(No Model.) 3 Sheets—Sheet 1.

W. T. SEARS.

CONSTRUCTION OF BUILDINGS.

No. 470,901. Patented Mar. 15, 1892.

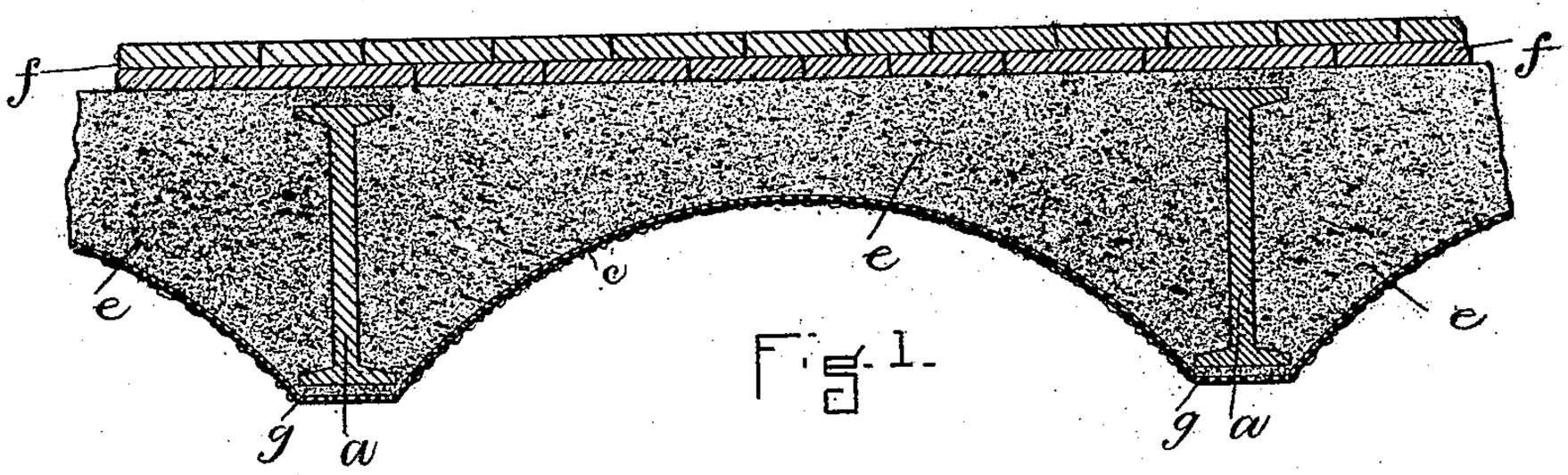

Fig. 1.

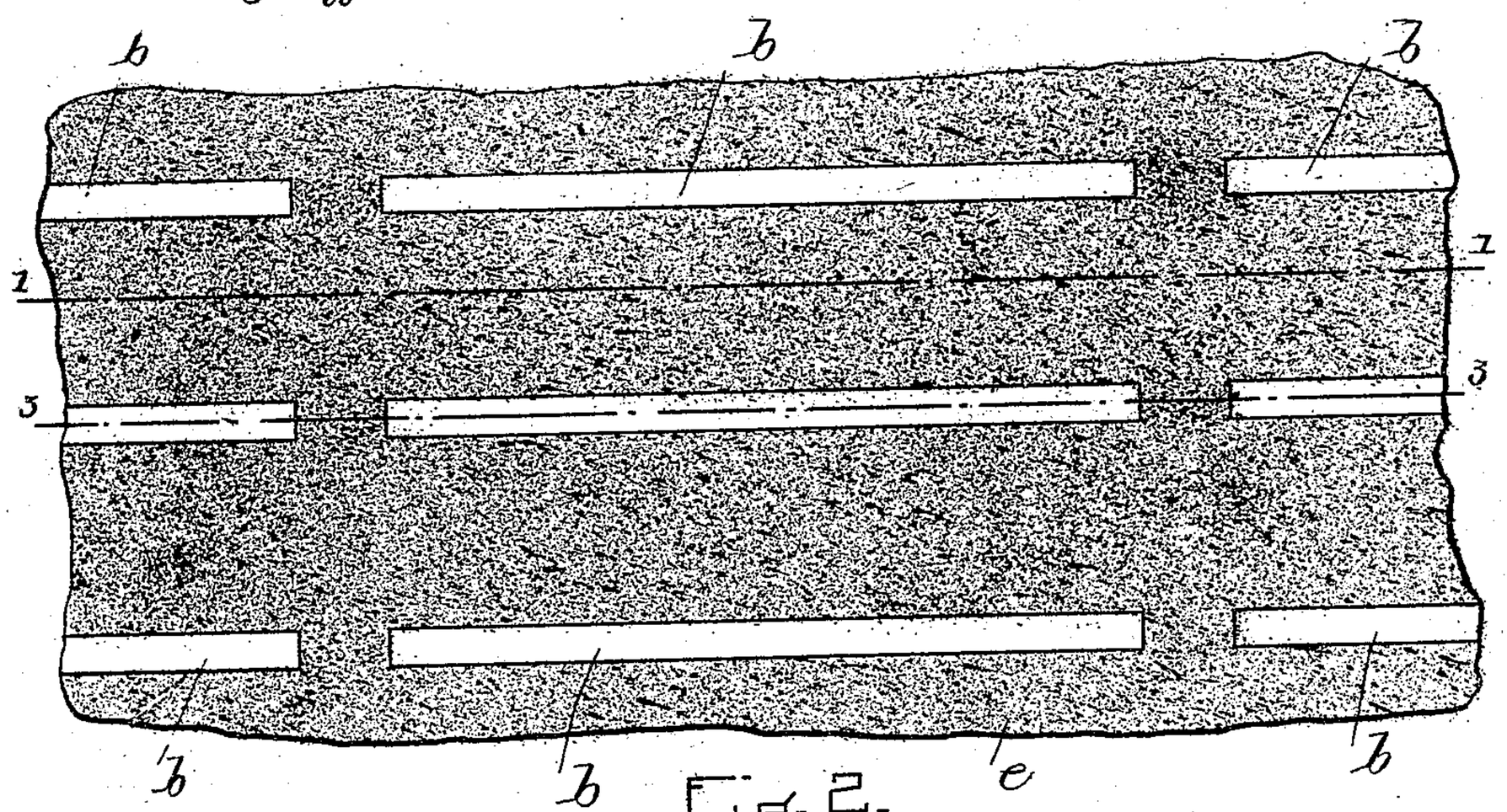

Fig. 2.

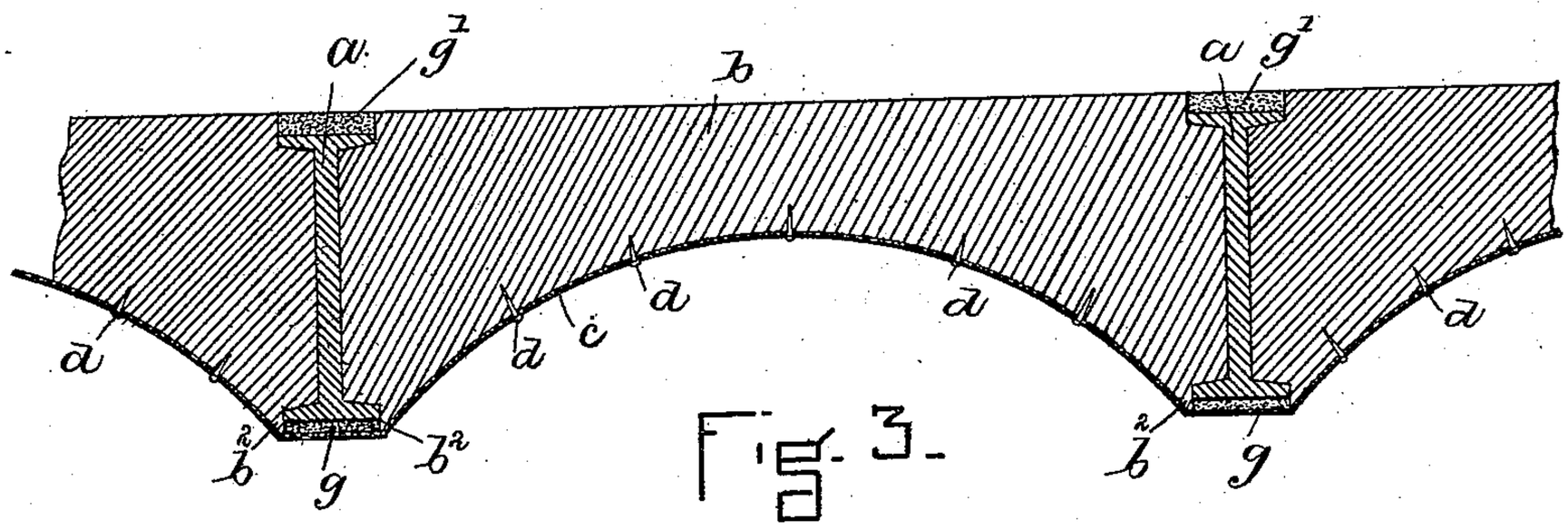

Fig. 3.

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CONSTRUCTION OF BUILDINGS.

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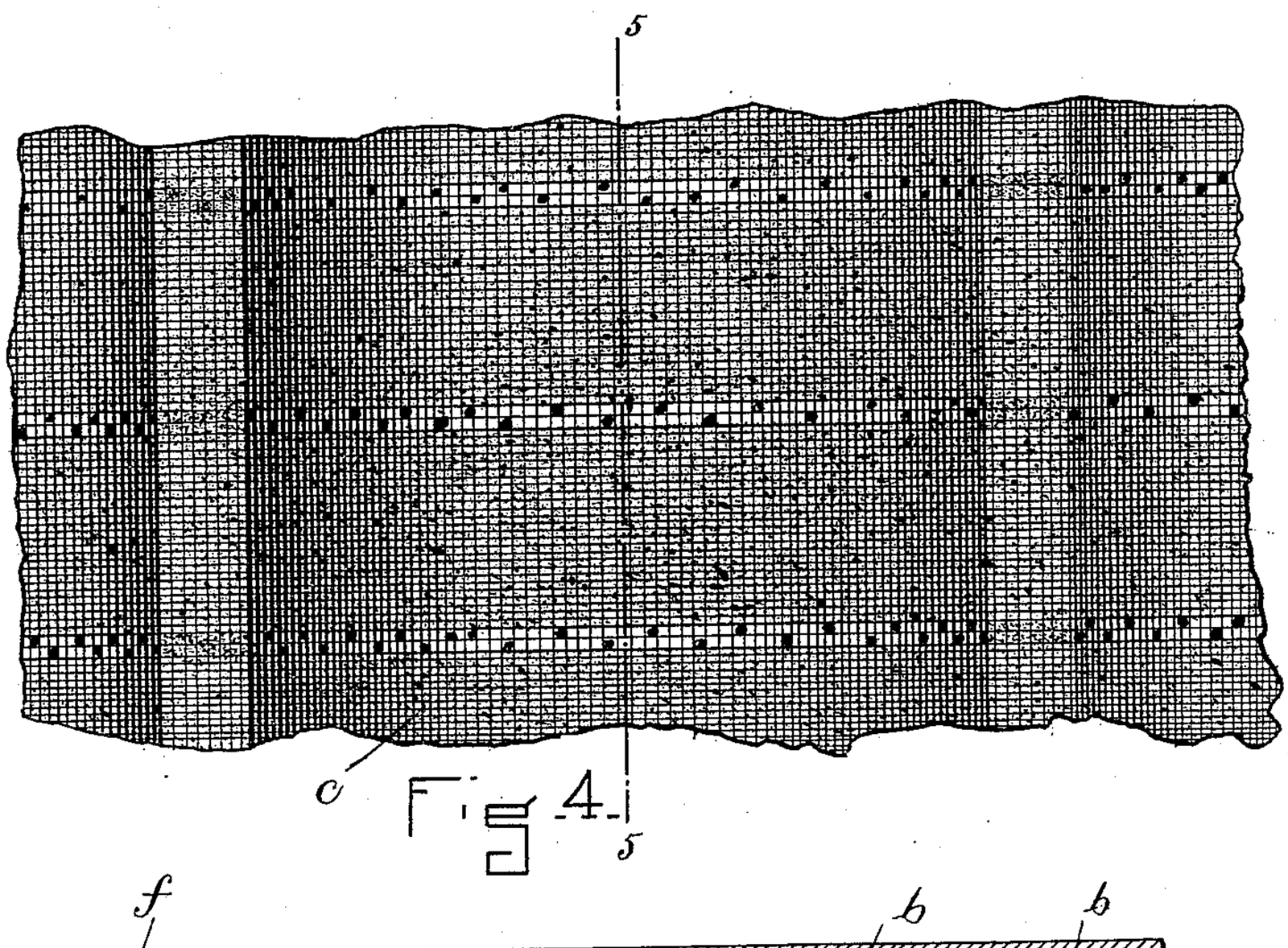

Fig. 4.

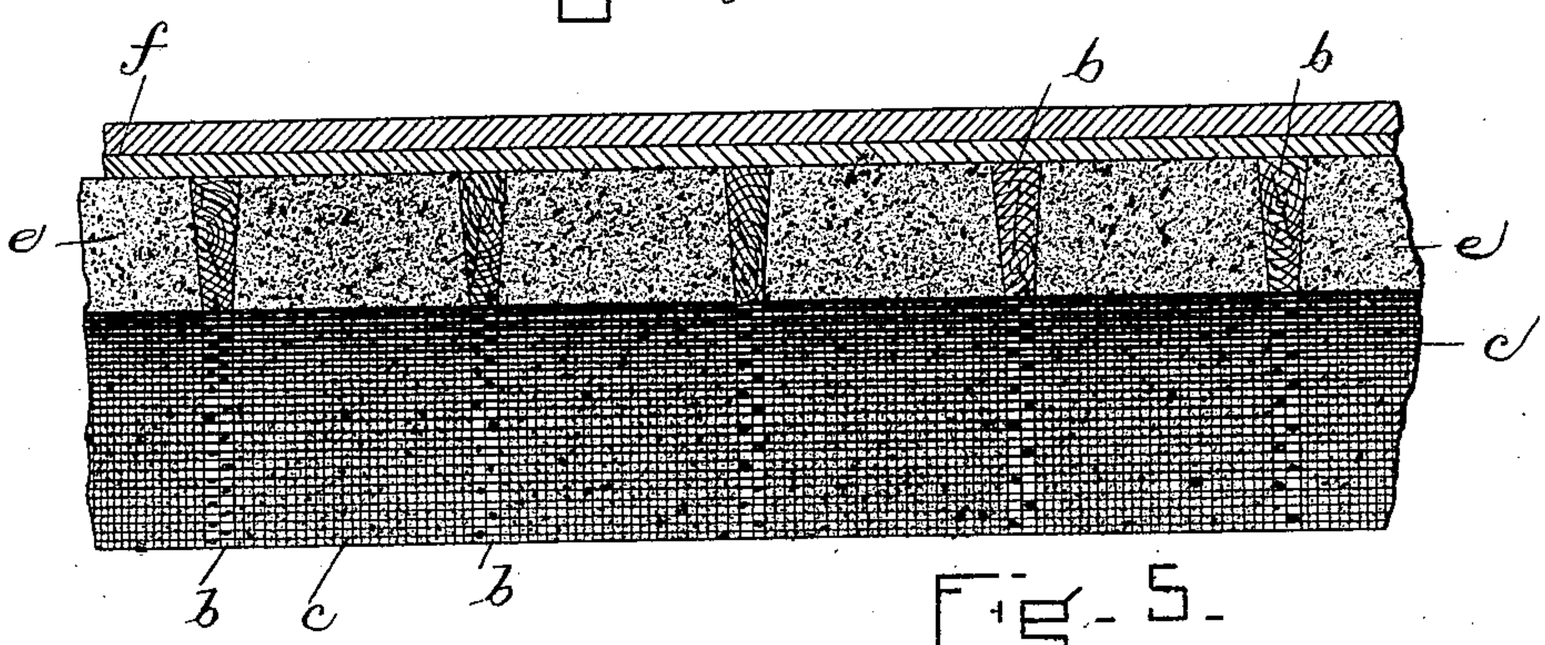

Fig. 5.

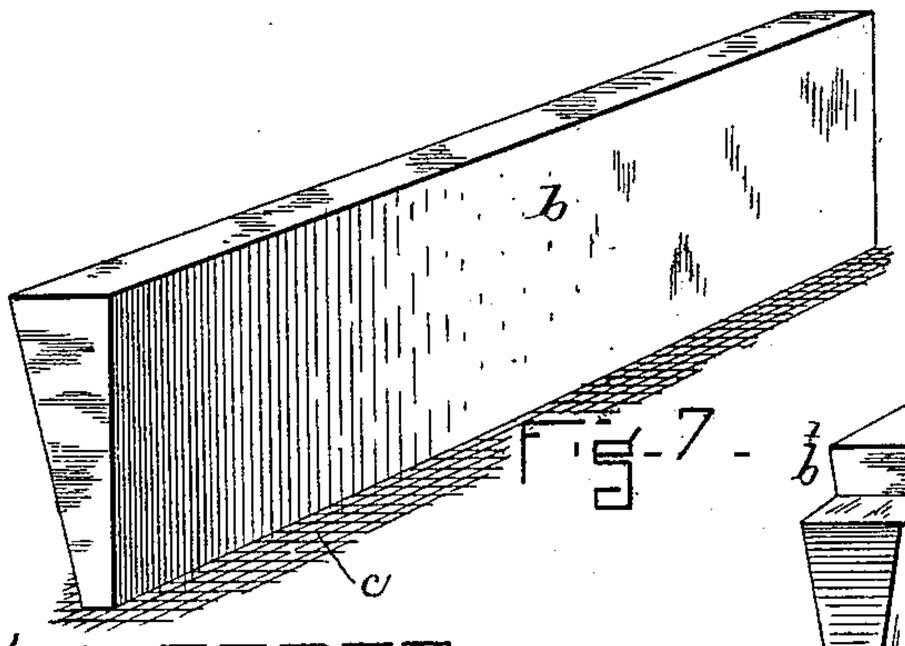

Fig. 7.

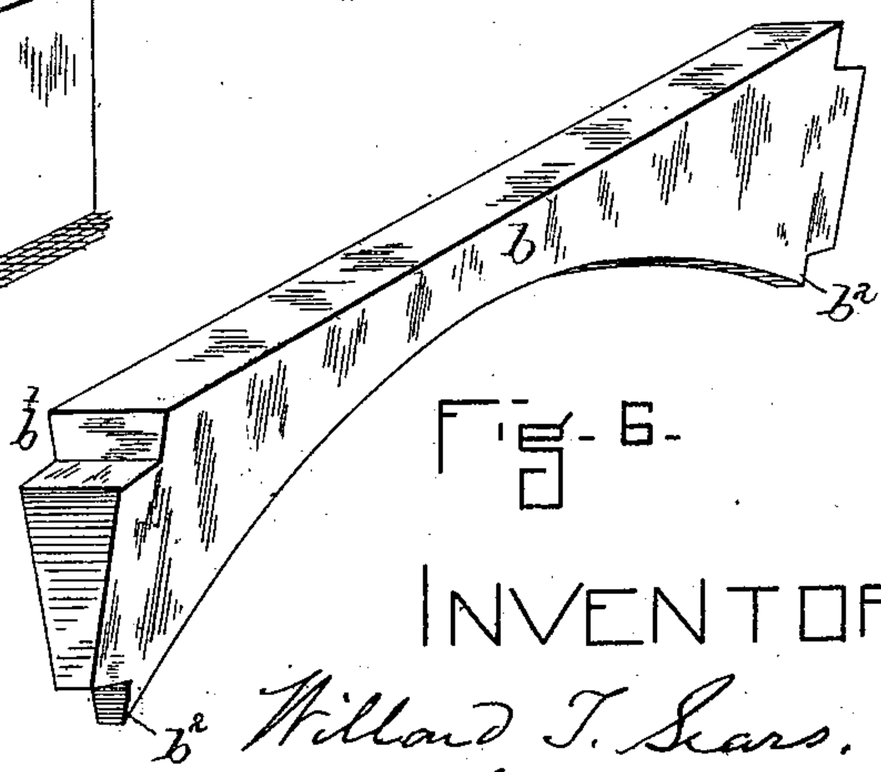

Fig. 6.

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(No Model.)

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CONSTRUCTION OF BUILDINGS.

No. 470,901. Patented Mar. 15, 1892.

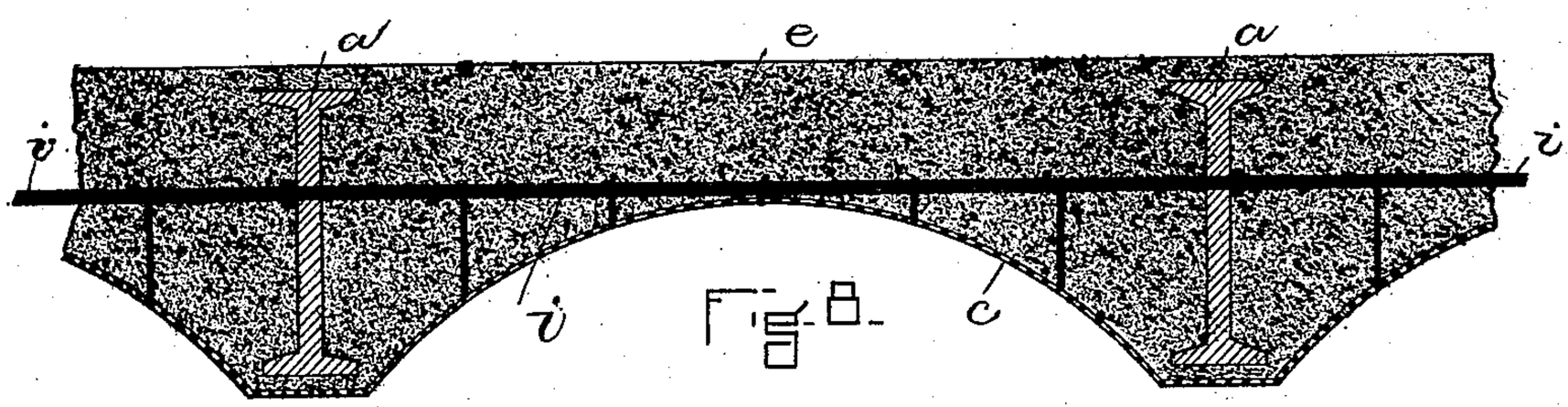

Fig. 7.

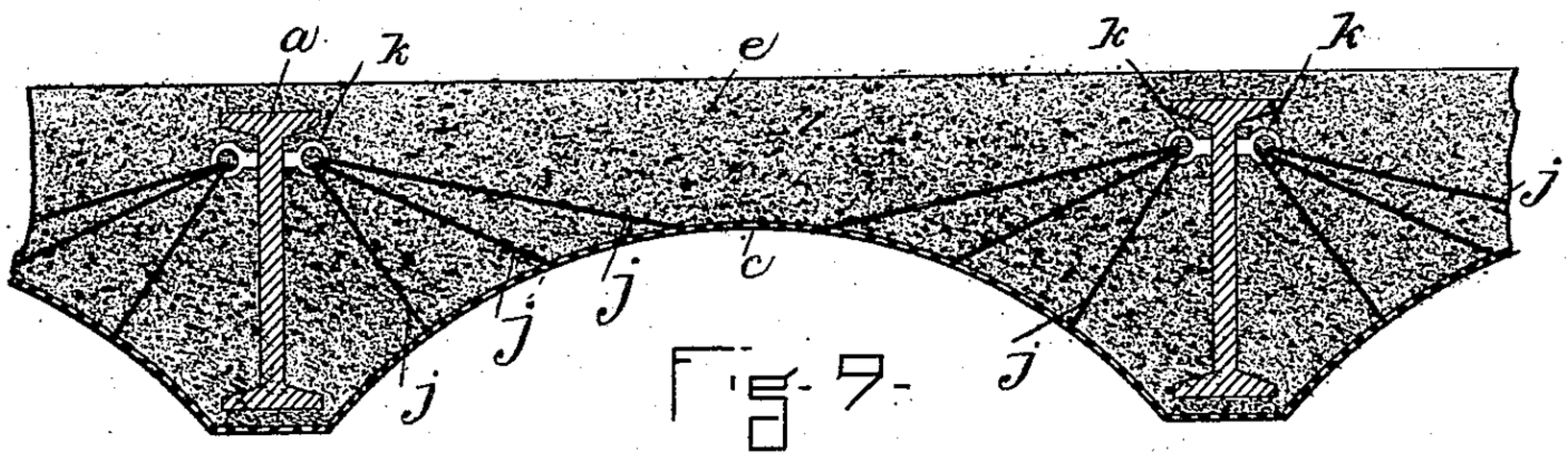

Fig. 9.

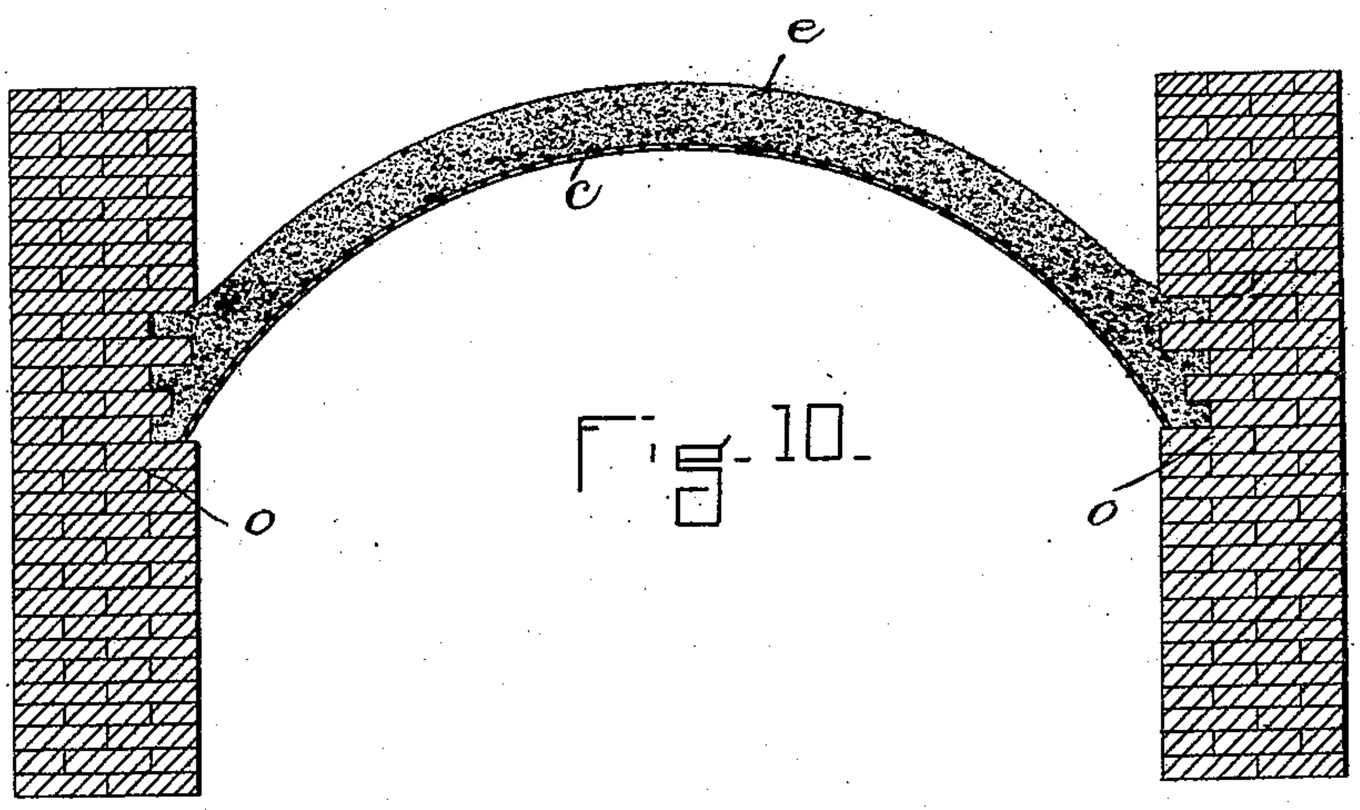

Fig. 10.

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UNITED STATES PATENT OFFICE.

WILLARD T. SEARS, OF BOSTON, MASSACHUSETTS.

CONSTRUCTION OF BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 470,901, dated March 15, 1892.

Application filed May 9, 1890. Serial No. 351,141. (No model.)

To all whom it may concern:

Be it known that I, WILLARD T. SEARS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Construction of Buildings, of which the following is a specification.

This invention relates chiefly to the construction of the horizontal partitions of buildings—viz., those partitions the upper surfaces of which support the floors of the rooms above, while their lower surfaces support the ceilings of the rooms below; and it has for its object to provide a partition of structure which shall comprise a homogeneous mass or filling of concrete or other like moldable material molded or formed into the desired shape between the fixed side supports—such as the horizonal beams—which form parts of partitions of this class, and a matrix or base on which said moldable material is superposed while in a plastic condition, said base serving, first, to give form to the said mass or filling, and, secondly, to furnish means whereby a coat of plastering may be retained on the under side of the structure or partition.

My invention consists in the construction and combination of parts, as hereinafter described and claimed.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical section of a portion of a composite partition embodying my invention, such section being taken on a plane transverse to the supporting-beams and on the line 1 1 of Fig. 2. Fig. 2 represents a top plan view of said partition, the floor-boards on the upper surface of the same (shown in Fig. 1) being removed. Fig. 3 represents a section on line 3 3, Fig. 2. Fig. 4 represents a bottom view of a portion of the partition. Fig. 5 represents a section on line 5 5 of Fig. 4. Fig. 6 represents a perspective view of one of the cross-bars. Fig. 7 represents a perspective view of one of said cross-bars of somewhat different form and a portion of the foraminous base attached thereto. Figs. 8, 9, and 10 represent modifications.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a a* represent the supports which form structural parts of the building, the same being, for example, beams or girders which are preferably of iron of **I** shape in cross-section. Said beams are engaged in the usual or any suitable way with the walls of a building or with any other suitable supports.

b b represent the transverse or intermediate supports, which are bars of any suitable material formed to bear at their ends upon the sides of the beams *a* and to extend across the spaces between said beams. I prefer to make said bars of a penetrable material, such as wood or terra-cotta lumber; but they may be made of metal or other material. I have here shown the ends of the supports *b* formed with recesses *b' b'* to receive the flanges of the beams *a*, so that said ends bear closely against the sides of the beams and are interlocked with the latter, the beams supporting the supports *b*.

c represents the foraminous base, which may be made of sheets of woven wire or of strips of other material—such as rattan—woven into sheets or formed in any other suitable way and attached by nails *d* or other suitable fastenings to the supports *b*. I prefer to make the lower edges of said cross-bars narrower than their upper portions, as shown in Fig. 5, so as to reduce the width of their bearing on the foraminous base to the minimum. It will be seen that the foraminous base attached to the cross-bars *b* constitute the bottom of the space between the beams *a a*.

e represents the filling of cement or other suitable material, which is originally plastic and becomes rigid subsequently. Said material is superposed upon the foraminous base *c* while in a plastic condition and constitutes a filling the shape of the under surface of which is determined by the shape of the said base *c*. I prefer to give said base an arched form, as shown in Figs. 1, 3, 4, and 5, by making the lower edges of the supports *b* concave, as shown in Figs. 3 and 6. The filling *e* therefore, when hardened, constitutes a span, presenting an arched under surface between the beams *a a*.

Portions of the plastic material may exude through the openings in the foraminous base and form small spuds or protuberances, projecting downwardly below said base and adapted to engage and hold a coating of plastering, said projections being a substitute for

ordinary lathing; or the cement may remain wholly above the foraminous base, the latter affording a roughened plaster-holding surface.

The upper surface of the filling *e* is preferably made flush with the upper edges of the supports *b*, so that the floor-boards *f* can bear upon and be nailed to the upper edges of said supports.

I prefer to extend the lower edges of the supports *b* below the bottom flanges of the beams *a* by forming downwardly-projecting shoulders b^2 b^2 on said supports, so that the portions of the foraminous base that extend across and under the beams *a* will be separated from the latter by spaces *g* of sufficient size to admit portions of the cement filling, so that the same hold will be afforded for the plastering material under the beams *a* as between said beams. The cement that finds its way under said beams protects the latter from the injurious action of heat in case of fire in the room below. The upper edges of the supports *b* are also preferably formed to project above the top flanges of the beams *a*, as shown in Fig. 3, so as to form cement-receiving spaces *g'* above said beams, the beams being therefore protected by the cement or filling both above and below.

It will be seen that the arched fillings or spans between the beams *a*, composed of the molded portions or fillings *e* and the foraminous base *c*, constitute a strong and durable structure, presenting an under surface capable of holding a coating of plastering, as already described, the arched foraminous base serving a threefold purpose—viz., of molding the cement filling into an arched span, stiffening and supporting said span, and affording a roughened under surface capable of holding a coat of plastering. I do not limit myself, however, to the arched form of the foraminous base, although I consider the same very desirable. In cases where the arched ceiling is not desirable, the cross-bars *b* may be rectilinear at their lower edges, as shown in Fig. 6, in which case the foraminous base would be held horizontally, or the supports may have any other form in which a ceiling is capable of being made.

By the employment of the arched base permanently secured to the frame-work of the partition and the filling *e*, molded upon said base, I am enabled to construct a higher arch than would be feasible by the employment of previously-formed sections or brick, such as are commonly used for arched ceilings. In cases where intermediate supports are required any other suitable devices may be employed as such support.

In Fig. 8 I show a modification in which a transverse metal rod *i* is extended across the space between the beams, the foraminous base *c* being attached to said rod at suitable points between the beams.

In Fig. 9 I show suspension-rods *j j*, connected at their inner ends with eyes *k*, attached to the beams *a a* and at their outer ends with the foraminous base. The rods *i* or *j* will be embedded in and covered by the cement filling *e* when the structure is completed.

The foraminous base may be constructed of woven wire, as already stated, or it may be of any other suitable construction—as, for example, perforated sheets of metal, strips or bars of any suitable material arranged in any suitable way to present openings adapted to permit the exudation of the cement filling in the manner described, or to prevent a roughened surface capable of holding a coat of plastering.

While my invention is intended chiefly for the construction of the horizontal partitions, or, in other words, the floors and ceilings of buildings, it is not limited to this feature, but may be used in arched roofs or ceilings made up of a single span, in which case the arched base may be spheroidal or dome shaped and supported at its margin by the walls of the structure to which it is applied. Fig. 10 shows a construction embodying the feature last indicated, in which *o o* represent the walls of the structure, the same being formed to support the arched base *c* and the marginal portions of the filling *e*.

I am aware that foraminous lathing is very old, and also that it has been proposed to construct ceilings, partitions, and other structures of plastic and hardened material covering both sides of a foraminous bed or frame-work; but my invention differs from all these, in that I cover only the upper side of the foraminous base, leaving the lower side either partially or wholly uncovered, whereby ceiling-plaster may be readily caused to adhere thereto.

I am also aware that crimped or corrugated plates forming a series of straight troughs have been proposed for horizontal partitions, said troughs being perforated and designed to receive plaster or cement, which is kept in position or strengthened by means of the vertical webs between the troughs; but in my invention I use only uncrimped or uncorrugated foraminous material, which may be of such strength only sufficient to support the weight of the filling until it has become set or hardened.

I claim—

1. The improved composite partition or floor comprising suitable supporting-beams, a foraminous base extending across the space between said beams, bars of penetrable material extending across said space and engaged at their ends with the beams and receiving fastenings passing through the foraminous base, and a filling superimposed upon the foraminous base and covering only the upper side thereof, as set forth.

2. The improved composite partition or floor comprising suitable supporting-beams, a foraminous base extending across the space between said beams, arched intermediate supports engaged at their ends with the beams and at intermediate points with the forami-

nous base, whereby the latter is supported in arched form, and a filling superimposed and formed upon the arched base, as set forth.

3. In a composite partition or floor, the combination of the supporting-beams, a foraminous base extending across the space between said beams and across the lower edge of the beams, and intermediate supports engaged at their ends with the beams and extended at their upper and lower edges, respectively, above and below the beams, whereby receiving-spaces *g g'* for plastic material are formed above and below the beams, as set forth.

4. The improved composite partition or floor comprising flanged metallic beams, transverse wooden beams extending between the metal beams and provided with arched under surfaces and flat upper surfaces, the latter constituting the surfaces for the attachment thereto of floor-boards, with foraminous material secured to the arched under surfaces, and a filling of plastic material occupying the space upon the foraminous material between the lower and upper surfaces of the beams, as set forth.

5. In a composite partition or floor, the combination of the flanged supporting-beams, a foraminous base extending across the space between said beams and across the lower edges of the support-beams, and intermediate supports having their ends recessed to interlock with flanged beams and extended at their upper and lower edges, respectively, above and below the beams, whereby receiving-spaces *g g'* for plastic material are formed above and below the beams, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 5th day of May, A. D. 1890.

WILLARD T. SEARS.

Witnesses:

ARTHUR W. CROSSLEY,

A. D. HARRISON.