(No Model.) 2 Sheets—Sheet 1.

F. SCHMEMANN.

TUBULAR FLOOR STRUCTURE.

No. 435,155. Patented Aug. 26, 1890.

FIG. 1.

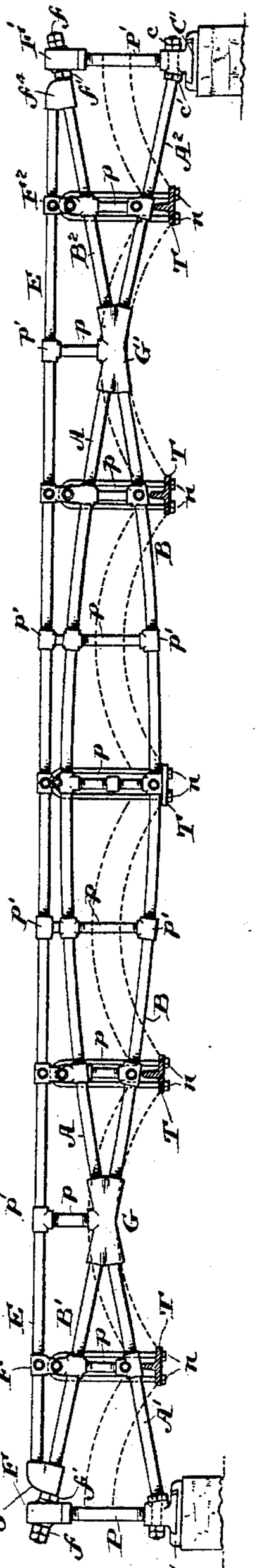


FIG. 2.

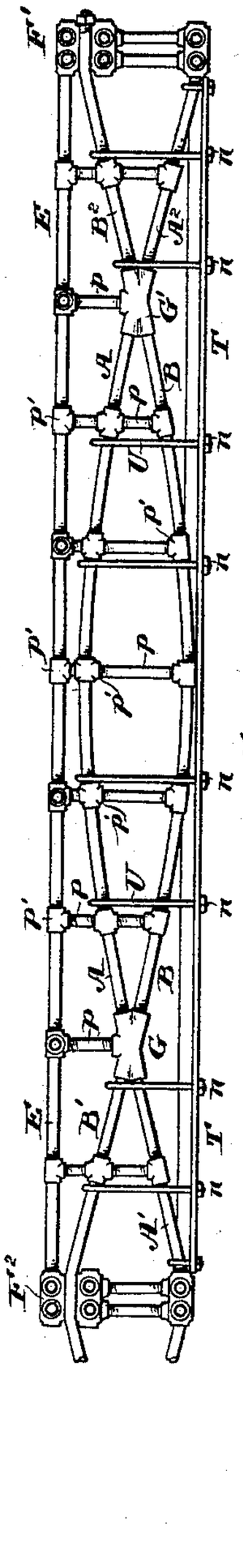


FIG. 3.

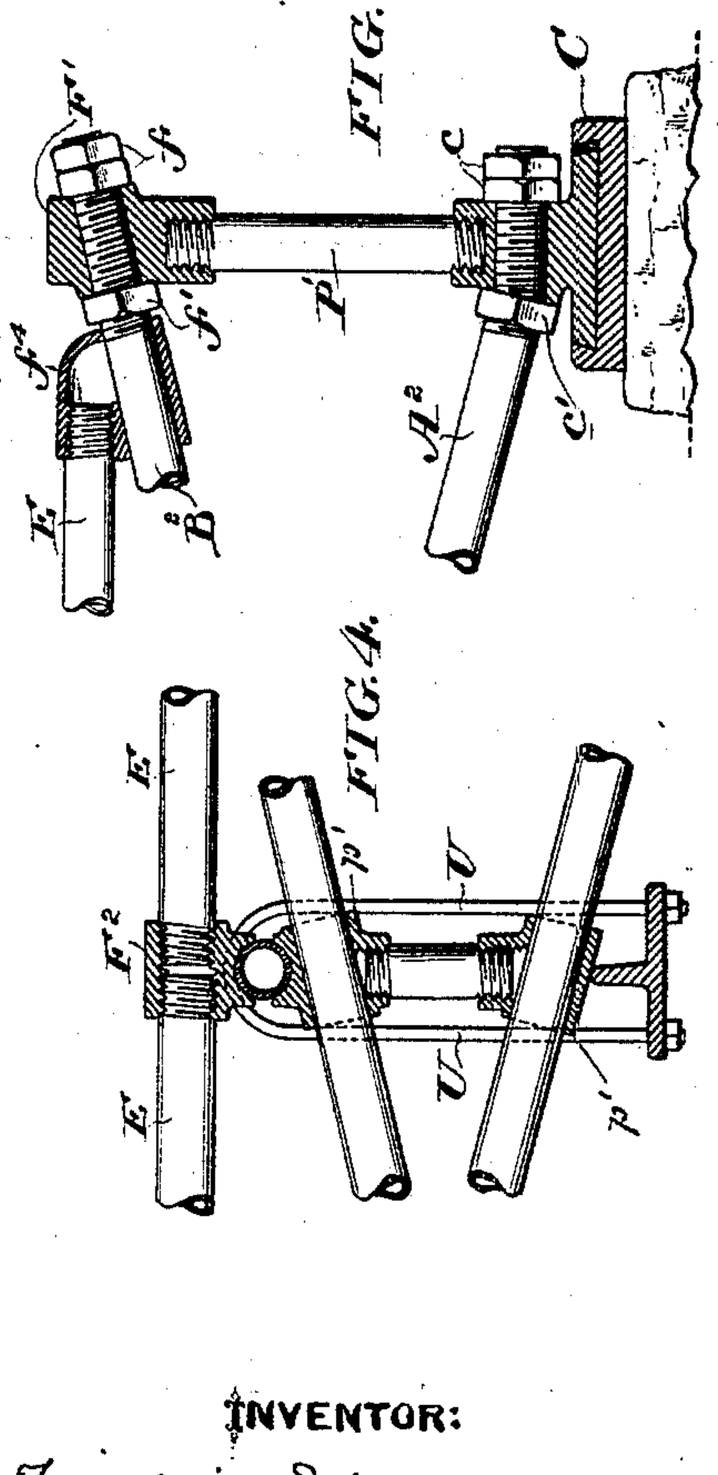
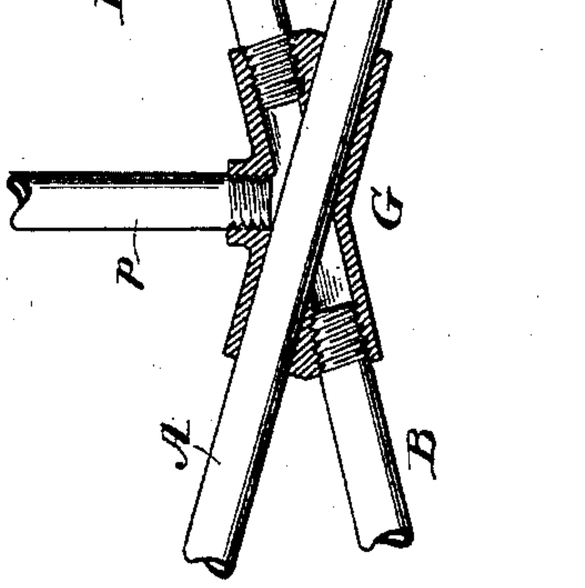


FIG. 4.

FIG. 5.



WITNESSES:

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Rose M. Fleischmann

INVENTOR:

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By his Attorney,

Harold Pellet.

(No Model.)

2 Sheets—Sheet 2.

F. SCHMEMANN.

TUBULAR FLOOR STRUCTURE.

No. 435,155. Patented Aug. 26, 1890.

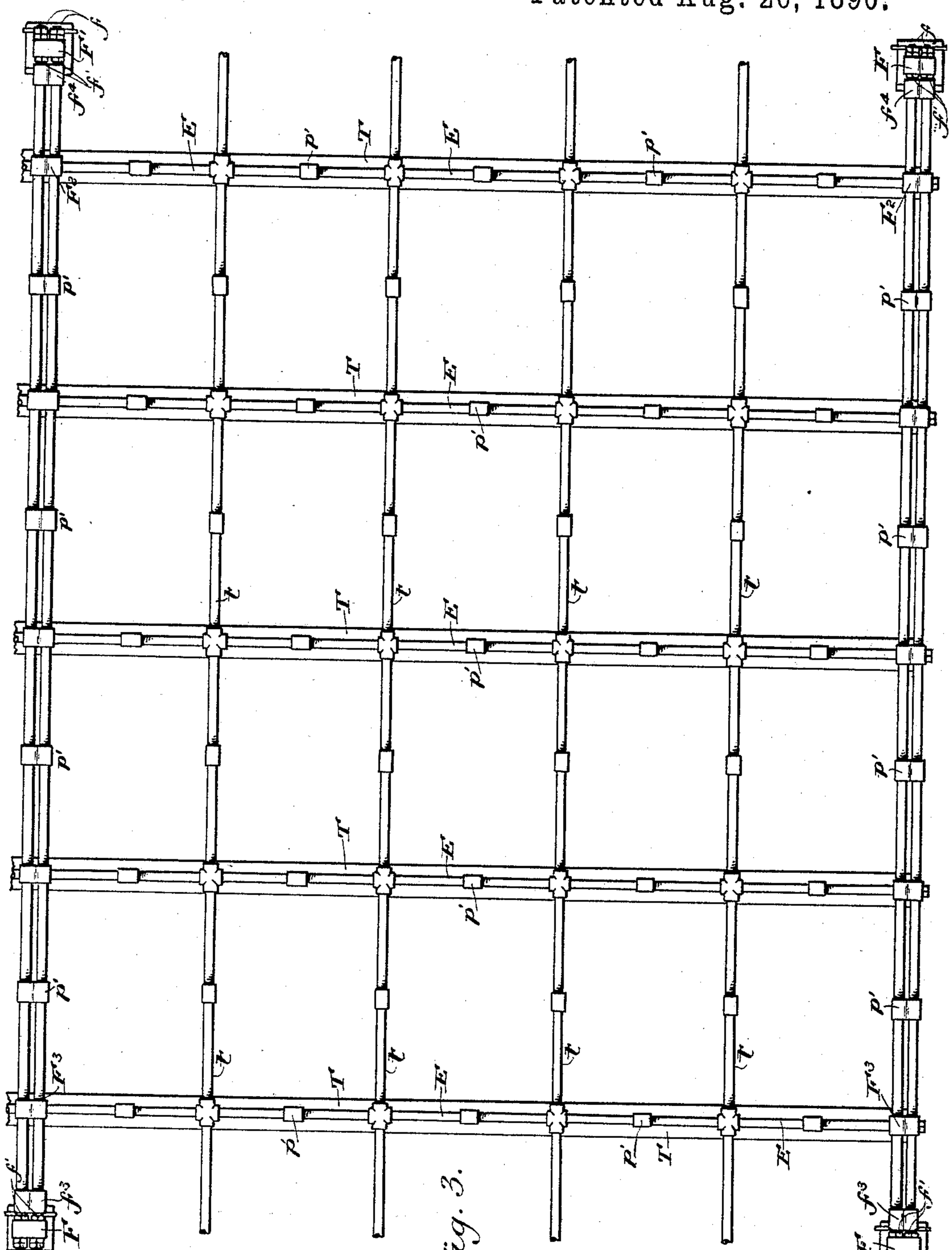

Fig. 3.

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UNITED STATES PATENT OFFICE.

FRIEDRICH SCHMEMANN, OF PHILADELPHIA, PENNSYLVANIA.

TUBULAR FLOOR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 435,155, dated August 26, 1890.

Application filed January 6, 1890. Serial No. 336,111. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH SCHMEMANN, of the city of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Tubular Floor Structures; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification.

My invention has relation to tubular floor structures; and it consists in the construction of flooring hereinafter particularly described.

The object of my invention is to produce a light, rigid, and inexpensive floor structure of uniform strength.

I will now describe my invention, so that others skilled in the art to which it appertains may make and use the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a front elevation showing one of the main tubular girders with the ends of the concrete arches shown built upon the horizontal T-plates hereinafter described. Fig. 2 shows one of the cross tubular girders. Fig. 3 is a plan view showing the combination of the main tubular girders and the cross tubular girders together with the intersecting pipe-braces. Fig. 4 is a sectional view showing the castings and connections of the main girder with the cross-girder. Fig. 5 is a sectional view of the end castings of the main girder. Fig. 6 is a sectional view of the sleeve-casting at the intersection of the upper and lower arch chords, and applies either to the main or cross girder.

The construction of the tubular reversed arch in the girder herein described is substantially similar to the construction of the bare reversed-arch chord shown in the Letters Patent No. 314,728, issued to me March 31, 1885, and of the metal purlins shown in my application for Letters Patent of the United States, Serial No. 333,816, for improvement in arch-pipe trusses for roof structures.

A is the upper arched chord of the girder.

B is the lower reversed-arch chord.

$A' A^2$ are the tangents, which are continuous with the upper arched chord A.

$B' B^2$ are the tangents which are connected by fittings with the lower reversed-arched chord.

C C′ are the shoe-castings or the bearings of the main girder, in which the tangential ends $A' A^2$ fit and are secured by means of the lock-nuts *c c′*, turned on the screw-threads provided on the ends of the tangential chords $A' A^2$. The tangential ends B B′ are secured to the castings F F′ by means of the lock-nuts *f f′*, turned on the screw-threads provided on the ends of the tangential chords $B' B^2$. Secured also to the chord $B' B^2$ by the sleeve-castings f^3 f^4 at the casting F is an upper horizontal chord E between the two end castings F F′. The castings F F′ are mounted on vertical posts P P′, which are secured to and mounted upon the shoe-castings C C′.

G G′ are the castings at the intersection of the arched chords A B and the tangential ends $A' A^2 B' B^2$, in which $A A' A^2$ are continuous, and the tangential ends $B' B^2$ are connected with the arched chord B by screw-fittings. These upper and lower chords $A A' A^2$ B B′ B^2 and the upper horizontal chord E, when it is employed, are intersected and connected together by vertical posts *p*, through the medium of the sleeve-fittings *p′*. These fittings are screwed on the ends of the vertical posts *p* and slipped loosely on the chords which they connect. The main girders are preferably constructed double, composed of two series of tubular connections and fittings. The cross-girders are of a construction substantially similar to the main girder described, and connected with the main girder, as shown in the sectional view, Fig. 4, and in the plan view, Fig. 3, by the mutual fittings and pipe-posts. The ends of the cross-girders are connected and secured, as shown in said Figs. 3 and 4, to the main girders between them and at right angles thereto at desired intervals. The cross-girders are laterally braced by the pipe-braces *t*, running from wall to wall.

When it is desired to employ or build in concrete arches instead of merely laying a wooden or plate flooring immediately upon the structure, as described, wrought-iron plates T are suspended longitudinally beneath the cross-girder through the medium of in-

verted-U bolts U, which are looped or secured over the chord of the upper arch of the cross-girder, the ends depending and passing through the iron plates T, which secures the said plate in the position shown in the drawings by means of the nuts *n* provided on the ends of the said inverted-U bolt. On these plates the abutments of the concrete or brick arches are built from one plate to the other, each arch connecting one with the other. In this way a most solid, substantial, and fireproof structure is provided. When the brick or concrete arches are employed as described, the upper horizontal chord E which is shown in the drawings may be dispensed with.

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

1. In a floor structure, the combination of main tubular reversed-arch girders with cross tubular reversed-arch girders, said cross tubular reversed-arch girders provided with horizontal suspension-plates, and brick or masonry arches constructed upon said horizontal suspension-plates, substantially as hereinbefore set forth and described.

2. In a floor structure, two or more main tubular reversed-arch girders, in combination with other tubular reversed-arch girders set at right angles to the main girders, between said main girders and connected therewith, and tubular pipe-braces connecting and supporting said cross-girders, substantially as hereinbefore set forth and described.

3. In a floor structure, two or more main tubular arched girders provided with an upper horizontal connecting-chord, in combination with a series of cross connecting tubular arched girders provided with upper horizontal connecting-chords secured to and connecting the main girders and tubular pipe-braces connecting and supporting the cross-girders, substantially as hereinbefore set forth and described.

4. In a floor structure, main reversed tubular arched girders, in combination with a series of cross tubular arched girders provided with horizontal lower suspension-plates, said cross-girders secured at right angles to the main girders and connecting the same, and brick or concrete arches built or constructed upon the said horizontal suspension-plates, the whole forming a continuous solid structure, substantially as hereinbefore set forth and described.

5. In a floor structure, in combination with main reversed tubular arch girders, cross tubular girders connecting said main girders and set at right angles thereto, tubular pipe-braces, and flooring plates or planks, substantially as hereinbefore set forth and described.

6. In a floor structure, the combination, with the double reversed-arched girders having the reversed-arch chords A B and the tangential ends A′ A^2 B′ B^2, and an upper horizontal chord E, of the cross tubular reversed-arch girders having also the tubular reversed-arch chords A B and tangential ends A′ A^2 B′ B^2, an upper horizontal chord E, and top flooring set upon said horizontal chords E, substantially as hereinbefore set forth and described.

7. In a floor structure, two or more double tubular reversed-arch girders having the reversed-arch chords A B, and the tangential ends of the said arch-chords A′ A^2 B′ B^2, secured to the upright posts P P′, in combination with cross tubular reversed-arch girders set at right angles to said main girders between said main girders and secured and connected therewith, said tubular cross arched girders provided with reversed-arch chords A B, and tangential ends A′ A^2 B′ B^2, connected with vertical posts P P′, horizontal plates T, secured to said cross-girders running horizontally underneath the same, masonry arches built between said cross-girders resting and abutting upon the horizontal plates T, and said arches connecting one with another, substantially as hereinbefore set forth and described.

8. In a floor structure, two or more tubular girders having the upper-arch chord A, provided with tangential ends A′ A^2, and lower reversed-arch chord B, having the tangential ends B′ B^2, secured and connected to the vertical posts P P′, through the medium of shoe-castings C C′ and F F′, the vertical connecting-posts *p*, connecting said upper and lower chords by means of sleeve-fittings, in combination with cross tubular girders secured between the main girders at right angles thereto by means of screw and sleeve fittings, horizontal plates T, attached and secured longitudinally with and underneath said cross-girders, brick or concrete arches provided between said cross-girders resting or abutting upon said horizontal plates T, substantially as hereinbefore set forth and described.

In witness whereof I have hereunto set my hand this 4th day of January, A. D. 1890.

FRIEDRICH SCHMEMANN.

Witnesses:
HORACE PETTIT,
REESE M. FLEISCHMANN.