3 Sheets--Sheet 1.

E. F. COOK.
Fire-Proof Buildings.

No. 152,340. Patented June 23, 1874.

Fig. 1.

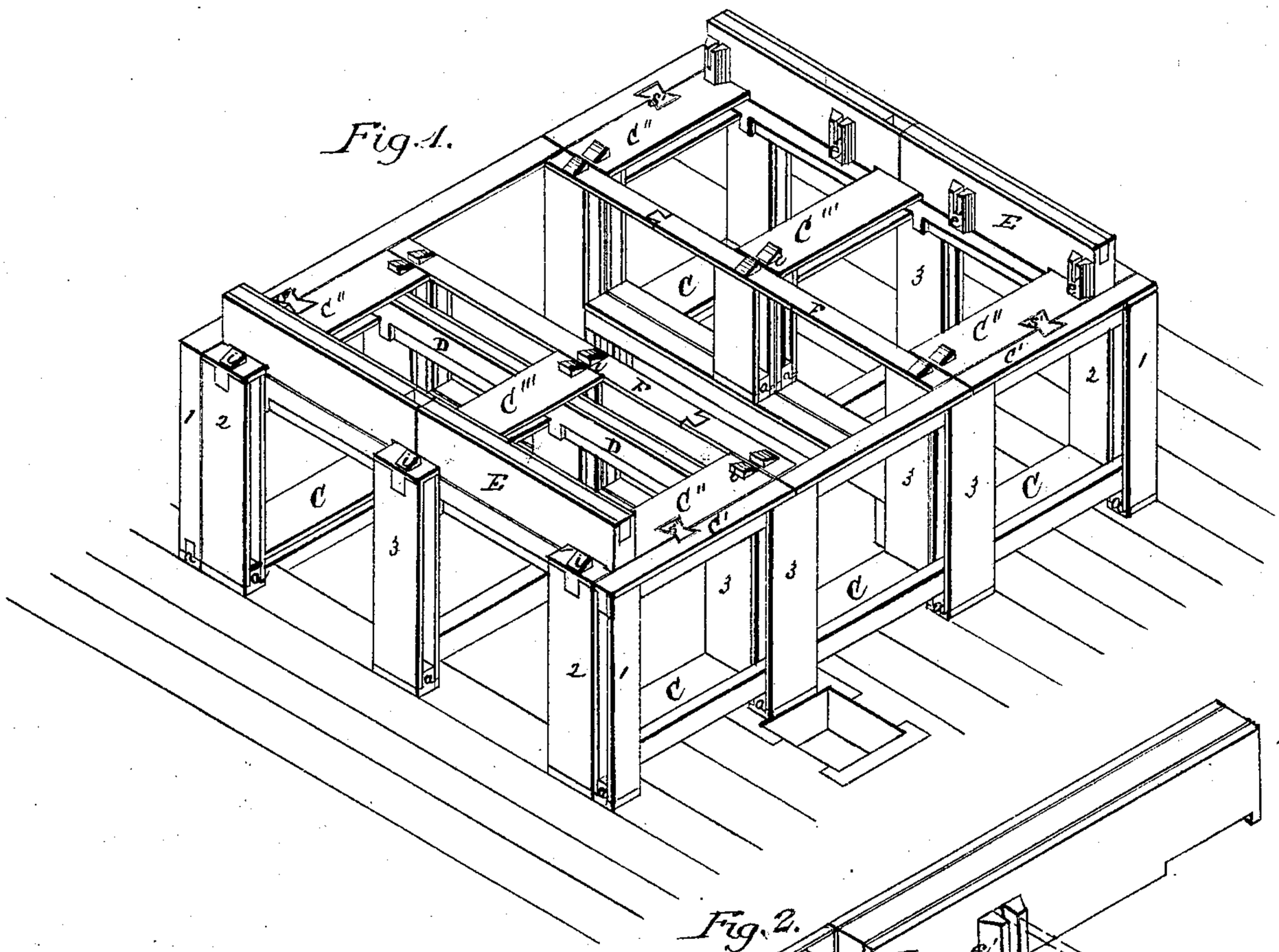
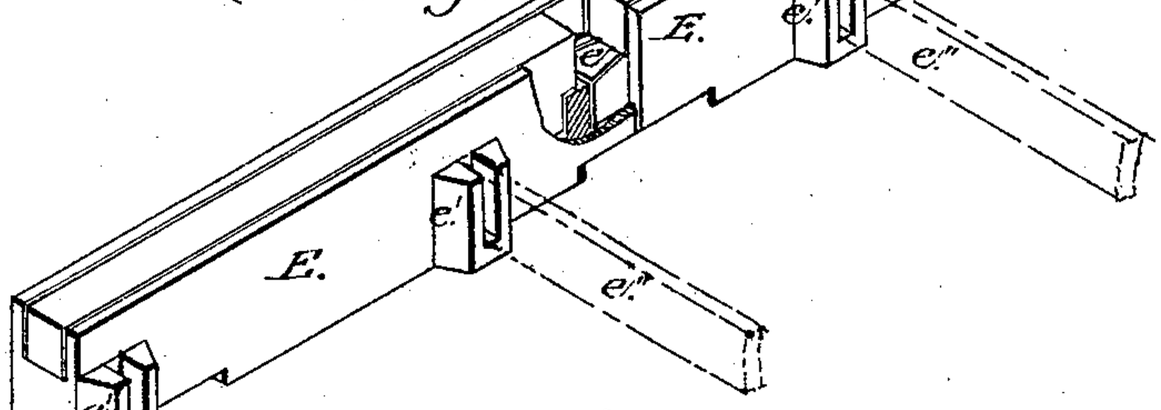


Fig. 2.



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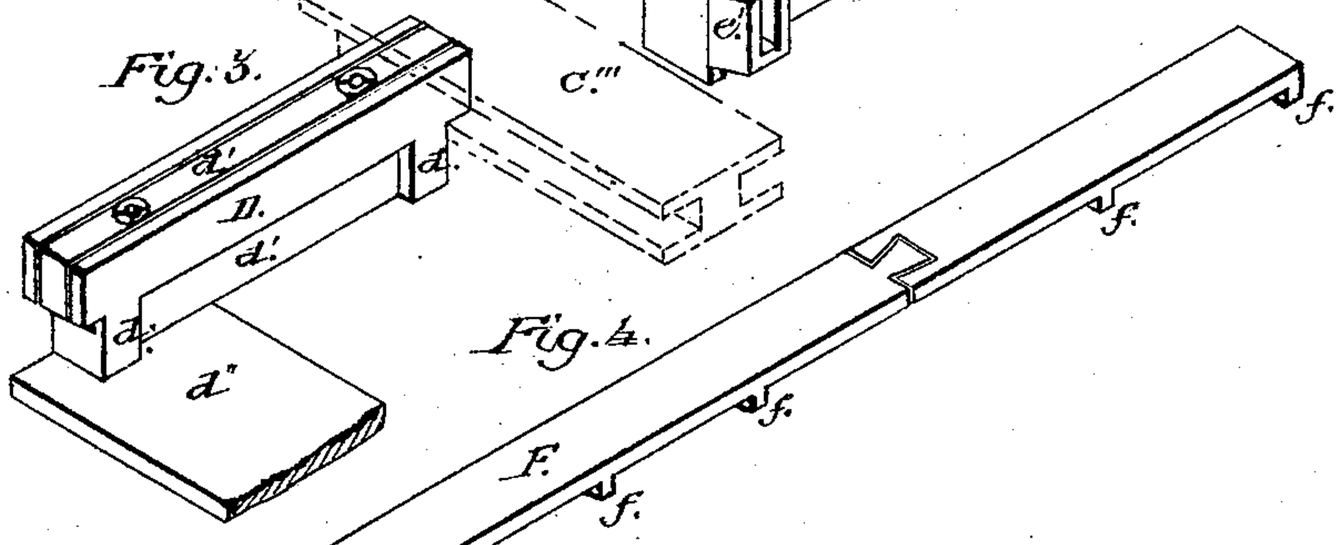

Fig. 4.

Witnesses.

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3 Sheets--Sheet 2.

E. F. COOK.
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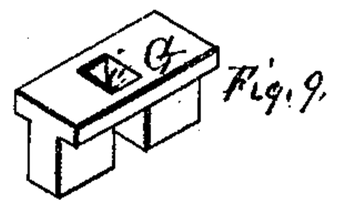
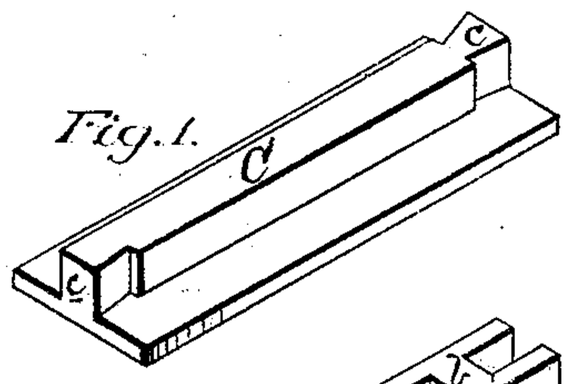


Fig. 9.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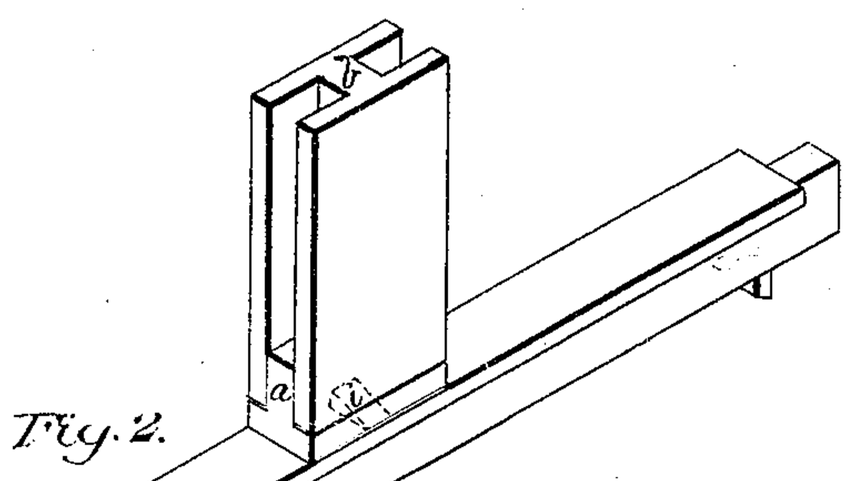
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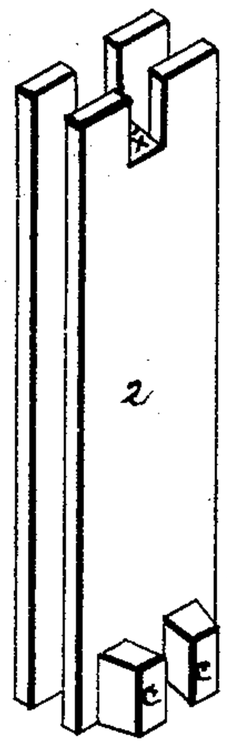
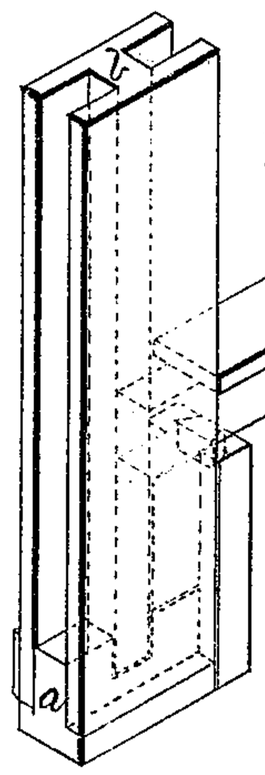


Fig. 3.



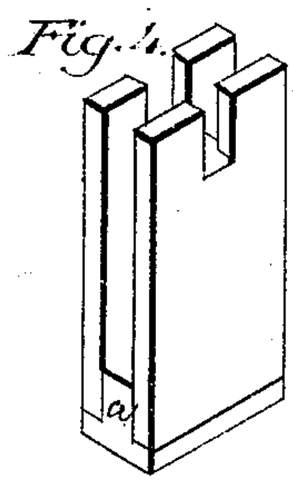


Fig. 4.

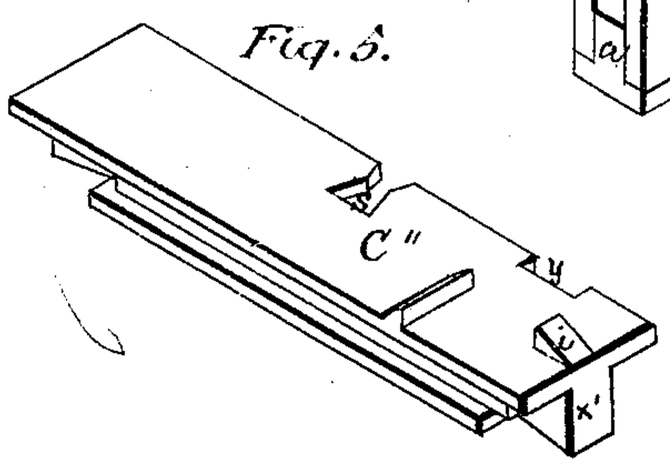


Fig. 5.

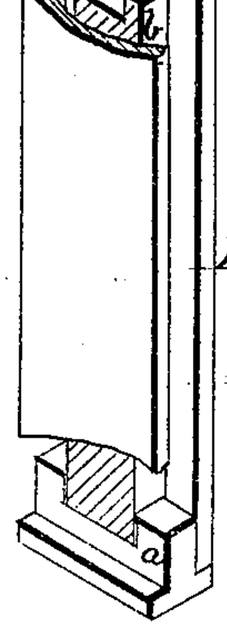


Fig. 6.

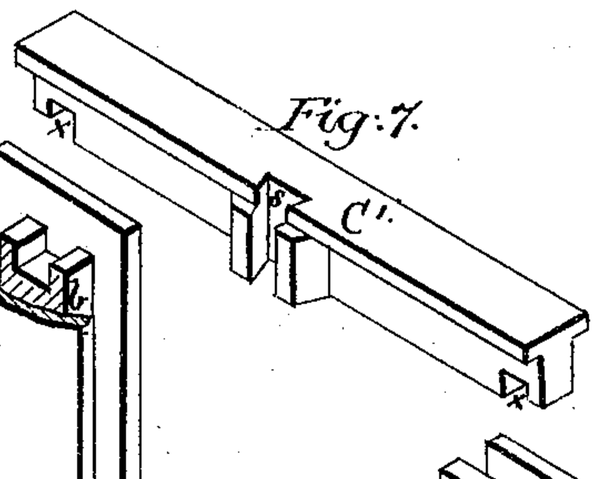


Fig. 7.

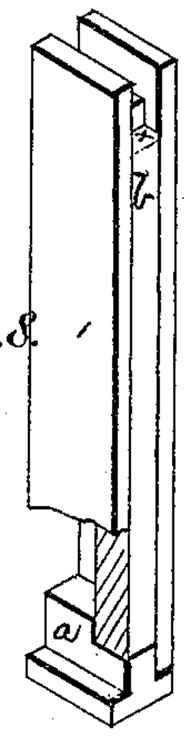


Fig. 8.

Witnesses:
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T. M. Hanson.

Inventor:
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his atty.

3 Sheets--Sheet 3.

E. F. COOK.

Fire-Proof Buildings.

No. 152,340. Patented June 23, 1874.

Fig. 1.

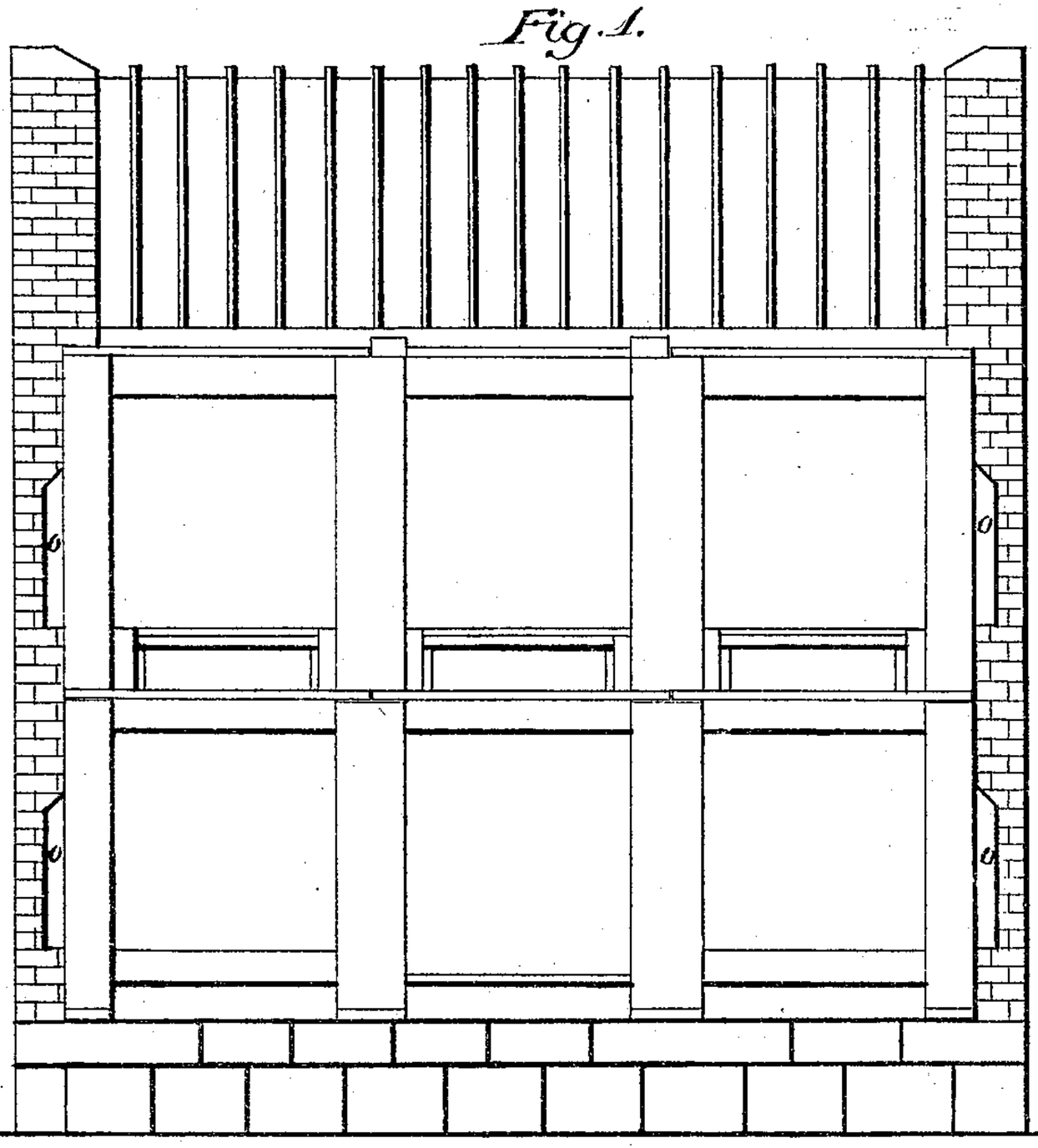
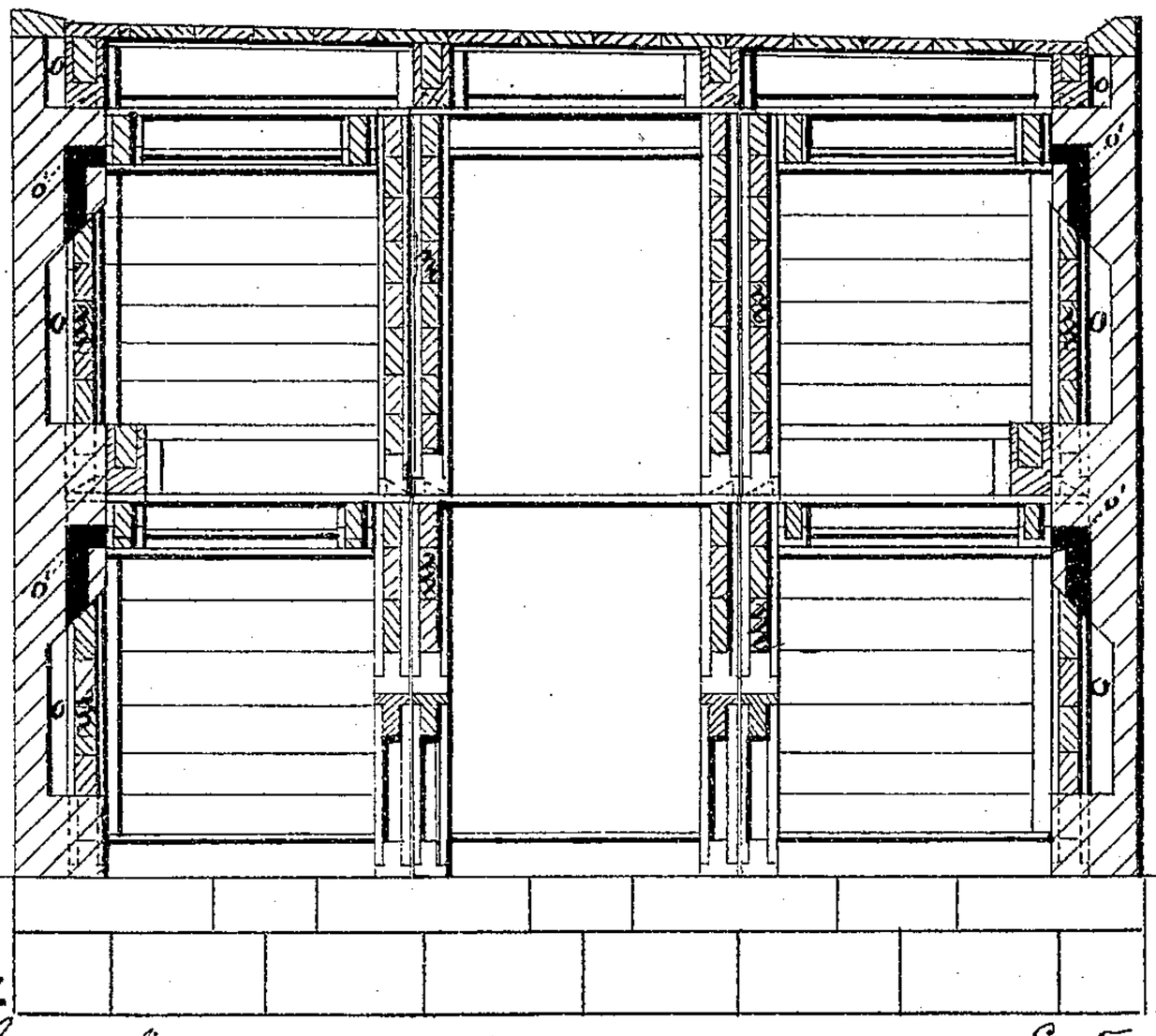


Fig. 2.



Witnesses.

C. Oley Gwalkey

T M Hanson

Inventor

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his atty.

UNITED STATES PATENT OFFICE.

ELIJAH FOX COOK, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN FIRE-PROOF BUILDINGS.

Specification forming part of Letters Patent No. **152,340**, dated June 23, 1874; application filed February 27, 1872.

To all whom it may concern:

Be it known that I, ELIJAH FOX COOK, of the city of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in the Construction and Arrangement of Fire-Proof Buildings; and I do hereby declare the following to be a true and correct description of the construction of the same, and the different parts thereof, reference being had to the annexed drawings making part and parcel of this my specification.

The nature of my invention consists in the peculiar construction and arrangement of the posts, beams, ties, girders, and walls, external and internal, with air-chambers in the external wall; also, in the construction of the roof and its appendages, and the stairways within the building, the several parts composing the frame-work of the structure being composed mainly of metallic cast or wrought iron materials, as hereinafter described.

In order to enable others skilled in the art to make and construct a fire-proof building according to my invention, I will describe the same.

Figure 1, Sheet 1, shows the first story of a building, consisting of the metallic frame-work, of posts, beams, steps, cross-ties, girders, &c. Figs. 2, 3, and 4 show in detail the connection of cross-pieces with ties and top plates, girders, &c. Figs. 1 to 9, inclusive, of Sheet 2, show the construction and arrangement in detail of posts, ties, &c. Fig. 1, Sheet 3, shows a front view of a building with the external brick wall (or stone) surrounding the frame, with the air-spaces in the wall. Fig. 2, Sheet 3, is a vertical cross-section of the same.

A suitable foundation of stone or brick is laid, with such division-walls as may be desired, containing cellars and places for stowage of any articles or merchandise desired, upon the surface of which the superstructure is to be reared. Upon this foundation, where it is desirable to place and adjust the upright posts of the building, are placed metallic or cast-iron steps or supports, upon which the posts may rest, of a size equal to the base or bottom part of each post. A central flange is formed on each step, with spaces cut at the center thereof, or at either end, when required, into which the posts, by their peculiar construction, are adjusted, and thus form a strong and firm seat for such posts, as may be seen at *a a a a* in the figures contained upon Sheets 1 and 2. The posts are in cross-section of the form of the letter H, the central core running the whole, or nearly the whole, length of said posts, as seen at *b b b* in figures upon Sheet 2, except that in the corner posts of said structure the core is upon one side, and flush with the outer side of such posts. The posts, by their peculiar construction, having double flanges on each side thereof, are thus made to adjust themselves upon the steps referred to, and become firmly seated upon the steps, upon which they rest, the whole forming a plane and flush surface, as shown in Sheets 1 and 2 of drawings. The corner posts of said structure are firmly held together at their bottom or lower parts by means of dovetailed connections of cross-ties, with the lugs formed and cast upon such corner posts, as seen at *c* in Sheet 2, Fig. 3, the form of construction of the tie referred to being seen at C, Fig. 1, upon same sheet, thus forming a very strong and rigid connection, and becoming strengthened in proportion to the number of connected buildings. The corner posts, as seen at 1 and 2 in Sheet 1, and separately at 1 and 2, Sheet 2, are connected at the top of the same by means of the cross pieces or beams *c′* and *c″*. The cross piece or beam *c′* has upon each end of its central rib, at *x x*, a square cut or mortise, that is adjusted and fits over and upon the core *x* of the corner post, thus connecting and holding together the two connected posts at the top or upper part thereof. The said post has also formed upon it the dovetail groove and projections, as shown at *s*, Sheet 2 of drawing. Another beam or cross-tie, corresponding with the one just described, and connected with the same by means of the dovetail key or wedge *s′*, as seen in Sheet 1 of drawing, is used to connect the post 2 with its opposite post, having a dovetail tenon, *x′*, formed upon either end of the same, fitting into a corresponding cut or mortise in top of said posts, so that when the key or wedge is adjusted in position shown, the whole structure is thus held firmly together. The intervening posts between the corner posts referred to are also held in position and kept together

by means of similar cross ties or beams, with omission only of the key or wedge above referred to, the mode of locking the same being by means of the dovetail form of the tenon or rib upon the same, with its corresponding mortise upon the posts so connected as aforesaid. The peculiar shape of the posts, having double flanges formed upon each side of the core thereof, is for the purpose of receiving within such flanges, and running from one post to the adjacent one, strips of wood or boards *m* of any suitable width, being preferably of hard wood, and upon which tile can be secured, in any proper manner, as shown in Fig. 2, Sheet 3 of drawings, to render the same impervious to fire from the inside of said structure. The cross beams or ties heretofore referred to, viz., *c''* and *c'''*, are also constructed like the posts, with double flanges each side of the core or central part of such beam or tie; and in order to furnish a support to the ceiling of the building, I construct a cross-piece, D, of metal, cast or wrought, with projections *d* near the end thereof, so that the projections at either end of the piece D, beyond *d*, may fit in and be adjusted between the flanges of the cross beams or ties *c''* and *c'''*, as shown in Fig. 3, Sheet 1 of drawings. Within the space formed between the sides of the cross-piece D and the projections *d* thereof, I insert a piece of hard wood, to which the ceiling may be fastened in any suitable way, and upon this is also secured tiles, or other incombustible material that tends to make the structure fire-proof. *d''*, Fig. 3, Sheet 1, represents the ceiling, to which such tile may be secured. The method employed to sustain and connect this structure together, longitudinally, is by means of beams or plates, constructed as shown in Sheet 1 of drawings, and lettered, respectively, E and F. The beam E, made of metal, may be in one piece; or when, on account of the length, this is deemed inadvisable, may be in two or more pieces, connected by dovetailed joints, as seen as *e*, Sheet 4. This beam is cast hollow, and the space filled with wood, upon which the flooring may be placed, and the latter covered by tiles, similar to the walls and ceilings hereinbefore described. The under side of said beam has spaces formed upon it that will fit over the cross-ties *c''* *c'''*, and lips formed upon the ends of the same, to fit into the spaces *y*, cut out of the front and rear cross-ties *c''*, as seen in Sheets 1 and 2 of said drawings. The plate F is, upon its lower side, constructed to rest upon the cross-ties, having projecting ribs formed upon the under side thereof, as seen at *f f* in Sheet 1 of drawings, which embrace the cross-ties *c''* *c'''*, as seen in Sheet 1 of drawings. Lugs or projections *c' c'*, &c., are formed upon the side of the beam E, with a groove or dovetail within them, into which are inserted the floor-joist *e''* *e''*, that connect with the opposite beam, as seen in Sheet 1. Upon the top or upper portion of the cross-ties *c''* *c'''*, and of the connecting-plates F, projections or lugs are formed as seen at *i i i*, Sheets 1 and 2. These are employed in such a manner as to receive steps G, having a corresponding depression, *i'*, of the form of the lugs or projections *i i*, upon which steps the posts forming the second story of the structure are adjusted, in a similar manner to the posts in the first story hitherto described. This step is seen at G, Sheet 2 of drawing, the bottom side being uppermost, in order to show the depression *i'*. Posts of similar construction to those hereinbefore described can be arranged in such a manner and at such distances apart as to allow for the necessary spaces for doors and windows of the structure, the object being to use metallic substances throughout the whole building, presenting such a surface that will not be affected, or will be the least affected, by fire.

The division and form of the several apartments and stories of the building can be varied to suit the taste and convenience of the builder, and doors, blinds, &c., for these structures can be made of metal, and lined with plaster or other incombustible material.

The whole metallic structure is surrounded by a stone or brick wall, containing within it vertical and horizontal air-passages, (that may be fed by openings in such walls,) as seen at *o o* and *o' o'*, Sheet 3 of drawings. The roof of said structure may be flat or pointed, as desired, and constructed in such a way that a layer of wood is interposed between metallic plates, and the outer or weather surface covered with tile, secured to such roof in any convenient manner.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The within-described mode or method of connecting and securing the metallic posts, both at the top and bottom of the same, by means of the ties *c*, when constructed, fitted, and adjusted to and within lugs *a a*, formed upon the bottom of said posts, and the top ties *c' c'' c'''* connecting and securing said posts at their upper ends, in the manner and for the purpose herein set forth.

2. The combination of the cross-ties *c' c''* and posts 1 2 3 3, constructed and arranged as herein described, with the dovetail wedge or connection *s*, in the manner and for the purpose herein described.

3. The posts 1 2 3, combined with the steps *a*, in the manner and for the purpose herein described.

4. The upper cross-ties *c'' c'''*, having formed upon them the lugs or projections *i*, in the manner and for the purpose herein described.

5. The combination of the beam E, constructed as herein described, with the metallic posts 2 3 2 and cross-ties *c'' c''' c''*, in the manner and for the purpose herein set forth.

6. The ceiling-supports D, construced as described, and combined with the cross-ties *c'' c'''*, for the purposes herein set forth.

7. The metallic plate F, with the projecting ribs or flanges *f*, when constructed and ar-

ranged in the manner and for the purpose herein set forth.

8. The combination of the double-flanged metallic posts with the wooden or plank filling, forming the wall-surface, when constructed and arranged in the manner and for the purpose herein described.

9. The combination of the external stone or brick wall, with its air-spaces *o* and *o'*, with the metallic frame-work of the building, when the same is constructed and arranged in the manner and for the purpose herein described.

10. The steps G, Sheet 2, with depressions *i'* formed upon the under side of same, when combined with the cross ties or plates, upon which are formed the lugs or projections *i*, in the manner and for the purpose herein described.

E. FOX COOK.

Witnesses:
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