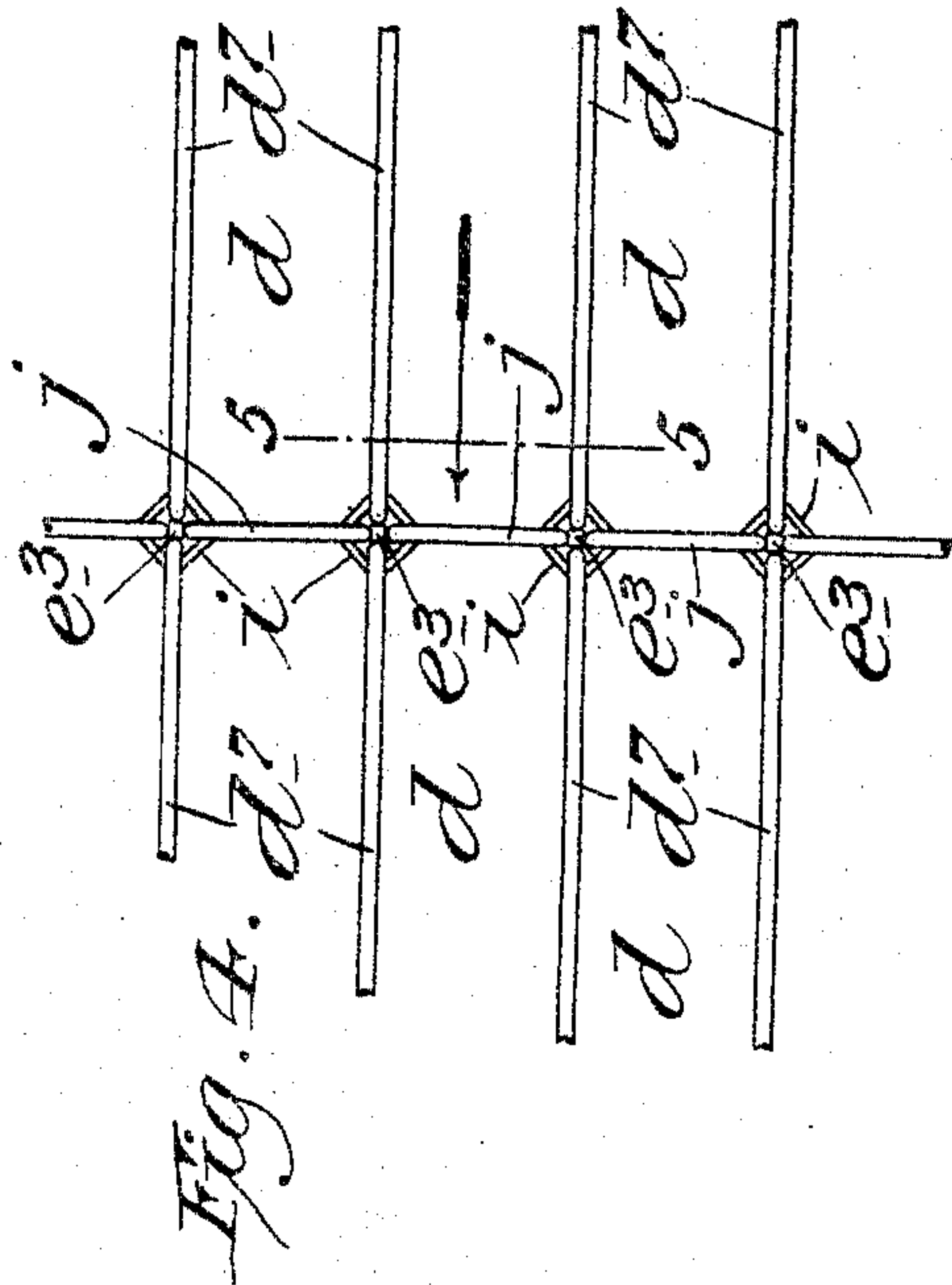
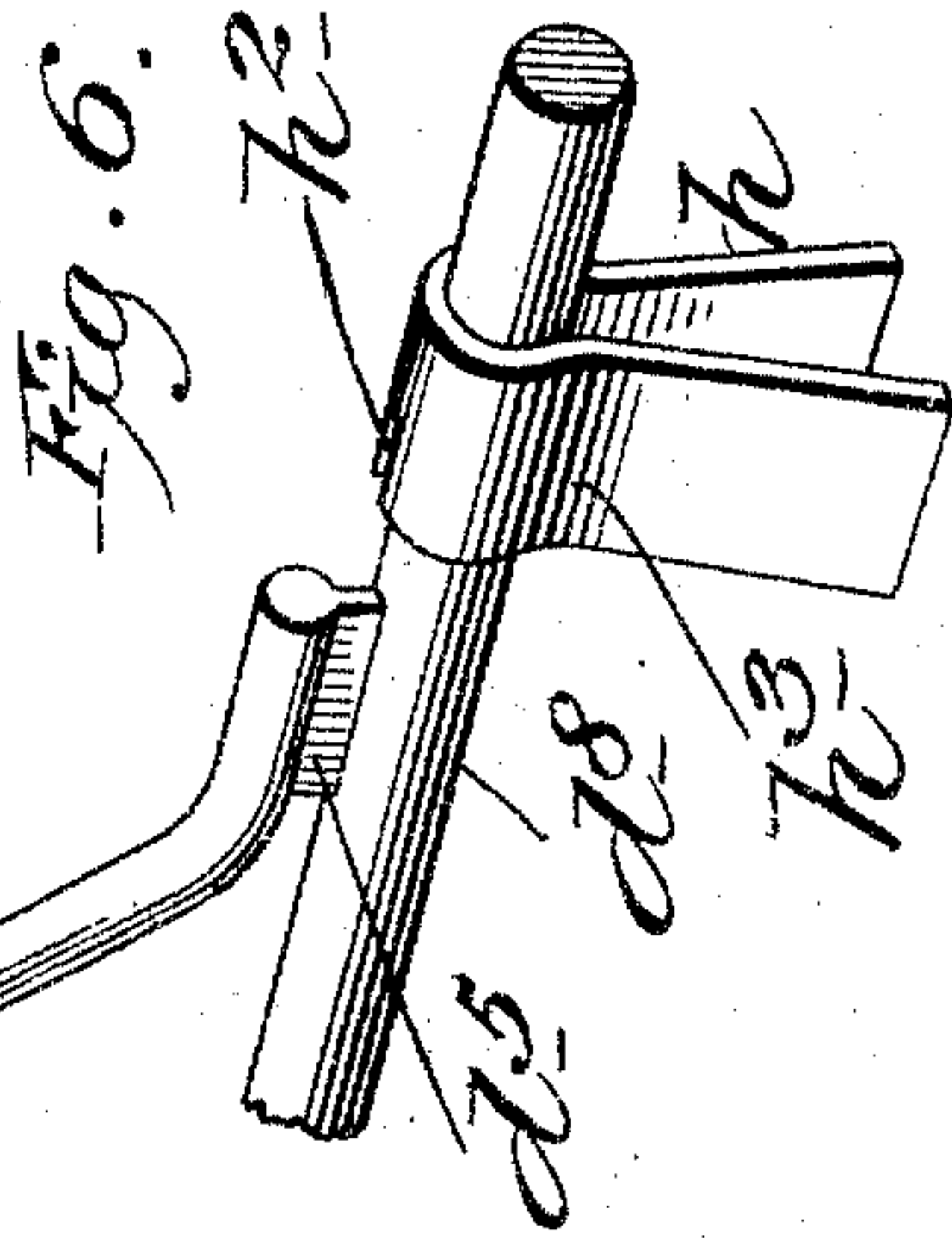
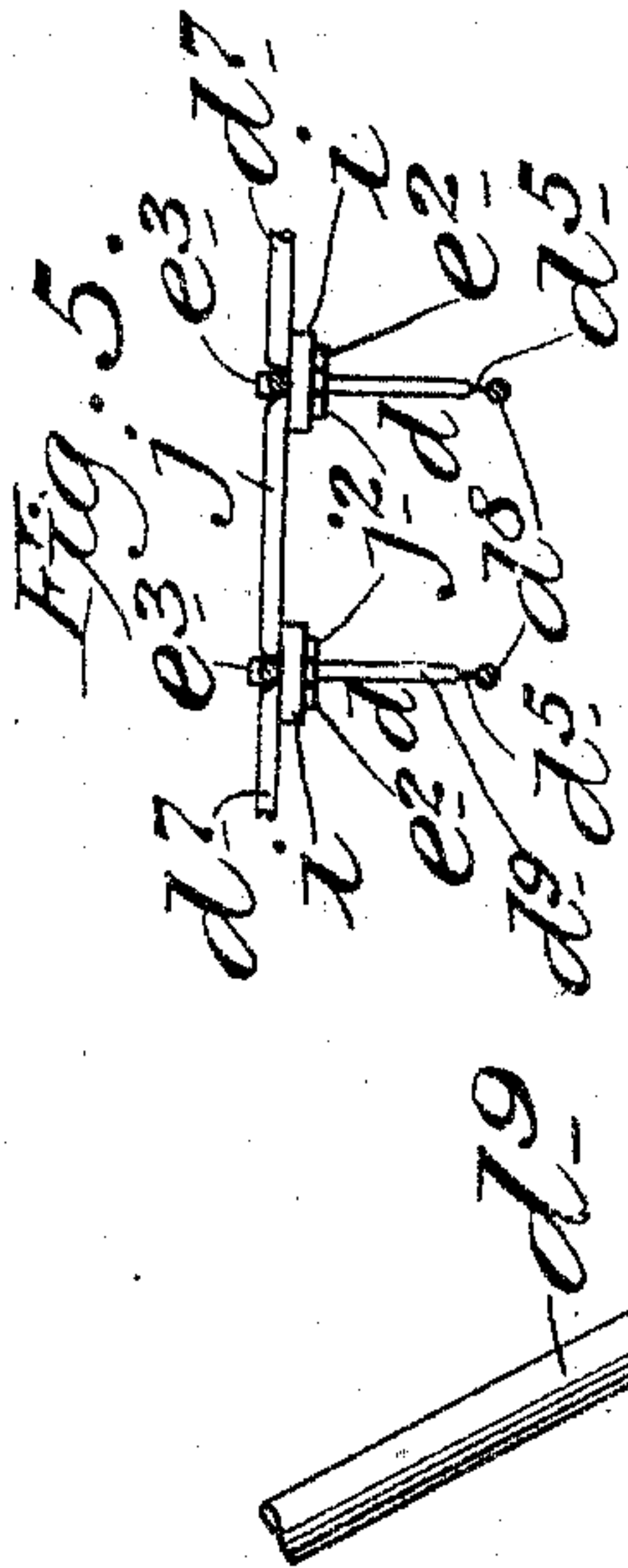
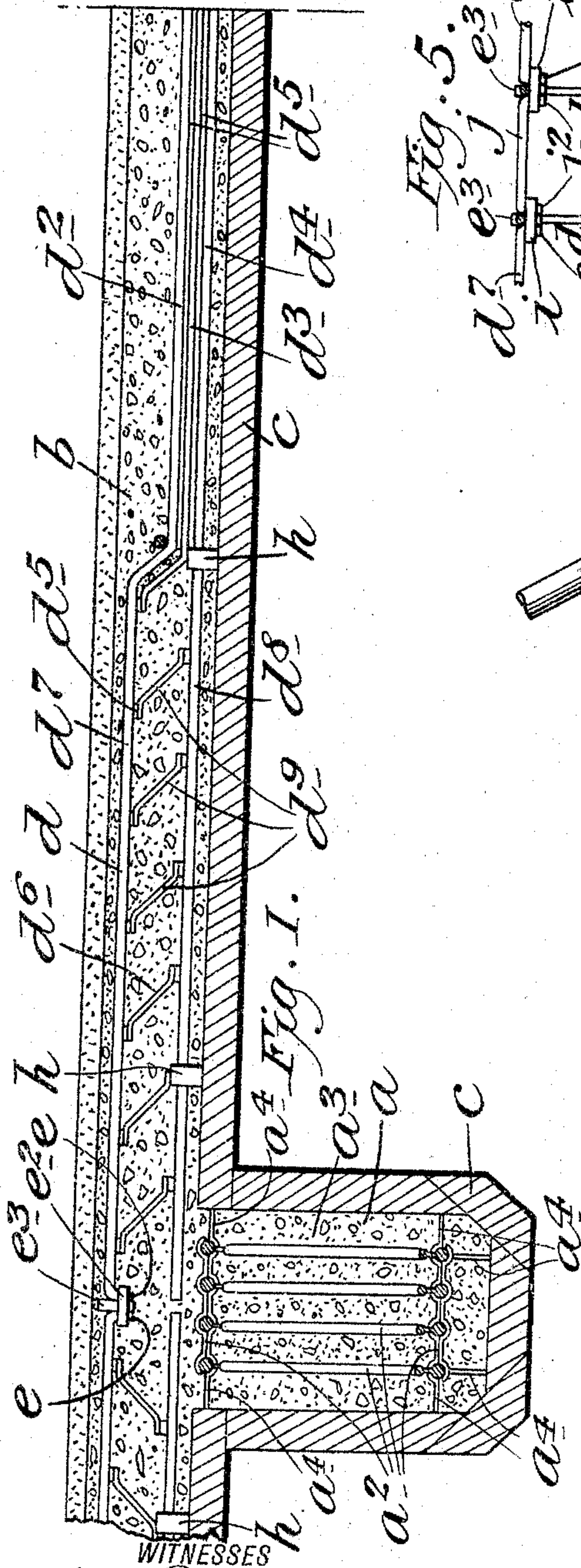


J. T. SIMPSON.
 MEANS FOR REINFORCING CONCRETE CONSTRUCTIONS.
 APPLICATION FILED AUG. 3, 1908.

928,475.

Patented July 20, 1909.

2 SHEETS—SHEET 1.



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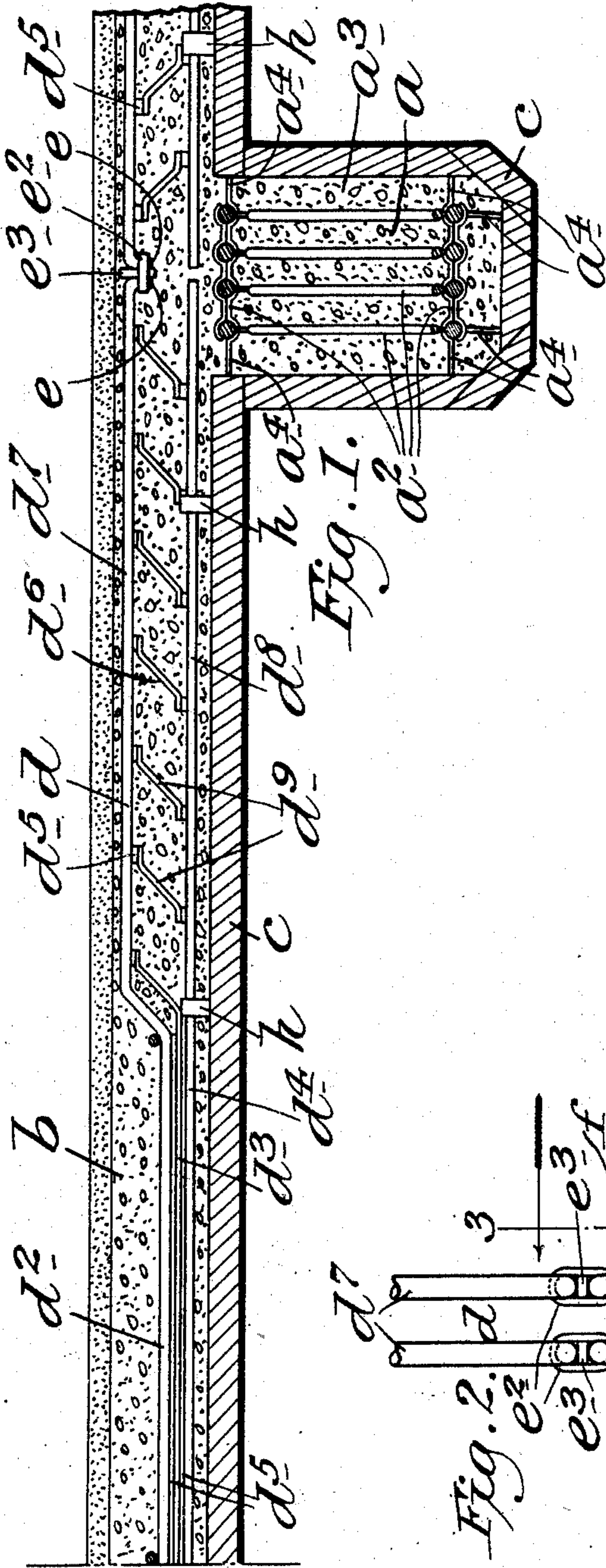


Fig. 1.

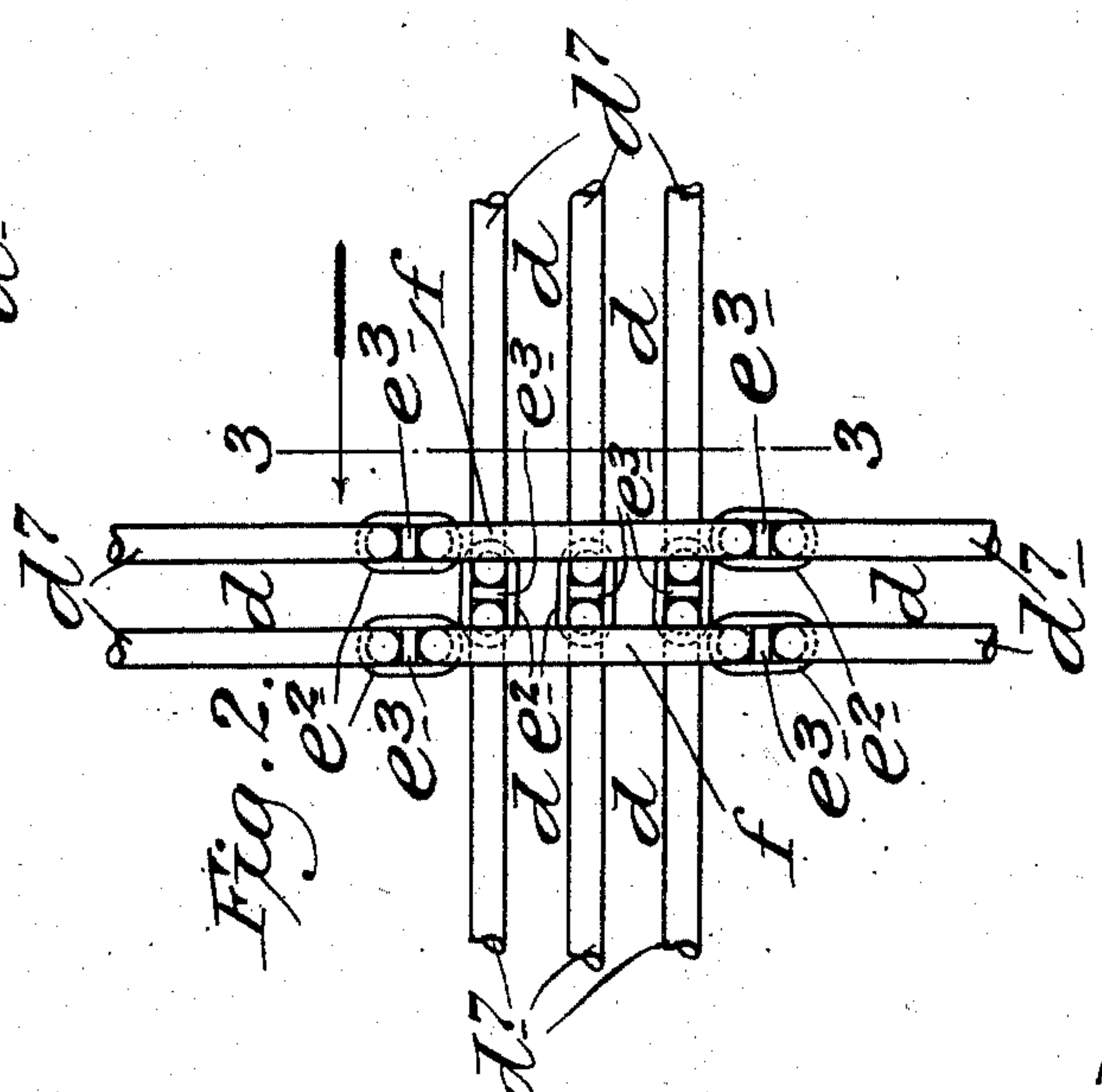


Fig. 2.

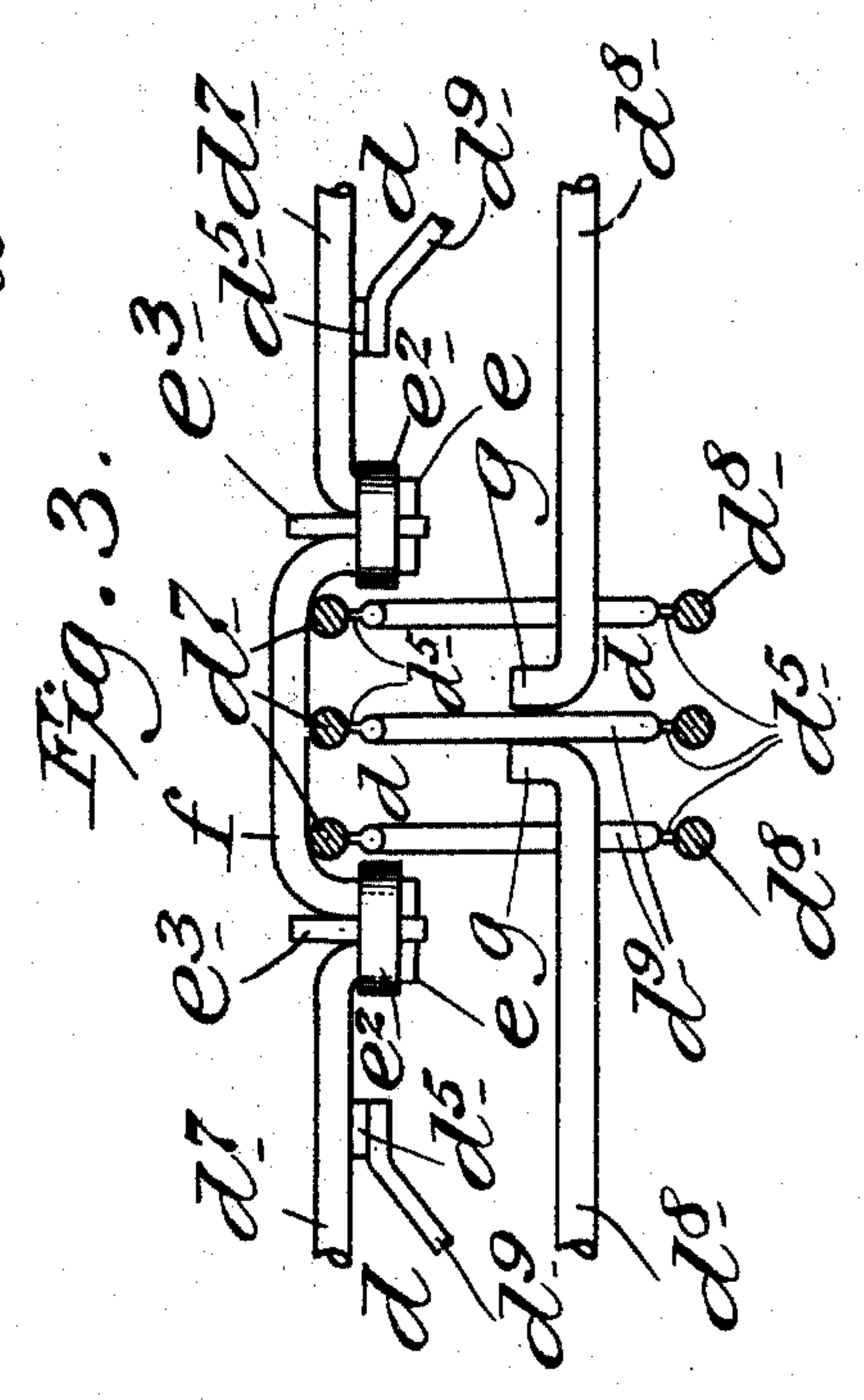


Fig. 3.

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JOHN T. SIMPSON, OF NEWARK, NEW JERSEY.

MEANS FOR REINFORCING CONCRETE CONSTRUCTIONS.

No. 928,475.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed August 3, 1908. Serial No. 446,554.

To all whom it may concern:

Be it known that I, JOHN T. SIMPSON, a citizen of the United States, and residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Means for Reinforcing Concrete Constructions, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to concrete structures and particularly to means for reinforcing concrete work in the construction of buildings, and the particular object of this invention is to provide means for forming a continuity between adjacent reinforcing elements, so as to be able to calculate the reinforced members as continuous over their supports; a further object being to provide spacing devices to insure the proper positioning of the separate reinforcing members in a horizontal floor and ceiling construction, and also to insure the proper positioning vertically of such elements in such constructions, thereby providing means whereby it is impossible to place the reinforcing elements in anything but the true position in which they belong.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which;—

Figure 1 is a sectional view showing two of the supporting beams of a floor and ceiling construction, and showing a part or section of the floor and ceiling supported thereby, and also showing the form or support in and on which the concrete is placed before it becomes set or hard, and also showing reinforcing elements and my improved method of connecting the same longitudinally so as to form a continuity of said elements, together with the spacing devices by which said elements are centered or positioned vertically in the concrete;—Fig. 2 a plan view showing a method of connecting reinforcing elements longitudinally so as to form a continuity of said elements, and showing also my improved means for arranging and connecting separate elements

when arranged transversely of each other and over a column supporting girders and beams. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4 a view similar to Fig. 2 but showing a modified means for connecting separate reinforcing elements longitudinally when used for reinforcing slabs so as to form a continuity of said elements, together with means for spacing said elements laterally and binding them together. Fig. 5 a section on line 5—5 of Fig. 4, and Fig. 6 a perspective view showing in detail one of the devices which I employ for spacing or adjusting reinforcing elements vertically in a concrete floor and ceiling construction, and showing a method of using the same.

In the drawing forming part of this specification, I have shown at *a* Fig. 1 a cross section of two beams used to support a floor and ceiling construction, and at *b* a part or section of a floor and ceiling construction supported by said beams, and I have also shown at *c* the form or supports, in which, or on which, the concrete is placed in forming said beams and floor and ceiling constructions. The beams *a* are composed of steel reinforcing material *a*² around which is cast concrete material *a*³ in the usual manner, and for the purpose of this invention the reinforcing material *a*² in said beams may be of any desired construction, and said beams, if desired, may consist of ordinary I-beams embedded in cement or concrete if desired, and when said beams are composed of reinforcing material embedded in cement as shown, the reinforcing material is provided with spacing devices *a*⁴ which extend from the body of said material to the form or support *c* and center the reinforcing material therein. I have also shown in the floor and ceiling construction and for the purpose of reinforcing the same, separate horizontally arranged reinforcing elements *d* which consist, in the form of construction shown, of parallel bars or rods *d*², *d*³ and *d*⁴, connected by webs *d*⁵ which are thinner than said rods or bars, and the end portions of the webs *d*⁵ are slit or sheared longitudinally and diagonally and then separated or expanded as shown at *d*⁶ to form top and bottom bars *d*⁷ and *d*⁸ connected by diagonally arranged rib members *d*⁹, the construc-

tion of these separate reinforcing members being the same as described and claimed by me in an application for Letters Patent of the United States, filed July 11th, 1908, Ser. No. 443,063.

In the invention which forms the basis of this application the ends of the top bars d^7 of the end portions of the separate reinforcing elements d are bent downwardly to form downwardly directed hook or finger members e and in practice I place on said hook or finger members, a loop, ring or band e^2 and a wedge e^3 is driven down through said loop, ring or band and between the hook or finger members e thus securely locking the top bars d^7 of the separate longitudinally arranged reinforcing members d together so as to form a continuity of said members, or make said members continuous over the point of support of the part or member reinforced.

In Figs. 2 and 3 I have shown a plurality of the reinforcing members d arranged side by side and connected as above described, as the same would be arranged when passing over a supporting column and I have also shown other reinforcing elements d arranged transversely of the first-named elements and in order to do this and to have all the reinforcing elements d in the same plane I provide bridge yokes f which bridge over one set of reinforcing elements and at the same time connect the separate elements of the other set, this result being also accomplished by means of loops, rings or bands e^2 and wedges e^3 similar in all respects to those shown in Fig. 1. In order to do this the end of the bridge yokes f are bent downwardly as shown in Fig. 3 and the top bars d^7 of the corresponding reinforcing elements d are similarly bent down as shown in said figure, and the loops, rings or bands e^2 are placed thereon and this after driving the wedge e^3 securely locks one set of said elements together longitudinally and at the same time bridges another set of said elements arranged at right angles thereto. This construction is particularly designed for connecting the reinforcing elements for girders and beams where the same pass over and are supported by columns. The ends of the bottom bars d^8 of the separate reinforcing elements d may be bent upwardly as shown at g in Fig. 3 if desired or said ends may be left straight as shown in Fig. 1.

In order to center the separate reinforcing elements d in the floor and ceiling construction vertically, or to space said elements vertically, I provide yoke-shaped or U-shaped attachments h one of which is shown in Fig. 1 and one of which is shown in detail in Fig. 6, and the bow or head portion of this attachment is provided at one side with a longitudinally arranged recess h^2 . In the construction of this attachment, the sides

thereof are preferably bent inwardly as shown at h^3 , and in practice said attachments are driven on over the bottom bar or member d^8 of the separate reinforcing elements d and at intervals between the diagonal ribs d^9 and said attachments are then moved along the said bar d^8 until the web member d^5 which connects the bottom of the adjacent rib d^9 with the bar d^8 enters the recess h^2 , and in this operation the yoke-shaped or U-shaped attachments h are driven along the bar d^8 with a hammer so that the web d^5 will be forced into the recess h^2 , and in this way the said attachments are locked to the bottom bars d^8 of the reinforcing elements d and the sides of said attachments extend below the said reinforcing elements a predetermined distance as clearly shown in Fig. 1 and rest on the form or support c and when the concrete of the floor and ceiling construction is placed on the form or support c the reinforcing elements d are centered therein and properly positioned vertically.

I have also shown in Fig. 4 and Fig. 5 my improved means for spacing the reinforcing elements d laterally when used as a slab reinforcement, and in this operation the top bars d^7 of said reinforcing elements are bent downwardly at their ends over the supporting beams or girders to form finger or hook members e^2 as in Fig. 1 and placed on said finger or hook members e^2 are rings or bands i which are preferably rectangular in form and spacing and connecting link members j are provided which serve to space the separate reinforcing members laterally and also rigidly connect said elements at their ends and hold the reinforcing elements d in a perpendicular position during the placing of the concrete. In this operation the link members j are also bent downwardly at their ends as shown in Fig. 5 to form hook or finger members j^2 and the wedge members e^3 are driven downwardly through the rings or bands i and between the ends of the top bars of the separate reinforcing elements and the ends of the bridge or link members j and, in practice, these spacing and connecting links are placed over the beams. This construction, as will be seen, securely binds the separate reinforcing elements d together laterally and also spaces said elements laterally and together with the setting or spacing attachments h properly locate and secure said reinforcing elements in the body of the concrete floor or ceiling construction.

In Fig. 1 of the accompanying drawing, I have shown the separate reinforcing elements d connected directly over the beams a but it will be apparent that this form of construction need not necessarily be followed, as said reinforcing elements may be connected at other points and it is not absolutely essential in all cases to connect the reinforcing

ing elements transversely as shown in Fig. 4 continuously and all in the same transverse line, and various modifications of this arrangement and other features of the construction herein described may be made, 5 within the scope of the appended claims, without detracting from the spirit of my invention or sacrificing its advantages.

In the construction of the reinforcing elements d as herein shown and described the parallel outer bars d^2 and d^4 thereof are not separated or expanded at the middle portion of said reinforcing elements, and as hereinbefore stated my invention is not limited to 15 the exact construction of the said reinforcing elements d herein shown and described, all that is necessary in this connection being to provide reinforcing elements of the same general form, the end portions of which are provided with horizontal top bars or members d^7 and horizontal bottom bars or members d^8 , or some equivalent devices by means of which the separate reinforcing elements may be connected longitudinally as herein 25 shown and described and centering or spacing devices h suspended from the bottom portions of said elements.

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

1. The herein described means for reinforcing a concrete floor and ceiling construction comprising reinforcing elements composed of top and bottom members and intermediate members connected with the top and bottom members by web portions, the bottom members being provided with spacing or centering devices which are suspended therefrom and movable longitudinally thereon and are yoke-shaped in form and the sides of which are contracted so as to hold said devices on the bottom members, said spacing or centering devices being provided with legs which extend below the reinforcing elements and support said elements above the floor of the mold, the top portions of said devices being provided with recesses adapted to receive the web portion that connects the intermediate members with the bottom members. 50 bers.

2. The herein described means for reinforcing a concrete floor and ceiling construction comprising reinforcing elements of predetermined length connected end to end and comprising top and bottom members and intermediate members, other reinforcing elements of the same form as the first named elements but placed transversely thereof and connected end to end by devices which 60 bridge the first named elements, the bottom members of all of said elements being provided with spacing or centering devices which are yoke-shaped in form and mounted thereon and longitudinally movable thereon 65 and the sides of which are contracted to hold

them on said members, said spacing or centering devices being provided with legs which extend below the reinforcing elements and support said elements above the floor of the mold, the top portions of said devices 70 being provided with recesses adapted to engage the intermediate members of the reinforcing elements.

3. The herein described means for reinforcing a concrete floor and ceiling construction, comprising reinforcing elements of predetermined length placed end to end and provided with top and bottom members, the top members being provided at their ends with downwardly directed projections, rings or bands placed on said projections, and wedges driven down through the said rings or bands and pressing on the ends of the top members of said elements so as to bind the separate elements together and make the same continuous, the bottom members being provided with downwardly directed spacing or centering devices, and the top members of said elements being connected by transversely arranged spacing devices having 90 downwardly directed projections which enter said rings or bands.

4. The herein described means for reinforcing a concrete floor and ceiling construction comprising reinforcing elements of predetermined length spaced apart and in alignment and comprising top and bottom and intermediate members, the top members being provided at their ends with downwardly directed projections, rings or bands placed on said projections, and wedges driven down through the said rings or bands and pressing on the ends of the top members of said elements so as to bind the separate elements together and make the same continuous, said elements being connected and spaced laterally by transverse members having depending end portions which are also passed downwardly through said rings before the wedges are driven. 110

5. The herein described means for reinforcing a concrete floor and ceiling construction comprising reinforcing elements of predetermined length which are placed end to end, said elements being composed of top, bottom and intermediate members, the top members being provided with depending end portions, rings placed on said end portions, wedges driven downwardly through said rings so as to securely lock the top members of said elements together, other reinforcing elements of the same form as the first named elements but placed transversely thereof and in the same plane therewith, the end portions of the top parts thereof being bent downwardly on the opposite sides of the first named elements, rings mounted on said end portions, bridging devices passed over the first named elements and downwardly through said rings, and wedges driven down 130

through said rings and bearing on the ends of the top portions of said elements and on the ends of said bridging devices so as to connect the said elements and said bridging devices end to end.

In testimony that I claim the foregoing as my invention I have signed my name in

presence of the subscribing witnesses this 30th day of July, 1908.

JOHN T. SIMPSON.

Witnesses:

A. R. APPLEMAN,
C. E. MULREANY.