

No. 610,070.

Patented Aug. 30, 1898.

W. C. LEWIS.  
FIREPROOF CEILING AND FLOOR.

(Application filed Dec. 7, 1897.)

(No Model.)

Fig. 1.

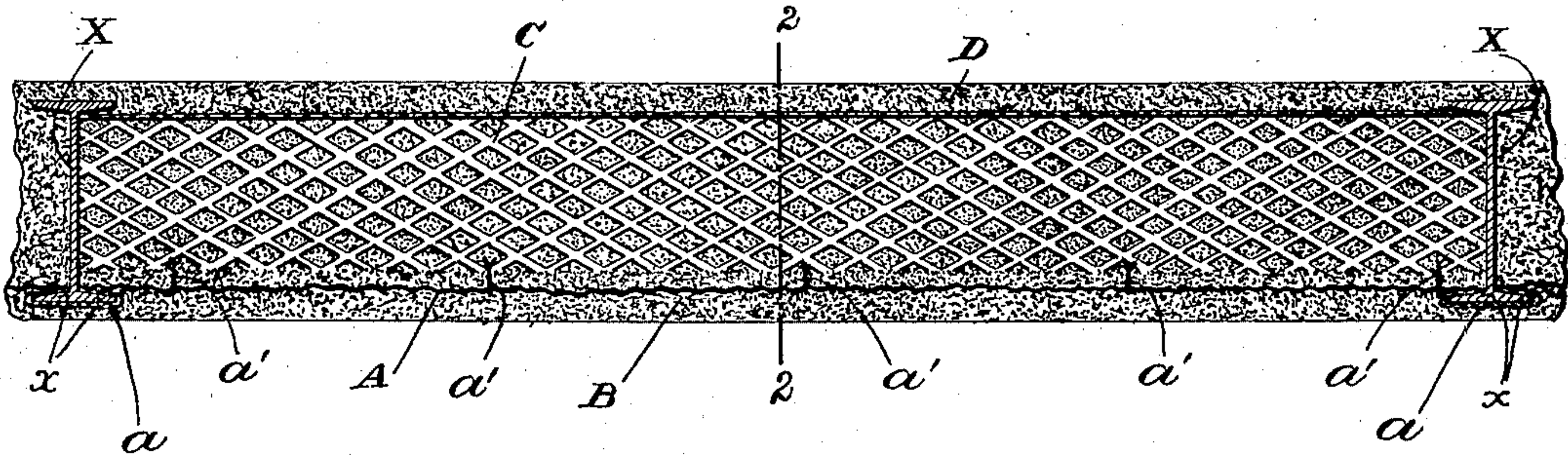


Fig. 2.

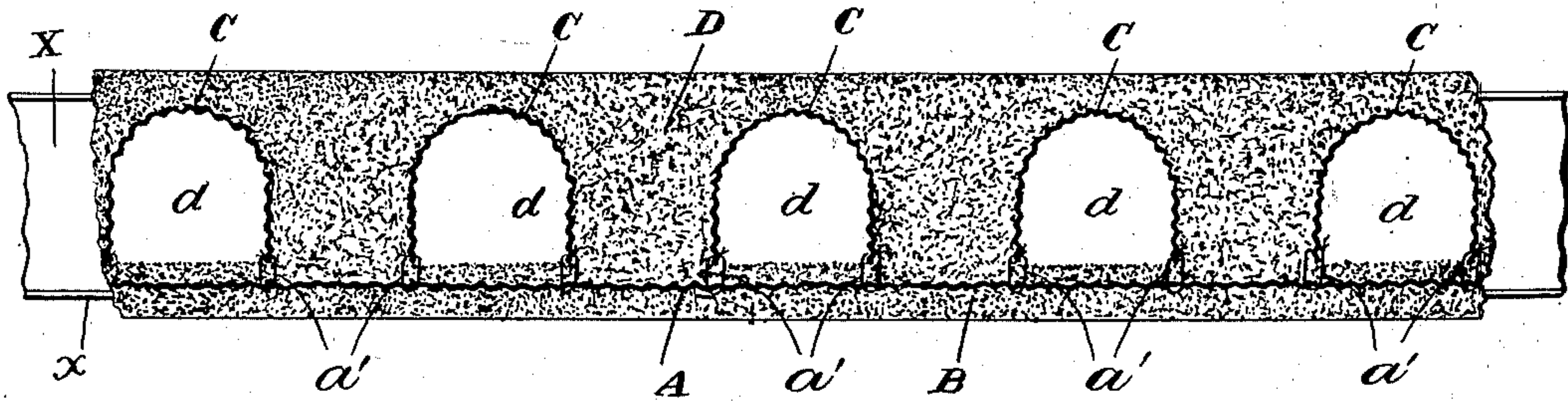


Fig. 3.

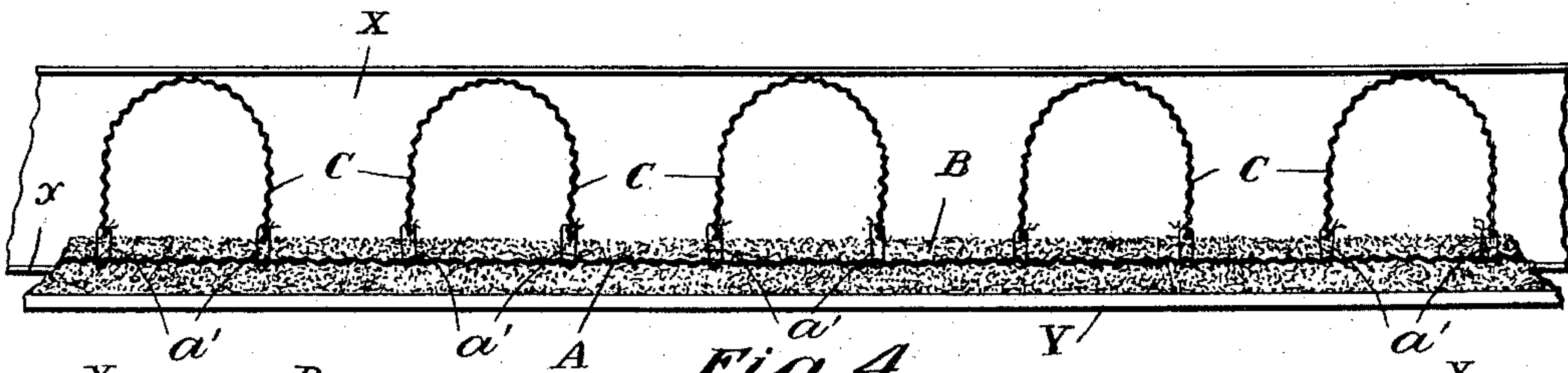


Fig. 4.

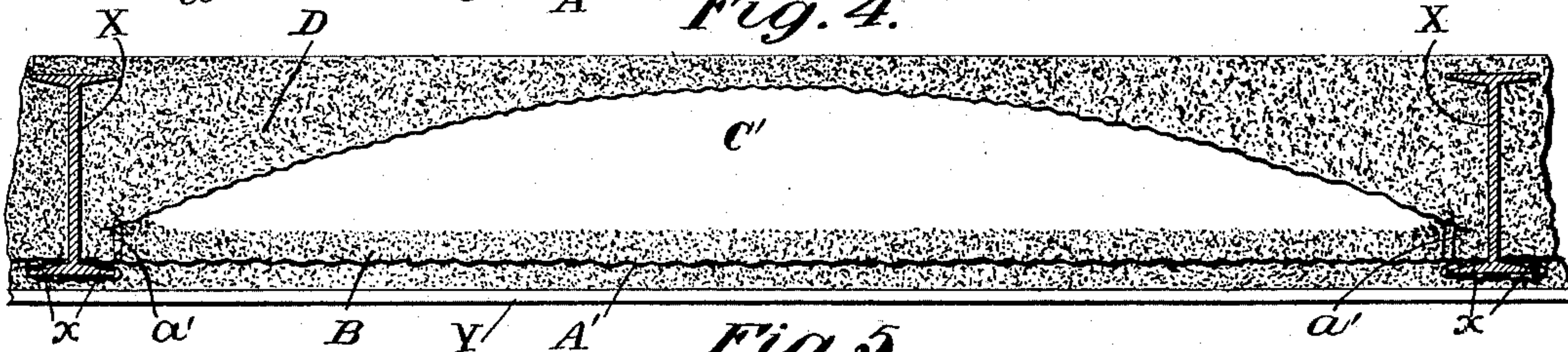
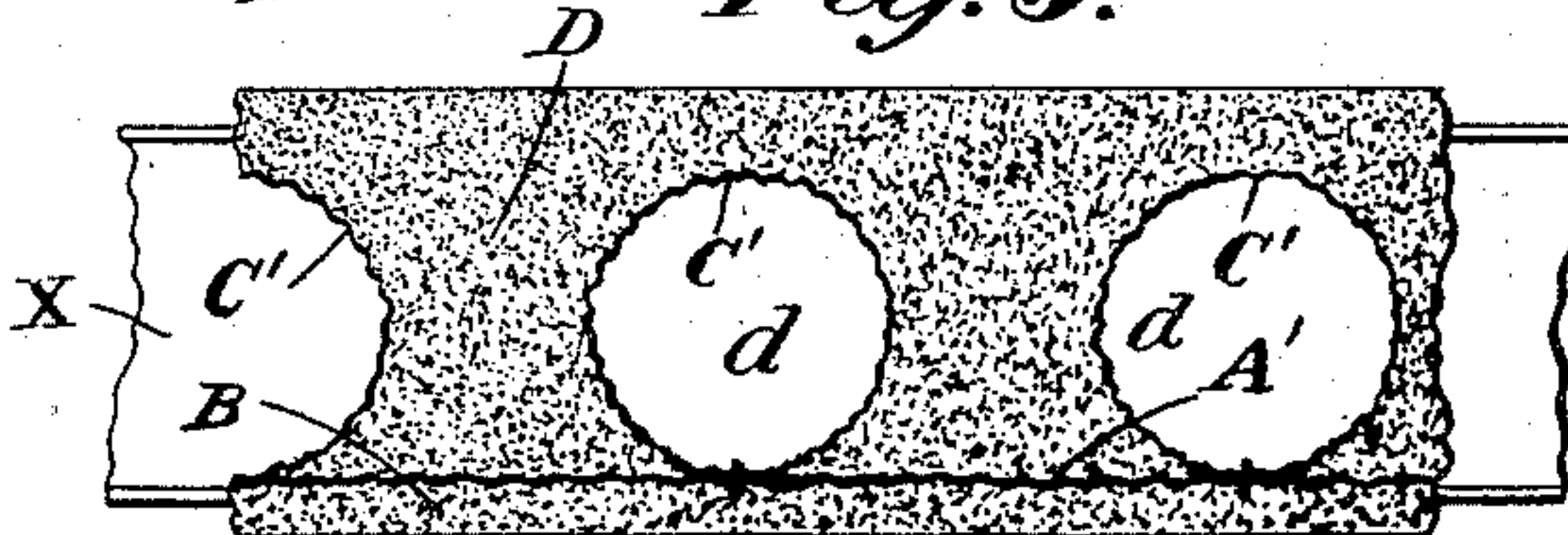


Fig. 5.



Witnesses.

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# UNITED STATES PATENT OFFICE.

WILLIAM C. LEWIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## FIREPROOF CEILING AND FLOOR.

SPECIFICATION forming part of Letters Patent No. 610,070, dated August 30, 1898.

Application filed December 7, 1897. Serial No. 661,015. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. LEWIS, a citizen of the United States, and a resident of Washington, District of Columbia, have invented certain new and useful Improvements in Fireproof Ceilings and Floors, of which the following is a specification.

This invention relates to an improvement in the construction of fireproof ceilings and floors, and especially in the construction of ceilings and floors by filling in the spaces or spanning between the parallel beams usually employed in large buildings.

The main object is to provide a ceiling and floor of a homogeneous mass of plastic material which is a good fire-resistant, such as cinder-concrete.

While it is most desirable in modern building construction that the floors and underlying ceilings shall be absolutely fireproof, and to this end that some fireproof material, as concrete, may be employed, yet it is highly essential that the floor should possess the requisite strength for load-supports and that it shall be non-collapsible. It is also important that the ceiling, which usually suffers the fiercest attack of the flames, shall be of the same fireproof material as the floor and shall completely cover the under sides of the girders, running from wall to wall, and shall effectually protect the same against the warping action of the fire. It has been found from practice that ceilings of the ordinary material, as the plaster commonly used, are very susceptible to the attack of fire and the girders are very soon exposed to the ravages of the same. The consequence is that where supposed fireproof buildings begin to burn a collapse usually follows, owing to the disintegration or crumbling of the plaster and falling of the same immediately exposing the girders of the several floors to the attack of the fire. As is well known, the effect of the heat is to warp the girders and render them misshapen, thereby destroying their ability to support the floors and ceilings during the early stages of the conflagration.

With these and other objects and advantages in view my invention consists of a ceiling of cinder-concrete or other fireproof plastic material completely covering the under side of the I-beams or other girders, such plas-

tic ceiling being so constructed as to form the main support for the superimposed flooring and having embedded therein bridge-spans which extend from girder to girder and rest on the lower flanges thereof, furnishing the additional tensile strength for the floor and holding the ceiling suspended and imparting stiffness thereto, and other features of construction hereinafter specified, and particularly pointed out in the claims.

In the drawings accompanying this specification and illustrating my invention, Figure 1 is a sectional view of my improved fireproof ceiling and floor, taken transversely of the beams. Fig. 2 is a sectional view of the same, taken on the line 2 2 of Fig. 1. Fig. 3 is a sectional view on the same line, showing the stage of the construction where the arched supports are laid on the stratum of plastic material forming the ceiling and secured to the span to form the bridge for the support of the floor. Fig. 4 is a sectional view showing a modified form of support, and Fig. 5 is a detail view showing a further modification of floor-support.

Like letters of reference denote like parts in the several figures of the drawings.

In carrying out my invention I employ a temporary centering of woodwork, which is built beneath the girders, or, where these are in the form of I-beams, beneath the flanges thereof. In the drawings I have illustrated these girders in the form of I-beams X, for the reason that it is the form commonly used in the construction of modern buildings, and throughout the description shall refer to the girders as the "I-beams;" but nevertheless it is to be understood that in the practice of my invention any other suitable support may be employed. After the centering is in position (see Fig. 3 at Y) sheets of reticulated or foraminated metal A, of suitable lengths or in one piece and wide enough to span between the I-beams, are placed upon the lower flanges of the said beams. This span of metal is employed as a stiffening element for the ceiling, serving with other constructions to impart rigidity and tensile strength to the superimposed floor and to hold the ceiling in place. To this end it is essential in the selection of this element that lightness shall be combined with tensile strength, and there-



fore I have illustrated and preferably use expanded metal, although heavy woven wire or corrugated metal may be substituted. The bottom flanges  $x$  of the I-beams are wrapped with strips of the same material  $a$  and a layer of plastic fireproof material, preferably cinder-concrete B, is then spread upon the centering Y and under the bottom flanges of the beams to cover the same and the span of expanded metal. It is well tamped in place and when "set" tenaciously adheres to the expanded metal and forms a cinder-concrete slab ceiling, completely covering and protecting the beams against the attack of the flames.

Before the layer of concrete is set a series of arched or cylindrical supports C, of a length to reach from girder to girder and of the same material as the span A, are laid thereon at right angles to the girders and with their ends contiguous thereto. They are then secured to the span in any suitable manner—as by strong steel-wire pieces  $a'$ , laced through at short intervals—to form a strong but light bridge between the girders, resting on the flanges thereof, to support the floor and hold the ceiling.

The floor is formed by filling in the spaces between the supports C with the same plastic fireproof material as that used for the ceiling. It is well tamped and more material added until the arched or cylindrical supports and the tops of the I-beams are completely embedded or covered, as clearly shown in Fig. 1, when it is finished off to form the surface of the floor. By this construction a series of cells  $d$  are formed where the plastic material covers or surrounds the supports C of the bridge, and therefore said bridge not only supports and gives tensile strength to the floor, but it materially reduces the weight thereof, according to the number of arched or cylindrical supports and equal number of cells. This is clearly shown in Fig. 2 of the drawings. The upper or second layer or stratum of plastic fireproof material D adheres to the supports C, working into the interstices thereof, and in the intervals between said supports where the upper stratum rests upon the lower or first stratum they unite or cohere to form a homogeneous mass with a series of cells  $d$  running therethrough to reduce the weight thereof. The completed structure is a ceiling and floor of great tensile strength and minimum weight, which reduces the cost of the building, the vitals of which are completely covered and protected by a homogeneous mass of fireproof material closely resembling artificial stone and possessing all of the characteristics thereof.

In Figs. 4 and 5 I have shown modified forms of supports, using in conjunction therewith the same form of span A' as the span A

before described, and in like manner secured to the supports. The support C' illustrated in Fig. 4 is formed of the same material as that used for the preferred form of support and consists of one or more strips of metal reaching nearly from girder to girder and bowed to form one continuous arch running the entire length of the girders and at intervals secured to the span A' by the same means as heretofore described. In Fig. 5 the supports C' are cylindrical instead of arched, as in the previous forms, and are secured to the span A' in a manner similar to that employed for the other forms.

I am aware that there are patents disclosing a so-called "fireproof" floor supported by suspenders hung between I-beams and a ceiling of plaster formed under sheet-metal or wire lathing which is laced to the suspenders and lies wholly beneath the bottom flanges of the I-beams; but this construction I do not claim.

I do not desire to limit myself to the precise details of construction or arrangement of parts herein shown and described, but reserve to myself the right to alter the same within the bounds of mechanical ingenuity without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a fireproof flooring and ceiling construction, the combination with flanged girders, an intermediate foraminous web connecting the lower edges of the girders, and a body of plastic fire-resisting material in which said web is embedded forming a suspended ceiling, producing a load-support, of an arched foraminous brace arranged thereover, and a body of fire-resisting plastic material surrounding the same and at each side thereof uniting with and supported by said ceiling.

2. In a fireproof flooring and ceiling construction, the combination with the girders, an intermediate foraminous web stretched therebetween and connected to the lower flanges of the girders, and a body of fire-resisting plastic material in which said web is embedded, the latter forming a suspended ceiling producing a load-support, of a series of hollow foraminous braces located at intervals above said suspended ceiling, and a body of fire-resisting plastic material surrounding said braces and between the same, uniting with the plastic material forming a part of the ceiling.

Signed at Washington, in the District of Columbia, this 6th day of December, A. D. 1897.

WILLIAM C. LEWIS.

Witnesses:

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