

No. 682,500.

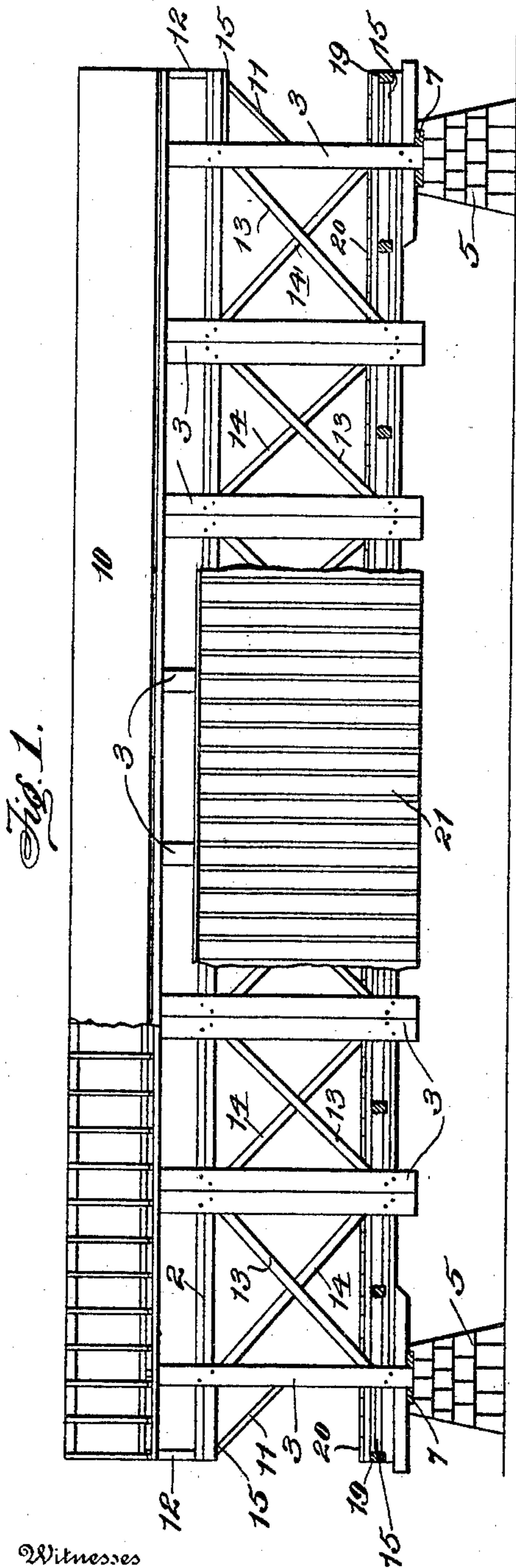
Patented Sept. 10, 1901.

W. SHAFER.  
TRUSS BRIDGE.

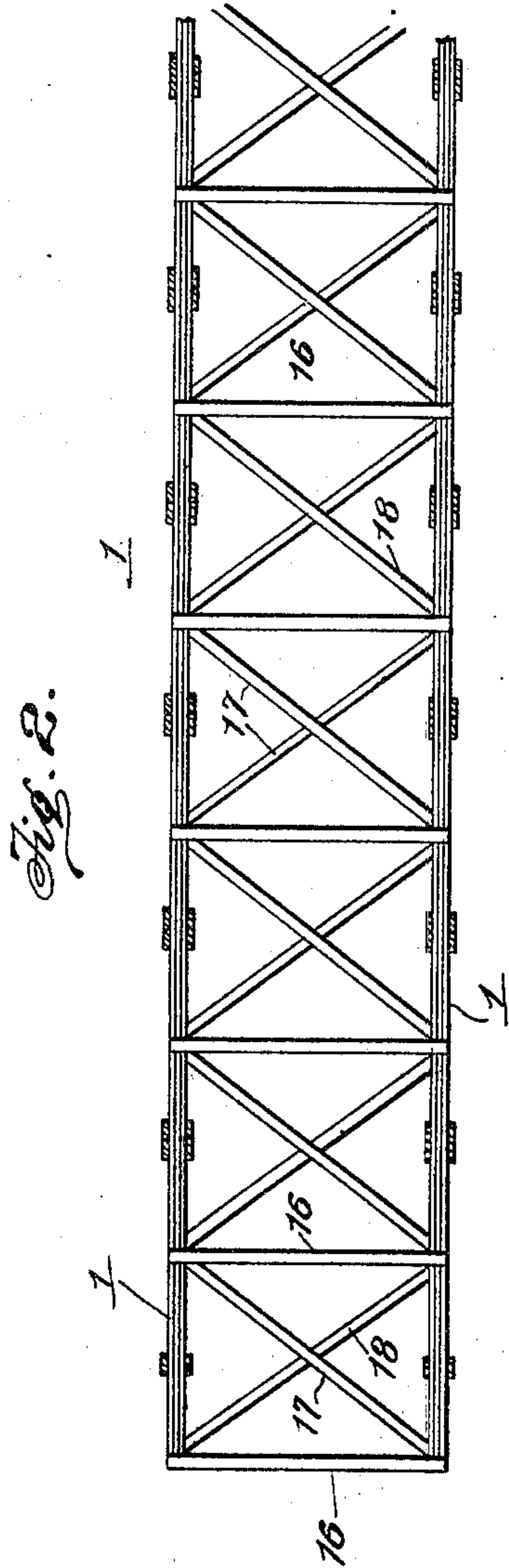
(Application filed Apr. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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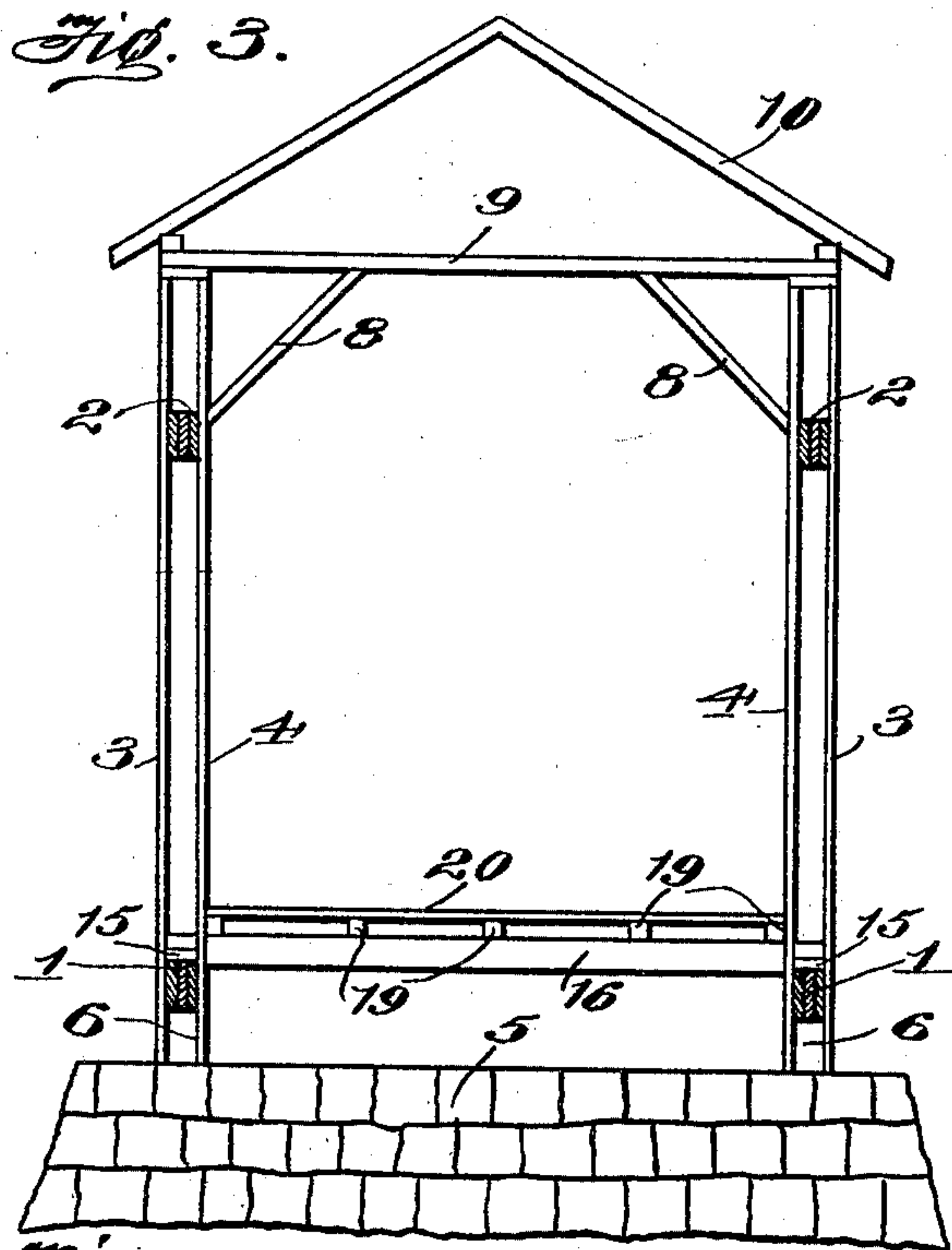
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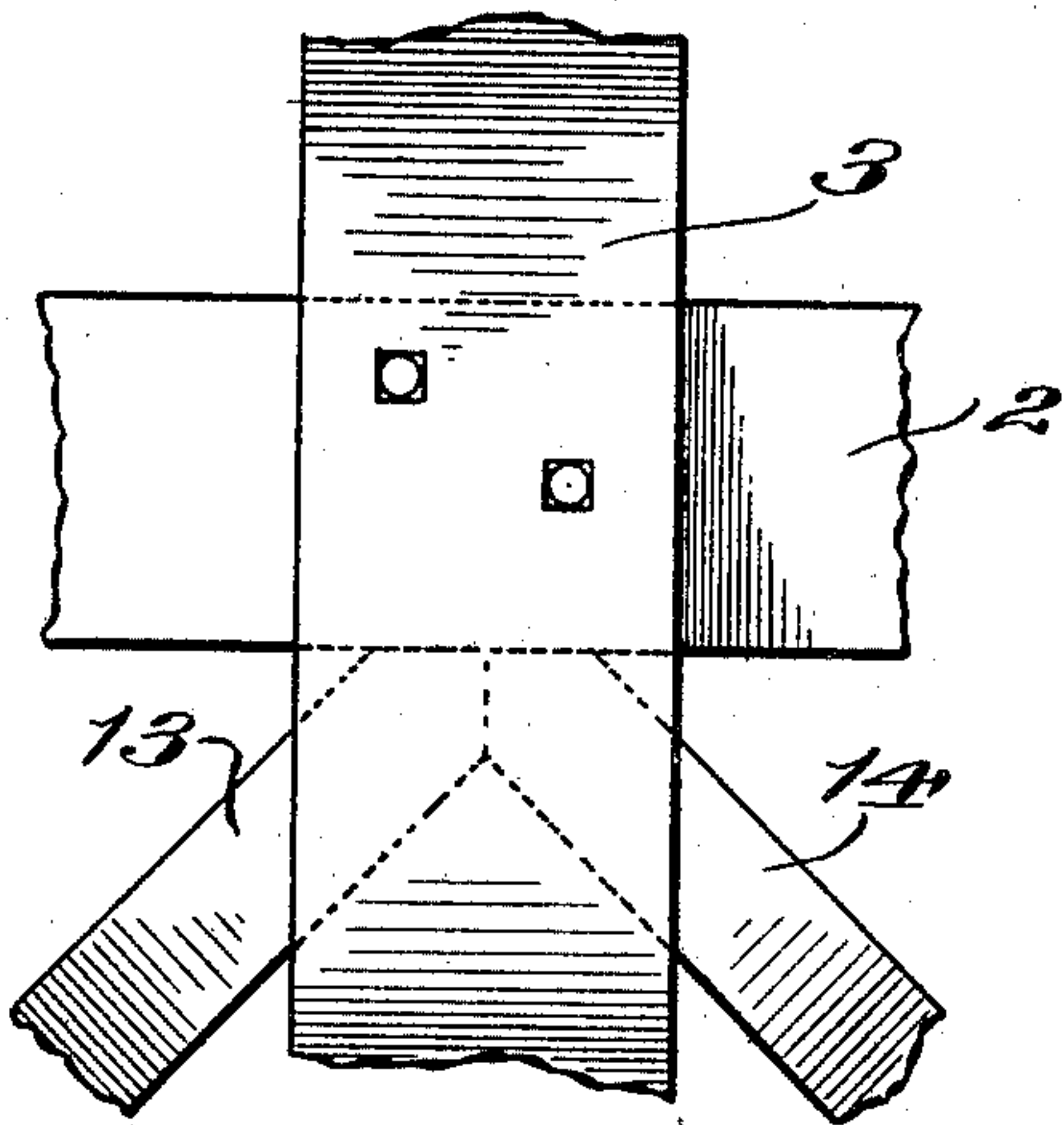
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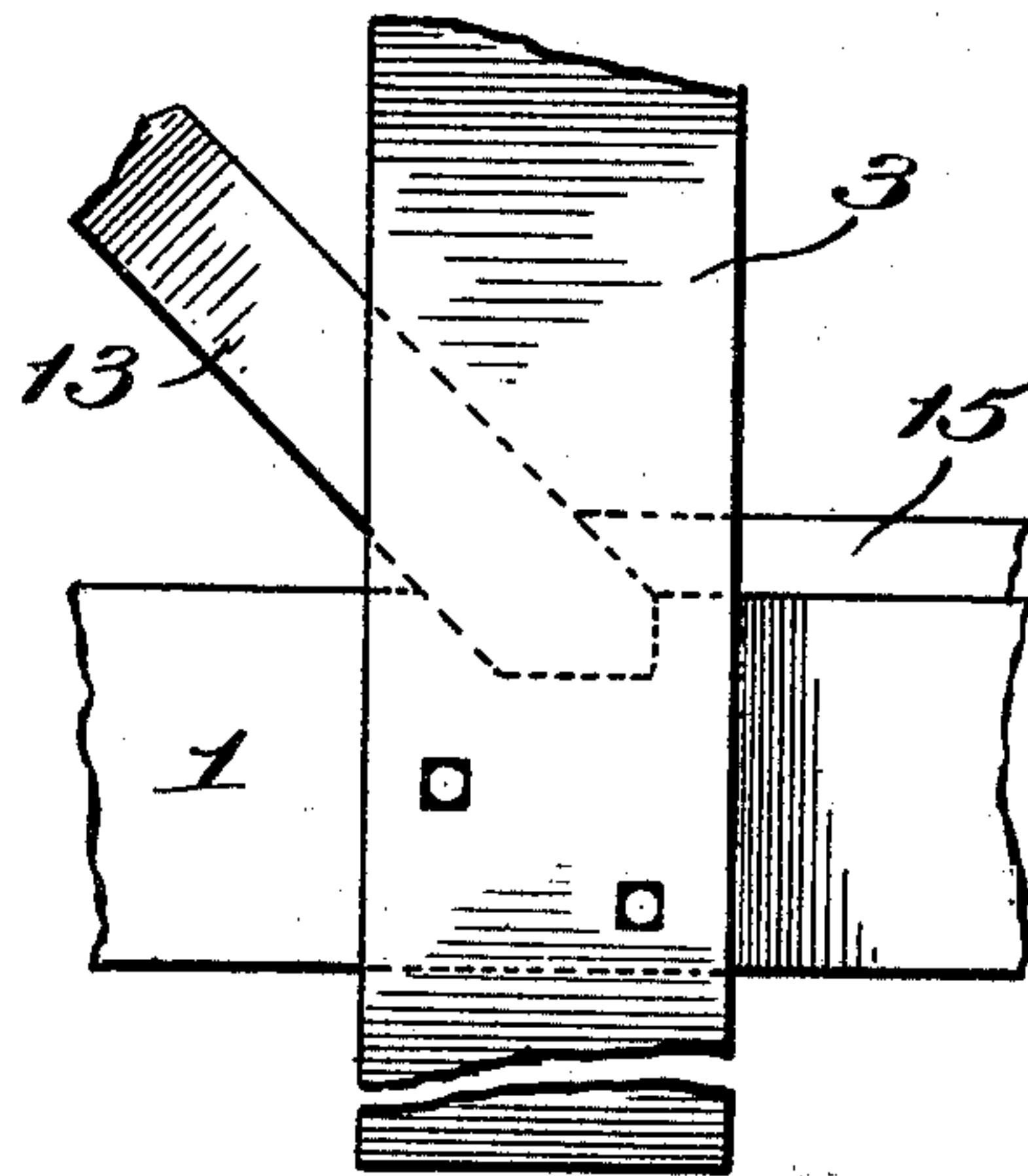
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

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## TRUSS-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 682,500, dated September 10, 1901.

Application filed April 18, 1901. Serial No. 56,473. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN SHAFER, a citizen of the United States, residing at Lagrange, in the county of Troup and State of Georgia, have invented certain new and useful Improvements in Truss-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 bridges, and more particularly to the truss type, in which solid-built continuous beams are employed and extend the entire length of the span and are connected and braced by suitable vertical and diagonal members.

It consists of certain novel constructions, combinations, and arrangements of the parts of a truss-bridge, as will be hereinafter fully described and claimed.

The objects in view are simplicity, economy, and efficiency in construction, and the combinations of principles and arrangements of parts heretofore unattained in the building of bridges.

In the accompanying drawings, Figure 1 represents a view in side elevation of a truss-bridge embodying the features of my invention, parts being broken away to better illustrate the construction. Fig. 2 represents a plan view of the bottom chords and transverse and diagonal braces. Fig. 3 represents a transverse vertical section through the parts illustrated in Fig. 1; and Figs. 4 and 5 represent enlarged detail views, respectively, of the top and bottom joints of the chords and vertical and diagonal braces.

Referring to the drawings by numerals, 1 1 indicate lower and 2 2 upper continuous chords, each of which is composed of preferably three parallel strips of wood nailed together and forming a compact solid beam. Each of the chords 1 and 2 is preferably extended for the full length of a span and is braced by vertical members, as 3 3, secured to the outside thereof, and similar vertical members 4 4 to the inner side thereof. At either end of a span the verticals 3 and 4 are adapted to rest above any suitable supports, as 5 5, and retain between them suitable timbers, as 6 6, for supporting the ends of chords 1 1. Each of the timbers 6 6 is of a size suffi-

cient to exactly fill the space between the lower ends of the end verticals 3 and 4 and between the chord 1 and pier or support 5, whereby said chords and verticals are rigidly and firmly supported by pier 5. Any suitable planks, as 7 7, may be embedded in the upper end of pier 5, to which the end verticals 3 and 4 may be secured at their lower ends, if desired. The upper chords 2 2 are secured between the verticals 3 and 4 near their upper ends and extend the entire length of a span. Side braces, as 8 8, may be provided and extend from verticals 4 at the point where chords 2 are secured to the same, the said braces 8 extending at an acute angle to said verticals and tending to assist in the support of cross-girders, as 9, extending transversely of the bridge from the upper ends of verticals 3 and 4 and connecting the same together. Any desired form of covered roof, as 10, may be provided, if desired, a shingled roof being preferred. The end verticals 3 and 4 are adapted to carry diagonal braces, as 11 11, for supporting the outer free ends of chords 2, and any suitable vertical post, as 12, may be interposed between the said free ends of said chords 2 for assisting in the support of roof 10.

Between each two pairs of vertical members 3 and 4 upon each side of the bridge are provided diagonal braces, preferably two in number, as 13 and 14, crossing at the middle of their length and being secured at their ends between said verticals 3 and 4. These diagonal braces are preferably cut away for half their thickness at the point of crossing and secured together by nails. The ends of said diagonals are secured, as seen in Figs. 4 and 5 in dotted lines, to the chords 1 and 2 and to the verticals 3 and 4. Fig. 4 illustrates the manner of securing the ends of the intermediate diagonals 13 and 14, wherein the ends are beveled according to the slant of said diagonals and made to fit snugly together and against the chord 1 or 2, as the case may be, whereby pressure upon one will be received and resisted by the other. Fig. 5 illustrates in dotted lines the manner of securing the ends of the diagonals 13 and 14 at the ends of the bridge, at which points the ends of said diagonals are beveled in a suitable manner and embedded into the wood of



the chord 1 or 2, and a supplemental or auxiliary brace 15 is nailed to said chord with its end beveled to correspond with the slant of said diagonal, so that the said brace may receive and resist the strains brought to bear upon said diagonal. Of course it will be seen that all of the diagonals and verticals may be nailed or by other suitable means, especially bolts, secured firmly in place with relation to the chords 1 and 2, whereby strength and rigidity of the parts are assured.

As best seen in Fig. 2, the bottom braces comprise a plurality of transverse beams, as 16 16, connecting the chords 1 1 and secured to the same by nails, the ends of said beams resting upon the upper edge of said chords, and a series of diagonal braces, as 17 and 18, which cross each other centrally and are secured together at the point of crossing. The ends of diagonals 17 and 18 are beveled to correspond with their slant and are nailed to the sides of chords 1 1. Resting upon and secured to transverse beams 16 are provided a plurality of parallel longitudinal beams, as 19 19, to which is secured any suitable flooring 20. Any suitable siding, as 21, may be applied, if desired, whereby a bridge closed against the weather is secured.

Among the many advantages of my improved construction of bridge might be mentioned the fact that the chords 1 1 and 2 2 are made solid without the interposition of any braces whatever, all of the braces—vertical, diagonal, and transverse—being secured to the outside of said chords. It will be seen also that all of the parts are arranged in the most advantageous manner, the diagonals 13 and 14 and top chords 2 2 carrying the compression strains and the verticals 3 and 4 and bottom chords 1 1 carrying the tensile strains. The diagonal braces 17 and 18 also strengthen the entire structure and prevent the same from any sidewise movement. Each of the chords 1 and 2 is formed of a plurality of parallel timbers nailed together and spliced at varying intervals, so as to break joints, whereby the same is of uniform dimensions throughout, as well as of uniform strength. It will be noted that the end verticals do not rest directly upon the pier 5, but are supported thereby through the medium of the chords 1 and timbers 6.

When the siding 21 is employed, it is usually nailed to strips, as 22 22, carried by the sides of the chords 1 and 2, between verticals 3, each of which strips 22 is of a thickness corresponding with the thickness of said verticals 3, whereby its outer edge will be flush with the outer face of each of the verticals 3, whereby the siding 21 will have its outer surface even throughout the entire length of the bridge. However, it will be apparent that

these strips may be omitted, if desired, and the said siding 21 may be nailed directly to the chords 1 and 2. It will also be observed that when the siding 21 is secured in position on the bridge the same will reinforce the verticals and give strength and rigidity to the bridge.

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

1. A truss-bridge, comprising in its construction a plurality of solid, continuous, upper and lower chords, each running the entire length of the span and made up of parallel timbers nailed together and spliced at varying intervals so as to break joints, vertical members secured to and inclosing said chords, girders securing the upper ends of the verticals together, transverse beams secured to the upper edge of the lower chords, means for supporting a floor upon said transverse beams, and a plurality of diagonal beams secured to the inner side of each of the opposite lower chords for bracing the entire structure against endwise movement, substantially as described.

2. A truss-bridge, comprising in its construction two parallel, continuous, lower chords extending the entire length of a span, means for supporting a floor upon said chords, means for securing said chords together, means for preventing sidewise movement of said chords, two parallel, continuous, upper chords extending the entire length of a span, vertical members secured to the outside of each of said lower chords and also secured to the outside of each of said upper chords, thereby connecting the upper and lower chords of one side of the bridge and the upper and lower chords of the other side of the bridge, vertical members secured to the inside of each of said upper and lower chords and corresponding in number to said outer vertical members, thereby forming sets of vertical members inclosing said chords, means for securing the upper ends of the respective opposite sets together, and crossed, diagonal braces, secured to each other at the point of crossing, and secured at the lower end between the lower portion of one set of vertical members and upon one of said lower chords, and secured at the upper end between the next set of verticals, near the upper end thereof, and beneath one of said upper chords, substantially as described.

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

WARREN SHAFER.

Witnesses:

H. W. BRADY,  
W. L. CLEVELAND.