

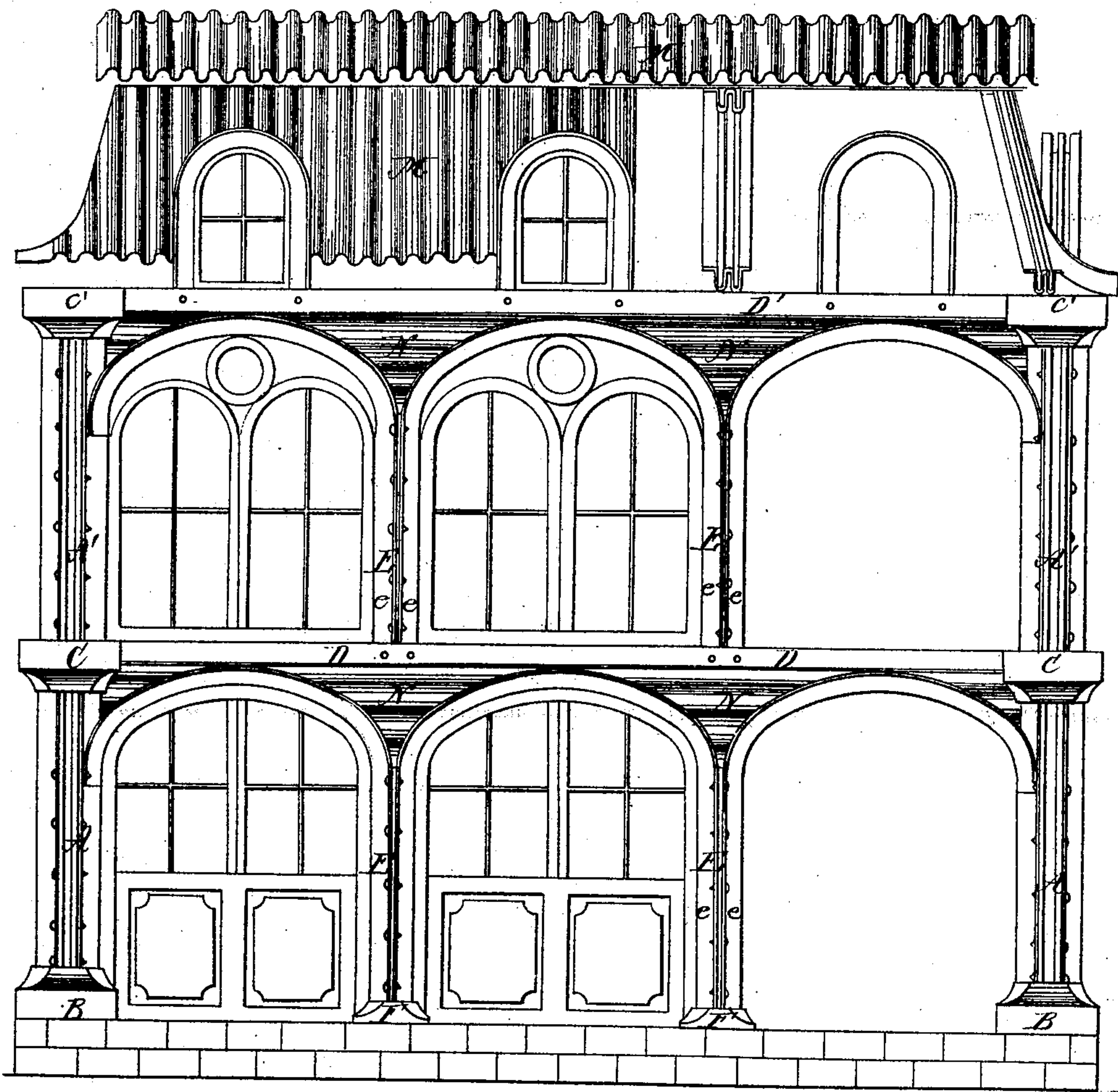
R. Montgomery

Iron House.

N^o 89,540.

Patented Apr. 27, 1869.

Fig. 1.



Witnesses,

*Amos Rome
and Abram*

Inventor,

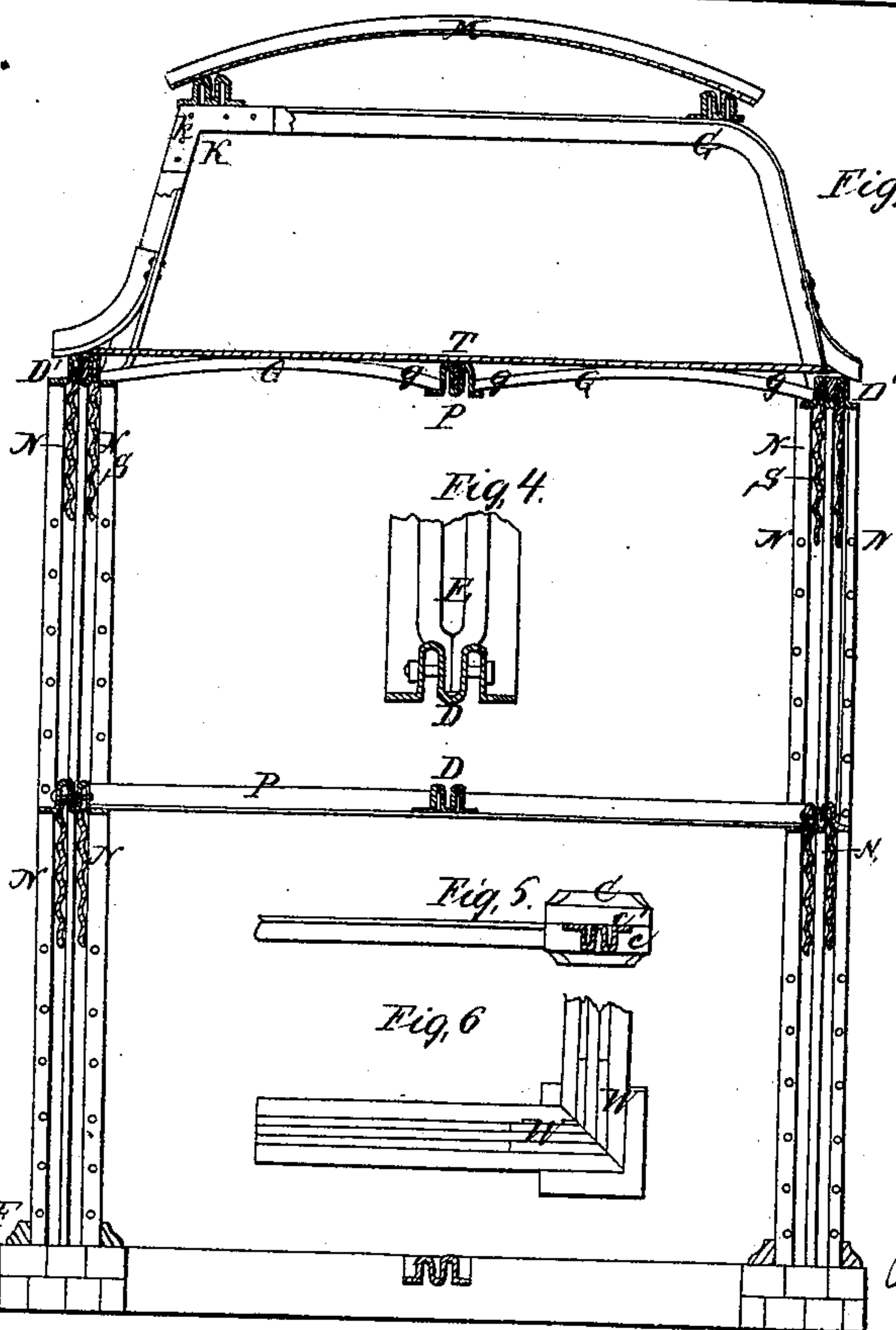
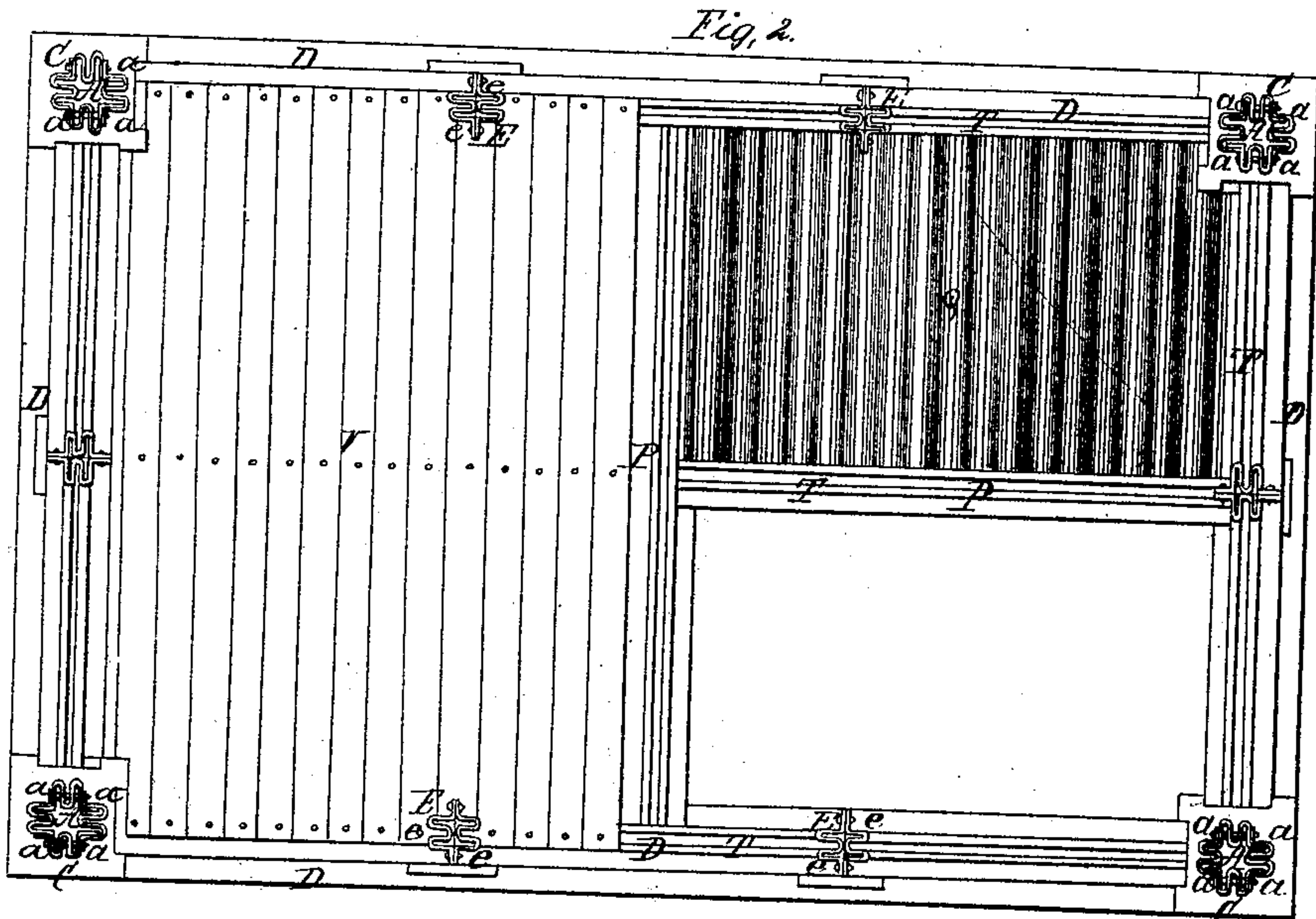
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Witnesses
Wm. H. Rorer
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United States Patent Office.

RICHARD MONTGOMERY, OF NEW YORK, N. Y.

Letters Patent No. 89,540, dated April 27, 1869.

IMPROVED CORRUGATED-METAL BUILDING.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, RICHARD MONTGOMERY, of the city, county, and State of New York, have invented a new and improved Corrugated-Metal Building; and I do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of one style of my improved buildings, with portions of the roofing removed;

Figure 2, a transverse section, in the line *x x* of fig. 1, showing portions of the flooring removed;

Figure 3, sheet 2, a vertical section, in the line *y y* of fig. 1; and

Figures 4, 5, and 6, detached views of details in construction.

The object of my invention is to obtain a cheap, ornamental, fire-proof metallic structure, which shall likewise be proof against the shocks of an ordinary earthquake, and possess superior advantages, as respects ventilation and economy of construction; and

It consists in the combination of corrugated sheet-metal, to form the sides, roof, floors, and partitions thereof, with corrugated metallic beams and columns, to form its frame-work and supports.

In erecting my improved buildings, I construct the frame-work with my patented corrugated-metal beams. I prefer to use for the corner-posts, columns *A*, constructed of four double-corrugated metal beams, *a, a, a, a*, (see fig. 2,) united substantially as described and illustrated in my Letters Patent for said column, and herein illustrated by the cross-sections of the columns in fig. 2.

The bases of these corner-posts rest in base-plates *B*, firmly set in or upon the foundations of the building, as shown in fig. 1, and mortised to receive and closely embrace the lower ends of the columns *A*, and are provided with corresponding cap-plates *C*, mortised in like manner, to fit closely and accurately upon the upper ends thereof, and also to receive the ends of the cross-beams *D*.

The intermediate studs, or supporting-posts *E*, of the structure may consist of simple double columns, formed by uniting two corrugated beams, *e e*, face to face. (See section thereof in fig. 2.)

Their lower ends may be secured in suitable base-plates, *F*, in the foundations.

I prefer to curve the upper ends thereof in opposite directions, as shown in fig. 1, to afford wider support to the superimposed transverse beams *D*; and in some cases, they may be so extended in the curve as to form a complete arch connected to this adjacent column, as illustrated in fig. 1 of the drawings, forming an ornamental finish between the columns, and imparting additional strength to the structure.

The outer transverse beams, *D*, consist of simple doubly-corrugated beams, whose ends rest in recesses cut in the cap-plates *C* to receive them, and which may

receive intermediate support from the arches sprung from the intermediate posts, or studs *E*, or from the studs proper, where the arches are dispensed with.

The frame-work of the upper stories consists of similar corner-posts, *A'*, whose lower ends are secured in mortises cut in the upper side of the cap-plates *C*, and whose upper ends are provided with similar cap-plates, *C'*, to receive the ends of the next tier of transverse beams *D'*, and of columns for the next story, or rafters for the roof.

Instead of providing base-plates to receive the lower ends of the intermediate studs *E*, the lower ends of the corrugated beams constituting these studs may be pinched or compressed, so as to form a tenon to fit in between the folds of the transverse beam, which will thus serve as a mortise therefor, as fully shown in the detached view, fig. 4, and in fig. 3.

Simple, light, corrugated beams, laid and secured as are wooden rafters, may be used for a hip-roof. Wooden cleats may be inserted between the folds of the corrugated rafters, to which an ordinary wooden sheathing may then be readily nailed in the usual manner for carrying any desired form of covering; or the rafters may be covered with light, corrugated sheet-metal, *M*, either iron or zinc, as illustrated in fig. 1.

Where a Mansard, or French roof is desired, the corrugated beams may be curved in any desired form, to constitute, in one unbroken piece, both side and horizontal rafters, (see *G*, fig. 3;) or, for a sharp angle, as at *K*, fig. 3, the ends of the beams may be united, and stayed by means of a metallic knee, *k*, inserted within the folds of the corrugations.

The buildings thus framed may be completed exteriorly by means of either plain or corrugated-metal sheets, *N*, fig. 1, whose ends are sprung into the recesses formed by the folds of the upright corrugated beams, as shown in fig. 3. As there are two or three grooves or recesses in each upright, two thicknesses of the sheet-metal may be used, forming a double wall. The inner space *s*, between them, left hollow, will enclose a stratum of air, forming a good non-conductor of both heat and cold.

The floor-beams, or joists *P P*, consist of corrugated-metal beams, similar to the transverse beams *D* of the framing, yet lighter. These joists *P P* rest, at either end, upon the inner flanges of the outer transverse beams *D*.

Between the floor-beams, and resting upon the flanges thereof, sheets of corrugated metal, *Q*, are sprung, so as to form arches separating the upper and lower stories.

The space *q*, fig. 3, over these arches may be filled in with cement to the level of the beams, and thus constitute a solid flooring.

Wooden cleats, *T*, fig. 2, may be inserted between the folds of the floor-beams *P P*, to which a wooden flooring, *V*, may be secured, either upon a cement filling, as described, or without it.

The under side of the corrugated arches Q will present a neat finish for the ceiling of the room below, or, if a ceiling of plaster be preferred, wire-netting may be stretched from beam to beam, to receive and hold the plaster; or wooden strips, T, may be readily secured in the folds of the corrugated beams, to which laths may be nailed in the usual manner. The inner walls of the room may, in like manner, be left finished by the simple corrugated metal, or be covered with plaster, as just described.

The facility with which wood may be combined with and secured to the corrugated beams, by means of strips or cleats inserted between their folds, permits the ready introduction of as great a variety in the style of finish for the interior or exterior of the buildings, as can be obtained even in a wooden structure, whilst, on the other hand, it may be very cheaply finished, in a neat, ornamental, substantial manner, almost wholly with metal alone.

The cap-plates C may be divided in two pieces, *c c'*, (see figs. 6 and 7,) to be subsequently riveted together. This may be found preferable, in order to obtain a superior finish thereof, and to obtain a stronger, firmer combination therewith, of the ends of the transverse beams.

Figs. 5 and 6 illustrate one of such divided cap-plates, arranged for a corner-support, fig. 6 illustrating the manner of combining therewith the ends of the corner-beams resting therein.

It will be perceived that the support of the beams extends to the very centre of the plate, the joint being made yet firmer by means of auxiliary knee-pieces, W, inserted in the folds of the beams, tying them firmly together.

I contemplate all suitable forms of cap or connecting plates in combination with my corrugated beams, not limiting my invention to the use of those herein described alone.

The corrugated columns, or supports, which I use, may be made by uniting two or three or four doubly-corrugated beams, and may be combined with intermediate longitudinal tie-plates, for additional strength. I contemplate using, for these columns, beams with single corrugations or folds, and also with three or more, although I consider the double-corrugated beam the most serviceable.

Simple flat sheet-metal, or even cast-metal, may be substituted for the corrugated sheets N in completing the walls of my buildings; but I prefer the corrugated sheet-metal for the floors and ceilings.

The hollow spaces within the columns and supports will constitute flues, which may be adapted and employed for purposes of ventilation throughout the building.

Having thus fully described my invention,

I claim as new, and desire to secure by Letters Patent—

An iron building, composed mainly of corrugated-metal columns, A A', connected substantially as described, studs E E', beams D D', and metallic plates, or sheets N, inserted within the grooves in said studs or columns, the whole being constructed substantially in the manner herein specified.

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Witnesses:

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