

No. 613,158.

Patented Oct. 25, 1898.

P. KÜHNE.  
FIREPROOF FLOOR AND CEILING.

(Application filed Apr. 23, 1897. Renewed Mar. 30, 1898.)

(No Model.)

FIG. 1.

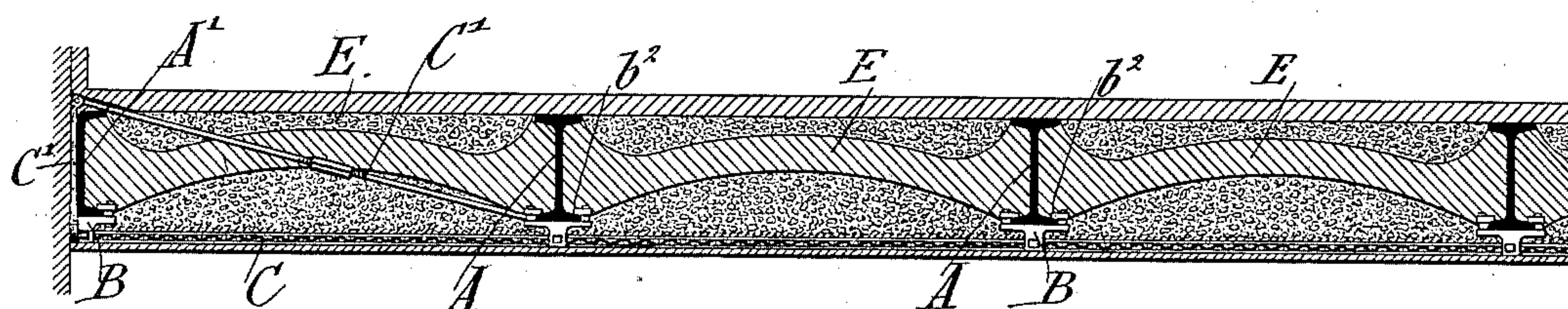


FIG. 2.

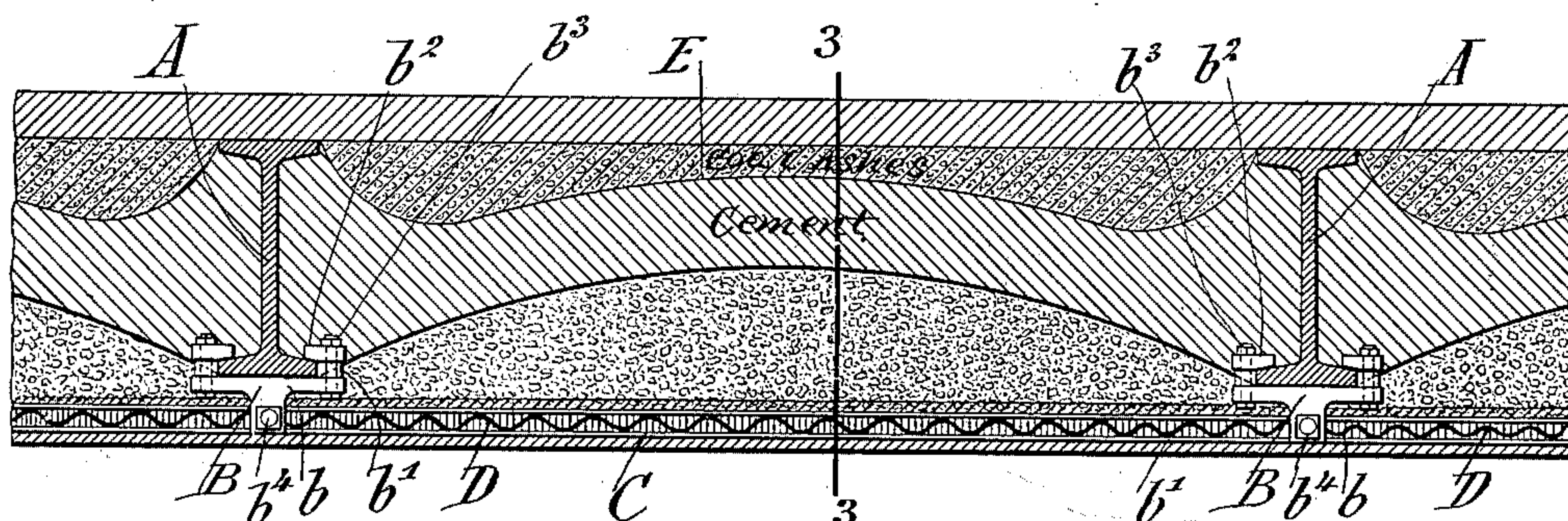


FIG. 3.

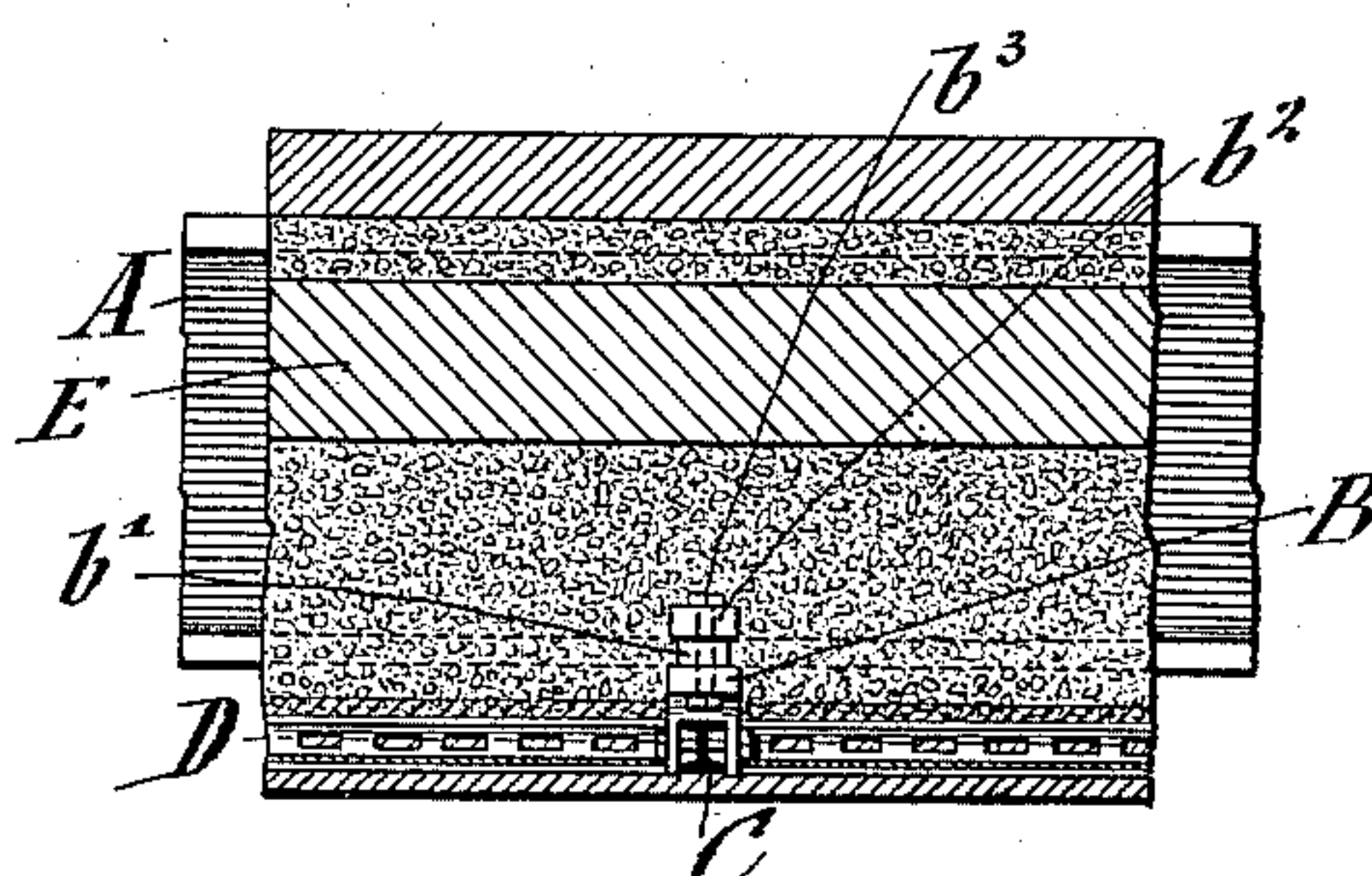
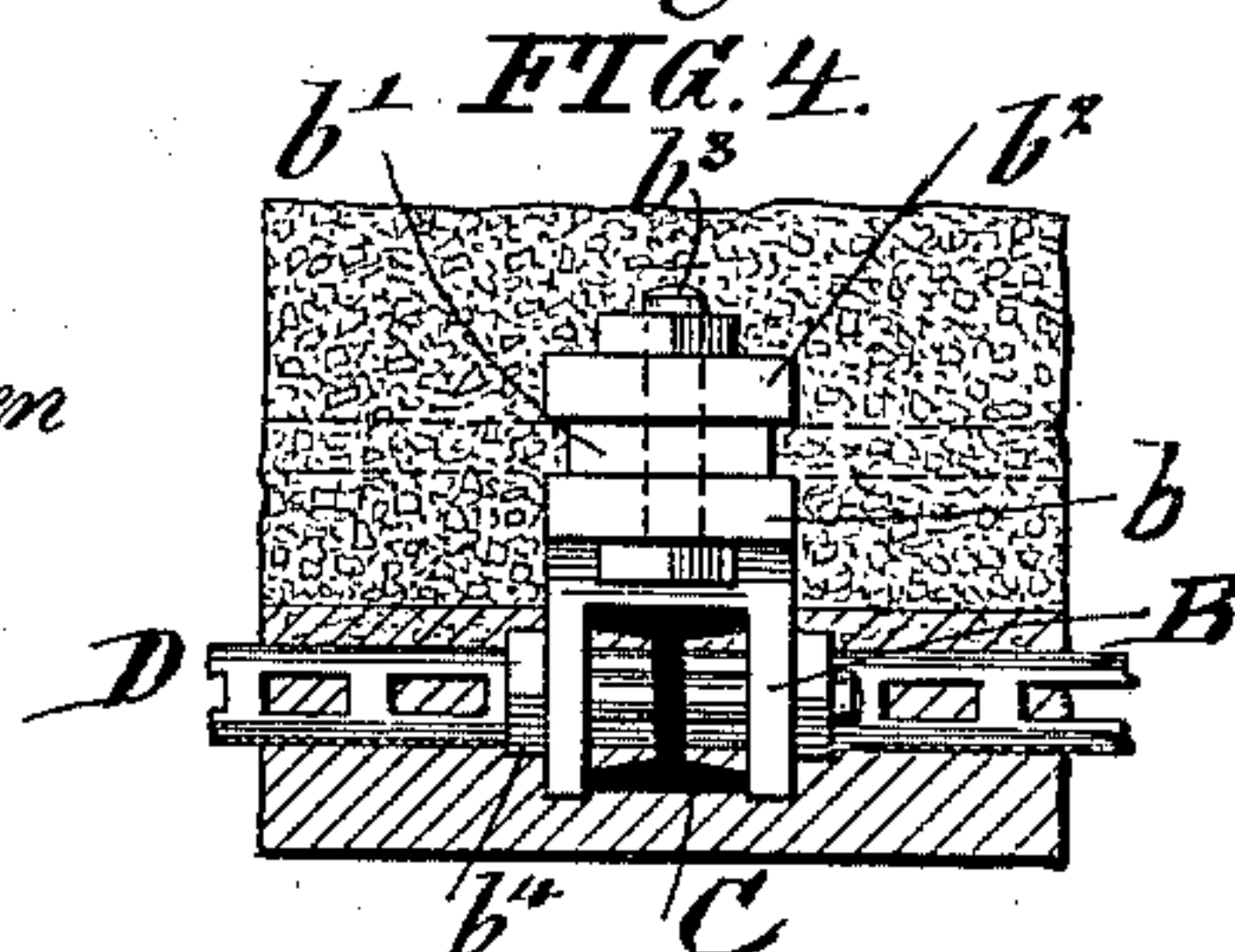


FIG. 4.



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## FIREPROOF FLOOR AND CEILING.

SPECIFICATION forming part of Letters Patent No. 613,158, dated October 25, 1898.

Application filed April 23, 1897. Renewed March 30, 1898. Serial No. 675,802. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL KÜHNE, a citizen of the United States, residing at New York, (Stapleton,) in the county of Richmond and State of New York, have invented certain new and useful Improvements in Fireproof Floors and Ceilings, of which the following is a specification.

This invention relates to an improved fireproof floor and ceiling by which a strong and absolutely fireproof construction is obtained, which can be erected without the use of scaffolds and centers, and in which the ceiling is suspended without weakening the web of the beams by tie-rods or other connections; and the invention consists of a fireproof floor and ceiling supported on I-shaped tie-rods suspended by suitable hangers from the bases of the beams, fireproof plates supported by said tie-rods, and a filling of ashes or other similar material between said ceiling-plates and the arch.

In the accompanying drawings, Figure 1 represents a vertical transverse section of my improved fireproof floor and ceiling. Fig. 2 is an enlarged vertical transverse section of one arch extending between two adjacent beams. Fig. 3 is a vertical longitudinal section on line 3 3, Fig. 2; and Fig. 4 is a detail side view showing one of the hanger-clamps and a tie-rod, drawn on a larger scale.

Similar letters of reference indicate corresponding parts.

A represents the beams of a fireproof building, which are made of the usual I-shaped cross-section. To the base of each beam is applied a hanger B, which is formed of a T-piece  $b$ , extending over the bottom of the beam and supported by intermediate pieces  $b'$ , having the thickness of the base of the beam, and inwardly-projecting clamping-pieces  $b^2$ , which are connected with the ends of the T-piece, said T-piece, clamping-pieces, and intermediate pieces being connected by clamping bolts and nuts  $b^3$ , as shown in Fig. 2. The shank of the T-piece  $b$  is provided with a recess, in which is located an I-shaped tie-rod C, that extends from beam to beam and that is bolted to the recessed shank of the T-piece  $b$  by a transverse bolt and nut  $b^4$ , as shown

clearly in Fig. 4. The T-shaped piece  $b$ , intermediate pieces  $b'$ , the inwardly-projecting pieces  $b^2$ , and the bolt  $b^3$  form together a hanger that is rigidly clamped to the base of the beam and forms a support for the tie-rod on which the ceiling-plates are supported. The tie-rods are arranged transversely to the beams at suitable distances from each other, and the spaces between the tie-rods are closed by means of fireproof ceiling-plates D, which are either made of metallic perforated and corrugated lathing coated with a layer of cement at the upper side and a coating of plaster on the lower side, as shown in Fig. 3, or the ceiling is formed of suitable terra-cotta plates, which are supported by the I-shaped tie-rods C. After the ceiling-plates are held by the tie-rods the space between the same and beams is filled with coal-ashes or other suitable filling material, which is molded in the shape of an arch by means of suitable molds, so that a cement arch E can be cast in the same, this arch being made thicker on both sides toward the beams, so as to form cement skewbacks for the arch, as shown clearly in Fig. 1. The skewbacks or ends of the arch extend up to the top of the beams and inclose the webs of the same entirely with cement. The arch E is preferably formed of one part of Portland cement and five parts of clean coarse sand, which is capable of sustaining a load of sixteen hundred pounds per square foot without danger of breaking. The space above the arch is then filled up with coal-ashes on a level with the top of the beams, and then a layer of cement or other suitable material is placed over the beams and filling of coal-ashes, as shown in Fig. 2. When the concrete arch is completed, the weight of the same is removed from the tie-rods, which have only to carry the weight of the ceiling-plates and the coal-ashes supported on the same. The ends C' of the tie-rods are secured around the channel-irons A', which are set into the walls of the building, and are returned to the hanger of the first adjacent beam, as shown in Fig. 1, so that a loop is formed that takes up the strain of the tie-rods and ceiling-plates supported thereon. The ends C', which in reality form parts of



the tie-rods, are composed of metallic straps or bonds secured at their inner ends, as stated, next to the last beam, while at their outer ends they are secured to metallic plates or clamps C<sup>2</sup>, which are set inside of the outer beams, the lower ends of the plates C<sup>2</sup> being connected with the ends of the tie-rods proper, C.

By the construction described a very strong yet light and self-sustaining floor and ceiling is formed in which the beams are fully protected against fire and which, as a comparatively small quantity of concrete is used, can be constructed at a comparatively low expense.

Having thus described my invention, what I claim is—

1. A fireproof floor and ceiling, composed of I-beams, hangers applied to the bases of said beams, transverse tie-rods supported by said hangers, fireproof ceiling-plates supported by said tie-rods, a concrete arch extending between the beams, and a filling be-

tween the ceiling-plates and arch, and above the arch, substantially as set forth.

2. The combination with I-beams, of hangers applied by clamps to the bases of said beams, the lower members of said hangers being each provided with a recessed shank, transverse I-shaped tie-rods bolted to said shanks, and ceiling-plates supported by said tie-rods, substantially as set forth.

3. A hanger for supporting the fireproof ceiling, composed of a T-shaped bottom piece having a recessed central shank, intermediate pieces, inwardly-projecting clamping-pieces, and bolts for connecting the T-shaped intermediate and clamping pieces, substantially as set forth.

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

PAUL KÜHNE.

Witnesses:

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