

(No Model.)

2 Sheets—Sheet 1.

W. ORR.

FIRE PROOF CONSTRUCTION OF BUILDINGS.

No. 462,773.

Patented Nov. 10, 1891.

Fig. 1.

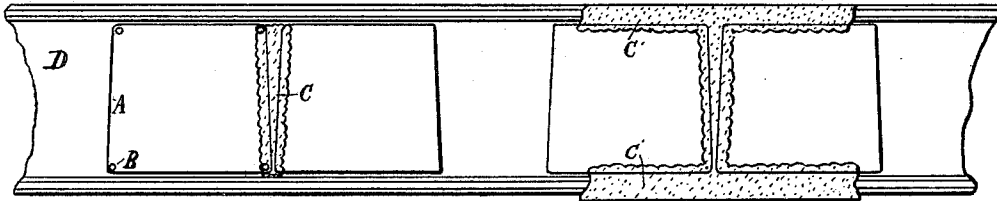


Fig. 2.

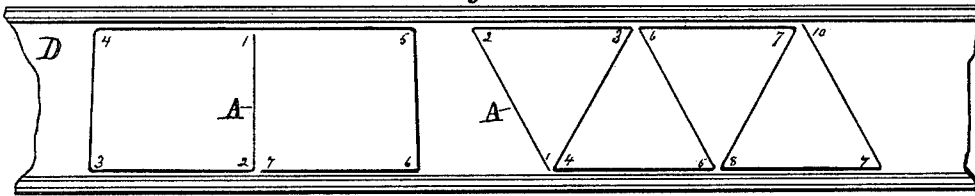


Fig. 3.

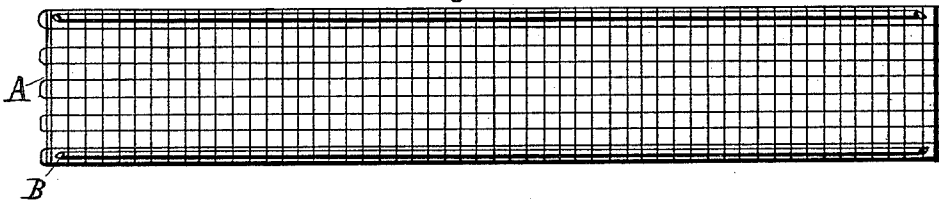


Fig. 4.

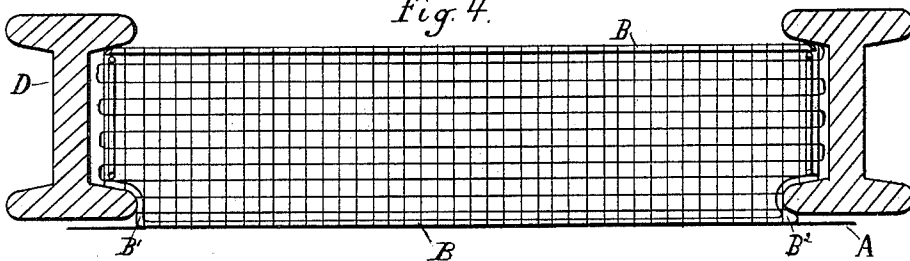
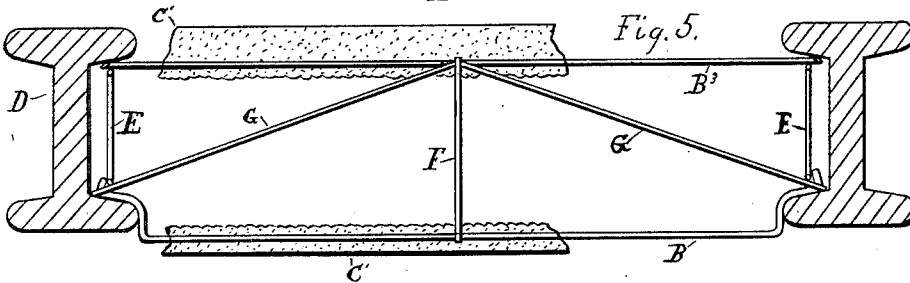


Fig. 5.



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(No Model.)

2 Sheets—Sheet 2.

W. ORR.

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Fig. 6.

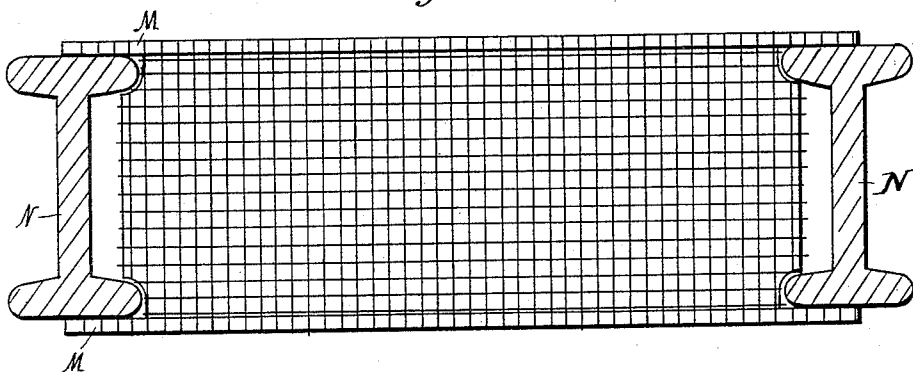
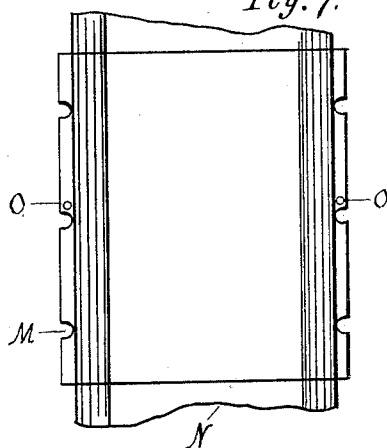


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM ORR, OF TRENTON, NEW JERSEY.

FIRE-PROOF CONSTRUCTION OF BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 462,773, dated November 10, 1891.

Application filed September 6, 1888. Serial No. 284,755. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ORR, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented new and useful Improvements in the Method of Fire-Proof Construction of Buildings, of which the following is a specification.

While the improvements forming the invention are of general application in fire-proof constructions, they are designed especially for buildings having iron floor-beams and partition joists or studding. Where these are used it is necessary that they be thoroughly protected against the action of fire, and for this purpose arches of hollow or common brick or tile are generally laid between the floor-beams, and hollow tile or brick are used in the partitions. This adds greatly to the cost, as the building has to be made of great strength to carry the heavy load, and the tile or brick and the laying of the same are very expensive. In the case of the arches, also, the under sides of the floor-beams are left exposed unless protected otherwise, as by furring-strips receiving sheets of metal lathing.

The purpose of this invention is to dispense with these brick arches and partition-blocks and to use in their place wire or perforated sheet-metal lathing, bent so as to form hollow blocks, having the wire or perforated metal forming each of the sides of the same. The material thus bent is preferably long enough to form a continuous block or section reaching from one floor-beam to the next, so as to be supported thereby. The blocks are designed to rest upon the lower flanges of the beams, and may be made of sufficient depth to reach above the upper flange and to take a bearing there also, or they may be made to reach any desired point below the top, as required by the specifications of the building. The blocks are greater in length than the space between the flanges of the beams, but not long enough as a whole to reach the webs, thus permitting them to be placed in position either by entering a block between the beams at an acute angle and then swinging one end around till the block extends at right angles to the beams, or by passing one end of a block inside the flange of one of the beams

far enough to allow the other end to clear the lower or upper flange of the opposite beam, raising or lowering the block into position and shifting the block lengthwise sufficiently to allow the end last to be put into position to rest in its place upon the flange. The ends of the blocks may be made to conform somewhat to the outline of the beams or studding which supports them. Where it is required to form a straight continuous ceiling, the sides and top are cut away or cut and bent out of line sufficiently to allow the bases of the blocks to meet or overlap each other under the floor-beams, and the sides are left long enough to take bearing on the top of the lower flange of the beams. In placing these blocks I do not consider it necessary to bed the ends in cement or mortar, as I consider an air-space at the ends better than either as a protection to an iron beam. They may, however, be so bedded by turning inwardly the sides and top, thus closing or nearly closing the ends of the blocks, so that cement or mortar may be spread thereon as the blocks are being placed in position. This would be of some benefit in stiffening the ends of the blocks, as the cement or mortar would press through the meshes and make it almost impossible to crush the blocks where they rest on the beams. The blocks are intended when laid to form a continuous plastering-surface. For the ceiling the plaster is spread on a line near the bottom of the floor-beam, preferably below, so as to protect the beams from the action of heat. Parallel with this and at or near the top of the beams is another plastering-surface, on covering which a continuous air-space is formed between the upper and lower surfaces of greater or less depth, according to the size of the floor-beam used. This would have sufficient strength for a wood floor and would afford ample protection against fire. I provide, however, a surface at each side of the blocks, which may be covered with cement or plaster, thus adding greatly to the strength of the whole, so that a tiled floor can be laid in the same manner and as safely as on the regular brick-arch construction. In this construction the continuous air-space above described is converted into a series of smaller spaces separated by the partitions between the blocks.

In the drawings which form part of this specification, Figure 1 is a side elevation of a floor-beam, showing the hollow lathing-blocks in section. Fig. 2 is a similar view showing the method of constructing two or more of the hollow blocks from a single sheet of material. Fig. 3 is a side elevation of a wire-cloth lathing-block with stiffening-rods. Fig. 4 is a side elevation of the same in place upon the floor-beams with the stiffening-rods bent. Fig. 5 shows a construction employing a truss in place of the stiffening-rods. Fig. 6 is a side view of a section of a partition; and Fig. 7 is an end view of the same, showing a modified arrangement of stiffening-rods.

Referring especially to Figs. 1 to 4, A is the lathing of wire-cloth, wire-netting, or perforated metal of any suitable construction, bent to form hollow blocks; B, stiffening-rods; C, plastering material between the blocks, and C' a finished section of plaster.

Independent sheets may be used to form the different blocks, as shown in Fig. 1, or a single sheet may be bent to form two or more blocks, as shown in Fig. 2. In the latter construction the blocks are formed by bending the wire-cloth or sheet-metal lathing at specified points, at which rods may be inserted or attached, marking the place to bend, as from 1 to 2, 2 to 3, 3 to 4, and so on, completing the block at 7 or more. This method makes a large saving in the material used, and in most cases would answer as well as the succession of independent blocks.

It is not necessary that the hollow blocks should be made from a single wide sheet, as two or more can be used for the purpose, if desired, the joints or connections being made by any of the well-known methods, as by folding the edges together, lacing, or otherwise. A shape nearly square is preferable; but the triangular shape shown may be employed, if preferred, this shape enabling the blocks to bear great weight without crushing. It is well to have the square blocks a little narrower at the top, as shown, so that mortar or cement can be poured into the wedge-shaped opening thus left between the several squares, thus sealing the sides and strengthening the construction. The sides can be sealed with cement or plaster if the blocks are square and pressed close together by leaving the topside of each or each alternate block unfastened at the junction of the two edges, so that it can be raised up like the cover of a box, and the cement or plaster be applied to the sides with a trowel. The bottom of the block, also, may then be plastered from the inside, if desired. The tops so left must be made short enough to clear the edges of the flanges if the blocks are not deep enough to reach above the tops of the beams. After the material is spread the top will be closed and fastened by lacing or otherwise, after which the top and under side can be coated in the usual manner. The sealing of the sides may be effected, also, by coating one side of

a square block after it is placed in position and pressing up the next succeeding block against the soft material as it is put into place, the wires cutting their way through the cement or mortar till the sides of the blocks come in contact and the cement or mortar closing over the wires, making a perfect clinch, after which the top and bottom can be treated as required. These hollow blocks, if made of wire-cloth and used in sections of any considerable length, will be galvanized, or if made of plain wire-cloth they will preferably be stiffened by ribs or rods B running through them longitudinally. The rods B may be woven into the meshes of the wire-cloth, or otherwise securely attached to it, prior to the formation of the block, or they may be placed in the hollow block as it is being bent into shape or after it is formed. If the rods form a part of the wire-cloth, they may be used to designate the points at which the material is to be bent to form the block, the bending being continued till a square, triangular, or other suitable shape has been obtained, having all the sides closed and at each of the bends or angles a rod. The rods B are shown in the inside of the square; but this is not absolutely necessary, as they could be on the outside and answer the purpose; but the projection of the rods would somewhat interfere with the laying on of the plaster.

The stiffening-rods B may be of various forms. For floors where it is proposed to cover the bottoms of the floor-beams with an ornamental molding they may be straight, as at B, Fig. 3, and the form for the molding be attached to the beam in the usual manner. For floor-beams and partitions, where a straight ceiling or wall covering all the beams is required, the rods may be bent at the ends into a kind of hook-shape, so as to rest upon the inner edge of the flange and to carry the line of the wire lathing below the lower or outer surface of the beam. This construction will readily be understood from Fig. 4, where one end of the rod B' is bent so that its end will rest on top of the flange, then curving downward carries the line of the rod on a line lower than the under surface of the floor-beam D, and the other end B² is bent so as to take a bearing both above and below the edge of the flange. With this construction any lift of the sections when the plaster is being applied to the under side may be prevented by reversing each alternate block or section and connecting them by lacing-wires passed around adjoining rods or around the wires at the corners of adjoining blocks. Both ends of the rod B may be bent, as at B' or as at B². I do not confine myself to these particular shapes for the ends of rods B, as my object of providing supporting and stiffening rods, which may be attached to the beams securely by the ends, may be attained by bending the ends in other shapes.

In place of the stiffening-rods B, trusses may be used, as shown in Fig. 5, the lathing

being bent around the trusses to form the blocks; or the truss may be formed inside the block, or the complete truss forced inside the block after it is made. The trusses adapt
5 the hollow blocks or sections of wire lathing to be used in long or wide spaces, where the beams are far apart, giving support to them in the intervening space.

The rods B, B³, E, F, and G represent a
10 truss of convenient form; but the truss may be arranged in any way to give the necessary stiffness to the structure or to support the plastered surfaces C'.

The squares constructed as heretofore described, especially after being re-enforced by the rods and trusses and further stiffened by the cement between them, which would fill the spaces and squeeze through the meshes, virtually making a brace of each mesh, would
20 be stiff enough and have sufficient strength to carry a cement or tiled floor, and to make what might be called an "absolutely fire-proof" construction, the partition being also constructed of the hollow blocks laid between the
25 studding and plastered so as to entirely cover it and protect it from the heat.

In Figs. 6 and 7 is shown a construction for partitions, in which M are the lathing-blocks and N N the partition beams or studding.
30 The blocks are preferably made wider than the studding or supports and longer than the space between them, as shown, so that they not only overlap the studding when in position, but will be offset from the edges of the
35 studding to allow the plaster to clinch properly in the space between their overlapped ends and the edges of the studding. These partition-blocks can be placed parallel with the studding, (which may be of wood or iron,)
40 as well as at right angles with it, and used with or without the stiffening-rods. If made of perforated metal or of galvanized wire-cloth, no stiffening-rods will be required. I prefer, however, to use galvanized wire-cloth
45 or sheet metal with corrugations made in it, in such position that when the blocks are formed, the corrugations will rest upon the face of the studding, so as to stiffen the lathing against the trowel and keep the face of
50 the lathing at some distance from the face of the studding to allow the plaster to press through and form a body between the two. These corrugations may be made only at the ends of the hollow blocks where they overlap
55 the face of the beam, it not being necessary that they should run the whole length.

If wire lathing not galvanized is used, or if the blocks are used in very wide spaces, it may be necessary to stiffen the lathing against
60 the push of the plasterer. For this purpose the rods heretofore described may be used, or common straight rods may be inserted between the edge of the studding and the wire-cloth, as at O, Fig. 7. These may be inserted
65 without any fastenings, as the studdings and wire-cloth will hold them in place, or they may be attached by clips or other suitable

means. The above methods can be applied also to roof-beams, substantially as described. It will be necessary to plaster only the face
70 sides of these blocks, no plaster being required between them, except in special cases, where it may be required between a few sections to cut off any current of air through the space between the studding and plastered
75 faces of the blocks. I have shown no plaster in the partition construction; but the plaster will be applied to the faces of the blocks to make a partition-wall in the usual manner, each block as it is laid in place being bedded
80 in mortar, if desired.

It will readily be seen that this method of fire-proof construction will greatly reduce the cost of a building. The load on the floor-beams will be largely reduced, and the parti-
85 tions also will be greatly reduced in weight, so that not only floor-beams but walls can be very much lightened. The ease and rapidity with which the lathing construction can be applied will also very much reduce the time
90 required, and the thorough manner in which the plaster clinches and adheres to wire lathing makes it impossible for it to crack and fall of, as is so liable to be the case when hol-
low brick is used for a plastering-surface. 95

I am aware that perforated sheet-iron and wire lathing have been used for ceiling and to form into curves for cornices and for or-
namental plaster-work under the exposed bases of iron beams. I am also aware that
100 rods have been used in connection with wire-cloth for lathing. I make no broad claim to such construction.

What I claim, and desire to secure by Let-
ters Patent, is— 105

1. The combination, with beams or stud-
ding, of hollow blocks of wire-cloth, wire-net-
ting, or perforated sheet metal placed there-
between and supported thereby as a basis
110 upon which to apply plaster, cement, concrete, or other plastic material in the construction of walls, partitions, ceilings, floors, or roofs of buildings, substantially as described.

2. The combination, with beams or stud-
ding, of lathing formed of pieces of wire-cloth,
wire-netting, or perforated sheet metal placed
between and supported by said beams or
115 studding, the ends of said pieces being shaped to fit around the edge of the flanges of the
120 beams or studding supporting them, and the face sides of said pieces being made to overlap the supporting-beams or studding to provide a continuous plastering-surface, substantially as described. 125

3. The combination, with beams or stud-
ding, of wire-cloth, wire-netting, or perforated
sheet metal formed into hollow blocks or sec-
tions, and stiffening-rods extending longi-
130 tudinally of the blocks either on their interior or exterior surface, the ends of the rods being supported by the beams or studding, substantially as described.

4. The combination, with beams or stud-

ding, of wire-cloth, wire-netting, or perforated sheet metal formed into hollow blocks, and stiffening-rods extending longitudinally of the blocks, and having their ends bent so as to receive support from the beams or studding and to carry the outer line of plastering-surface outside the edge of the beams or studding, substantially as described.

5. The combination, with beams or studding, of wire-cloth, wire-netting, or perforated sheet metal formed into hollow blocks, and strengthening-trusses inside of and extending longitudinally of the blocks, said trusses consisting of rods at opposite sides of the blocks, and cross-rods joining the same, substantially as described.

6. The combination, with wire-cloth, wire-netting, or perforated sheet metal formed into a hollow block or section to be used as a plastering-surface, of a frame-work, of wire or rods, so arranged in the interior of the blocks or sections as to stiffen and brace the construction to withstand heavy weight or pressure, substantially as described, and for the purpose set forth.

7. As an article of manufacture, a lathing-block formed of wire-cloth, wire-netting, or perforated sheet metal adapted to hold plaster and of sufficient size in cross-section to leave an air-space within the block when plastic material is applied to some or all of its faces, substantially as described.

8. A hollow metallic lathing-block having its ends molded to fit closely upon flanges of beams and bring its lower face flush with the lower face of the beams, and all its faces provided with apertures adapted to hold plaster, substantially as described.

9. A hollow lathing-block of wire-cloth, wire-netting, or perforated sheet metal strengthened by stiffening-rods extending longitudinally of the block at the angles of the same, substantially as described.

10. A hollow lathing-block of wire-cloth, wire-netting, or perforated sheet metal having one of its sides free to be opened for applying the plastic material from the inside of said block, substantially as described.

11. Lathing consisting of a series of lathing-blocks formed of wire-cloth, wire-netting, or perforated sheet metal adapted to hold plaster and of sufficient size in cross-section to leave air-spaces within the blocks when plastic material is applied to some or all of their faces, said blocks being placed side by side to form a continuous plastering-surface, substantially as described.

12. Lathing consisting of a sheet of wire-cloth, wire-netting, or perforated sheet metal adapted to hold plaster and bent to produce a series of hollow blocks forming a continuous plastering-surface and of sufficient size in cross-section to leave air-spaces within the blocks when plastic material is applied to some or all of their faces, substantially as described.

13. Lathing consisting of a sheet of wire-cloth, wire-netting, or perforated sheet metal bent around stiffening-rods to form a series of hollow blocks, substantially as described.

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