(No Model.)

3 Sheets—Sheet 1.

J. H. SEMMES.

BRIDGE.

No. 584,525. Patented June 15, 1897

Fig. 1.

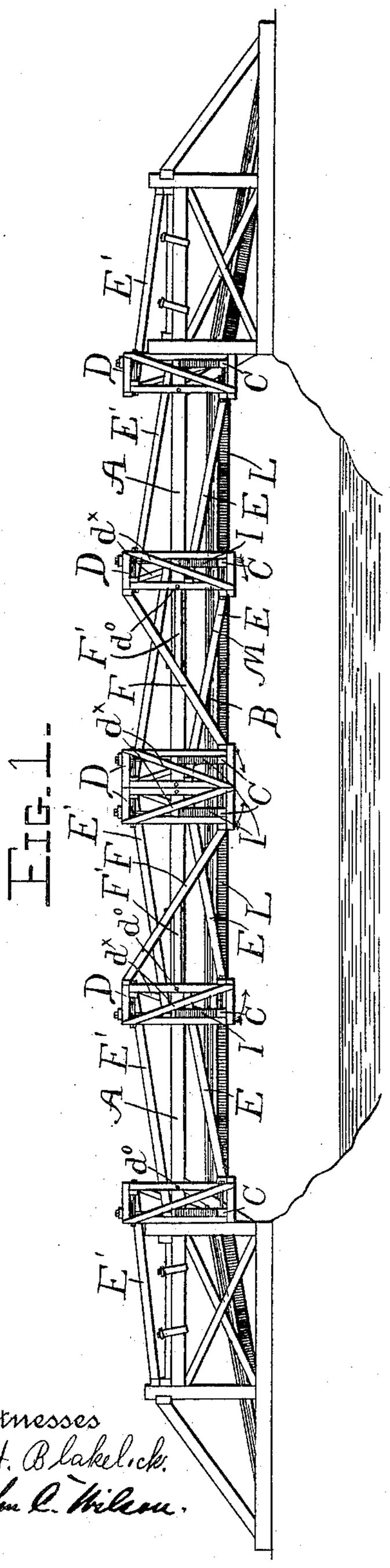
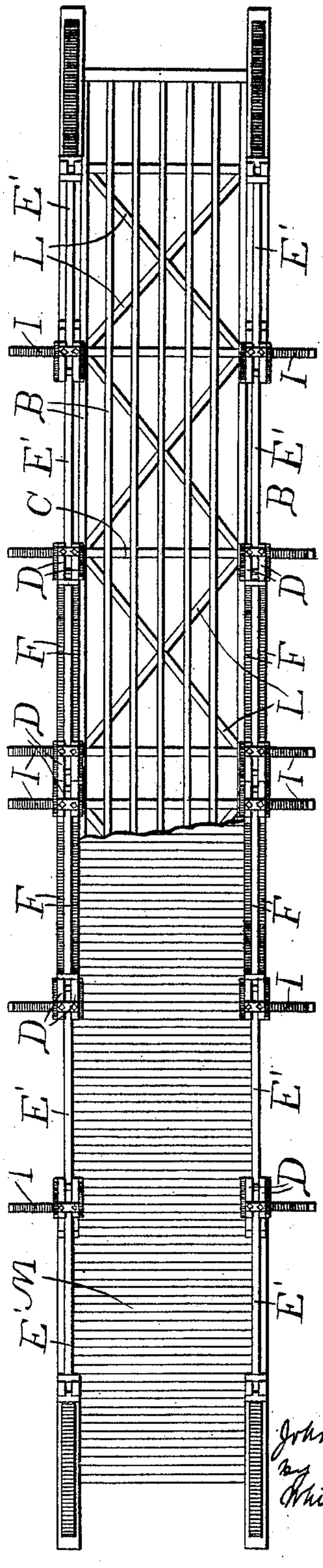


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 3.

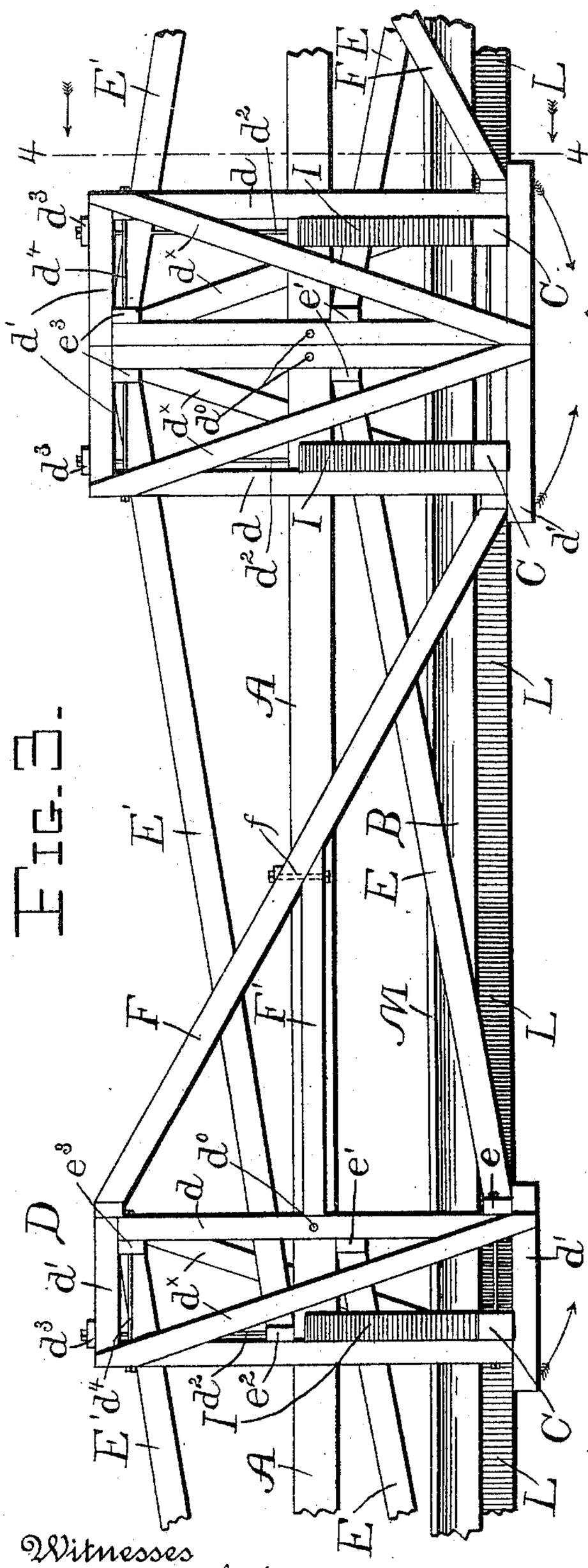
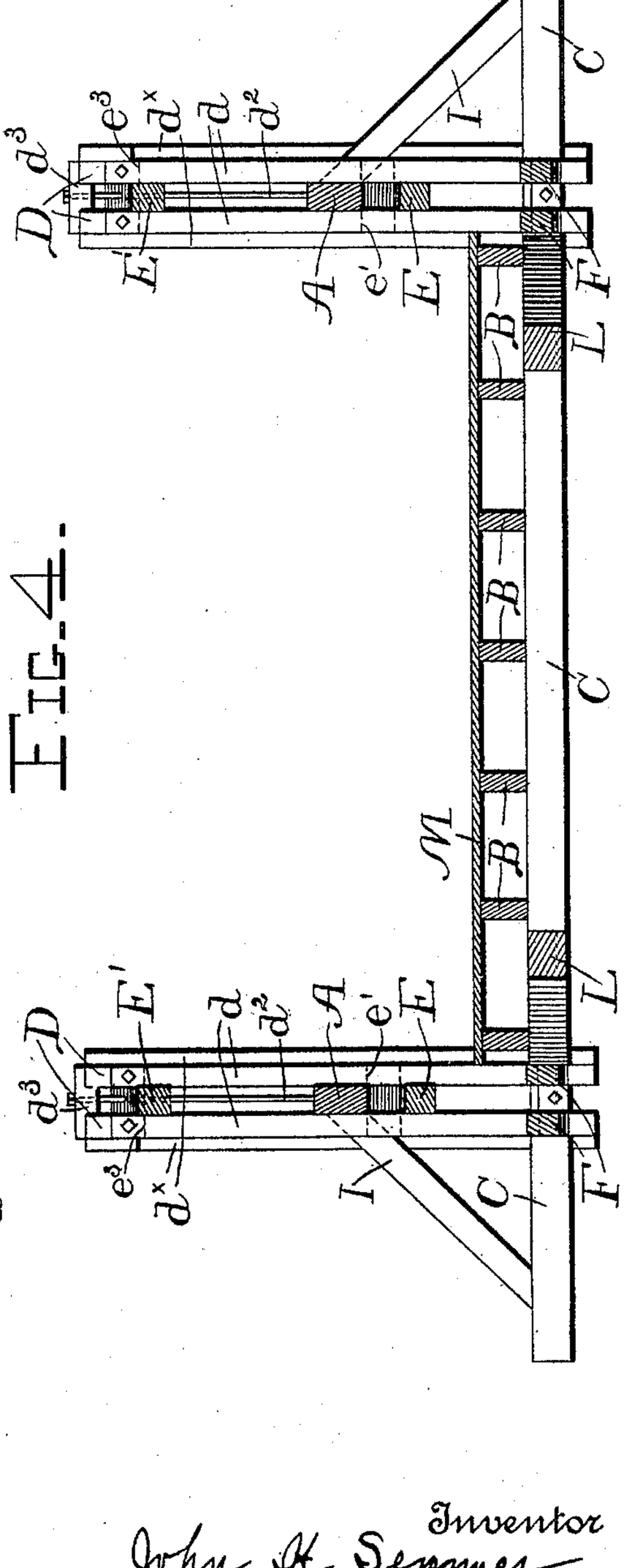


FIG. 4.



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(No Model.) 3 Sheets—Sheet 3.

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FIG. 5.

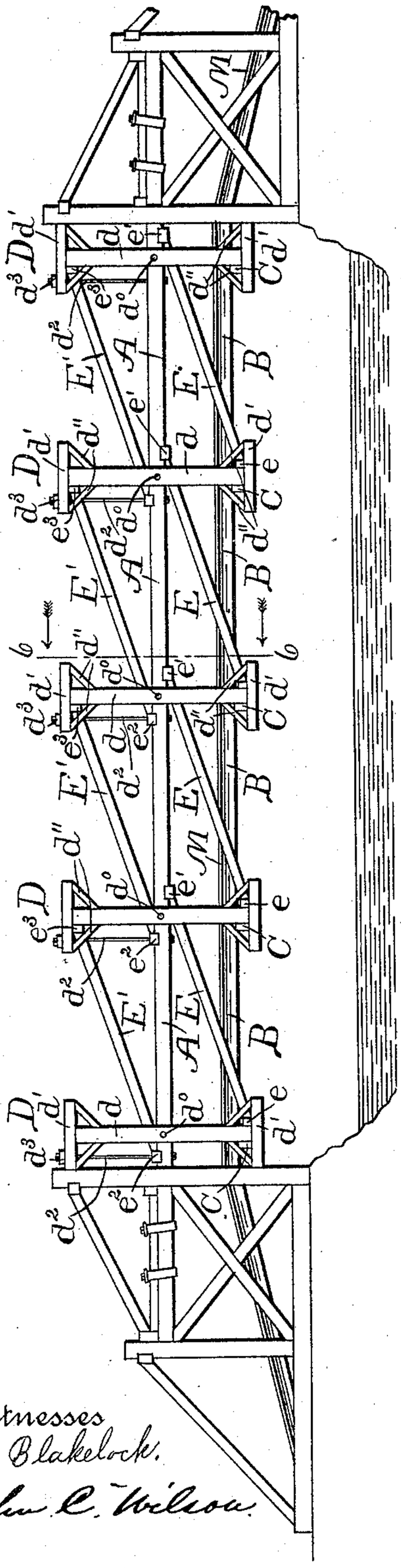
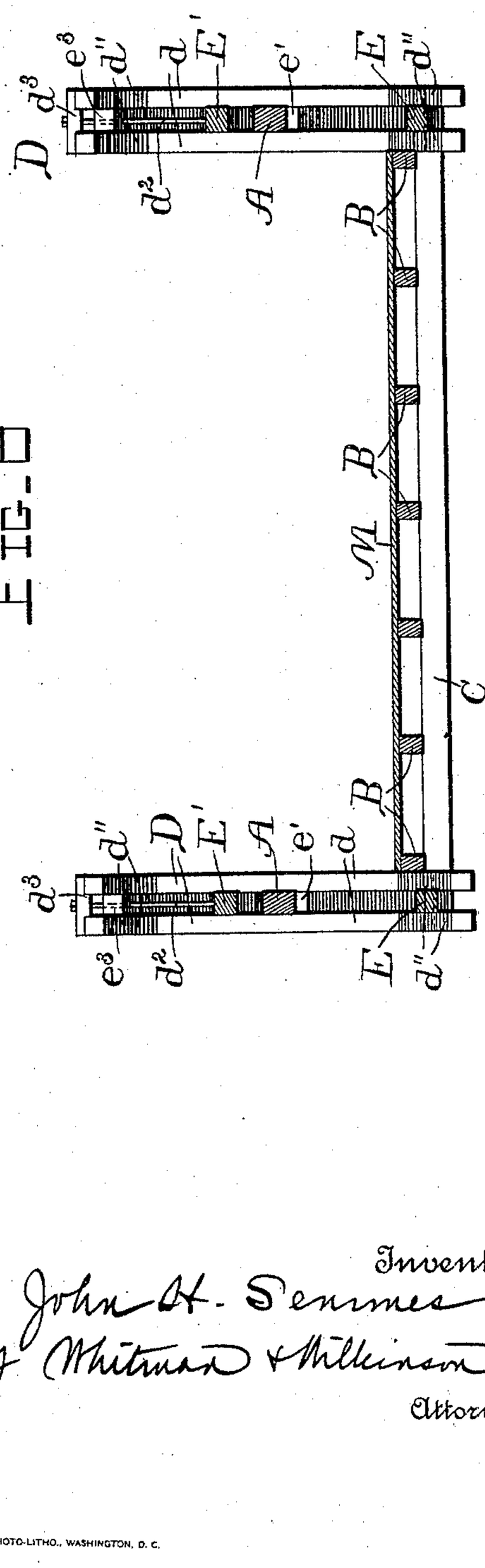


FIG. 6



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UNITED STATES PATENT OFFICE.

JOHN H. SEMMES, OF MERIDIAN, MISSISSIPPI.

BRIDGE.

SPECIFICATION forming part of Letters Patent No. 584,525, dated June 15, 1897.

Application filed July 27, 1896. Serial No. 600,701. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. SEMMES, a citizen of the United States, residing at Meridian, in the county of Lauderdale and State of Mississippi, have invented certain new and useful Improvements in Bridges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in truss-bridges; and it consists in the novel construction hereinafter described and claimed.

My invention will be understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation of a bridge constructed in accordance with my invention. Fig. 2 is a top plan view of the same, part of the flooring being broken away. Fig. 3 is an enlarged view of a portion of the bridge shown in Fig. 1, showing the middle frame and one of the side frames. Fig. 4 is a section taken on the line 4 4 in Fig. 3 and looking to the left. Fig. 5 is a side elevation of a modified form of bridge; and Fig. 6 is a section taken on the line 6 6 in Fig. 5 and looking in the direction of the arrows.

A A represent the two main chords of the bridge. These chords are supported at their ends and firmly held by suitable buttresses, as shown in the drawings.

B B represent the longitudinal floor-timbers of the bridge. These longitudinal timbers rest upon cross-timbers C, which are supported in frames D. Each of these frames D is composed of four uprights *d*, two on either side of the chord A, connected at their ends by horizontal pieces *d'*. Diagonal braces $d^{\times}$ are secured across the sides of the frames D to give additional strength thereto. These frames D are pivoted upon the chord A at d^{0} by means of bolts or pins which pass through two of the uprights *d* of each frame and through said chord, as seen in Figs. 1 and 3. The cross-timbers C rest upon the lower horizontal pieces *d'* on the opposite side of the frame from that which is pivoted upon the chord A. In this way the weight of the floor is brought upon the frames D off of their centers, and this has a tendency to cause the lower ends of said frames to swing inward toward the center of the bridge, as indicated by the arrows in Fig. 3.

E E represent braces, which rest at their lower ends against short cross pieces or blocks *e*, bolted or otherwise suitably secured across the two inner or pivoted uprights *d* of the frames D at or near their lower ends, and at their upper ends these bear against similar cross pieces or blocks *e'*, secured across the inner sides of the pivoted uprights of the adjacent frame immediately beneath the chord A. The object of these braces E is to truss the chord A by exerting a maximum upward pressure at a point coincident with the middle of the said chord and to exert lesser degrees of upward pressure along its length—viz., at points approximately coincident with the pivotal points of the frames D.

It is clear how the frames D on each side of the center of the chord A may be made to have a tendency to rotate, those frames on the left of the center rotating in a left-handed direction and those of the right of the center having a tendency to right-handed rotation. This tendency to rotate is obviously due to the tendency of the platform of the bridge to assume the shape of an arc of a circle when a load passes over it. Now did all of the frames D have a tendency to rotate in the same direction then the forces exerted by the braces E on the frames D near their pivotal points would be resolved into two components, the greater by far acting parallel with the chord, owing to the fact that the frame against which it acts is pivoted and may have a tendency to rotate, and hence the lesser force, which would act to raise the chord, would be so small as to have practically no effect; but this is not the case in this structure. The frames D on each side of the center of the bridge have a tendency to rotate in opposite directions, and the forces transmitted from one frame to the other meet at a point approximately at the middle of the chord A and on its lower side. Hence, referring to Fig. 1, it will be seen that the tendency of one frame D to rotate transmits to an adjacent frame a force which augments the tendency of the latter to rotate, and this augmented frame tends to increase the tendency of its next neighbor to rotate, and so on, until the forces

a plurality of frames pivoted upon each of said chords, two of said frames abutting against each other at the center of each of said chords; cross-timbers supported in pairs of said frames to one side of their centers of gravity; flooring resting upon said cross-timbers; diagonal braces between the upper end of each of said pivoted frames and the central portion of the adjacent frame, and diagonal braces between the lower end of each of said pivoted frames and the central portion of the adjacent frame, substantially as described.

3. In a bridge of the character described, the combination with the chords A supported at their ends in suitable buttresses, of a plurality of frames composed of uprights and horizontal pieces secured to the ends thereof, one pair of said uprights of each frame being pivoted upon said chord A with the said chord between the two, two of said frames abutting against each other at the center of each of said chords; a cross-timber supported at its ends upon the lower horizontal pieces of each pair of said frames out of line with the centers of gravity thereof; flooring resting upon said cross-timbers, and diagonal braces between said pivoted frames, substantially as described.

4. In a bridge of the character described, the combination with the chords A supported at their ends in suitable buttresses, of a plurality of frames composed of uprights and horizontal pieces secured to the ends thereof, one pair of said uprights of each frame being pivoted upon said chord A with the said chord between the two, two of said frames abutting against each other at the center of each of said chords; a cross-timber supported at its ends upon the lower horizontal pieces of each pair of said frames out of line with the centers of gravity thereof; flooring resting upon said cross-timbers; diagonal braces between the upper end of each of said pivoted frames and the central portion of the adjacent frame, and diagonal braces between the lower end of each of said pivoted frames and the central portion of the adjacent frame, substantially as described.

5. In a bridge of the character described, the combination with the chords A supported at their ends in suitable buttresses; of a plurality of upright frames pivoted upon each of said chords, two of said frames abutting against each other at the center of each of said chords; cross-timbers supported in opposite frames out of line with the centers of gravity thereof; flooring resting upon said cross-pieces, the said pivoted frames thus having a tendency to turn upon their pivots due to the force of gravity; braces between said frames transmitting the strain from the top of one frame to the central portion of the adjacent frame, and braces transmitting the strain from the bottom of one frame to the central portion of the adjacent frame, whereby the said strains are distributed to each frame, *seriatim*, throughout the structure, substantially as described.

6. In a bridge of the character described, the combination with the two chords A A supported in suitable buttresses; of a plurality of frames D pivoted upon each of said chords, two of said frames abutting against each other at the center of each of said chords, cross-timbers C supported in opposite frames in such a manner that the center of gravity of the weight on each of said pivoted frames will tend to cause said frames to swing about their pivots; braces communicating this rotary strain from each pivoted frame to the others on each side of the center of the bridge and causing a maximum upward action of the forces at points approximately below the pivotal points of the central braces; and flooring resting upon said cross-timbers substantially as described.

7. In a bridge of the character described, the combination with the two chords A A supported in suitable buttresses; of a plurality of frames D pivoted upon each of said chords, two of said frames abutting against each other at the center of each of said chords, cross-timbers C supported in opposite frames in such a manner that the center of gravity of the weight on each of said pivoted frames will tend to cause said frames to swing about their pivots toward the center of the bridge at their lower ends, and away from the center of the bridge at their opposite ends; braces communicating this rotary strain from each pivoted frame to the others on each side of the center of the bridge and causing a maximum upward action of the forces at points approximately below the pivotal points of the central braces; and flooring resting upon said cross-timbers, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. SEMMES.

Witnesses:

JAS. H. BLACKWOOD,

JOHN CHALMERS WILSON.