

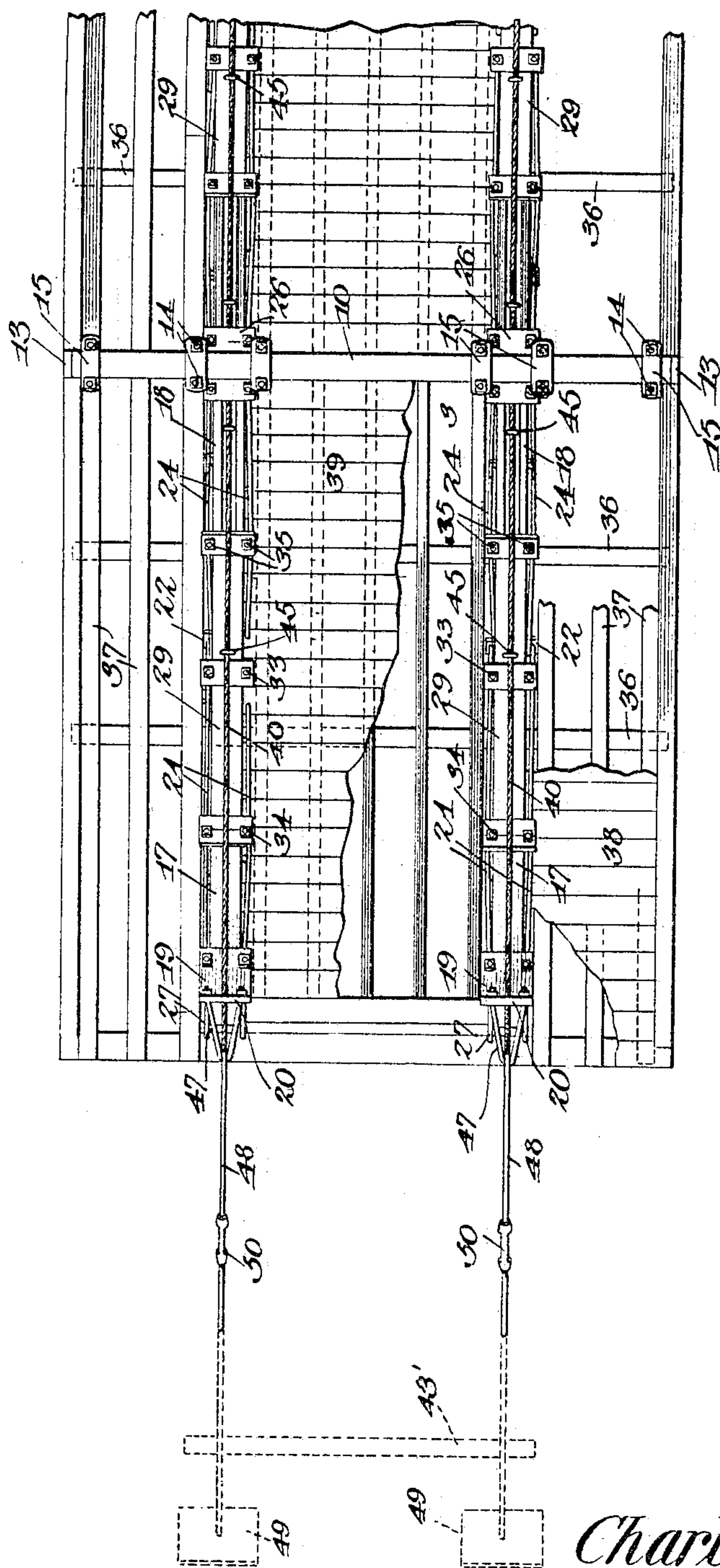
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C. BRYANT.
BRIDGE.

APPLICATION FILED OCT. 3, 1904.

2 SHEETS—SHEET 1.



Witnesses

Edmund
Wm Bagger

Charles Bryant,
Inventor.

by

Cashmore
Attorneys

C. BRYANT.
BRIDGE.

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2 SHEETS—SHEET 2.

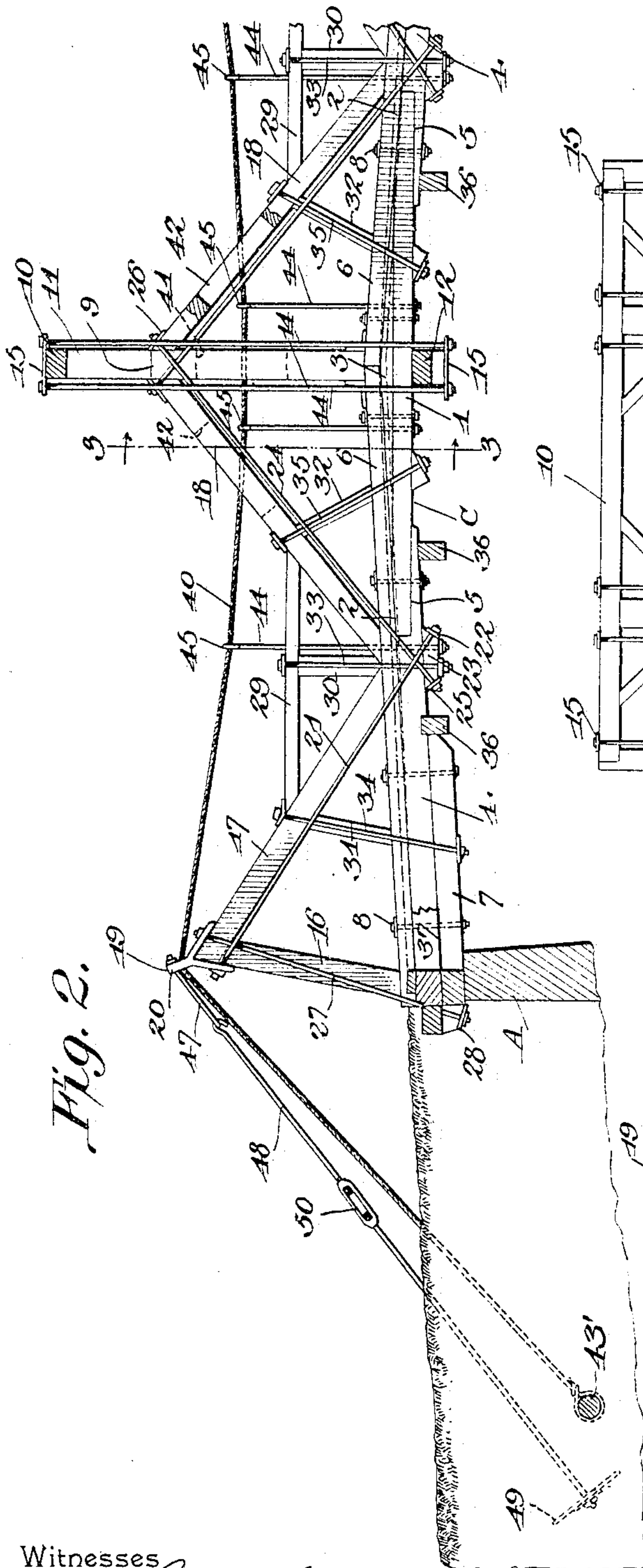


Fig. 2.

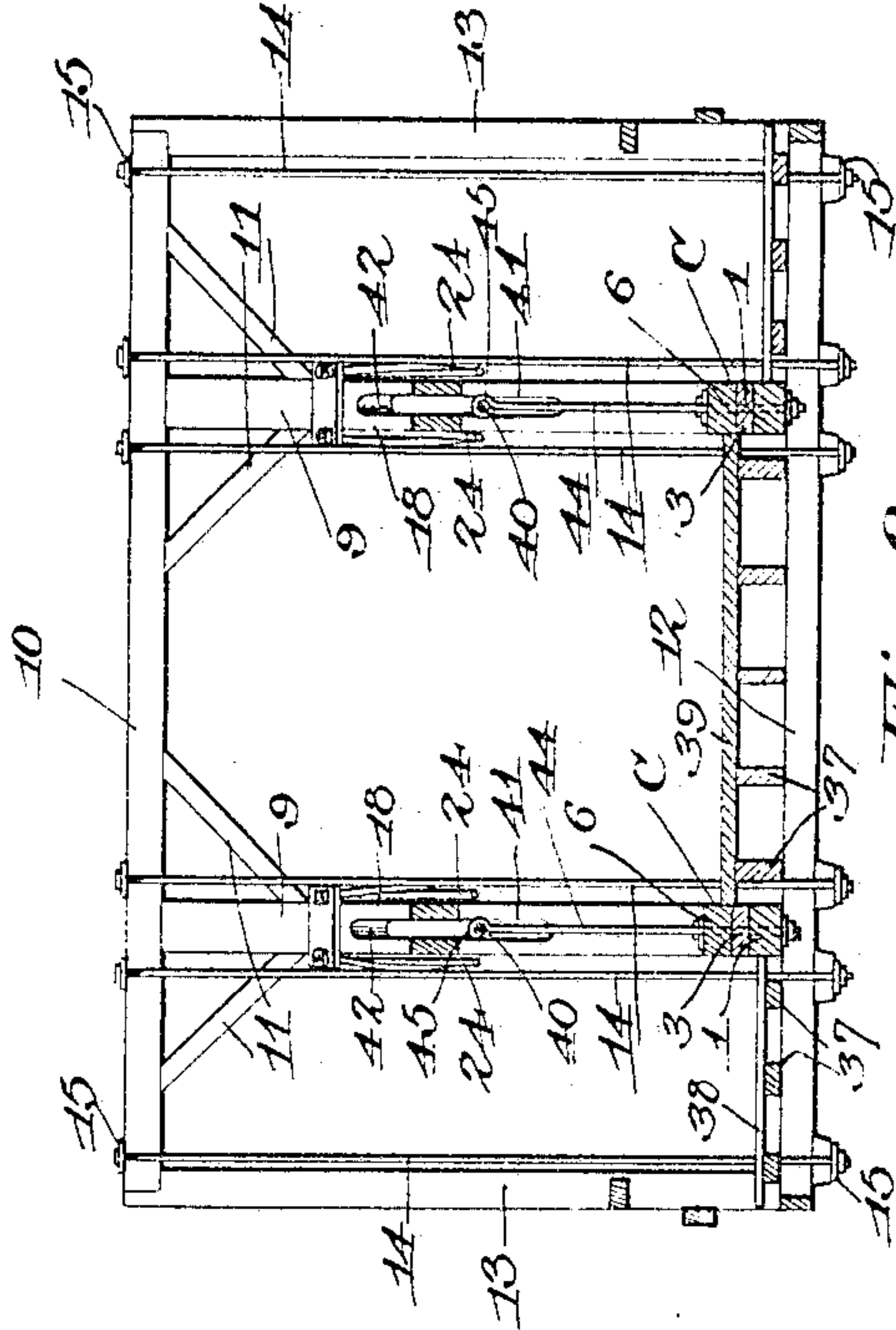


Fig. 3.

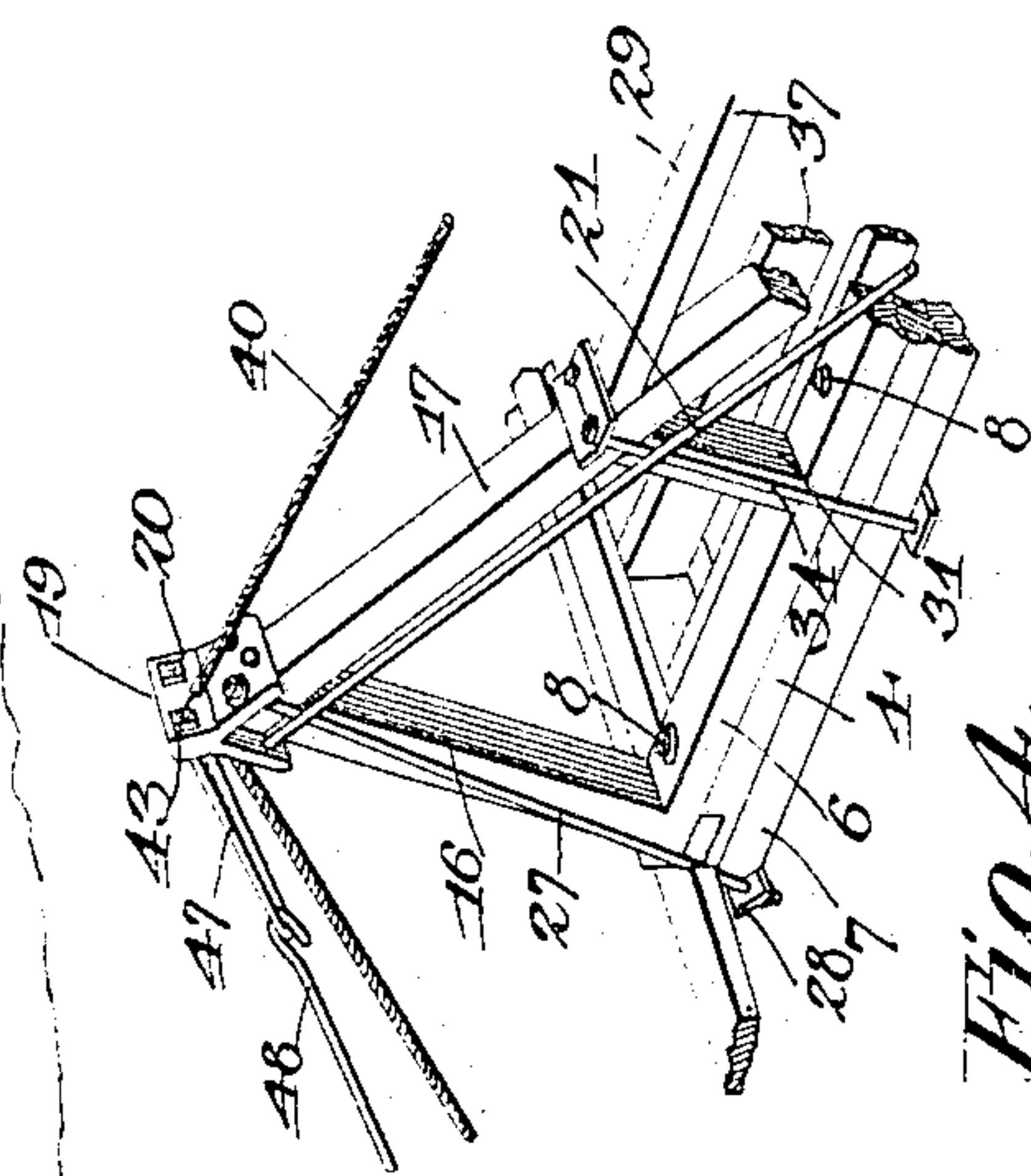


Fig. 4.

Witnesses
E. H. Stewart
Wm. Baggers

Charles Bryant,
Inventor

by *C. A. Snow & Co.,*
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES BRYANT, OF LITTLETON, COLORADO.

BRIDGE.

SPECIFICATION forming part of Letters Patent No. 782,215, dated February 14, 1905.

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To all whom it may concern:

Be it known that I, CHARLES BRYANT, a citizen of the United States, residing at Littleton, in the county of Arapahoe and State of Colorado, have invented a new and useful Bridge, of which the following is a specification.

This invention relates to bridges; and it has for its object to simplify and reduce the cost of construction of the same.

With these ends in view the invention consists in a bridge constructed materially or principally of wooden timbers, the same being assembled together by means of the necessary bolts and tie-rods in such a manner as to present a durable and efficient bridge capable of resisting heavy strains.

The invention further consists, in the combination with the bridge proper, of suspension-cables whereby the bridge shall be partly supported, said suspension-cables coöperating with the end piers or abutments to support the bridge structure and to enable it to resist strains.

The invention further consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to any changes, alterations, and modifications to which recourse may be had within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a plan view of a bridge structure constructed in accordance with the principles of the invention and showing somewhat more than one-half of a bridge, it being understood that the construction of the end of the bridge which does not appear in the drawings is identical with that which has been shown. Fig. 2 is a longitudinal vertical sectional view. Fig. 3 is a

transverse sectional view taken on the line 3 3 in Fig. 2. Fig. 4 is a perspective detail view.

Corresponding parts in the several figures are indicated by like characters of reference.

The chords C C, two of which enter into the construction of the improved bridge as illustrated, are each made up of timbers spliced together, each including a central base-timber 1, having beveled ends 2 2, a triangular plate 3, mounted upon the upper side of the base-timber between the beveled ends thereof, end timbers 4 4, which are connected by lap-joints 5 with the under side of the base-timber 1 at the ends thereof, the upper sides of said end timbers being flush with the beveled ends of the base-timber and with the sides of the triangular plate 3, and top timbers 6 6, the ends of which abut upon each other directly above the apex of the triangular plate, said top members being supported upon the sides of said plate, upon the beveled ends of the base-timber, and upon the upper sides of the end timbers, as shown. Auxiliary reinforcing-timbers are disposed under the ends of the end timbers 4, as shown at 7. The timbers entering into the construction of the chords are all united firmly together by means of tie-bolts 8, of which any desired number may be used at suitable distances apart. The chords are supported at their ends upon the abutments A, only one of which appears in the drawings, it being understood that the end of the chords (not shown) is to be similarly supported.

By the construction of the chords just described a bridge-span of considerable length may be made which will be of great strength and capable of resisting very heavy strains, the said chords being arched to some extent owing to the peculiar construction set forth, whereby the ends of the base-beam are beveled on their upper sides and the triangular plate is used to support the abutting ends of the top timbers.

Supported centrally upon the chords directly upon the abutting ends of the top members 6 are uprights 9 9, connected by a cap-

beam 10, which extends beyond said uprights and is connected therewith by diagonal braces 11. Supported transversely under the chords is a frame-timber 12, the ends of which are spaced from the ends of the cap-beam 10 by means of uprights 13, tie-rods 14 and plates 15 being used to connect the cap-plate 10 with the transverse beam 12, so as to support the latter without weakening either of the beams by perforations or bolt-holes. In Fig. 3 of the drawings six pairs of tie-rods have been illustrated; but it is to be understood that a greater or lesser number may be used, as may be found desirable and appropriate. Supported upon the ends of the chords directly above the abutments are uprights 16, the upper ends of which are inclined slightly in the direction of the center of the bridge.

17 and 18 are obliquely-disposed timbers the upper ends of which are connected with the uprights 16 and 9, respectively, and the lower ends of which rest upon the chords in proximity to each other. Under the construction shown the upper end of the timber 17 is supported on top of the timber 16, while the upper end of the timber 18 abuts upon the side of the upright 9. Upon the upper extremities of the timbers 16 are mounted V-shaped cap-plates 19, provided at their apexes with flanges 20. These cap-plates are of sufficient dimensions to cover the joints between the timbers 17 and uprights 16, as will be clearly seen in Figs. 2 and 4. Tie-rods 21, disposed approximately parallel to the timbers 17, connect the outer ends of the cap-plates 19 with tie-plates 22, supported upon bolsters 23, bearing against the under sides of the chords. Tie-rods 24 are likewise disposed approximately parallel to the timbers 18, the ends of said tie-rods engaging tie-plates 25, resting against the outer ends of the bolsters 23, and tie-plates 26, supported upon the upper ends of the timbers 18, which lean upon the opposite sides of the uprights 9. It will be readily seen that by tightening the said tie-rods the inclined beams or braces 18 will be forced to grip the uprights 9 with great tenacity. Tie-rods 27 are also used to connect the cap-plates 19 with tie-plates 28 at the ends of the chords, said tie-rods 27 being disposed adjacent to the uprights 16. Truss-bars 29 are supported upon the inclined or diagonal beams 17 18, and struts 30 31 32 are interposed between the said truss-bars, the inclined beams 17 18, and the chords, said struts being bound in place by means of pairs of tie-rods 33, 34, and 35.

It will be observed that by the construction which has been thus far described a structure is provided which is constructed mainly of timber and which while comparatively very light is so thoroughly trussed and reinforced as to impart to it great strength and power of resistance. The chords are connected at suit-

able intervals by transverse timbers, such as shown at 36, which are suitably supported thereby and which are for the purpose of supporting the stringers 37, upon which the flooring of the foot-walks 38 and the roadway or carriage-way 39 is laid, said flooring being of planking or other suitable material.

It is obvious that the relative dimensions of the passage-ways may be modified to any desired extent. It is also obvious that the number of chords in the bridge may be increased, especially when the latter is to be of considerable width.

To assist in supporting the bridge, suspension-cables 40 are employed, said cables passing through slots 41 in the uprights 9, through slots 42 in the inclined brace-beams 18, and through eyes or openings 43 in the cap-plates 19, the ends of the cables being made fast to deadmen 43' well buried in the soil at a suitable distance from the upper parts. Suspension-rods 44 are provided at suitable intervals, said suspension-rods being provided at their upper ends with eyes 45, engaging the cables, and the lower ends of said suspension-rods being extended through vertical perforations in the chords, their lower extremities being screw-threaded and provided with nuts and washers whereby they may be drawn taut. It will be evident that by the employment of these suspension cables and rods the strength of the bridge and its power to resist strains will be greatly multiplied.

Suitably connected with the flanges 20 of the cap-plates 19 are yokes 47, which are connected by means of link-rods 48 with anchor-plates 49, which are well buried in the ground at suitable distances from the upper parts. The link-rods 48 include turnbuckles 50, whereby they may be tightened to any desired degree of tension.

From the foregoing description, taken in connection with the drawings hereto annexed, the advantages of my improved bridge construction will be readily understood by those skilled in the art to which it appertains. In this construction the use of material is economized not only with a view of effecting a material saving in the expense, but more particularly for the purpose of lightening the structure, at the same time the parts entering into the construction are so thoroughly united and braced together as to present a structure of very great strength and capable of supporting a very heavy weight in proportion to the size thereof. The suspension-cables, it will be observed, are utilized without the necessity of providing special towers or structures for their support, and at the same time they will be found extremely effective not merely in supporting weights placed upon the bridge, but the strain or weight of the bridge itself. The general construction is not costly and may

be carried out without the use of special skilled labor.

Having thus described the invention, what is claimed is—

5 1. In a bridge, the herein-described longitudinal members or chords each of said chords being composed of a base-timber having beveled ends, a triangular plate supported upon said base-timber, end timbers connected with
10 the ends of the base-timber by lap-joints, the upper sides of said end timbers being flush with the beveled ends of the base-timber at the sides of the triangular plate, and top timbers supported upon said plate, base-timber
15 and end timbers with ends abutting upon each other directly above the apex of the plate, the several members being connected by connecting means at suitable intervals.

20 2. In a bridge, the herein-described longitudinal members or compound chords including triangular center plates, and top and end beams disposed parallel to the sides of said triangular plates.

25 3. In a bridge, the herein-described longitudinal members or compound chords including triangular center plates whereby the central portions of the chords are elevated above the ends, in combination with uprights supported centrally upon said chords, a cap-beam
30 supported upon said uprights, a transverse beam disposed below the chords, and tie-rods and plates connecting said transverse beam with the cap-beam and supporting it therefrom.

35 4. In a bridge, the herein-described longitudinal members or compound chords having central raised portions and top beams centrally abutting upon each other, uprights supported upon the abutting ends of the top
40 beams, a cap-beam supported by said uprights, a beam disposed transversely under the chords in the vertical plane of the cap-beam, tie-rods and plates connecting said cap-beam with the transverse beam and supporting
45 ing the latter, and spacing-beams interposed between the ends of the cap-beam and the transverse beam.

50 5. In a bridge, the herein-described longitudinal members or compound chords having central raised portions, uprights supported thereon, a cap-beam supported upon said uprights, a transverse beam below the chords, means for suspending said transverse beam from the cap-beam, inclined braces abutting
55 upon the uprights, uprights supported upon the ends of the chords, inclined beams supported upon said uprights and meeting the inclined beams abutting upon the center uprights, tie-rods to secure said inclined beams
60 and uprights, truss-beams supported upon the inclined beams, and struts and tie-rods be-

tween said truss-beam, inclined beams and chords.

6. In a bridge, the chords, uprights supported centrally thereon, uprights supported upon
65 the ends of the chords, inclined beams supported upon the latter uprights and upon the chords, inclined beams supported upon the central uprights and upon the chords, V-shaped caps having upwardly-extending flanges sup-
70 ported upon the ends of the inclined beams above the end uprights, and tie-rods disposed adjacent to the several uprights and inclined beams and serving to connect the same together with each other and with the chords. 75

7. In a bridge, the chords, central uprights supported thereon, a cap-beam supported by said uprights, a transverse beam below the chords, tie-rods connecting said transverse
80 beam with the cap-beam, suitably-disposed braces and tie-rods including uprights supported upon the ends of the chords and braces resting upon said uprights, V-shaped cap-plates upon said braces above the end uprights,
85 said cap-plates having perforated flanges, cables extending through said perforated flanges, through slots in the center uprights and the adjacent inclined braces, and having their ends connected with deadmen, and hooked suspen-
90 sion-rods engaging said cables, extending through perforations in the chords and provided with tightening-nuts and washers.

8. In a bridge, the chords, uprights supported centrally upon said chords, a cap-beam connecting said uprights, a beam disposed trans-
95 versely below the chords, tie-rods connecting said transverse beam with the cap-beam, uprights supported upon the ends of the chords, diagonal beams supported upon the end and the central uprights and, adjacent to each other,
100 upon the chords, reinforcing truss-beams, struts and tie-rods, V-shaped caps supported upon diagonal beams above the end uprights and having perforated flanges, cables supported by said cap-plates, extending through slots
105 in the center uprights and the adjacent diagonal beams and having their ends connected with deadmen embedded in the soil at a distance from their abutments, suspension-rods engaging the cables, extending through per-
110 forations in the chords and having tightening-nuts and washers, anchors embedded in the soil at a distance from their abutments, and link-rods, including turnbuckles connecting said anchors with the cap-plates. 115

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES BRYANT.

Witnesses:

E. C. STERTIE,
W. C. STERNE.