

C. A. BALPH.
FIREPROOF CONSTRUCTION.

(Application filed Apr. 22, 1899.)

(No Model.)

2 Sheets—Sheet 1.

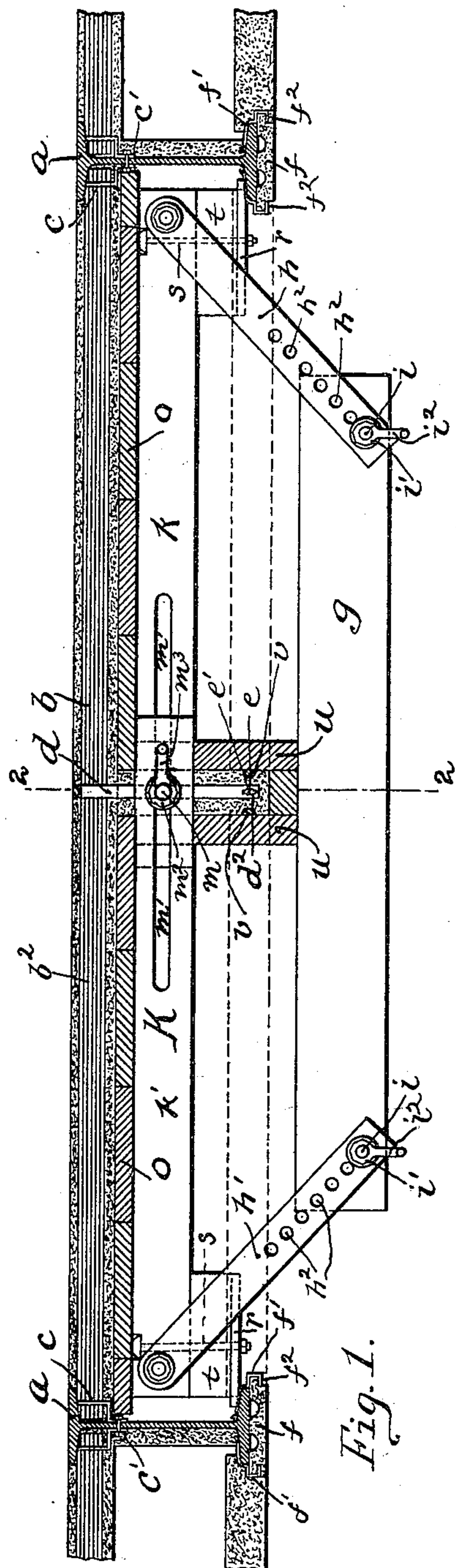


Fig. 1.

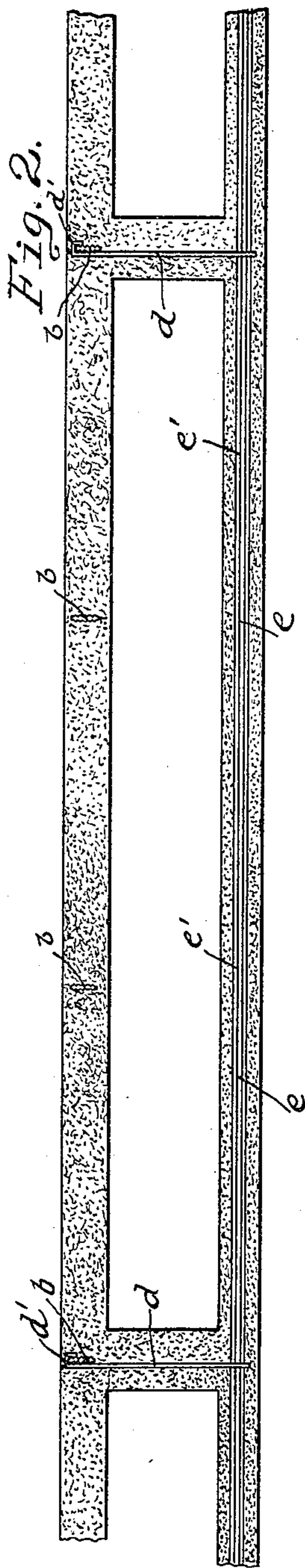


Fig. 2.

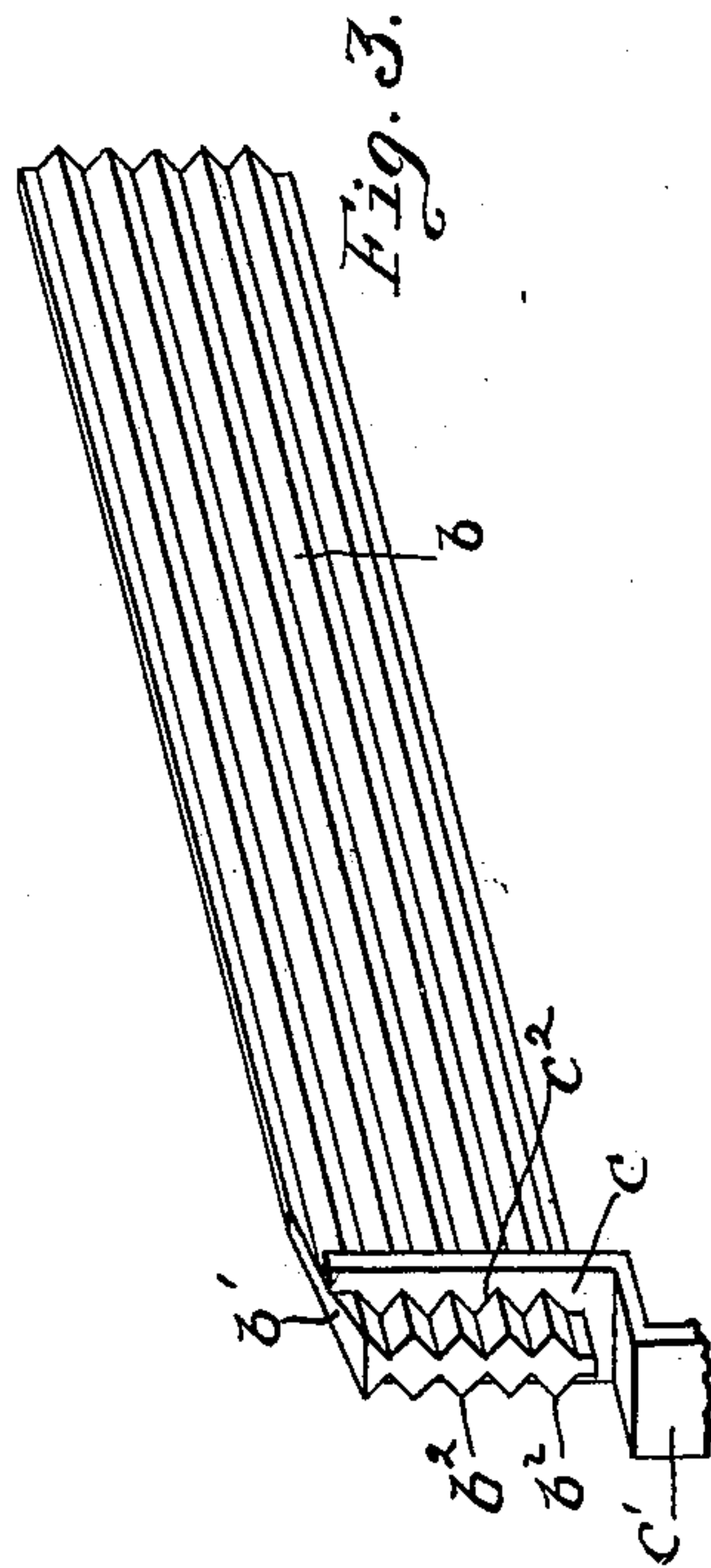


Fig. 3.

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2 Sheets—Sheet 2.

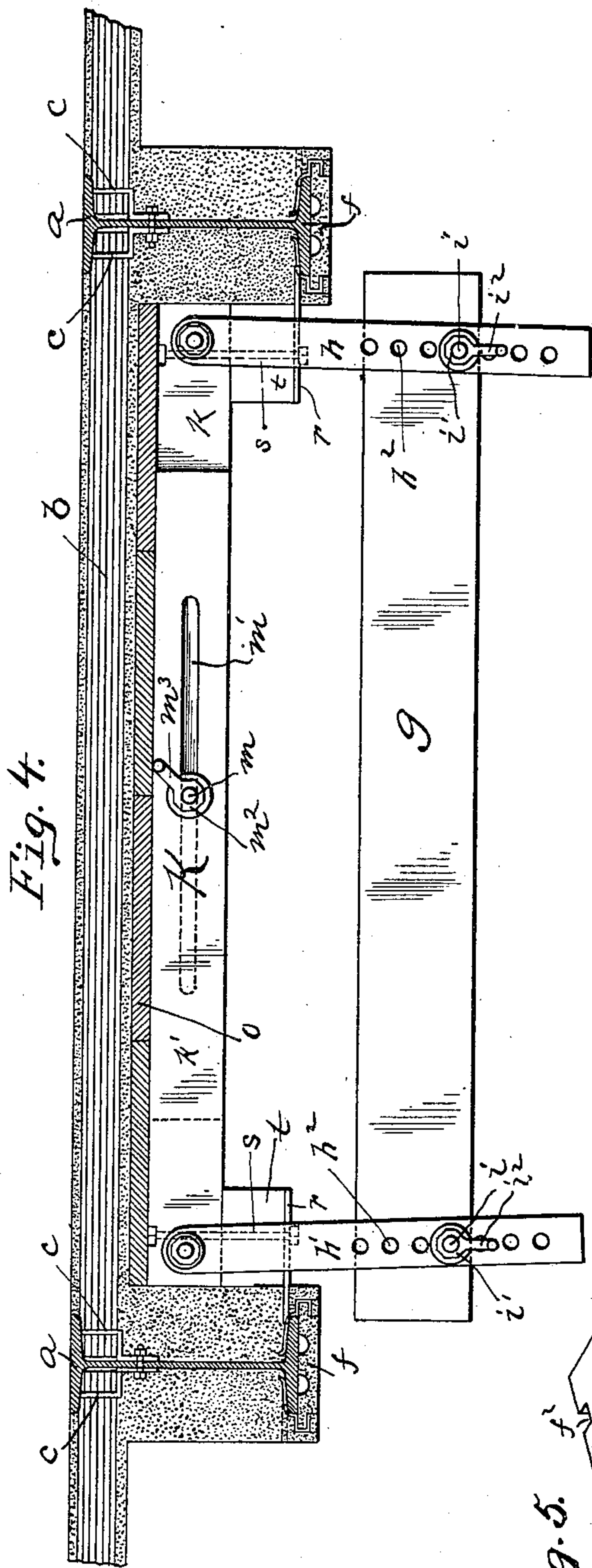


Fig. 4.

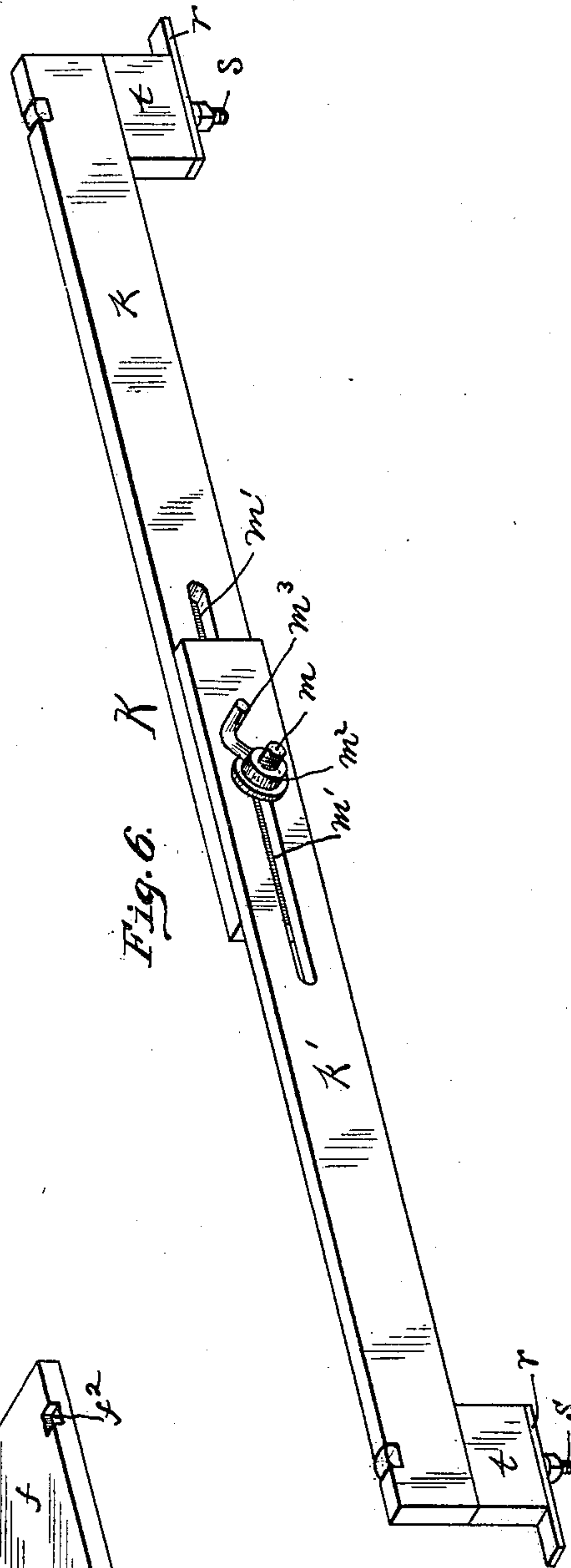


Fig. 6.

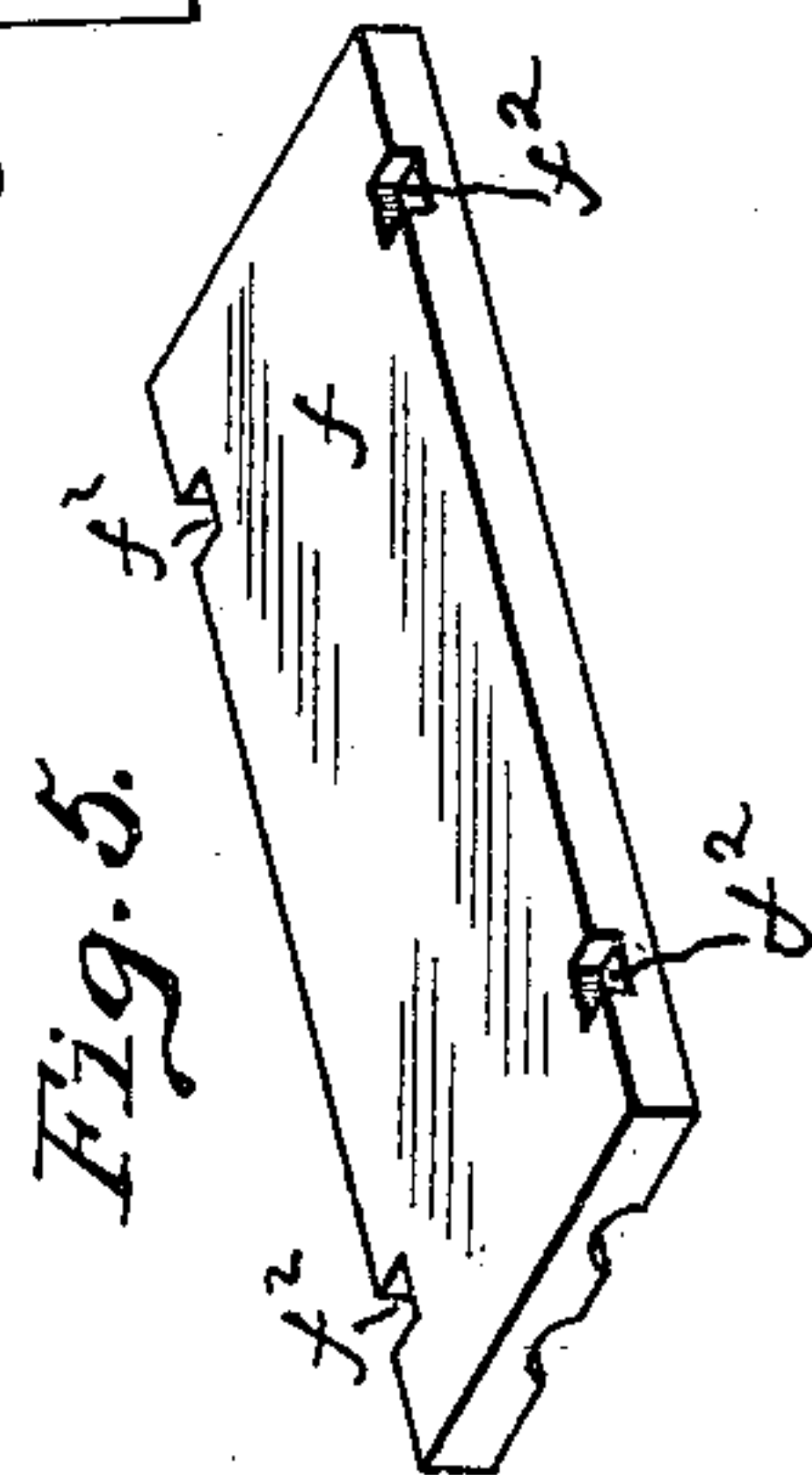


Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES A. BALPH, OF PITTSBURG, PENNSYLVANIA.

FIREPROOF CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 662,162, dated November 20, 1900.

Application filed April 22, 1899. Serial No. 714,139. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BALPH, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Fireproof Construction; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to fireproof construction, and more particularly to that class in which plastic concrete is employed in connection with a suitable iron or steel framework which is enveloped by the concrete and which acts to support the same.

The object of my invention is to provide means for retaining the concrete securely in place and at the same time to provide suitable "centering" for supporting the concrete when it is being packed in position in its plastic state and one which may be readily adjusted for use where the space between the main beams may vary.

To these ends my invention comprises the novel features hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a cross-section of a portion of a floor and ceiling construction embodying my invention and showing the centering in position for work. Fig. 2 is a section of finished construction on the line 2 2 of Fig. 1. Fig. 3 is a perspective view of a portion of one of the cross-girders and the bracket which supports same. Fig. 4 is a cross-section of a floor construction, showing the centering in its contracted form, where the space between the main beams is less than that shown in Fig. 1. Fig. 5 is a perspective view of one of the slabs for protecting the lower flanges of the main beams, and Fig. 6 is a perspective view of the extension beam or girder.

Like letters indicate like parts in each of the figures.

In the accompanying drawings the letter *a* represents the main beams, which are in the form of steel I-beams, arranged at proper intervals apart. Supported by these I-beams

a are the cross-girders *b*, said girders being supported on their edges by means of the brackets *c*. These brackets *c* are secured to the webs of the beams by means of bolts, said bolts passing through the plates *c'*, one bolt acting to secure two brackets in position, one on each side of each beam. The brackets *c* have the openings *c²* therein, adapted to receive the girders *b*. The upper edges of the girders *b* at the ends thereof are cut away, as at *b'*, to permit of the end of the girder passing beneath the upper flange of the I-beam *a*. The side faces of these girders *b* have the wedge-shaped ribs *b²* formed thereon, extending longitudinally of said bar. By having the girders *b* supported in the brackets in the manner shown said girders are free to expand and contract longitudinally without affecting the position of the brackets *c*. These girders *b* are arranged at proper intervals, and depending from said girders are the hangers *d*, which are hooked at *d'*, where they engage the girders *b*. The lower ends of the hangers *d* have the slots *d²* formed therein, adapted to receive the bars *e* and support the same. These bars *e*, like the girders *b*, are provided with the wedge-shaped ribs *e'* and the slots in the hangers *d* are made to conform to the shape of said bars. These hangers and the bars supported thereby form part of an application for Letters Patent filed by me of even date herewith, Serial No. 714,138.

The bottom flanges of the I-beams *a* are protected by means of the slabs *f*, said slabs being secured to the lower flanges of the beams *a* by means of the clips *f'*. The slabs *f* are provided with the seats *f²*, with which the lower ends of the clips *f'* engage, as shown in Fig. 5, the upper ends of said clips engaging with the flange of the beam. When the framework of the structure has been put together in the manner above described, said structure is ready to receive the concrete, and in placing the concrete I employ a removable centering, which I will now describe. This centering consists of the suspended beam *g*, to which are secured the swinging arms *h h'*. These arms are provided with a series of openings *h²*, and through one of said openings and a suitable opening in the beam *g*

passes the bolt i , said bolt having the locking-nut i' thereon with the handle i^2 , by means of which said nut is turned, so that when the bolt has been adjusted in one of the openings h^2 by turning the handle i^2 the nut locks the arm h securely to the beam g . The upper ends of the arms h are pivoted to the extensible frame K, said frame consisting of the two bars $k k'$, which are held together by means of the bolt m , said bolt passing through the slots m' , formed in the bars $k k'$. The bolt m has the jam-nut m^2 with the handle m^3 , so that when the frame K has been drawn out or contracted, according to the space between the beams a , the handle m^3 is turned and the nut m^2 acts to lock the frame K in the position it has been arranged for. As shown in Fig. 1, this centering is arranged for a construction where there is a wide space between the beams, and the frame K is elongated to its full length. The centering is supported by means of the plates r , which rest upon the lower flanges of the I-beams a , said plates being secured to the frame K by means of the bolts s , said bolts also passing through the blocks t , interposed between the frame K and said plates r . Supported by the frame K is the platform o . Concrete is deposited on this platform o and packed down until it is substantially level with the tops of the flanges of the beams a , the said concrete enveloping the girders b and filling up the grooves formed by the wedge-shaped ribs b^2 . In this manner the concrete is locked securely in place, and said girders act to support the same and give the floor strength to bear very heavy loads.

My invention is illustrated in Fig. 1 in connection with a floor and ceiling construction, in which the ceiling consists of separate slabs, and these slabs are supported in the same manner as set forth in the accompanying application hereinbefore referred to. Accordingly, the centering has the longitudinal beams u supported by the depending beams g of the centering, said beams u forming a recess for the reception of the concrete which is to envelop the hangers d and also the bars e supported thereby. The inner faces of these beams u are provided with the strips v , which form the longitudinal groove in the concrete in the same manner as in said application, and the slabs rest with one of their ends fitting in said groove, the opposite end being supported upon the lower flange of the beams a .

In Fig. 4 I have illustrated my invention as applied to a floor construction where no separate ceiling is employed, and in this case also the beams a are shown closer together than in the construction shown in Fig. 1. Accordingly, the frame K is shortened, bringing the arms $h h'$ into substantially a vertical position, the bolts i passing through openings higher up on the arms h than when in position shown

in Fig. 1. Where there is no individual ceiling, the entire bottom flange and web of the beam must be embedded in the concrete, and consequently when the centering is in the position shown in Fig. 4 there will be, as shown at the right of said figure, sufficient space between the centering and the web of the beam to provide a large recess for the concrete, said recess being shown as packed with concrete at the left of Fig. 4.

By my invention I provide a form of centering which can be readily adjusted for use in connection with constructions where the distance between the main beams varies, while at the same time it is one that can be readily erected in position and removed after the concrete has been packed in position.

The peculiar form of projections on the faces of the girders b afford a secure hold on the concrete, as the concrete is locked in the grooves formed on the faces of the said girders and is rigidly supported against heavy strains.

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

1. In fireproof floor and ceiling construction, the combination with the main beams, of a centering supported by said beams and comprising an extensible frame, means for locking the parts in adjusted position, depending arms pivoted to the ends of said frame and a beam adjustably fastened to the lower ends of said arms, substantially as set forth.

2. In fireproof floor and ceiling construction, the combination with the main beams, of a centering supported thereby, said centering comprising an extensible frame, mechanism for locking said extensible frame in its adjusted position, swinging arms connected to said frame and to a suspended beam, said arms having a series of openings therein, and a locking device engaging one of said openings and opening in said beam, substantially as set forth.

3. In fireproof floor and ceiling construction, the combination with the main beams, of a centering supported thereby, said centering comprising a frame composed of two bars in sliding relation to each other, locking mechanism for securing said sliding bars together, swinging arms connected to said sliding bars, a depending beam connected to the lower ends of said arms, and mechanism for locking said arms rigidly to said beam, substantially as set forth.

4. In fireproof floor and ceiling construction, the combination with the main beams, of plates adapted to rest on the lower flanges of said beams, an extensible frame secured to said plates, said frame comprising bars in sliding relation to each other, mechanism for locking said bars securely together, swinging arms secured to said bars, the lower ends of said arms being connected to a suspended beam, said arms having a series of openings therein, substantially as set forth.

5 In fireproof floor and ceiling construction, the combination with the main beams, of a centering supported thereby, said centering comprising an extensible frame consisting of bars having slots therein, a bolt passing through said slots, a jam-nut adapted to lock said bars securely together, arms pivoted to the ends of said frame at the upper ends and a

beam adjustably bolted to the lower ends of said arms, substantially as set forth. 10

In testimony whereof I, the said CHARLES A. BALPH, have hereunto set my hand.

CHARLES A. BALPH.

Witnesses:

ROBT. D. TOTTEN,
ROBERT C. TOTTEN.