

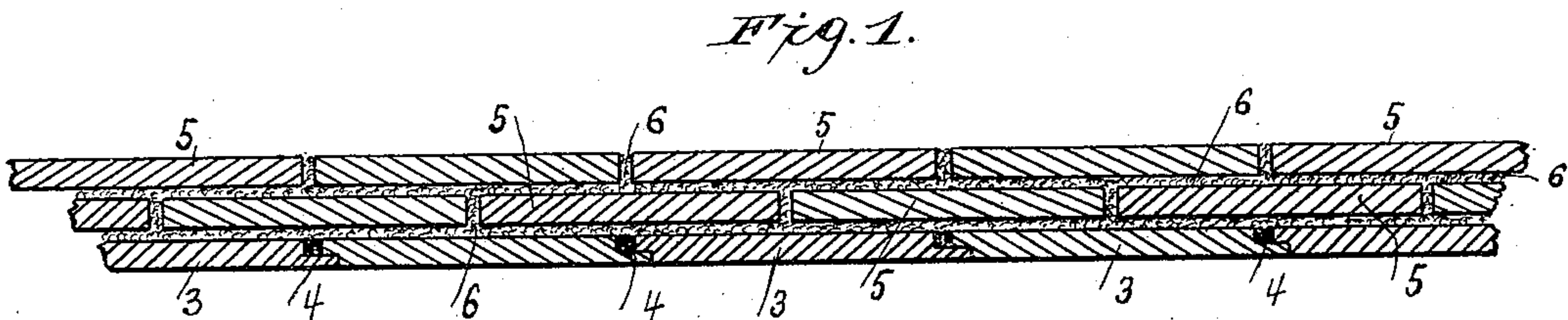
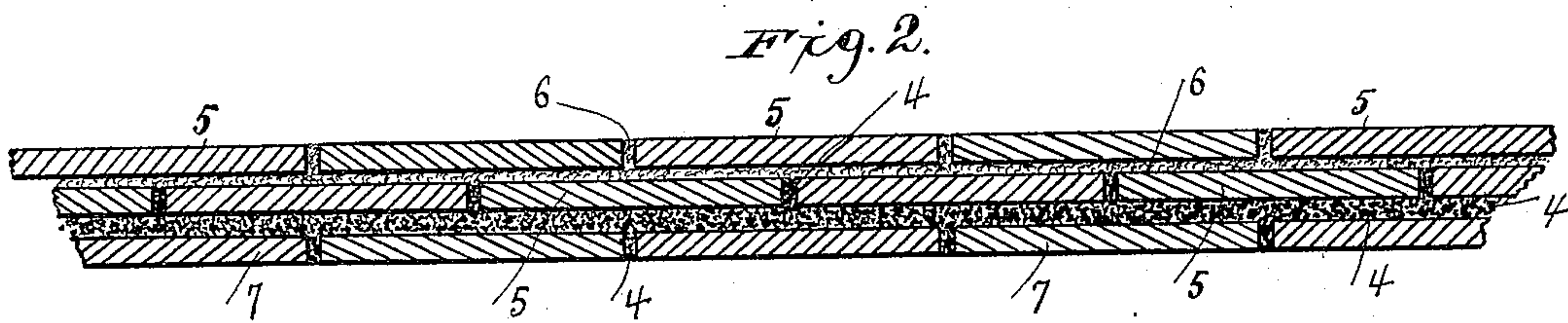
(No Model.)

R. GUASTAVINO.

CONSTRUCTION OF TILED ARCHES FOR CEILINGS, STAIRCASES, &c.

No. 430,122.

Patented June 17, 1890.



Witnesses:

W. E. Bowen
Benj. Miller

Inventor:

Rafael Guastavino,
By J. E. Bowen
Attorney.

UNITED STATES PATENT OFFICE.

RAFAEL GUASTAVINO, OF NEW YORK, N. Y.

CONSTRUCTION OF TILED ARCHES FOR CEILINGS, STAIRCASES, &c.

SPECIFICATION forming part of Letters Patent No. 430,122, dated June 17, 1890.

Application filed September 19, 1889. Serial No. 324,463. (No model.)

To all whom it may concern:

Be it known that I, RAFAEL GUASTAVINO, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in the Construction of Tiled Arches for Ceilings, Staircases, &c., of which the following is a specification.

My present invention has reference to the construction of arches for ceilings, staircases, &c., for buildings of various descriptions; and it has for its object to render it practicable to construct with brick tiles full floors, without beams, with spans of twelve, twenty, twenty-five, thirty, or more feet and of an average of two, three, or four inches of thickness and yet capable of sustaining with safety a load of more than three to five hundred pounds per square foot. The use of plaster in the construction of arches of such lengths of span as mentioned has always been deemed necessary in order to stiffen the arches; but this stiffness, owing to the expansive quality of the plaster and the large quantity required in such large arches, frequently forces the walls from plumb, and when this occurs and the center is removed the arch falls. A large quantity of plaster in such constructions is, therefore, an element of danger instead of security. As plaster is not waterproof and is readily disintegrated by dampness, an arch or the like laid wholly in plaster and frequently cleaned with water will in time become weakened by the disintegrating influence of the water on the plaster. Moreover, dampness due to defective plumbing or to leakage of water from other causes will also produce weakness in the arch, besides rendering it unsightly. The fact that plaster sets quickly is its desirable quality, since no time is lost in erecting the structure, as the several courses of tiles may be placed in position without allowing time for setting and drying. This quality of quick setting of the plaster has its disadvantage, however, in laying tiled arches where the tiles cannot be laid at a uniform inclination, but are required to be laid at various angles of inclination, thus rendering it difficult in many cases to produce perfect work because of this quick-setting quality.

In building arches of short spans of four or five feet, plaster may be used in the ordinary way—that is, in large quantities—with comparative safety; but owing to its peculiar nature it cannot be relied upon when used in the usual quantities for laying the several courses of tiles of an arch with a length of span of from twelve to twenty feet.

It is my aim to be able to build arches of brick tiles of unusual length of span, which shall be free from the objections above stated, and which objections are inherent in such arches as heretofore constructed. To accomplish this it is necessary to avoid the use of large quantities of plaster, which I am enabled to do by employing the plaster only in the first course of tiles, which are flanged, and in very small quantities, and disposed, as herein shown and described, so that it will not be exposed to the disintegrating influences of moisture, temperature, and the like, and laying the second course of tiles (and the third, where three are employed) in Portland cement. By thus reducing the quantity of the plaster to a minimum the element of danger is altogether eliminated from structures of this nature. In cases where cement has been used in laying courses of tiles the cement has required so long a time to set properly and dry, which it must do to insure a safe and perfect structure, that it is not possible to employ it where time is an element of importance, and besides while the cement is setting and the moisture is drying out in the incomplete arch the latter is liable to be injured by the workmen in the building, thus causing delays and expense. Furthermore, while the cement is in a wet condition it will not set, and consequently as the weight of the arch material nearly counterbalances the cohesion of the cement, the tendency of the structure during the setting process is to crush and fall, particularly where the arch has not a solid center, and this tendency often weakens the arch permanently. I overcome these objections to the ordinary cement by preparing the same as follows: I select the best grades of hydraulic cement and also a superior quality of sand, and these two ingredients are mixed in the usual proportions to render the same suitable for laying the tiles of the arches, &c. Before, however,

mixing the sand with the crude cement I subject it (the sand) to an artificial drying agent—such, for example, as heat. When the sand is thus thoroughly dried or relieved of every particle of its moisture, it is then mixed with the selected cement and water. By subjecting the sand to an artificial drying process the cement-mixture will set quite as quickly as plaster, and when set there will exist none of the superfluous moisture that is present when the sand is not previously dried, as described, and which moisture, under the usual plan, can only be dried out by exposure of the unfinished work to the air for days or even weeks.

In the accompanying drawings, which form a part of this specification, and in both views of which like features are indicated by like figures of reference, Figure 1 is a fragmentary cross-section of an arch constructed in accordance with my invention, and Fig. 2 is a similar view of an arch constructed according to the system commonly practiced.

In carrying out my invention I employ in constructing the first or facing course of the arch the tiles 3, which are provided with flanges, as shown. These tiles 3 are laid in plaster 4, which is spread only on the inner or upper half of the vertical joints of the flanges, as seen in the drawings, and in such limited quantity that when the flanges are brought together the plaster will not appear in the exposed joints. In this position the plaster serves to securely hold the tiles in place and is, moreover, incased by the flanges, so that it is not exposed, and hence is not liable to be affected by any of the influences above mentioned, which would tend to disintegrate it and thus weaken the arch. The tiles 5, which comprise the remaining courses of the arch, are of the ordinary form, and these are laid in cement 6, prepared in the manner already explained, and which, drying quickly, permits the entire arch to be finished without the usual delays for drying and setting properly.

In Fig. 2, which shows an arch of the ordinary construction, the finishing-tiles 7 have vertical joints only, and the first and second courses of tiles are laid in plaster 4 in the ordinary manner, and the final course is laid in cement 6. Such a structure not being hydraulic is liable to be ruined by the flooding of the building, and the joints will slowly disintegrate under the influence of the dampness, and even under the influence of the atmosphere when exposed thereto, as the joints of the finishing-tiles necessarily are.

An arch constructed in accordance with my invention, besides possessing the advantages mentioned, is thoroughly hydraulic and therefore will not be detrimentally affected by washing it or by leakage of water, the flooding of the building, or by dampness due to any cause, and as the cement used in its erection contains no superfluous moisture there will be no liability of the tiles separating from one another by shrinkage of the cement, which often happens during the process of drying out under the old modes of construction.

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

In the construction of tiled arches for ceilings, staircases, &c., the combination, with one or more courses of flangeless tiles laid in cement, of a facing-course of flanged tiles joined together by plaster laid only on the inner or upper half of the vertical joints of the flanges, whereby a hydraulic structure is provided of great solidity and strength, substantially as and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 16th day of August, A. D. 1889.

RAFAEL GUASTAVINO.

Witnesses:

J. E. W. BOWEN,
W. E. BOWEN.