

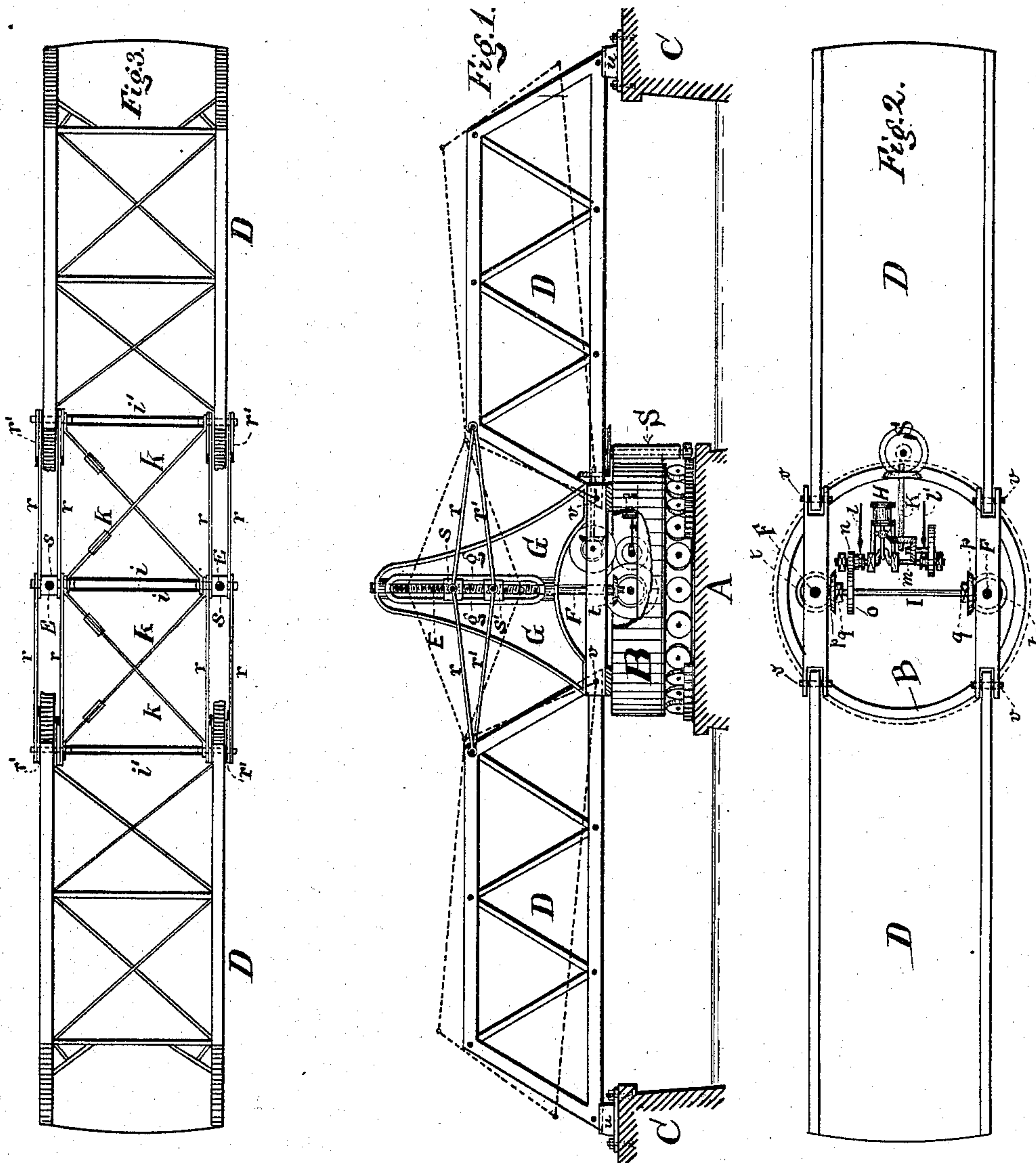
(No Model.)

M. A. ZÜRCHER.

DRAW BRIDGE.

No. 255,831.

Patented Apr. 4, 1882.



WITNESSES:

Wm H. Dyrenforth.
Thomas H. Manning

INVENTOR

Max A. Zürcher,
By R. C. Dyrenforth,
Attorney.

UNITED STATES PATENT OFFICE.

MAX A. ZÜRCHER, OF CHICAGO, ILLINOIS.

DRAW-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 255,831, dated April 4, 1882.

Application filed January 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, MAX A. ZÜRCHER, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draw-Bridges; and I hereby declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a side elevation of a bridge constructed in accordance with my invention; Fig. 2, a plan view of the same, showing the bottom chords and operating mechanism; and Fig. 3, a plan view, showing the upper bracing.

My invention relates to draw-bridges of the class that are opened by being turned upon their centers in a horizontal or nearly horizontal plane; and my primary object is to produce a discontinuous draw-bridge in which the two spans crossing the separate openings shall, when closed, be absolutely independent of each other, whereby the action of a moving load upon the bridge when closed can be exactly calculated, which is not the case in a continuous draw-bridge.

My invention consists broadly in combining with the center pier, swinging mechanism, and abutments the following elements, viz: first, two independent spans, one crossing each opening of the draw, each span being hinged at its inner lower end to struts or girders resting upon or attached to the turn-table upon the center pier, or otherwise adapted to work upon the turn-table as a fulcrum, and thus be raised and lowered at its outer end without changing its elevation at and between the fulcrums; and, second, mechanism of any suitable character at the center of the bridge for raising the outer ends of the spans from the abutments, either separately or simultaneously, and lowering them thereon.

My invention consists, also, in the specific mechanism by means of which I carry out my invention, and also in various details of construction and combinations of parts, all as hereinafter more fully set forth.

In the drawings, A is the center pier, B the turn-table, and C C the abutments.

D D are the two spans, each of which, when

the bridge is closed, rests at its inner end upon the turn-table B and at its outer end upon one of the abutments, as shown in Fig. 1. The inner ends are represented in the drawings as connected to the central sections of the bottom chord, bearing on the turn-table by hinges *v*. They may, however, be hinged or pivoted in any other manner that will maintain them in place. When resting upon the abutments the outer ends are secured against lateral movement by means of the blocks *u*; but of course any other securing device from which the ends might be released by lifting, with or without the interposition of other mechanism at the ends, would be the equivalent of the blocks *u*. It is obvious that the blocks *u* may also be made adjustable vertically by suitable means to allow for discrepancies in level or for any other reason. The object sought is to lift the ends of the spans by mechanism acting at the center of the bridge sufficiently to permit the turning; and it is of course preferable to have the same motor which turns the bridge also perform the office of raising the ends. One of the various ways by which all this may be effected is shown in the drawings, and is as follows:

E is a right-and-left-hand screw formed upon the upper part of a spindle, F, mounted vertically in a strong standard, G, and projecting below the bottom chord, where it is provided on its lower end with a beveled-gear wheel, *t*. On the screw E are two nuts, *s s'*, one being on the right hand portion of the screw and the other on the left, and both working in suitable guides, *g*, on the standard G. Both nuts are connected to the adjacent upper end of the truss or girder by pivoted rods or members *r* and *r'*. A device similar to the one above described is formed on any or all trusses or girders of the bridge. It is also obvious that by turning the screw E in one direction the nuts *s* and *s'* are carried away from each other, and, through the medium of the rods or members *r* and *r'*, shorten the distance between the inner ends of the top chords of the bridge, thus lifting the ends of the spans from their abutments, all as indicated by the dotted lines in Fig. 1, while if turned in the contrary direction the said nuts and rods are carried toward each other, and

the distance between the inner ends of the top chords will be increased, and will thus allow the outer ends of the spans to descend. In practice, when the ends of the spans are thus lowered the nuts are brought toward each other until all the tensile strain upon the rods or members r and r' is taken up, thus rendering the separate spans absolutely independent of each other.

10 The essential feature of this part of my invention lies in the rods or members r and r' , arranged, as above described, to form a double knuckle-joint, in combination with the separate spans of the bridge; and it is obvious that
15 a differential screw, a hydraulic jack, or any other suitable agent for operating them may be substituted for the right-and-left screw without departing from my invention.

To operate the screws by means of the engine
20 H, I provide a transverse horizontal shaft, I, revolving in bearings q upon the turn-table, and having beveled-gear wheels p meshing with the beveled-gear wheels t upon the lower end of the screw-spindle. Another gear-wheel,
25 o , upon this shaft meshes with a gear-wheel, n , upon an extension of the crank-shaft m , which is turned by the engine and operates the ordinary bridge-turning mechanism K L.

It is clear that the engine must not be permitted to act upon the turning and lifting mechanism simultaneously. I therefore provide two clutches, l and l' , of the well-known construction, the first to connect or disconnect the lifting mechanism at will and the second
30 to connect or disconnect the turning mechanism. Any well-known device may be employed for this purpose, and, if desired, it may be made automatic.

The engine may be located in any place or
40 position which the particular construction of the bridge renders most expedient, and the various mechanisms adapted accordingly.

The operating mechanism may be worked by steam, hand, or any other motive power.

To preclude all possibility of torsion while
45 swinging the bridge, the inner ends of the upper chords may, if desired, be connected to the opposite upper nuts, s , or to the opposite lower nuts, s' , or to both, by means of the diagonal lateral braces k , each of these braces being
50 pivoted both to the chord and the nut, whereby it conforms to the movement of the bars r and r' . Also, the opposite nuts are connected together by struts i and the ends of opposite chords by struts i' .

What I claim as new, and desire to secure by Letters Patent, is—

1. In a draw-bridge, the combination, with the center pier, swinging mechanism, and abutments, of two spans, one crossing each opening and hinged or pivoted in place at its inner end, and mechanism at the center of the bridge for raising the outer end of each span from its abutment and lowering it thereon, substantially as described.

2. In combination with the center pier, abutments, and turn-table of a draw-bridge, the two spans D, each pivoted at its inner end, as described, pivoted rods or members r and r' , connecting the inner ends of the upper chords
70 of the spans and forming a double knuckle-joint, as shown, and mechanism for moving the linked inner ends of the rods or members to or from each other at will to raise or lower the outer ends of the spans, as set forth.

3. In combination with the center pier, abutments, and turn-table of a draw-bridge, the two spans D, pivoted at their inner ends, as described, pivoted rods or members r and r' , connecting the upper chords of the span, nuts
80 s and s' , right-and-left-hand screw E, passing through the nuts and braced in a suitable standard, and mechanism for turning the screw either way, substantially as described.

MAX A. ZÜRCHER.

In presence of—

C. C. LINTHICUM,

WM. H. DYRENFORTH.