(No Model.)

R. GUASTAVINO, Jr.

HOLLOW COHESIVE ARCH.

No. 471,173. Patented Mar. 22, 1892.

Fig. 3.

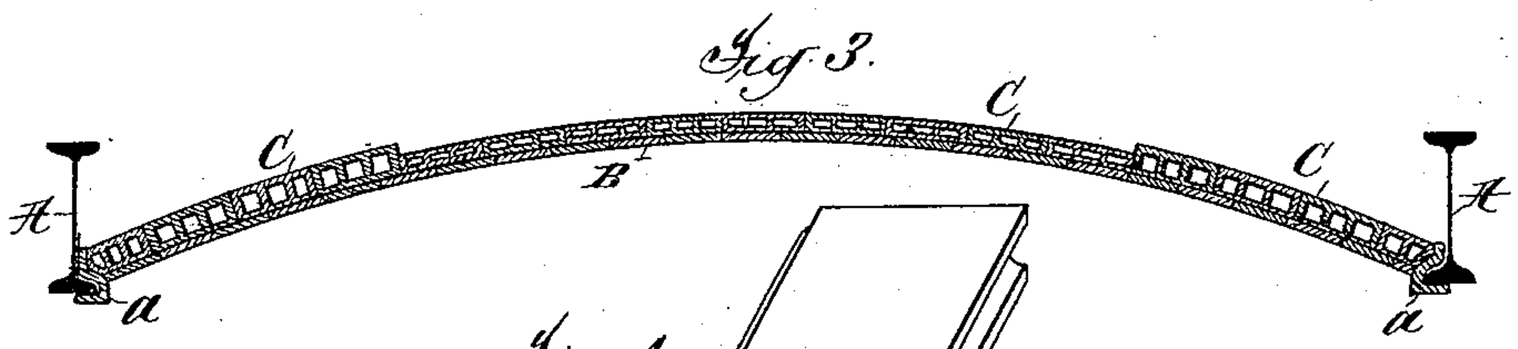


Fig. 4.

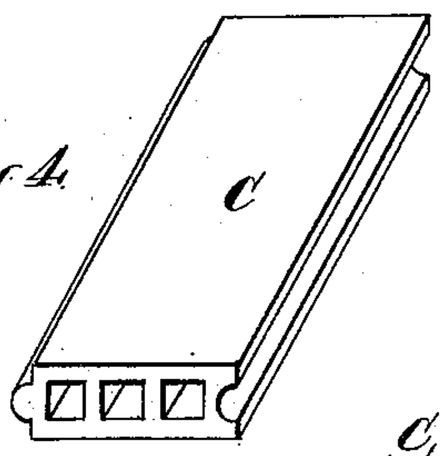


Fig. 2.

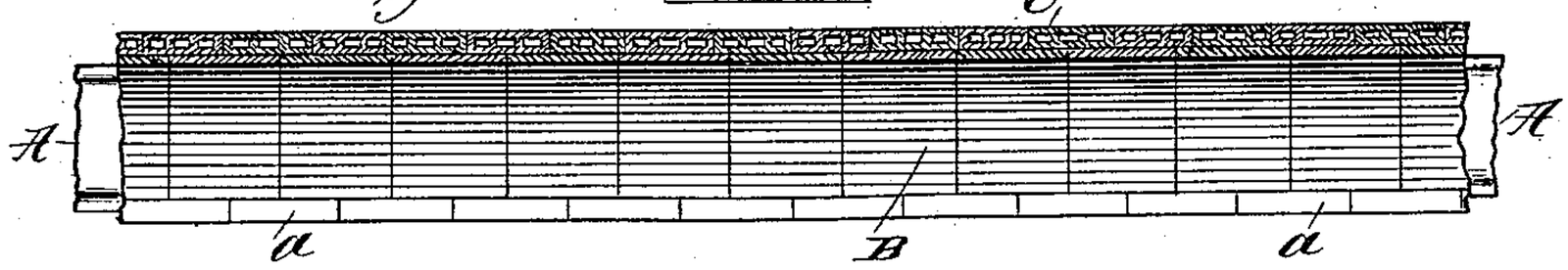
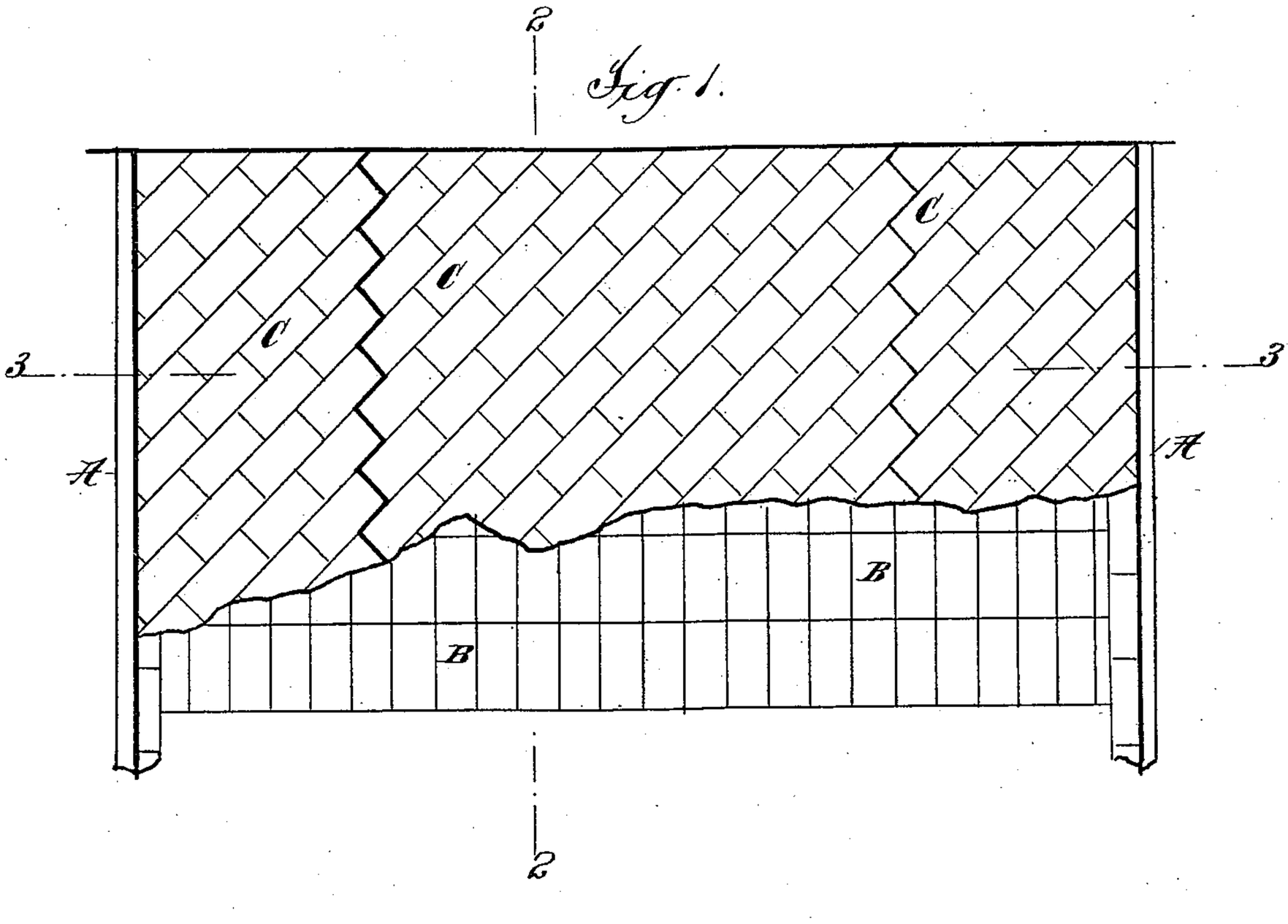


Fig. 1.



WITNESSES:

William E. Bridgett

J. Wm. Brown

Inventor.

Rafael Guastavino Jr

UNITED STATES PATENT OFFICE.

RAFAEL GUASTAVINO, JR., OF BOSTON, MASSACHUSETTS.

HOLLOW COHESIVE ARCH.

SPECIFICATION forming part of Letters Patent No. 471,173, dated March 22, 1892.

Application filed June 23, 1891. Serial No. 397,267. (No model.)

To all whom it may concern:

Be it known that I, RAFAEL GUASTAVINO, Jr., a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Hollow Cohesive Arches, of which the following is a specification.

This invention has reference to the construction of arches for ceilings and floors of buildings of all descriptions, fire-proof and otherwise.

The object I have in view is the production of a thin-tile arch for the purpose stated which shall be light in weight, cheap, and possessing the qualities of great strength and permanency.

The structure embraces a course of thin flat tiles laid in cement or plaster and a course of perforated tiles having grooves and elevations on their respective longitudinal sides and laid in cement on top of the first-named course of thin flat tiles, with their joints diagonal to the joints of the tiles beneath and also breaking joints with each other.

In the arches now being used in the construction of fire-proof buildings with two, three, and four courses of arch material the resistance to the pressure is in proportion greater than the bending resistance of the arch. In the case of a solid arch the same principle applies that is applicable to any massive column compared with another column of the same weight built hollow, because it is increasing the radius of gyration. For this reason a hollow arch is much better adapted for building purposes than a solid arch of the same mass. This principle may be utilized in arch erection for buildings in two ways. The arch may be built of hollow pieces and an arch of thin tiles with ribs laid over the same, and over the ribs another arch of thin tiles may be placed, thus giving the hollow effect of the arch built entirely of hollow pieces and giving cohesion on top and bottom, or the thin-tile arch may be first built, and instead of ribs a second course of hollow tiles may be placed on top of the thin arch and another thin-tile arch placed over the hollow tiles, and this construction will give to the structure the condition of a larger radius of gyration in section for the arch with the same material than in the case of an arch of solid section. To be effective, however, the hollow tiles should carefully break joints with the tiles below, and the only way to accomplish this result satisfactorily is to lay the superimposed course of hollow tiles in a diagonal direction to the lines of the first course. In this way it is impossible to have two vertical joints one over the other, and, besides, every line of the second course, if laid in diagonal of the arch, forms a series of diagonal arches from right to left and from left to right, crossing one another. Furthermore, the second or top course should be composed of tiles provided with tongue-and-groove joints, so as to have a perfect interlacing and locking of the tiles, which, when laid in cement, will become substantially a solid piece or layer. The superimposed course of hollow tiles will be somewhat thicker from the abutments of the structure to about one-third the distance toward the crown of the arch, which will give increased strength to the bending moment in the weakest part of the arch.

In the accompanying drawings, in which like parts are indicated by like letters of reference in the several views, Figure 1 is a top plan view of a part of an arch embodying my invention. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig. 3 is a sectional view on the line 3 3 of Fig. 1, and Fig. 4 is a view in perspective showing the form and construction of the hollow-tile block used in the erection of the arch.

Referring to drawings, A A indicate the beams. (Shown as rolled **I**-beams of small section.) These beams extend between the side or end walls of the building and may, if found necessary or desirable, have intermediate supports of fire-proof material. The lower flanges of the beams A are fitted with burnt-clay jackets *a*, which serve as skewbacks for the arch to rest upon and also to conceal from view the flange of the beam, so that the same will not be visible in the completed ceiling.

B indicates the flat thin tiles which form the first or exposed surface course of the arch. These tiles are laid in cement or plaster with their joints parallel to the length of the beams, as shown in Fig. 1 of the drawings; but they

may have their joints in any other direction. Over the thin arch thus constructed of the tiles B, I build a course of hollow-tile blocks C. The preferred form of these blocks is shown in Fig. 4. They are about twelve inches long, six inches wide, and about two inches thick, with a series of openings through them longitudinally. The tile blocks C are laid in cement and diagonally to the thin tiles B, which form the first course, as explained. The tile blocks B adjacent to the beams A may be shaped to fit snugly upon the skewbacks *a*, as indicated. To give increased strength to the bending moment in the weakest part of the arch the tile blocks B for about one-third the distance from the supporting-beams toward the crown of the arch are made somewhat thicker than the rest of the arch, as shown in Fig. 3 of the drawings, as already stated.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hollow cohesive arch, a course of thin tiles laid in cement or plaster and a superimposed course of hollow-tile blocks provided with tongues and grooves on their respective long sides and laid in cement or plaster diagonally to said course of thin tiles, substantially as set forth.

2. In a hollow cohesive arch, the combination, with a course of thin tiles laid in cement or plaster, of a superimposed course of hollow-tile blocks provided with interlocking tongue-and-groove joints and laid in cement or plaster to break joints with one another and diagonally to the joints of said course of thin tiles, substantially as set forth.

3. In a hollow cohesive arch, the combination, with flanged supporting-beams, of a course of thin tiles laid in cement or plaster, a superimposed course of hollow-tile blocks provided with tongue-and-groove joints on their respective long sides and also laid in cement or plaster and diagonally to said course of thin tiles, and clay shoes embracing the lower flange of said supporting-beams and serving as skewbacks from which the courses of the arch spring, substantially as set forth.

Signed at Boston, in the county of Suffolk and State of Massachusetts, this 16th day of May, A. D. 1891.

RAFAEL GUASTAVINO, JR.

Witnesses:
KATIE L. RATIGAN,
JAMES N. BEASLEY.