W. J. Fryer, Jr.

Iron Building.

No. 88,953. Patented Apr. 13, 1869.

Fig. 1.

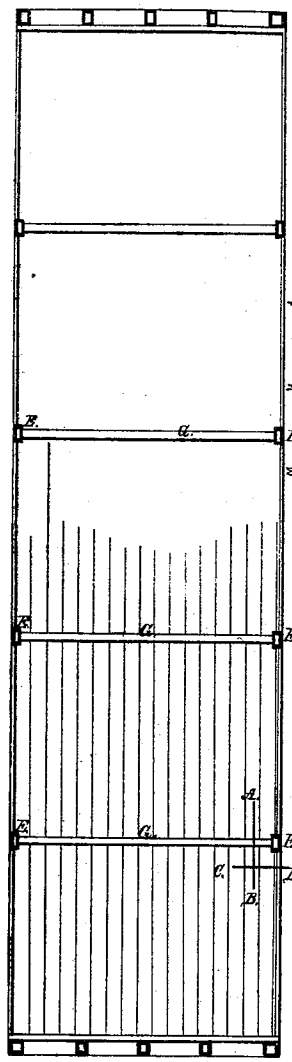


Fig. 2.

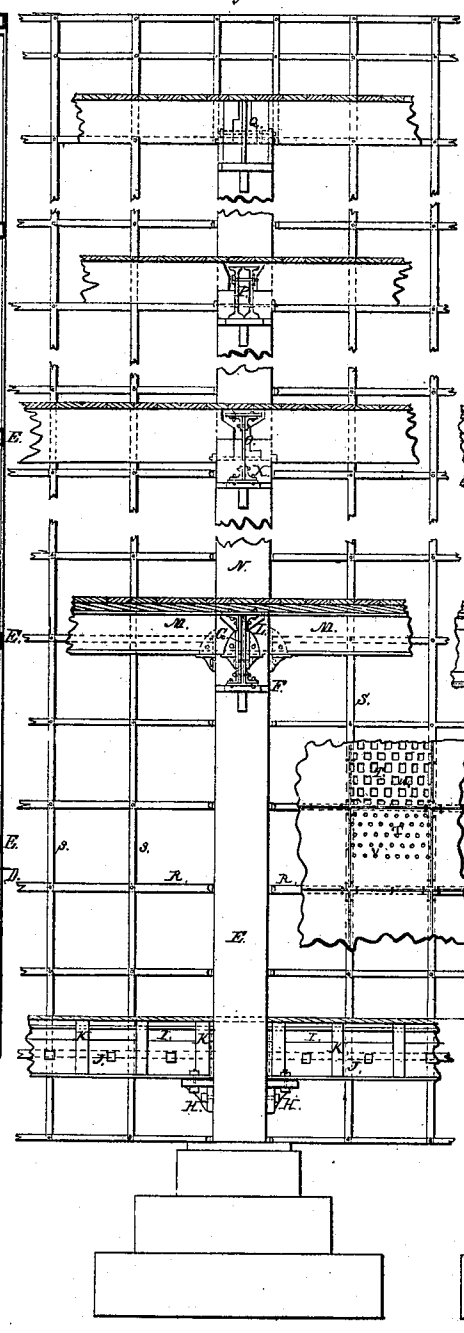


Fig. 3.

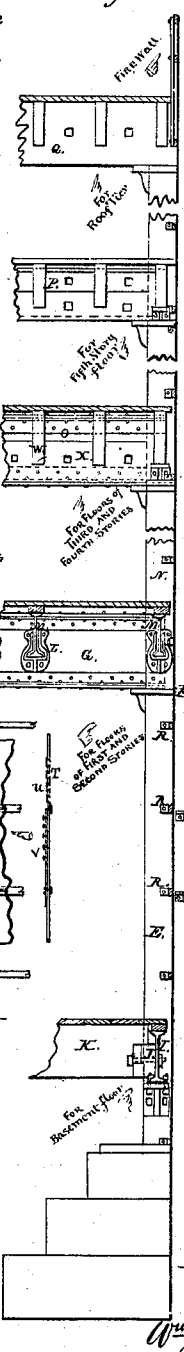


Fig. 5.

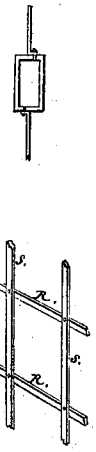
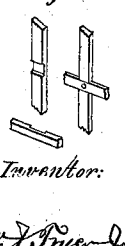


Fig. 4.



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Letters Patent No. 88,953, *dated April* 13, 1869.

IMPROVED 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, WILLIAM J. FRYER, Jr., of the city of New York, and State of New York, have invented a new and improved Mode of Constructing Iron Buildings; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan of a store-building, whose size is, say, thirty feet wide by one hundred feet deep.

Figure 2 is a vertical section, on line A–B, showing construction of different kinds of girders and floor-beams, &c.

Figure 3 is a vertical section, on line C–D.

Figures 4 and 5 are variable details.

Similar letters of reference indicate similar parts.

The object of this invention is to provide iron walls in substitution for brick, together with a system of columns and cross-girders, for sustaining the floor-beams, and presents in its favor economy in space, economy in construction, lightness in structure, facility in erection, durability, incombustibility, and freedom from dampness.

The drawings show particularly the adaptation of my invention to an inside store, *i. e.* a store situated between two others, as being the simplest to describe in detail, inasmuch as my invention is applicable to dwellings and every other kind of building, both public and private.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction.

I divide off the depth of the lot to be built over, into equal parts, or as the position of stairways, &c., demands, and at these stated points set up, on as uitable foundation, cast-iron box-columns E, usually about eighteen feet apart on a line.

On the top of these columns E, which are, say, eight by sixteen inches in section, I place a plate, F, on which a cross-girder, G, rests.

At a point low down on the column E, I bolt a heavy bracket, H, on which rests a girder, I, extending from column to column in a direction of the length of the building.

Bolted to this girder I is a timber, J, the latter being mortised to receive the floor-timbers K, which timbers run in the usual cross-direction.

These timbers K are planked, and so form the basement floor.

If the span from the girder I to the similar girder directly opposite, is too great for the ordinary size timbers K, then a central wood girder, supported on piers, can be used in addition.

To the sides of the girder G are bolted shoes L, into which are fitted floor-beams M.

On the top of the columns E, I stand similar columns N, the same being cut out on one face so as to straddle the girder G.

I continue the same system of placing column on top of column, and girder over girder, forming the different stories, to any required height. The girders O P Q illustrate different forms of favorably-known girders.

From the column E to the next adjoining one, I extend wrought-iron horizontal bars R R R, say, of one and one-half by one-half inch, and bolted at the kneed ends to the columns.

I place bars of the same size, S S S, extending vertically and riveted or bolted at their intersection with the bars R. These bars are, from centre to centre, each way, say, two feet.

Between the columns of each tier are these bays of horizontal and vertical bars.

On these bars are riveted, or bolted, or otherwise fastened sheathing-plates T T, of cast or wrought-iron.

Directly on these plates the ordinary wall-plaster is spread, and in order to retain the plaster, the said plates T are made with partially sunk surfaces, as at U, or with button-head projections, as at V, or some similar device to accomplish the desired object.

The fire-walls above the roof-tier of beams, I construct by the same system of horizontal and vertical bars, and sheath one or both sides with iron plate.

These iron walls formed of bars R S, and sheathing-plates T, are applicable for side, or rear, or front, or partition-walls. Where the walls are exposed on both sides, as in the case of a corner building, where the side wall faces the street, a double sheathing can be used, outside as well as inside of the bars. The bars themselves may be halved at the points where they intersect, as shown in fig. 4, and then riveted, or bolted together. The bars can be placed at right angles to each other, as shown in the drawings, or at obtuse angles, or to form diamond or other shaped spaces.

For flues, cast-iron or wrought-iron oblong tubes, forming continuous lengths, placed at required points, will be bolted and otherwise hung to the bars. These flue-tubes will be, say, three by ten inches, and sufficient space will be found between the beam M and bars R S for their accommodation.

In practice, the columns will be drilled by templet, the bars drilled at marked places, and the entire work done at the manufactory with such accuracy as to fit together in its various parts, and the entire building erected with rapidity. Columns are fastened to columns, and these in turn to the girders, by knees, straps, angle-pieces, braces, bolts, and by other ways familiar to workers in iron. The entire building can be made fire-proof by the use of girders G and floor-beams M, using the ordinary fire-proof cement arch, thrown from iron beam to iron beam; or wood beams W, with iron girders O, the latter having wood timbers X bolted to same, into which the floor-beams are mortised, can be used. For the principal stories, the first method can be used, and for the remaining stories, the second, thus making part absolutely fire-proof, and the remainder only partially so. Other modifications can also be adopted, as shown at P Q. Supposing a fire to occur where the girders O P Q are used, all that could burn

would be the wood floor-timbers and planking, and the wood timber bolted to the said girders. The columns and girders, and bars and sheathing-plates, being of iron, amidst the fiercest heat from within or without, would remain intact. An inexpensive renewal of the carpentry-work would restore the building to as good a condition as before the fire occurred.

The structure is tied together in every direction, and an earthquake shock could not overthrow it. The danger of an imperfect foundation is obviated. Instead of a foundation extending all along the depth of the building, as required for brick walls, only a foundation where the columns E occur is wanted, and the load to be calculated for is simply the weight of the columns, and girders, and floors, &c., and the load to be sustained on the latter, thus being free from the enormous compressing weight which brick-work itself involves.

At any time the building can be taken down and removed, and re-erected elsewhere, with the same perfection as at first. Their portability enables them to be constructed at one place and transported and put up at another. It enlarges the interior of a structure by lessening the space usually occupied for walls, a very important item in cities where land is of very great value. The greatest range of temperature it can be subjected to will exert upon it no appreciable effect.

Here, then, is a structure original in conception, novel in construction, and useful wherever buildings are required, fire-proof and substantial, in which not a brick is required.

The columns E may be of wrought-iron, put together in plates, or rolled in one piece to a desired shape, either plain or ornamental, or plastered over. The sheathing-plates T may be placed on the outside or on the inside, or both outside and inside, and the space between filled with plaster; or the plates can be placed centrally between the bars R S. Special-shaped bars can be arranged so that the sheathing-plates can be slipped between, and when the bars are riveted together, clamp the plates, and hold the latter firmly without other fastenings. In the case of a building intended for storage-purposes, situated between buildings with brick walls on both sides, these sheathing-plates could be dispensed with. The outside of these plates, where exposed to view, can be plastered with cement or concrete, and blocked off to resemble stone, or wood, or iron-clapboarding, used as an outside covering and finish. For church-spires, the sheathing-plates can be made to resemble slate on the outside.

In districts where earthquakes disturb the stability of buildings, the bars R S might be advantageously built in brick walls, where brick was preferred or required, thus acting as a tie in holding the parts together.

Referring to fig. 1, if the lot is a narrow one, say, twenty feet wide, the girders I, fig. 3, which run in the direction of the building, would be sufficient to sustain the floor-beams, without the use of cross-girders G. Then, however, tie-rods should be used to bind the entire structure together. In fig. 1, which illustrates thirty feet span, if desirable to have the floor-beams run crossways, instead of lengthwise, the same can be arranged by placing a beam centrally between, and at right angles with the girders G, to sustain the floor-beams, and then the latter can run crossways, resting at their other ends on a girder running between the columns E, as at I. For a double store of, say, fifty feet in width, a span practically too much for the girder G, a central support of columns will be required.

I do not confine myself to any particular size, or form, or thickness of columns, girders, bars, &c., or to any particular relative distances between any or all of same, but shall vary each and all of them according to the span, and other ordinary circumstances.

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

The within-described system of constructing buildings, consisting of a combination of iron columns, iron girders, and iron bars and sheathing-plates, substantially as shown in the drawings, and for the purpose specified.

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Witnesses:

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