

July 24, 1923.

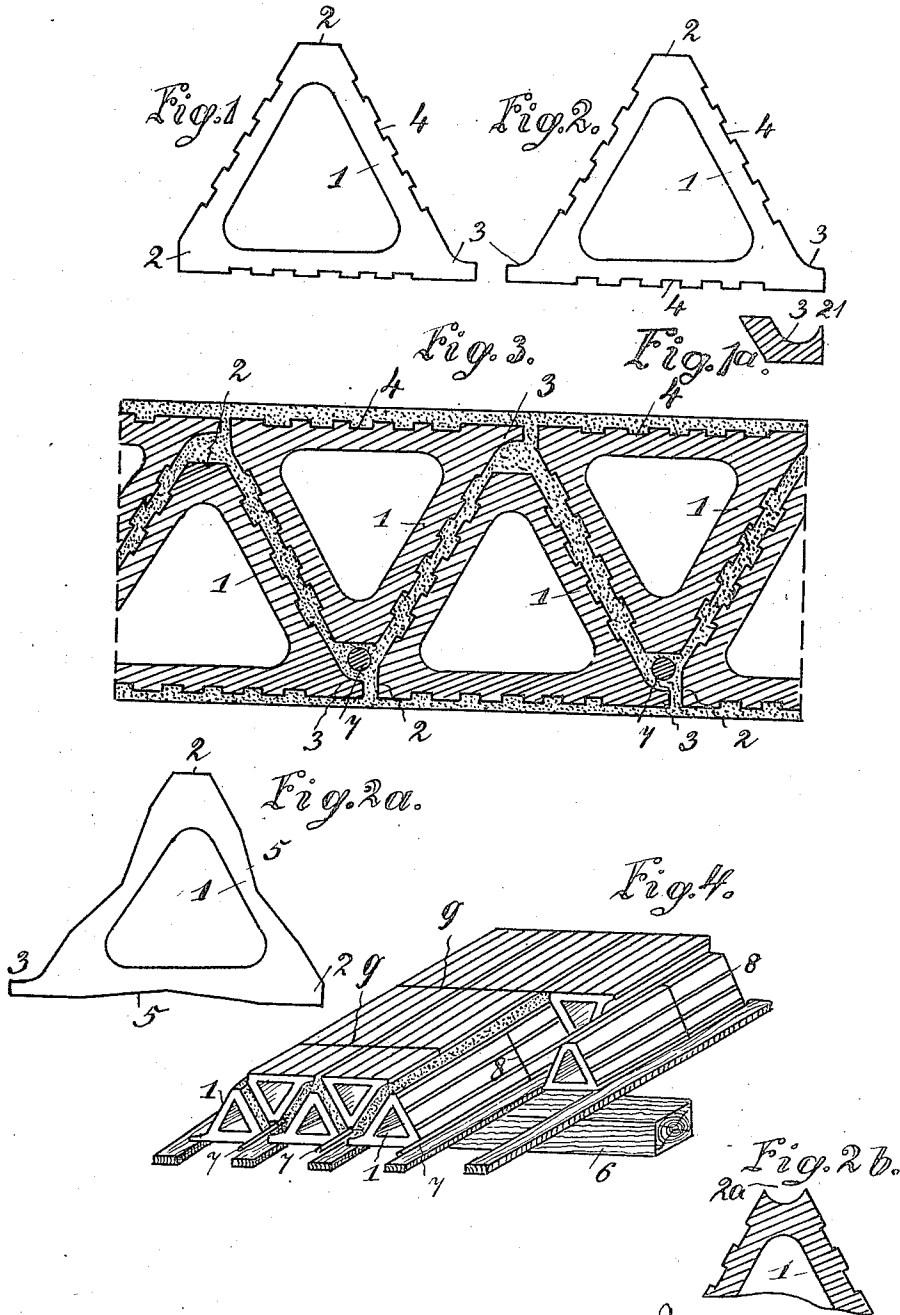
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E. P. BERKES

HOLLOW BUILDING TILE

Filed March 15, 1921

2 Sheets-Sheet 1



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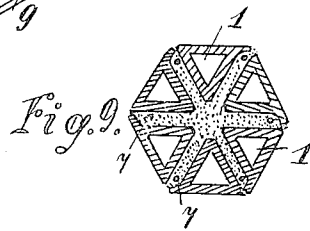
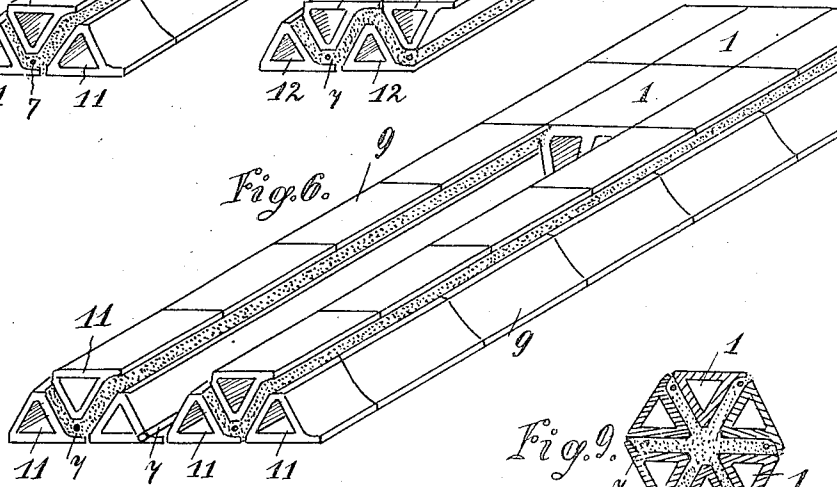
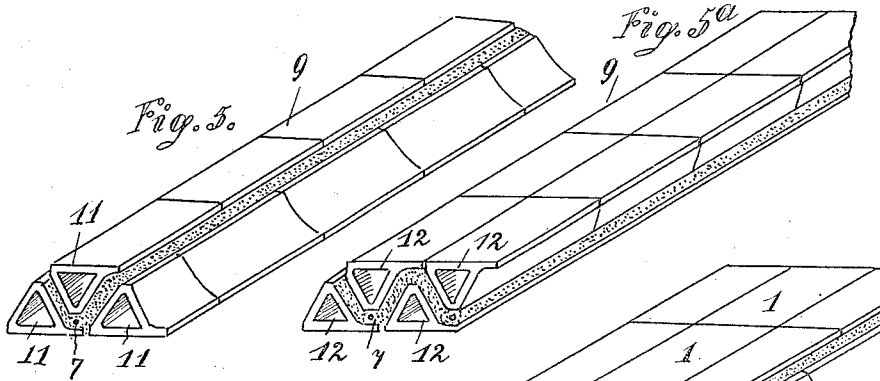
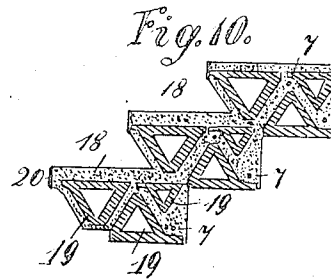
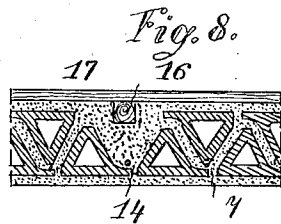
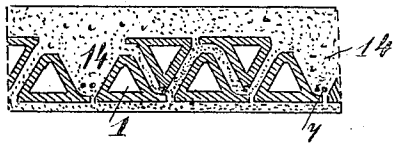


Fig. 7.



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UNITED STATES PATENT OFFICE.

ERNST PHILIPP BERKES, OF PFEDDERSHEIM, NEAR WORMS, ON THE RHINE,
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HOLLOW BUILDING TILE.

Application filed March 15, 1921. Serial No. 452,533.

To all whom it may concern:

Be it known that I, ERNST PHILIPP BERKES, a subject of the German State and resident of Pfeddersheim, near Worms, on the Rhine, have invented certain new and useful Improvements in Hollow Building Tiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The subject matter of this invention is a hollow block for the construction of unsupported ceilings, pillars, stairs, cover plates, window frames and the like, also a process for the construction of ceilings from such hollow blocks or tile.

The essential feature of the improvement lies in the fact that the hollow block is of triangular cross sections and has two other points bevelled off while the point is provided with an extended hollow flute shaped projection. The hollow flute may extend towards the end of the projection where it may be provided with a low edge. The stone may also be so constructed that only one angle is bevelled off, while the two others are constructed to form a hollow flute shaped projection.

The side faces of the stone may be straight, curved inwards or bent. They may also be provided with grooves for mortar or be corrugated.

This form of stone can be put to manifold uses and by means thereof reinforced ceilings, or even ceilings with concrete ribs, as well as pillars, stairs, plates, etc., can be constructed as may be desired both with and without mould boards. When the blocks are laid they extend through the whole thickness of the ceiling but owing to the bevelled off point and the projecting beak there is formed in the tension zone an enclosed space for the reinforcing iron. The strain in the iron is transmitted directly to the blocks. Owing to the fact also that the lower block does not extend through the whole thickness of the ceiling the latter is divided into a part which is subject to tension and a part which is not subjected to tension. In consequence thereof the abutting joints of the lower rows of blocks do not require to be provided with mortar. As the iron is enclosed on all sides by the blocks it can never be freely exposed, with the re-

sult that should the concrete sheathing be defective subsequent appearance of iron rust stains in the ceiling decoration is absolutely impossible.

The construction of reinforced ceilings is carried out by laying the lower layer of blocks in place on a mould board framework constructed of laths, boards, or the like and the blocks are laid on this framework in such a way that they are not in contact with each other but that the transverse joints all run in one line. In the hollow flutes formed by the projections are laid, in cement mortar, the iron cores, and the side faces of the blocks are also covered with cement mortar. The filling up of triangular shaped gutters which were left now takes place by the upper layer of blocks and in such a way that the bevelled off point of the upper layer of blocks almost touches the iron core and this upper layer of blocks is bonded with the lower one. If spaces are to be produced for wall openings in ceilings or cover plates are to be formed beams may be constructed conveniently of three blocks each in cross section together with an iron core prepared on a support and after the removal thereof placed in position on the spot. The gutters which are formed between the laid beams are filled in with a row of blocks after the insertion of iron cores.

For the attachment of the wooden flooring several rows of blocks may be omitted and filled in with concrete in which the nailing strips for the floor are embedded.

The procedure is similar when beamed ceilings are to be constructed with these blocks. In such case at those points where the beams are to be formed the corresponding upper rows of blocks are omitted, and the continuous spaces filled in with cement concrete to form the beam.

The manufacture of reinforced pillars without using mould boards, is effected by stretching the iron core according to a pattern and building the blocks in cement mortar round it. The intermediate spaces which are thus formed can be filled with concrete. The construction of stair treads can also be carried out without the use of mould boards, by making up the treads singly beforehand on the floor. The treads may conveniently be formed from three blocks with an iron core.

In like manner the hollow blocks are ad-

mirably suited for the construction of roofs. The walls are carried up underneath the roof and the block ceiling laid thereon so that all wooden constructions are done away with.

In the accompanying drawing are shown the hollow blocks in various constructional forms and as used for various purposes.

Figure 1 shows the hollow block in cross section with a hollow fluted projection.

Fig. 1^a is an enlarged detail view of the open flute.

Figure 2 shows the same hollow block with two hollow fluted projections.

Figure 2^a is a hollow block the sides of which are slightly bent.

Figure 2^b shows the upper bevelled off point with the hollow flute.

Figure 3 shows the blocks as laid in a reinforced ceiling.

Figure 4 is a perspective view of a reinforced ceiling and mould boards in process of construction.

Figures 5 and 5^a are single beams or plates of hollow blocks for small spans, in perspective.

Figure 6 shows two beams according to Figure 5 laid alongside each other with the filling in of the gutter by hollow blocks commenced.

Figure 7 shows the cross section of a beamed ceiling built with the hollow blocks.

Figure 8 shows the method of fixing the floor on a reinforced ceiling.

Figure 9 shows a cross section of a column.

Figure 10 shows the cross section of a staircase.

In Figures 1 to 2^b the hollow blocks are shown in cross section. In the type shown in Figure 1 two points 2 are bevelled, while the third point is constructed in the form of an extended fluted projection. The open flute can be formed with or without a small edge 21 Fig. 1^a. The side faces of the blocks 1 are made with grooves for mortar or of corrugated form. In the construction shown in Figure 2 only a single point is bevelled off at 2 while the other two points

are extended into a fluted projection 3. When the blocks are laid alongside each other as in Figure 3 the flute is formed by the beaks of projections 3 between the blocks in which the iron cores 7 rest. The latter are completely surrounded by the stones and can never be exposed whereby the appearance of rust stains on the ceiling decoration should the concrete sheathing be effective is absolutely impossible.

The form of block shown in Figure 2^a differs from those previously shown by the fact that the side faces 5 are slightly curved inwards, whereby a widening of the joint is produced and the blocks can be laid more closely together. The concave side faces are

likewise provided with grooves for mortar or made of corrugated form.

In order to enable the upper bevelled off point to better fit the round iron it may also as shown in Figure 2^b, be made in the form of a gutter round 2^a.

The construction of a reinforced ceiling of large span, which is shown in cross section in Figure 4 is carried out in the following way.

The mould boards are erected on a framework 6 of lath boards or the like, on which the blocks are laid in rows alongside each other. At the abutting joints only the upper bevelled off point is mortared. All the other joints of the lower rows of stones require no mortar. The blocks of the lower rows need not be mortar bonded with each other but have cross joints going right through them. In the three cornered gutters thus formed are first laid the iron cores 7 over the projections 3 embedded in concrete mortar and cement mortar is then applied to the sides of the blocks and the upper course of blocks 1 is laid into the gutter. The upper layer of blocks is thus laid in connection with the lower layer as shown in Figure 4. The cross joints 9 of the upper layer again run in one line but the blocks of the upper course break joint with those of the lower course.

If in the construction of ceilings it is necessary to construct small spans or cover plates the mould boards may be dispensed with. Beams which are denoted as a whole by 9 are then laid on a support and constructed according to Figures 5 or 5^a. The beam 9 in Figure 5 consists in cross section of three blocks 11 while the beam shown in Figure 5^a consists of four blocks 12. The beams or plates 9 so finished are, as shown in Figure 6, when the mortar has set, laid alongside each other and in the gutters are placed iron cores 7 embedded in cement mortar. Mortar likewise applied to the side faces and a row of hollow blocks 1 laid in.

The construction of continuous concrete ribs or beams in the hollow block ceilings can be carried out in a simple manner by leaving out upper rows of blocks at the points where continuous beams are desired.

An example is shown in Figure 7. At two points 14 the rows of hollow blocks are left out throughout the whole length. The gutters are provided with reinforcing cores Z and then rammed full of concrete so that a layer of concrete is also formed above the hollow blocks. The method of attaching the wooden flooring is shown in Figure 8. In this case also gutter-shaped channels 14 are formed by the omission of single rows of blocks and are filled up with concrete in which the nailing strips 16 for the attachment of the floor boards 13 are laid.

The construction of columns etc. is car-

ried out, likewise without mould boards. The iron cores 7 (see Figure 9) are first stretched to a pattern and the hollow blocks 1 built up round them in cement mortar and the spaces in between are filled in with concrete rammed in.

The hollow blocks are also admirably suitable for the construction of stair treads for unsupported stairways as they can be also prepared previously without the use of mould boards. The several treads 18 may conveniently consist in cross section of three hollow blocks 19 with iron cores of which the rear block is half the size of the others.

The front edge of the treads is protected by an angle iron 20 and the tread provided with a smooth coating of mortar.

Special advantages of the present blocks are the stable form whereby they can be made light and the breakage of the projections is avoided during transportation and also the close fit which can be obtained. By this means the joints are quite narrow, concrete is economised, and a small thickness of ceiling and rapid removal of the mould boards rendered possible.

The separate three cornered blocks interlock in a way with each other. They also by their special construction completely enclose the reinforcing rods both at the top and also at the bottom.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is:

1. A hollow block or tile free of undercuts triangular in cross section having an extension or beak at one apex edge provided with an open flute, said extension flush with one face and extending beyond the adjacent face the entire length of the tile.

2. A hollow block or tile triangular in cross section having an extension or beak at one apex edge provided with a flute terminating in an arc edge projecting therefrom said flute extending along one entire edge of the tile.

3. A hollow block or tile triangular in cross section whose walls are of less thickness at the middle with gradually increasing

thickness toward the edges, to form hollows extending lengthwise of the block.

4. A hollow block or tiles triangular in cross section whose walls are thicker near the apices and thinner at the middle between the apices, with one or more apices bevelled and at least one apex having an extension in the plane of one face to form a reinforcement support, said extension being along the entire length of one edge.

5. A reinforced concrete construction comprising a layer of triangular hollow tile one or more of whose apex edges are bevelled and the other edge having an extension reinforcements lying above said extensions and a second layer of inverted like blocks bonded in triangular gutters formed between the rows of the first layer by cement mortar.

6. A reinforced concrete construction comprising a layer of triangular hollow tile one or more of whose apex edges are bevelled and the other edge having an extension reinforcements lying above said extensions and a second layer of inverted like blocks bonded in triangular gutters formed between the rows of the first layer by cement mortar, and other gutters filled with reinforced concrete thereby forming at intervals reinforced concrete beams integral with said construction.

7. A reinforced concrete construction comprising rows of hollow triangular blocks each having a bevelled apex edge and a fluted extension on another edge in the plane of one its sides extending the entire length of the tier, the bevelled edge of one row being adjacent the extension on the other row, reinforcements in the open gutter thus formed lying above said extension, and a filling for the gutters formed between the rows.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ERNST PHILIPP BERKES.

Witnesses:

LINA RÜCKER,

RICHARD ALBERSHEMN.