(No Model.)

T. A. LEE.

ARTIFICIAL FIRE PROOF JOIST FOR FLOORS OR ROOFS.

No. 461,028 Patented Oct. 13, 1891.

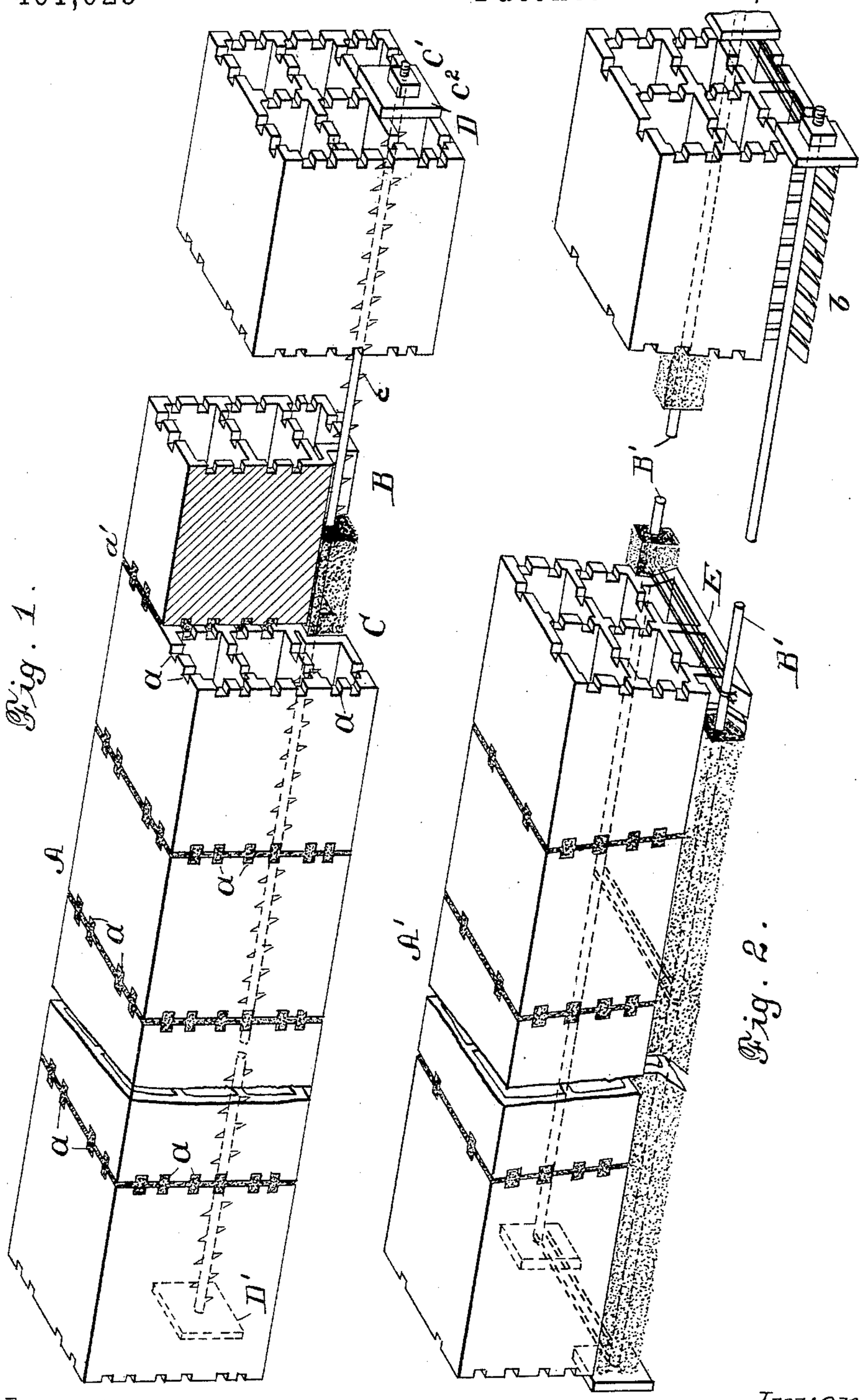

Fig. 1.

Fig. 2.

Witnesses:
F. G. Fischer
R. Tomlinson

Inventor:
Thomas A. Lee
By Richd. H. Manning
Atty.

UNITED STATES PATENT OFFICE.

THOMAS A. LEE, OF KANSAS CITY, MISSOURI.

ARTIFICIAL FIRE-PROOF JOIST FOR FLOORS OR ROOFS.

SPECIFICATION forming part of Letters Patent No. 461,028, dated October 13, 1891.

Application filed December 20, 1890. Serial No. 375,333. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. LEE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and Improved Artificial Fire-Procf Joist for Floors or Roofs; and I do hereby declare that the following is a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is to construct an artificial joist of fire-proof material which may be employed in the construction of buildings to sustain the weight at determinate points of a floor or roof; and it consists in the novel construction and combination of parts, as hereinafter described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a longitudinal broken view of the artificial joist, showing one of the blocks in section, the cavity in the blocks, and the blocks cemented and clamped together and the tension-rod cemented to the blocks within the cavity. Fig. 2 is an alternate form of construction to that seen in Fig. 1.

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

In the construction of my improved artificial joist I employ a suitable number of hollow fire-proof blocks A A, which are preferably of the same dimensions in length and thickness within the desired length of the joist. The ends of each block A are cut in a transverse direction at right angles to the sides of said block, and across said ends are made the intersecting grooves *a a*, one series of which grooves, extending in one direction from one side of said block, being made at right angles to a series of grooves extending across the end of said block from an adjoining side.

In the under surface or base of each block A is made a cavity B, which cavity is made of a suitable width and depth to receive the cement and tension-rod hereinafter mentioned, and also extends the length of said block, and in a series of blocks A A the cavities B B are made to register one with another. In each one of the blocks A, and in the under surface of said block forming the sides of said cavity B, are made in an upward direction the grooves *b*.

A number of the blocks A A necessary to form, collectively, the length of joist required are placed in a single line, and between the abutting ends of each block is placed cement in proper quantities to form a joint *a'*, which cement enters the grooves *a* in the ends of said blocks, and a series of blocks of the proper compression strength are thus united firmly together.

In the cavity B of the series of blocks A which forms part of the artificial joist is placed a tension-rod C, which extends in length an equal distance to that of the artificial joist and also a short distance beyond the end blocks A A, which form the ends to said joist. Upon the rod C, at suitable distances apart and extending from one to the other end of said rod, are made roughened portions or projections *c*. Within the cavity B is then placed the tension-rod C and cement filled in the cavity and around the tension-rod, so as to completely bury said rod in the cement, which cement also adheres to the blocks A. Upon the end portion of the rod C, extending beyond the end block at one end of the joist, is fitted a washer D, and upon the other end of said rod is fitted a similar washer D'. Both ends of said rod C are screw-threaded at *c'*, and to said screw-threaded ends of said rod is fitted the clamping-nuts c^2 c^2.

In Fig. 2 I have shown the separate fire-proof blocks which compose the joist cut at an angle to the upper and lower surfaces of the said blocks, forming arch-blocks A' A'. Two cavities are made in the latter construction, one on each side of the artificial joist in the base and near the lower longitudinal edge portion, in which the tension-rods B' B' are laid within a bed of cement, and thus made to unite with the arch-blocks. Around one of the tension-rods B' upon one side of the artificial joist is looped a short piece of wire E and the ends of said wire extended between the ends of the arch-blocks and also around the other tension-rod B' upon the other side of said joist, and both ends of said wire twisted together. At the end of said joist I

have shown a similar wire attached in like manner to said rods B′ B′ between the ends of the joist and washer, and the wire may then be placed in position before the washers are placed upon the tension-rods.

In my improved artificial joist the blocks A which are employed are of the usual hollow, dense, or porous fire-proof material, and in their manufacture are given the requisite compression strength to sustain a determinate crushing weight. The compression strength of the blocks in each artificial joist is therefore uniform, when no slipping of one block upon another is permitted, and in cementing the blocks together the cement which adheres to the blocks enters the groove *a* in the end of the blocks, and the movement of one block upon another is thereby prevented.

In the employment of the tension-rod with the artificial joist composed of separate blocks I am able to obtain the tension strength of the rod, and in the position in which the rod is placed in the cavity of the blocks—*i. e.*, in the base of the blocks. I am also enabled to obtain the resistance to the compression strain to which the joist is subjected in supporting a floor or roof, and thereby utilize the compression strength of the fire-proof blocks to its fullest capacity.

The tension-rods, which are preferably of steel, and which are thus made to offset the strain, are further re-enforced with the projections *c*, which receive the cement, and the blocks adhering to the cement and the cement adhering to the rod the blocks are prevented from slipping upon the rod, and a greater resistance is afforded to the vertical strain which is brought to bear upon the joist.

In the series of the cross-tie wires which are placed between the blocks in the joists as aften as found necessary to prevent spreading of the tension-rods the arch-blocks are not only supported thereby but are held rigidly in place, and no deflection of one block beneath another is permitted to occur.

The clamping-nuts upon the tension-rods serve to gain the compression strength of the end blocks at the base, the object being that when a weight is placed directly upon an end block the tension-rod cannot be pulled loose from the said end block.

I do not limit myself to the use of fire-proof material or to clay products for the material with which to make the joist. Other material may be substituted, such as manufactured blocks of straw, paper, cement, plaster, &c. I prefer, however, to use the fire-proof hollow tile, either porous or dense.

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

1. An artificial joist for floors and roofs, composed of separate blocks united together and having a cavity in the base of each block extending the length of said joist, and a tension-rod cemented within said cavity and to the said blocks in said artificial joist, substantially as described.

2. An artificial joist composed of separate blocks united together and having a cavity in the base of each block and extending the length of said joist, and a tension-rod cemented within said cavity of said blocks, having a cement-engaging surface, substantially as and for the purpose described.

3. An artificial joist composed of separate blocks united together and having a cavity in the base of each block and extending the length of said joist, grooves extending in an upward direction in said blocks in the sides of said cavity, and a tension-rod cemented within said cavity and united with the grooves in said cavity, substantially as described.

4. An artificial joist composed of separate blocks united together and having a cavity in the base of each block and extending the length of said joist, and grooves in the said blocks in the sides of said cavity, and a tension-rod having cement-engaging surface cemented within said cavity of said blocks, substantially as described.

5. In an artificial joist composed of separate blocks united together and having a longitudinal cavity in both sides of said joist and in the base of said joist, the combination therewith of tension-rods within said cavities and a link connecting said rods, substantially as described.

6. In an artificial joist composed of separate blocks united together and having a longitudinal cavity in the base of said joist, the combination of a tension-rod cemented within said cavity and block-clamping washers upon said rod, as and for the purpose described.

7. In an artificial joist composed of separate blocks united together and having a longitudinal cavity in the base of said joist, the combination therewith of a tension-rod cemented within said cavity, provided with screw-threaded end portions and suitable clamping-nuts upon said rod, for the purpose described.

8. In an artificial joist composed of separate blocks united together and having a longitudinal cavity in the base of said joist, the combination therewith of a tension-rod cemented within said cavity, provided with screw-threaded end portions and suitable clamping-nuts, and washers between said nuts and blocks, substantially as and for the purpose described.

THOMAS A. LEE.

Witnesses:
S. L. C. HASSON,
W. A. SIMMONS.