No. 882,216. PATENTED MAR. 17, 1908.

P. STRAGIOTTI.

REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED JUNE 13, 1907.

3 SHEETS—SHEET 1.

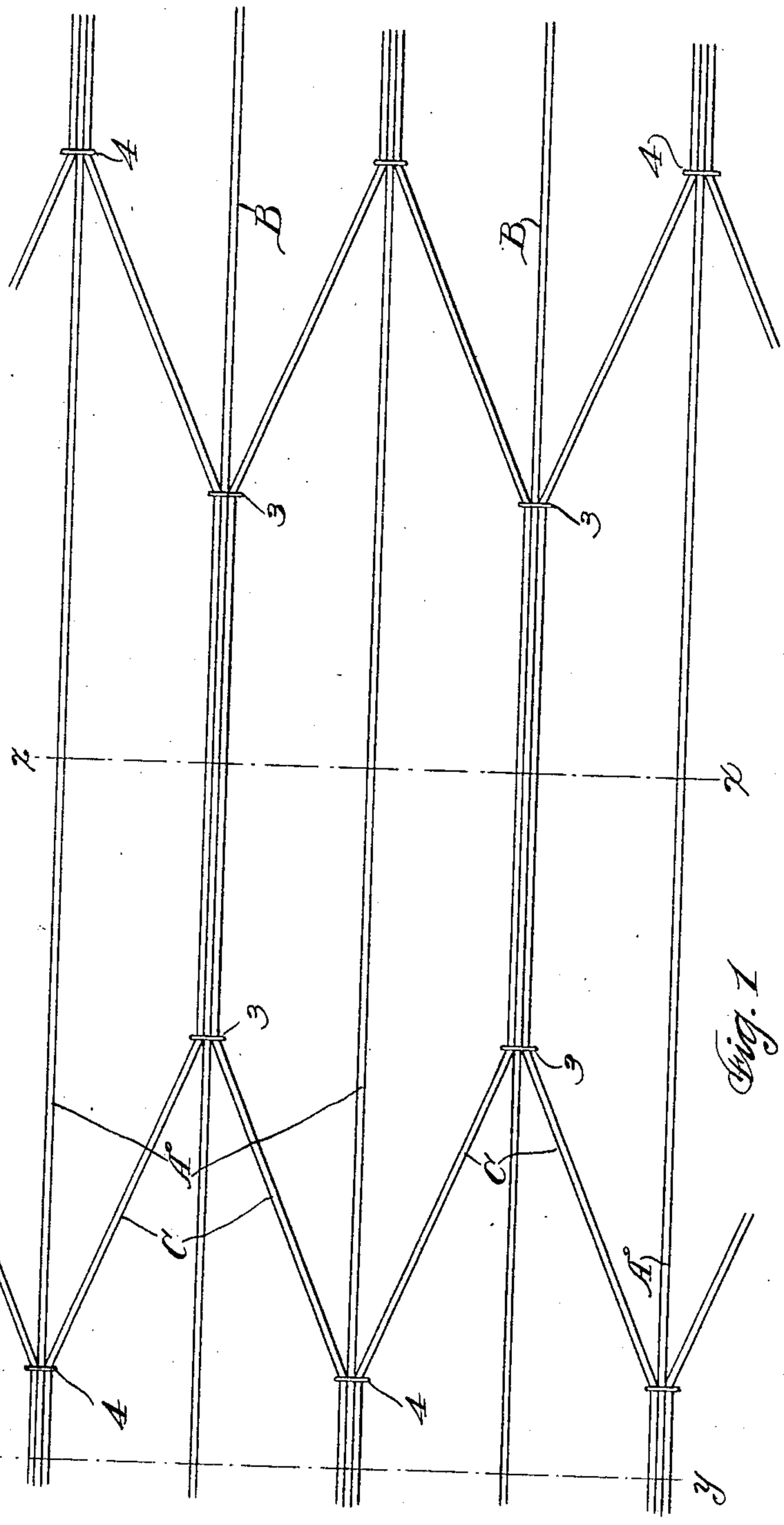

Fig. 1

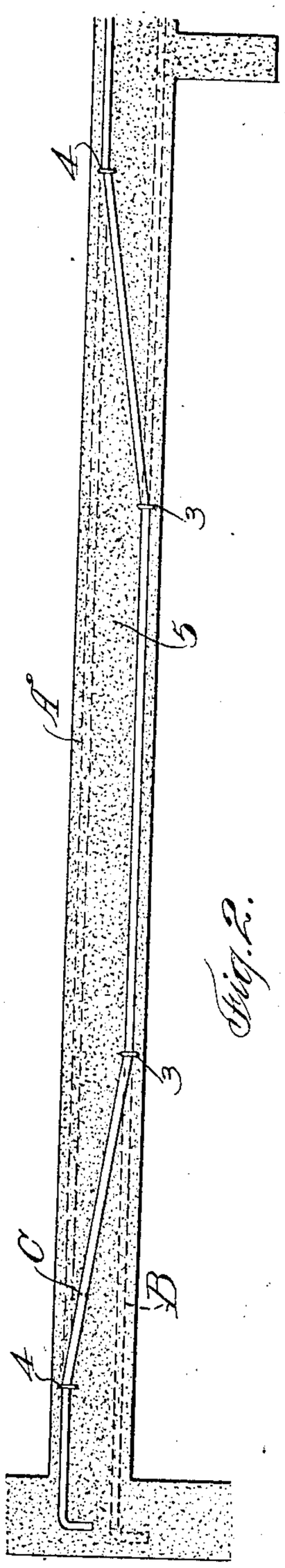

Fig. 2.

WITNESSES

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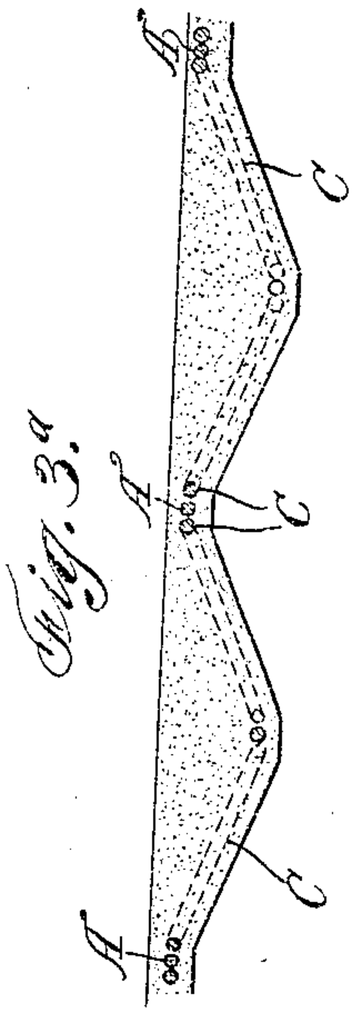

Fig. 3a.

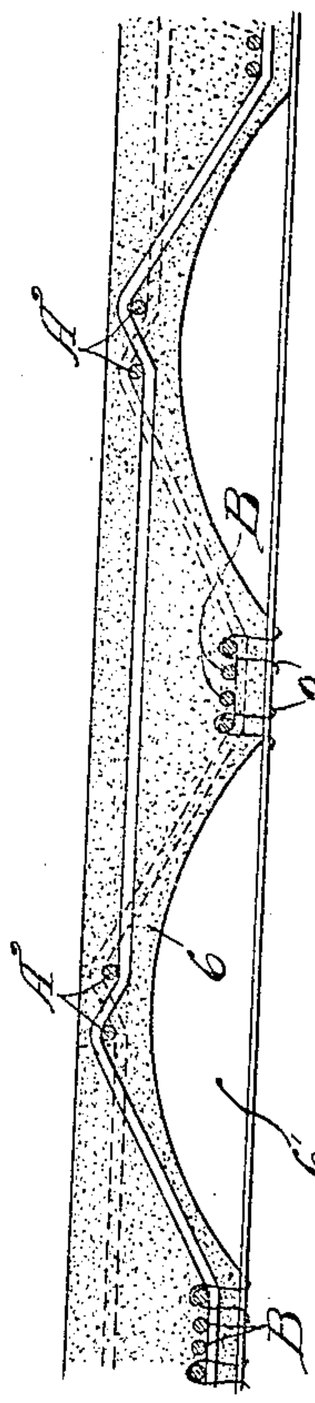

Fig. 9.

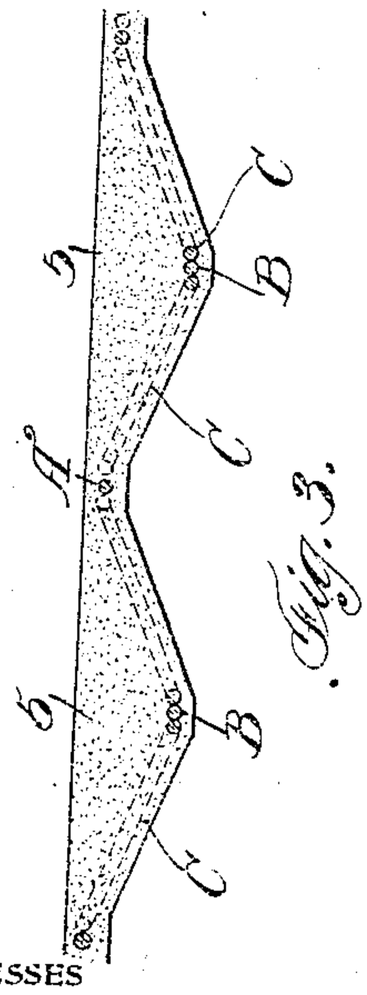

Fig. 3.

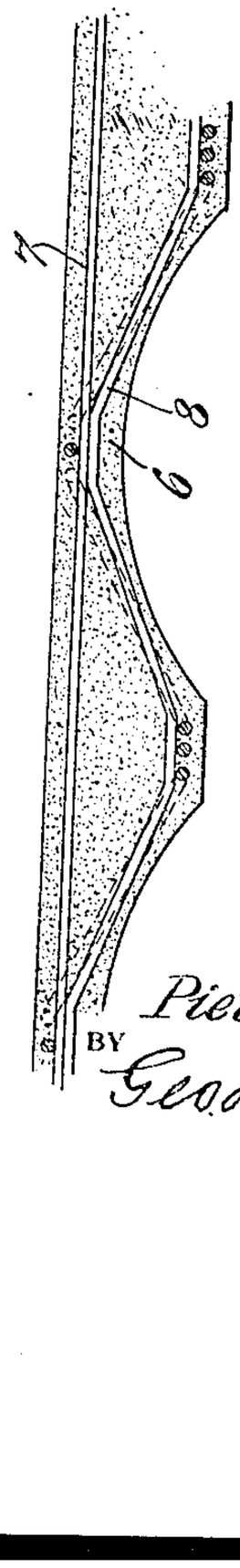

Fig. 8.

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3 SHEETS—SHEET 3.

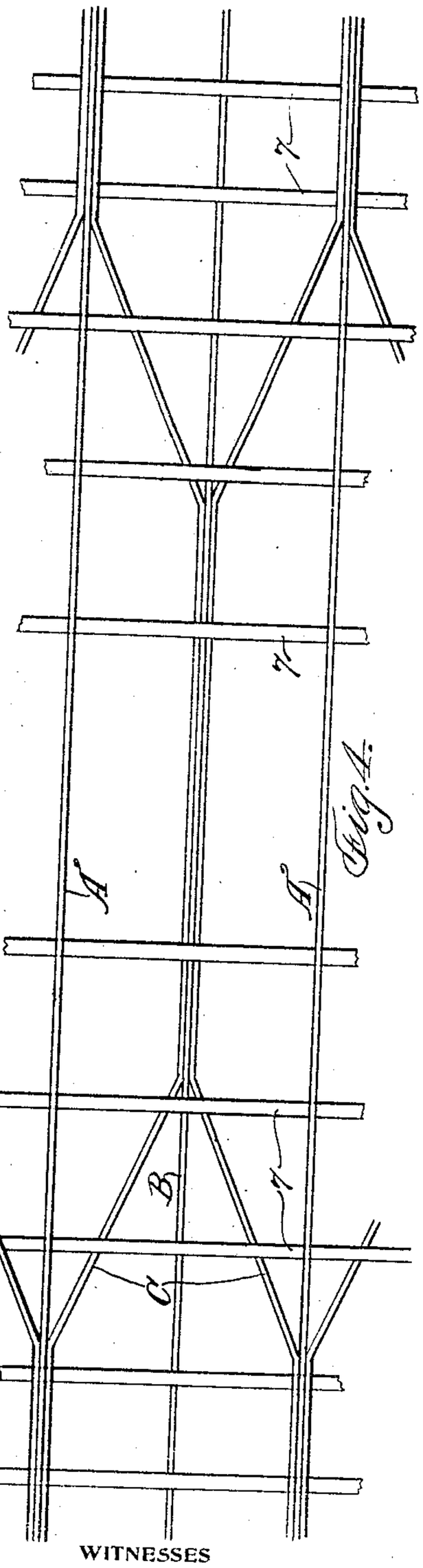

Fig. 4.

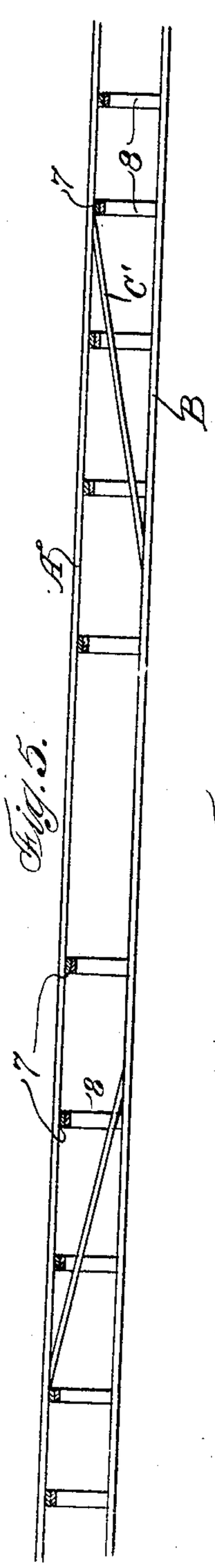

Fig. 5.

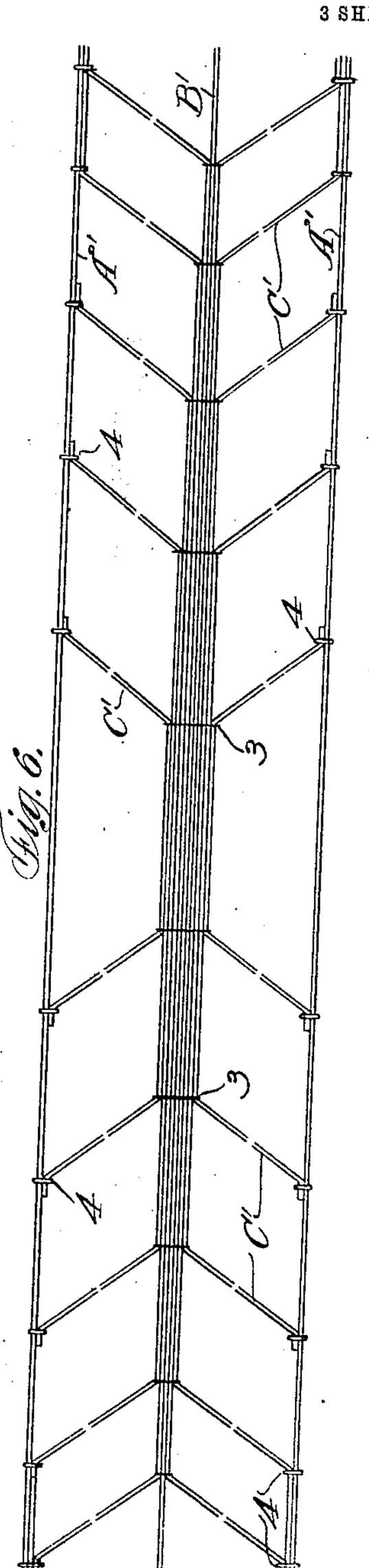

Fig. 6.

Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

PIETRO STRAGIOTTI, OF BERKELEY, CALIFORNIA.

REINFORCED CONCRETE CONSTRUCTION.

No. 883,216. Specification of Letters Patent. Patented March 17, 1908.

Application filed June 13, 1907. Serial No. 378,725.

To all whom it may concern:

Be it known that I, PIETRO STRAGIOTTI, citizen of Italy, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Reinforced Concrete Construction, of which the following is a specification.

My invention relates to a novel system of reinforced concrete building construction, and pertains especially to floors, ceilings, and roofs.

The object of the present invention is to provide a simple, practical system based on scientific principles whereby a minimum depth of flooring, girders and beams may be obtained with maximum strength and staunchness.

This object is accomplished by a special disposition of the bars and the special shape of the concrete slab or filling, whereby the head load is greatly diminished and the material distributed and arranged most advantageously.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a plan view representing the invention. Fig. 2 is a side elevation of the same. Fig. 3 is a cross-section of the same on *x*—*x* Fig. 1. Fig. 3ª is a section on *y*—*y*, Fig. 1. Fig. 4 is a plan view representing a modification of the invention adapted for deeper floors and ceilings. Fig. 5 is a side elevation in the form shown in Fig. 4. Fig. 6 is a plan view of another modification. Fig. 7 is a side elevation of the form shown in Fig. 6. Fig. 8 is a cross-section of the plan of construction shown in Fig. 4. Fig. 9 is a sectional view of another modification of construction in which stirrups and transversal bars are substituted for the bent bars.

A represents a series of horizontally disposed parallel rods or bars arranged either singly or in groups, and B represents a corresponding series of lower rods or bars parallel and alternating with the bars A. The distance between the horizontal planes of the respective bars A—B represents approximately the depth of the floor and ceiling, according to my invention.

C represents what I prefer to term the bent bars by which the upper and lower series of bars A—B are knit or bonded together into a rigid structure. These bent bars or rods C are arranged one on each side of a lower bar B, and are connected therewith and to each other in pairs, as shown by suitable means as the tie wires 3. The rods C are then bent away from their respective lower rods B and upwards toward the respective, adjacent upper rods or bars A and thereto connected, and connected to each other in pairs by the tie wires 4 or equivalent means. These bent rods or bars C are suitably secured as their ends, and when they and the rods A and B are placed in position and tied together in the manner just described, a staunch skeleton work of extreme lightness is produced. While I speak of bars A, B and C, it is understood that these bars may be of any suitable size, shape or form of construction. In actual practice they are preferably made up of one or more rods; and any suitable form of anchorage may be provided for the ends of these several rods or bars, and they may be supported at any suitable point or points in the length thereof.

In some instances the tensional strength of the floor will be borne by the rods A and in other places by the rods B. As the required tensional stress passes from B to A, or vice-versa, the bars C will be bent to lend their strength and be connected to the parts needing reinforcement. In this way the bars can be spaced farther apart than is usual under present systems.

By my system of alternately arranged upper and lower bars A—B and connecting bent bars C, I can by increasing the distance between the planes of the upper and lower bars, gain an immense advantage in stiffness of the structure; also by making the underneath part, or ceiling portion, of the structure arch-shaped as in Figs. 3 or 8, I reduce the dead weight of concrete and so do not materially increase the entire weight of the structure.

In Figs. 1—4—6—8 are shown various forms of construction resulting from the use of the above described arrangement of bars A, B and C, adapting the invention to a variety of conditions continually arising in the building of reinforced concrete structure. Thus in Figs. 1—3—4 is shown a shallow floor and ceiling structure, in which the mass of concrete 5 is advantageously disposed. In Fig. 8 where a thicker floor and ceiling is required, there is an advantageously disposed mass of concrete 6 arranged arch-shape on the underside of the bars to resist com-

pressive stress. The dead weight of the floor structure may be reduced by providing suitable air spaces above, as shown at 6′; and any suitable form of flooring may be employed.

If required or deemed advisable, the rigidity of metal structure may be increased by an arrangement of transverse stirrups and bars 7—8 as shown in Figs. 4 and 8, in which these stirrups and cross-bars run over and under the several upper and lower bars A—B and coöperate with the bent bars C. The object of these stirrups is particularly to resist the shearing stress. If a plain, non-arched ceiling is desired, wires 9 may be fastened to the metal structure before the application of the concrete or other covering by which the metal is protected from fire; metal or other lathing may afterwards be suspended in place by these wires.

Instead of the transversal bars and stirrups 8—7, there may be an arrangement of bent bars C′ as in Fig. 6, in which there are a number of these bent bars C′ laid in pairs on opposite sides of a lower bar B′ and connected to the lower bar between their ends with the ends of the bars C′ bent outward and upward to connect the corresponding upper bars A′. Such a construction is advantageous under certain conditions where thin floors are wanted and where we want to economize in iron or steel.

With every form of reinforced concrete system known to me, the bars which resist deflection are arranged wholly in vertical planes. In my invention, my bars C which resist deflection are arranged essentially in non-vertical planes; that is to say, they pass diagonally from a lower bar to an upper bar with the upper and lower bars alternating with one another. The main scheme of my system is to abolish the use of such a tremendous quantity of iron and steel, and also to reduce the number of rods and beams usually required for tensional strength and to establish a most advantageous arrangement between the metal of my structure and the concrete.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is—

1. In a reinforced concrete construction, the combination of horizontal upper bars, horizontal lower bars alternating with the upper bars, and closely arranged bent bars disposed parallel with each other and extending parallel with the upper and lower bars and connected at intervals both to the upper and lower bars.

2. In a reinforced concrete construction, the combination of a series of horizontal upper bars, a series of horizontal lower bars alternating with the upper bars, and a third set of bars, each of which has a portion arranged close to and running parallel with a corresponding lower bar and then bent upwardly toward and secured to a corresponding upper bar.

3. In a reinforced concrete construction, the combination of a series of horizontal upper bars, a series of horizontal lower bars alternating with the upper bars, a third set of bars, each of which has a portion arranged close to and running parallel with a corresponding lower bar and then bent upwardly toward and secured to a corresponding upper bar, and a series of transversal bars connecting the upper and lower bars and coöperating with said bent bars to give rigidity to the structure.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PIETRO STRAGIOTTI.

Witnesses:
B. G. Tognozzi,
Fred V. Vellmer.