions are adapted to receive mortar, and thereby form dowels connecting the abutting ends of the bricks in successive courses. Another advantage due to the use of a hollow brick is that in burning the fire is admitted to the interior, as well as the exterior surface of the brick, whereby they may be uniformly dried and burned. A hollow brick is also much lighter than a solid brick of the same size, and there is,

therefore, not so much weight on the lower courses of the bricks when they are stacked in the kiln, and less danger of distortion from this cause, and this saving in weight reduces largely the cost for clay, for freight and for hauling, and the bricks are handled more easily and rapidly by the mason and helper. Being hollow it requires less fuel to burn them, and they are burned or fused perfectly throughout, and as the walls are subjected to great pressure in being forced through the die the bricks are stronger than a solid brick that is less dense in texture. These, and other advantages of the present invention will be apparent from the following detailed description, in connection with the accompanying drawings:

Figure 1 is a perspective view of a brick formed in accordance with the present invention; Fig. 2 is a sectional view through three adjacent bricks, showing the formation of the interlocking ribs and spaces between adjacent bricks, together with the mortar joint; and Fig. 3 is a perspective view showing one arrangement for stacking the bricks of the present invention in a kiln.

The brick as shown herein is slightly tapered from the edge *a* to the edge *b*, or vertically as viewed from one end when the brick is positioned as in Fig. 1, and hollow channels 7, 9, are provided in the brick, running from end to end, so as to make the two vertical side walls 2, 2 and the top and bottom walls, with an intervening web 4 between the hollow spaces. It is preferred to form the top, bottom, and two side walls of substantially equal thickness throughout. Along one side wall the brick is provided with spaced, longitudinal ribs 8, 8 which project beyond the surface of the brick, and are set in, or removed from the upper and lower surfaces of the brick, forming therebetween a groove, or valley 15, whose bottom is constituted by a portion of the surface of the side wall of the brick, and hence does not extend into the wall 2. Upon the opposite side of the brick is formed a longitudinal rib 6, projecting from the surface of said wall, and being preferably of a height and thickness agreeing with those of the ribs 8, 8, upon the opposite side. The rib 6 is, as shown, located at substantially the center of the wall of the brick and in position to enter the space between the ribs 8, 8, of the next brick in the course. The mortar 10 between the adjacent bricks fills the slight space which is ordinarily provided for the mortar joint, and said mortar lies between the ribs 8, 8, and the rib 6, so as to complete the interlocking joint provided by these parts, as will be clearly apparent from an inspection of Fig. 2.

By having the hollow channels 7, 9, properly spaced and designed with reference to the material of the brick, the many advantages following from the use of hollow bricks are secured and by providing in connection therewith the external, spaced ribs 8, 8, upon one side wall, and the intermediate single rib 6 upon the opposite side wall, a perfect interlocking brick of the hollow variety is produced in which the interlocking function is secured without weakening, in any manner, the side walls, which are straight and unbroken, from end to end, and thereby possess maximum strength to resist the vertical pressures to which these bricks are subjected, both in the kiln during the burning process, and in a sewer or other conduit when the latter is laid deep in the ground. As thus formed, moreover, the bricks when stacked in a kiln present walls of equal thickness, throughout, to the action of the fire as it circulates exteriorly and interiorly of the bricks, and they are, therefore, dried and burned with uniformity, and all twisting and warping is obviated.

Fig. 3 of the drawings shows a preferable arrangement for stacking the bricks in a kiln. It will be observed that the bricks in the courses or tiers are superposed upon each other with their smaller ends abutting, so that two successive courses will present between their adjacent sides diamond-shaped spaces. The next two successive courses are laid with their longest dimension at right angles to the bricks of the first two courses, and the second two courses are likewise arranged with their smaller ends in abutting relation so as to form the diamond-shaped spaces between the bricks. The bricks, as thus described, and when placed in a kiln in the manner stated, will have their weight distributed equally and ample space will be provided for circulation of heat around as well as through the bricks. The entire kiln is set with bricks in the manner described, preferably about 30 bricks high, and these bricks are usually to be burned in what is known as a down-draft kiln in which the fire is admitted to the kiln, first up in what is known as "bags" to the top of the bricks, and then down through the bricks, and through the interstices in the floor to the stack.

While I prefer that the hollow spaces in the bricks be of the form shown in the drawings, the invention is not necessarily limited to this form, as some clays may be worked successfully in bricks in which the hollow spaces are of different forms in cross section. Whether the hollow spaces are of the form shown, or not, however, one important advantage following from the combination with hollow spaces of the longitudinal ribs and grooves on the bricks of the shape described, is that when laid in circular rows to build a man hole or sewer the mortar will

form dowels to connect the adjacent courses, while the abutting edges of the bricks in each course will be held against relative movement by the ribs and grooves. It will thus be seen that the bricks will be rigidly locked against separation along the planes of two surfaces that lie at right angles to each other. The result of this capacity for double locking of the bricks is very noticeable in circular conduits, such as sewers or man holes, where these bricks will produce circular walls so rigid as to have capacity to resist successfully the enormous external pressures to which such structures are frequently subjected.

I do not limit this invention to the exact shape of the drawings nor to the number of the interlocking ribs as shown and described. It may be desirable in large diameter conduits to make the brick much larger, in which case the number of interlocking ribs may be increased. It may also be of advantage in such larger size bricks or blocks to have more than two openings and of different shape so as to conform to the contour of the brick or block. With some kinds of material these interlocking ribs may be applied to solid brick, but wherever it can be done it is preferable to make the brick hollow for the reasons set forth.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. As an article of manufacture, a hollow brick having two side walls of greater length than its end walls and of substantially the same thickness throughout, said side walls provided with flat surfaces, two longitudinally extending ribs projecting from one of said surfaces and removed inward from the top and bottom surfaces of the brick, said ribs forming between them a groove whose bottom wall is flush with the surface of the brick, and a longitudinally extending rib projecting from the surface of the opposite side wall of the brick and located opposite the groove formed between the ribs of the first-mentioned side wall.

2. As an article of manufacture, a hollow brick having two side walls of greater length than its end walls and of substantially the same thickness throughout, each of said side walls provided with a substantially flat side surface, said brick having two channels which extend therethrough from end to end and are divided by an intermediate web, two longitudinally extending parallel spaced ribs upon the surface of one side wall, said ribs being removed inward from the upper and lower surfaces of the brick, and the bottom of the space between the ribs lying flush with the remaining portion of the surface of the brick, and a longitudinally extending rib upon the surface of the opposite side wall, said rib being located opposite the space between the two ribs on the surface of the first-mentioned side wall.

CHARLES H. FROST.

Witnesses:
R. S. DICEY,
JAY W. TINNEY.