M. F. LYONS.

Bridge-Tiles for Fire-Proof Buildings.

No. 204,347. Patented May 28, 1878.

Fig: 1.

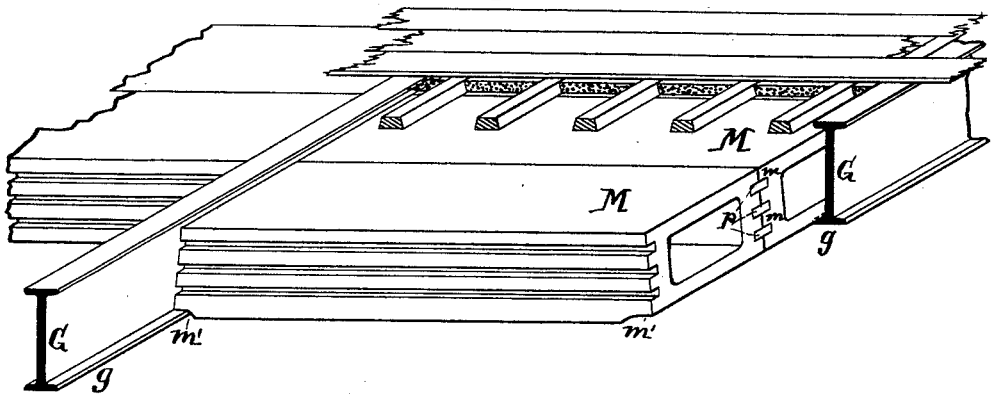


Fig: 3

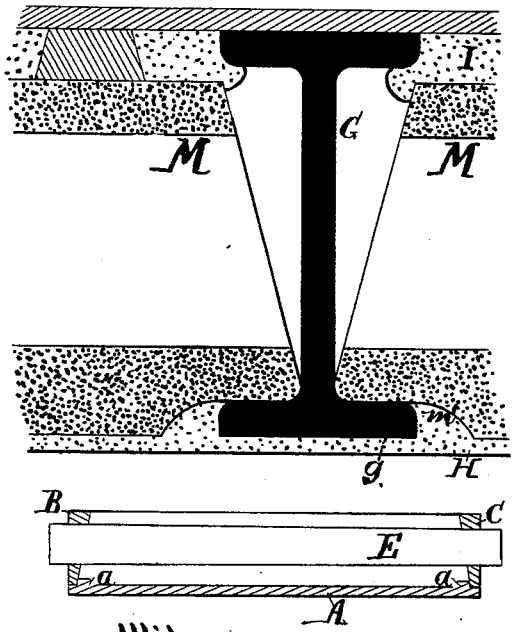
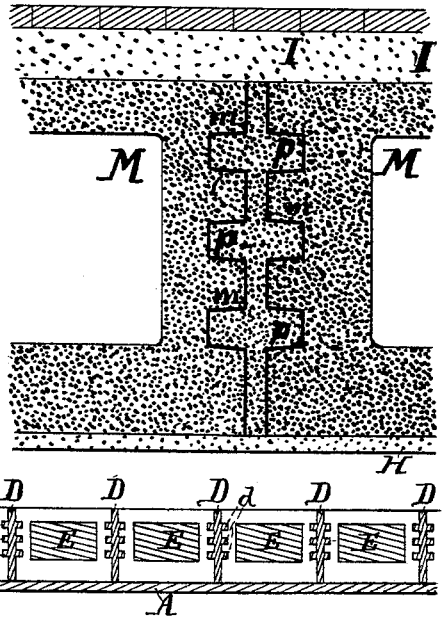


Fig: 2.



Witnesses:

A. H. Gentner

H. A. Johnstone.

Inventor:

Michael F. Lyons

by his attorney

T. D. Stetson

UNITED STATES PATENT OFFICE.

MICHAEL F. LYONS, OF NEW YORK, N. Y.

IMPROVEMENT IN BRIDGE-TILES FOR FIRE-PROOF BUILDINGS.

Specification forming part of Letters Patent No. **204,347**, dated May 28, 1878; application filed January 15, 1878.

To all whom it may concern:

Be it known that I, MICHAEL F. LYONS, of New York city, county and State of New York, have invented certain new and useful Improvements in Bridge-Tiles, or masses of fire-proof material adapted to extend across between iron floor-beams in fire-proof buildings, of which the following is a specification:

My invention relates to improvements in bridge-tiles which are formed of an earthy material, and have ridges on the sides and rabbets on the bottom, resting on the flanges of the supporting-beams, the series of tiles being united by a cement, as hereinafter more fully set forth.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a perspective view. The remaining figures are sections on a larger scale. Fig. 2 is a section taken parallel to the floor-beams. Fig. 3 is a section at right angles thereto.

Similar letters of reference indicate like parts in all the figures.

I will designate the completed tile by the letters M *m*, in which M represents the main hollow body of rectangular section, and *m* a series of longitudinal ridges along each side.

I construct a series of molds of proper dimensions, and having a removable core extending through and formed with a slight taper, adapted to be driven out endwise through the ends of the mold. The top of the mold stands always open, and the material, when the mold is fully filled, is smoothed on top by the ordinary process of scraping or striking with a straight-edged board or other device.

Referring to the figures, A B C D constitute the exterior parts of the mold, and E the removable core, the latter being fitted in holes in the end pieces B C, and thereby supported at the proper level. A is the bottom; B C, the end pieces, inclined inward, as shown, to impart a corresponding beveled form to the ends of the tile; and D D are division-pieces, which form the sides of the several tiles. The pieces D are formed with longitudinal ridges, indicated by *d*, the object of which, as also of the elevated pieces *a* on the bottom plate A, will presently appear.

The material employed may be any earthy plaster which is capable of hardening with sufficient rapidity and of forming a sufficiently-strong and reliable fire-proof tile.

I have used a composition composed of one part shell-lime, two parts calcined plaster, (sulphate of lime,) and three parts coal-ashes, or coal-cinder finely comminuted. To this I add a small quantity of alum in a very finely-diffused condition, the alum being introduced by being dissolved in water. The proportion I prefer to employ is one part of alum to one hundred parts of water. This material sets quickly. A sufficient quantity is mixed rapidly, and poured or shoveled into the molds through the open top. It is vigorously rammed during the filling process, to insure that it will flow well in and fill the entire space in the bottom under the core E. When the entire set of molds is filled and struck off, the whole is allowed to rest a brief period, to harden, and then the several cores E are started endwise by being struck with gentle blows by a heavy hammer, or by other means, so as not to crack or disturb the soft, but rapidly-hardening, tile. When the hardening has progressed a little further, the cores are entirely removed, and the molds taken apart. The tiles are carefully stowed away and allowed to become still harder by exposure to the air, after which they may be transported to the places where they are required, and applied successively in position, each against the next, with a coating of freshly-applied mortar on the sides, so that when the side of one of my bridge-tiles is applied against the side of the next and slightly rubbed together the fresh mortar introduced on the sides will mold itself to the grooves in the sides of the bridge-tiles, and serve, not only by its adhesive property, but also by forming ridges, which act like dowels, to engage in the grooves in the bridge-tiles, and lock them, so that any vertical movement of one must be partaken of by the adjacent bridge-tile.

The ridges *d* may be larger or smaller than here represented. The tiles may be ordinarily set considerably nearer together than here represented. It will usually be practicable to apply just enough mortar to fill the grooves be-

tween the ridges *d*, and a little more, so that, on applying the bridge-tiles together and rubbing them slightly, each ridge *d* will come nearly in contact with a corresponding ridge on the adjacent bridge-tile. The spaces between the tiles may be increased by increasing the amount of mortar whenever it is necessary to make the work come out right—that is to say, to enable the spaces between any given two floor-beams to be completely bridged over the whole length when a succession of these tiles are laid side by side. Without the cementing-mortar *p* there would be a little looseness. The cement fills the entire space, as indicated by *p*.

The elevated portions *a* on the bottom piece A produce corresponding cavities or rabbets *m'* in the molded tiles. I can, by taking sufficient care, mold these rabbets to exactly correspond with the thickness and approximately with the width of the supporting-flange on the iron floor-beams; but I do not esteem it necessary to take great care in this particular. It is sufficient that the rabbets *m'* be made a little greater than the thickness of the supporting-flange, so that the lower faces of my tiles come a little below the bottom of the floor-beams. The subsequent addition of mortar or hard-finish being applied a little thicker across the bottom of each floor-beam, a flush surface is obtained on the bottom of the mortar.

In Figs. 1, 2, and 3, G represents the body of an iron beam, and *g* the lower flange thereof. H represents the ordinary rough mortar. There may be a further facing of hard-finish. (Not represented.) It will be understood that the coatings H and I are applied after the bridge-tiles are in place and the cementing-mortar *p*, which is applied between them, has hardened.

My tiles, made of the material described, are hard and strong, and they are lighter than when formed of any ordinary mortar.

In case my tiles have to be shortened, as is sometimes the case at certain points or over the whole of the work, the shortening may be done with little skill and with rough tools. Care must be taken to remove sufficient material by a stone-cutter's tools or by other means to make a sufficient rabbet, *m'*, whenever so much of the end has been cut away as to render the molded one inadequate.

The tiles may be of sufficient depth to equal or more than equal the depth of the floor-beams; but I do not esteem it generally necessary to do that. The bevel at the ends of the tiles may be omitted, if desired, provided sufficient provision is made by other means to allow room for introducing the tiles into their places from above.

The material designated is not essential to the success of my invention, though I esteem it preferable. In some cases clay may be used, and the bridge-tiles burned in a kiln, allowance being made, as with all such ware, for the shrinkage in burning.

The mortar applied over the top of my bridge-tiles may be of the same or different character from that which cements the sides of the tiles together. Ordinarily a cheaper material may be employed on top. No harm results if it is sufficiently thin, and applied so liberally as to gush down and fill much more space at the sides of the floor-beams than is represented; but it should not be applied in so thin a grout as to flow in and fill the whole interior of the tile. Such filling would increase the weight without proportionately contributing to the strength.

I have described and illustrated the method of coring and molding my improved tiles for the purpose of more fully setting forth my invention; but I do not make any claim thereto.

I claim as my invention—

1. The bridge-tile described, formed of earthy material, with a hollow interior, and having ridges *m* on the sides and rabbets *m'* on the bottom, adapted to serve as herein specified.

2. A series of tiles, M *m m'*, united by mortar *p*, in combination with iron beams G *g* and finishing H, as herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

MICHAEL F. LYONS.

Witnesses:

THOMAS D. STETSON,

J. K. OULAHAN.