(No Model.)

E. M. BUTZ.

FIRE PROOF BUILDING.

No. 304,780. Patented Sept. 9, 1884.

Fig. 3.

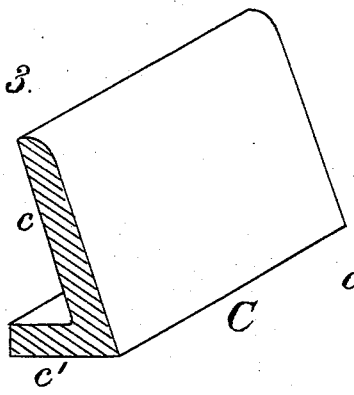


Fig. 4.

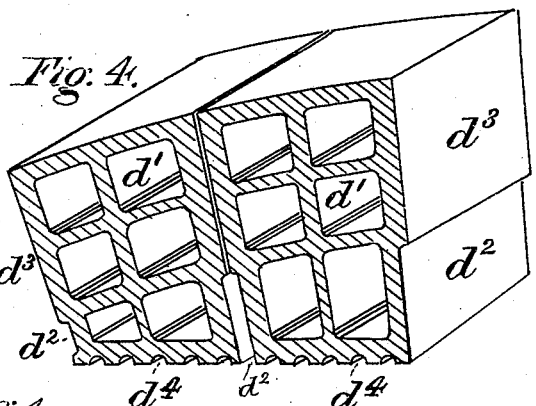


Fig. 1.

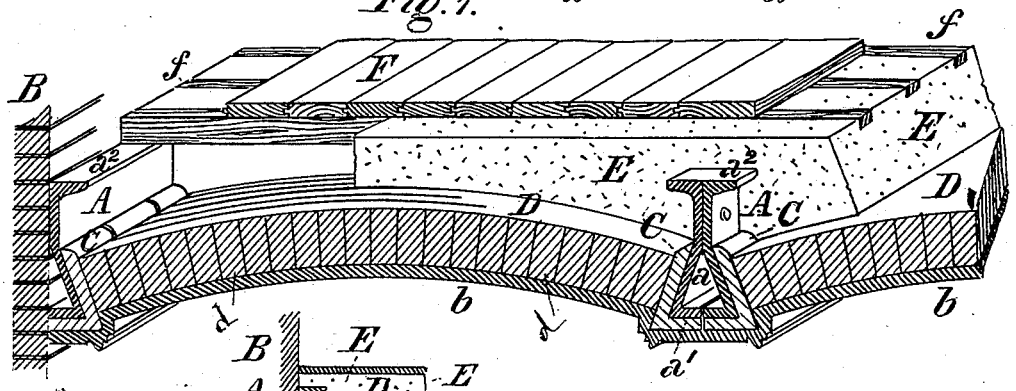


Fig. 5.

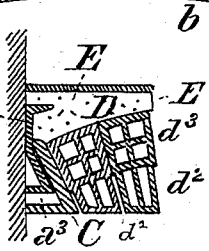
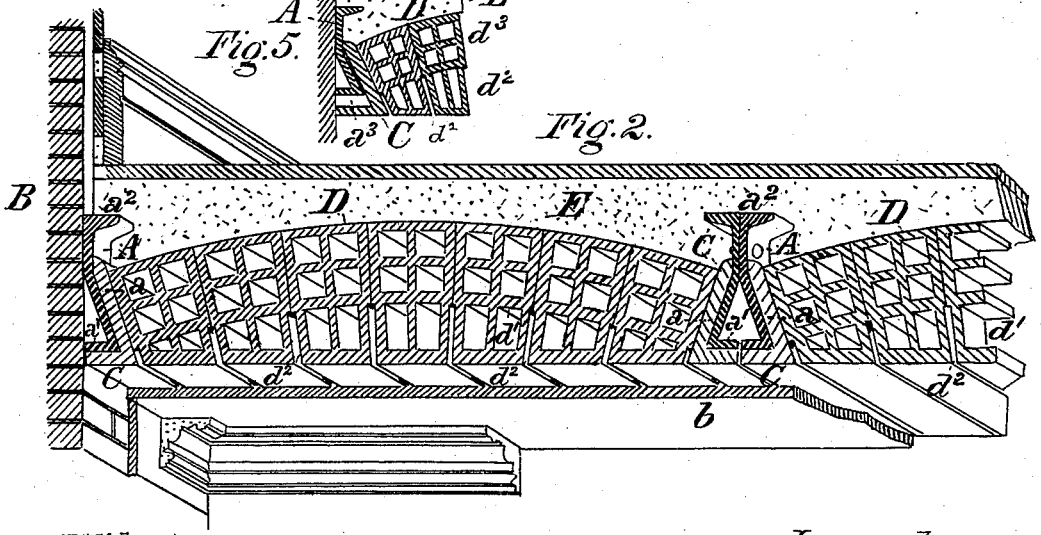


Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD M. BUTZ, OF ALLEGHENY, PENNSYLVANIA.

FIRE-PROOF BUILDING.

SPECIFICATION forming part of Letters Patent No. 304,780, dated September 9, 1884.

Application filed December 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. BUTZ, a citizen of tht United States, residing at Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Fire-Proof Buildings; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a section in perspective through portion of a floor and ceiling of a fire-proof building embodying my invention; Fig. 2, a similar section, showing a different construction of the arch; Fig. 3, a similar section, on an enlarged scale, through one of the skewback tiles; Fig, 4. a similar section, on an enlarged scale, through a portion of a hollow-tile arch; and Fig. 5, a section through a portion of a floor and ceiling, showing a modification in the connection of the arch and girder.

My invention is an improvement upon that for which Letters Patent of the United States No. 223,275, were granted and issued to me under date of January 6, 1880; and its object is to provide improved facilities for the protection of the metallic members and the connection of the arches, flooring-beds, and ceilings.

The improvements claimed are hereinafter fully set forth.

In the practice of my invention I employ, as sustaining-members for a fire-proof floor or ceiling, a series of metallic beams or girders, A, the ends of which are supported in the walls of the building in the usual manner, and I completely inclose and protect the same in and by non-combustible material, in the manner presently to be described. The specific form of said girders does not *per se* constitute part of my present invention, as any approved section may be employed, so long as it is found to present the qualities of sufficient strength and lightness. It is, however, essential in the application of my improvements that there should be combined with each girder, on one or both of its sides, (according as said girder is next to a wall or intermediate between walls,) a skewback or skewbacks of metal, so inclined relatively to the axis of the girder as to form proper abutments to receive the end-thrust of and support an arch sprung from one to an adjacent girder. The shape selected for illustration in the drawings, in which the skewbacks constitute portions of the webs of the girders, is one of a series devised by me properly adaptable to use in the structure herein described, as well as to other and different applications, and is set forth in a separate application for Letters Patent by me filed December 13, 1883, Serial No. 114,429. (Case B.) In the instance shown, a skewback or inclined abutment, *a*, is formed upon the lower portion of one or both sides of each of the girders A, by outwardly inclining the webs of the girders, which, continuing from the lower edges of the skewbacks, are bent inwardly to form lower flanges, *a'*. Upper flanges, a^2, are also rolled upon the girders similarly to those of ordinary **I**-beams. The girders which adjoin the side walls, B, of the building are single—that is to say, have an upper flange, a skewback, and a lower flange, on one side only—and the remaining girders are double, or composed of two such single girders riveted together, said double girders thus having skewbacks and flanges on each side of their axes. The surfaces of the skewbacks and lower flanges of each girder are faced or covered with a series of skewback-tiles, C, formed of fire-clay or other non-combustible material not a good conductor of heat, said tiles being composed of an upper inclined web or plate, *c*, and a lower horizontal web, *c'*, the inner surfaces of said webs corresponding in length and inclination with the faces of the skewbacks and lower flanges of the girders. The tiles C are properly luted at their joints, to prevent the access of air to the girders thereat. An arch, D, which may be formed either of sections of brick or masonry *d*, as in Fig. 1, or of hollow-tile arch-pieces or voussoirs *d'*, as in Figs. 2 and 5, is sprung from each skewback-tile C to that upon the adjacent face of the next girder, and upon the arches D there is laid a bed or layer of concrete or equivalent material, E, said bed inclosing and covering the portions of the girders A, which project above the skewback-tiles, and providing upon its top a level surface, on which may be laid the planking F of the floor, for securing

which wooden strips *f* may be embedded in the top of the layer of concrete E. A tile flooring or a roof-covering may be laid upon the concrete with equal facility. Where the arches D are formed of hollow tiles *d'*, as in Figs. 2 and 5, said tiles are, by preference, constructed as shown on a larger scale in Fig. 4. The outer faces of the tiles *d'* are curved, as required, to form, when united, the back of the arch, and their inner faces are straight and parallel with the cord of the segmental back, and are provided with a series of grooves or corrugations, d^1, to facilitate the attachment of the plastering *b* of the ceiling. The sides of the tiles *d'* are recessed at d^2, from their inner toward their outer faces, for such distance as to provide abutting-surfaces d^3 of a depth which is substantially uniform throughout the arch, and is sufficient to afford the area required for the transmission of the thrust thereof to the skewbacks at its respective ends. By such construction the inner portions of the hollow tiles are kept out of contact one with the other, and, being relieved from any strain due to the superincumbent weight, are more efficient in sustaining the plastering of the ceiling. The recesses d^2 may further serve as air-passages, if desired, and where an arched ceiling is required, the inner faces of the tiles *d'* are curved properly to form the intrados of the arch desired. The spaces between the skewbacks *a* form continuous air-passages, which, by suitable flues in the walls, may be made to communicate with the outer air, and thereby to afford means for facilitating the maintenance of normal temperature in the girders, and additional air-passages, a^3, may be provided by extending the skewback-tiles below the angles of the skewbacks, and correspondingly extending the horizontal webs of the skewback-tiles, as shown in Fig. 5, said skewback-tiles maintaining their before-described relation to the skewbacks and arches.

In the construction of the arches D there may be combined, if desired, with the members hereinbefore described, a lower series of flat tiles having curved perforated ribs on their backs, as in my Patent No. 223,275, before referred to, said flat tiles being supported by the skewback-tiles C, and serving to enable the curves of the arches to be turned, and to provide communicating air-chambers between their upper surfaces and the inner faces of the arches.

I claim herein as my invention—

1. In a fire-proof construction, the combination of a metallic girder having a metal skewback formed on or secured to one of its sides, and a skewback-tile facing of corresponding form fitting against the outer surface of said skewback, substantially as set forth.

2. In a fire-proof construction, the combination of two or more metallic girders having skewbacks of metal formed on or secured to their sides, arches each sprung between two adjacent girders, and skewback-tile facings covering the skewbacks of the girders and receiving the thrust of the arches, substantially as set forth.

3. In a fire-proof construction, the combination of a series of metallic girders having metal skewbacks formed on or secured to their sides, skewback-tile facings covering said skewbacks, arches sprung between and abutting on said skewback-tile facings, and a bed of concrete or analogous material laid upon the tops of said arches and inclosing the girders above said skewback-tile facings, substantially as set forth.

4. The combination of a metallic girder having a metal skewback formed on or secured to one of its sides, and a skewback-tile facing fitting against said skewback, and extended beyond the same and below the base or lower flange of the girder, so as to form an air-passage between said base and its adjacent face, substantially as set forth.

5. A hollow tile-arch section for fire-proof constructions, having a curved outer face, a straight inner face, and recesses extending longitudinally along its sides from its inner toward its outer face, said recesses being so located as to prevent, throughout their surface, the contact of the arch-section with an adjacent section, when in position in an arch, substantially as set forth.

6. A skewback-facing tile for fire-proof constructions, composed of a horizontal web or plate adapted to fit beneath the base of a girder, and a vertically-inclined web adapted to fit against a skewback or inclined side on said girder, substantially as and for the purposes set forth.

7. In a fire-proof construction, the combination of a series of metallic girders, metal skewbacks formed on or connected to said girders, and hollow tile-arches sprung between said skewbacks, said arches having the abutting faces of their sections recessed at and adjacent to their lower sides, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand.

EDWARD M. BUTZ.

Witnesses:

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R. H. WHITTLESEY.