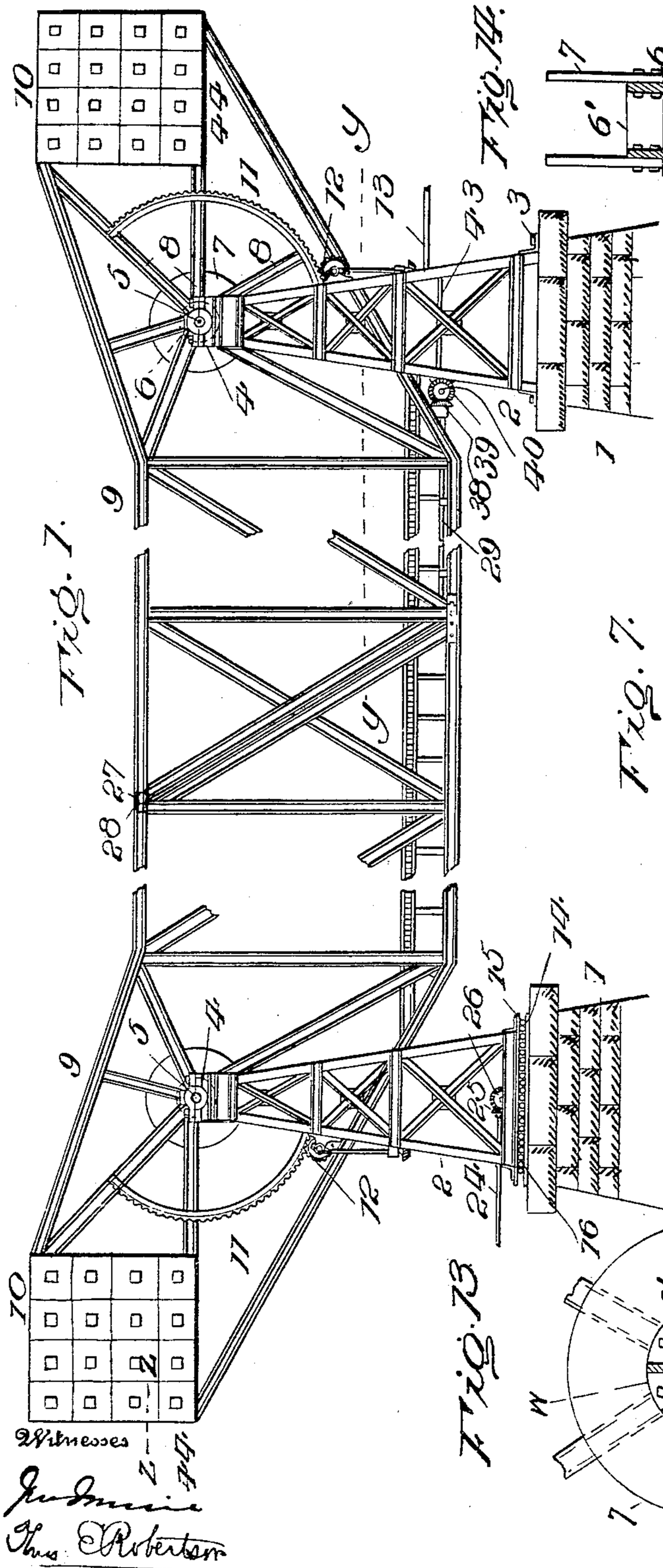
No. 632,985. Patented Sept. 12, 1899.

# W. L. BRAYTON.

## BRIDGE.

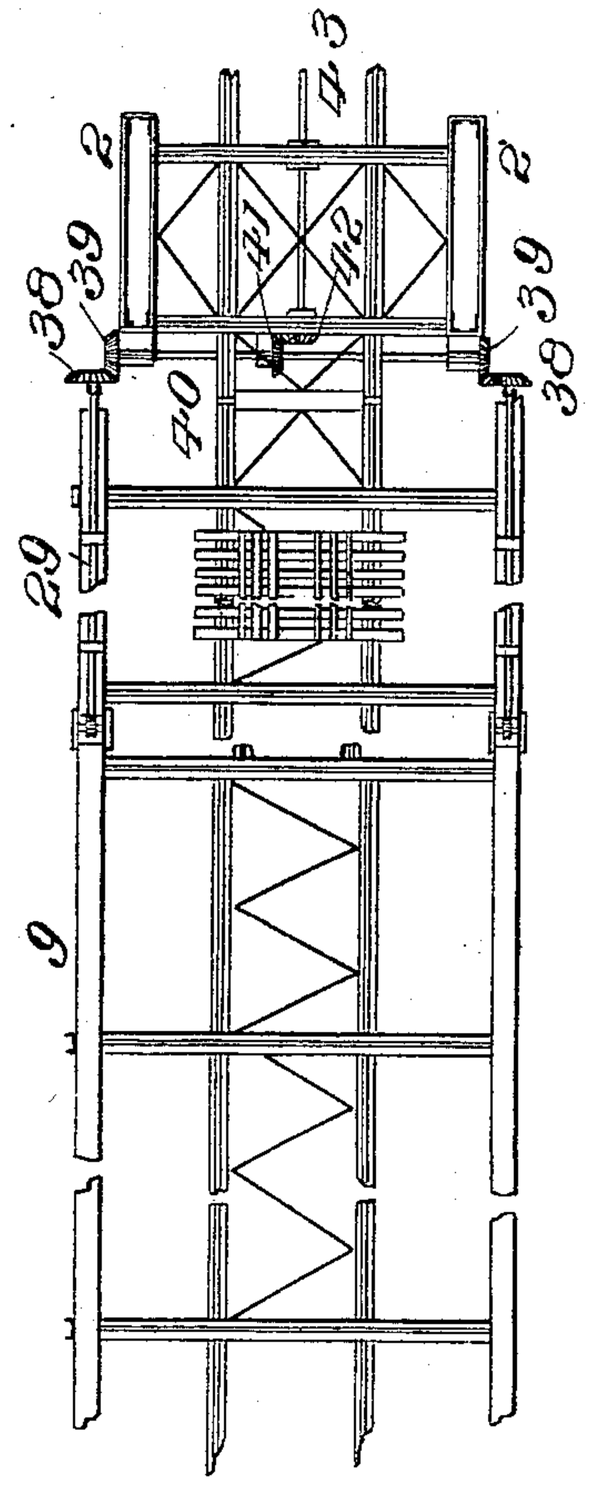
(Application filed Mar. 21, 1899.)

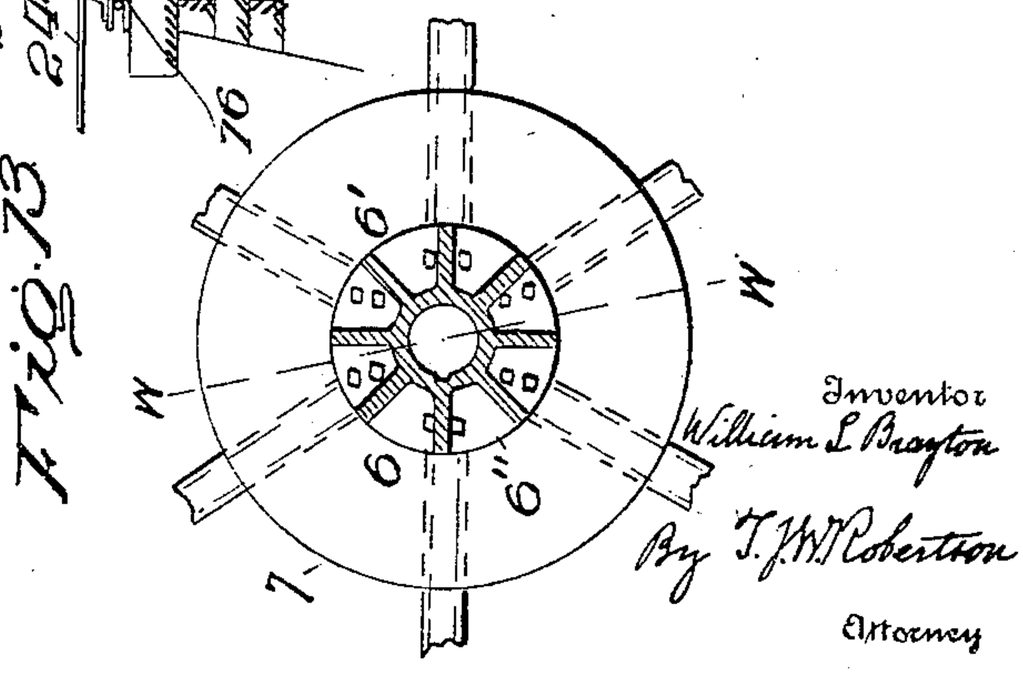
(No Model.) 4 Sheets—Sheet 1.









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## BRIDGE.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.

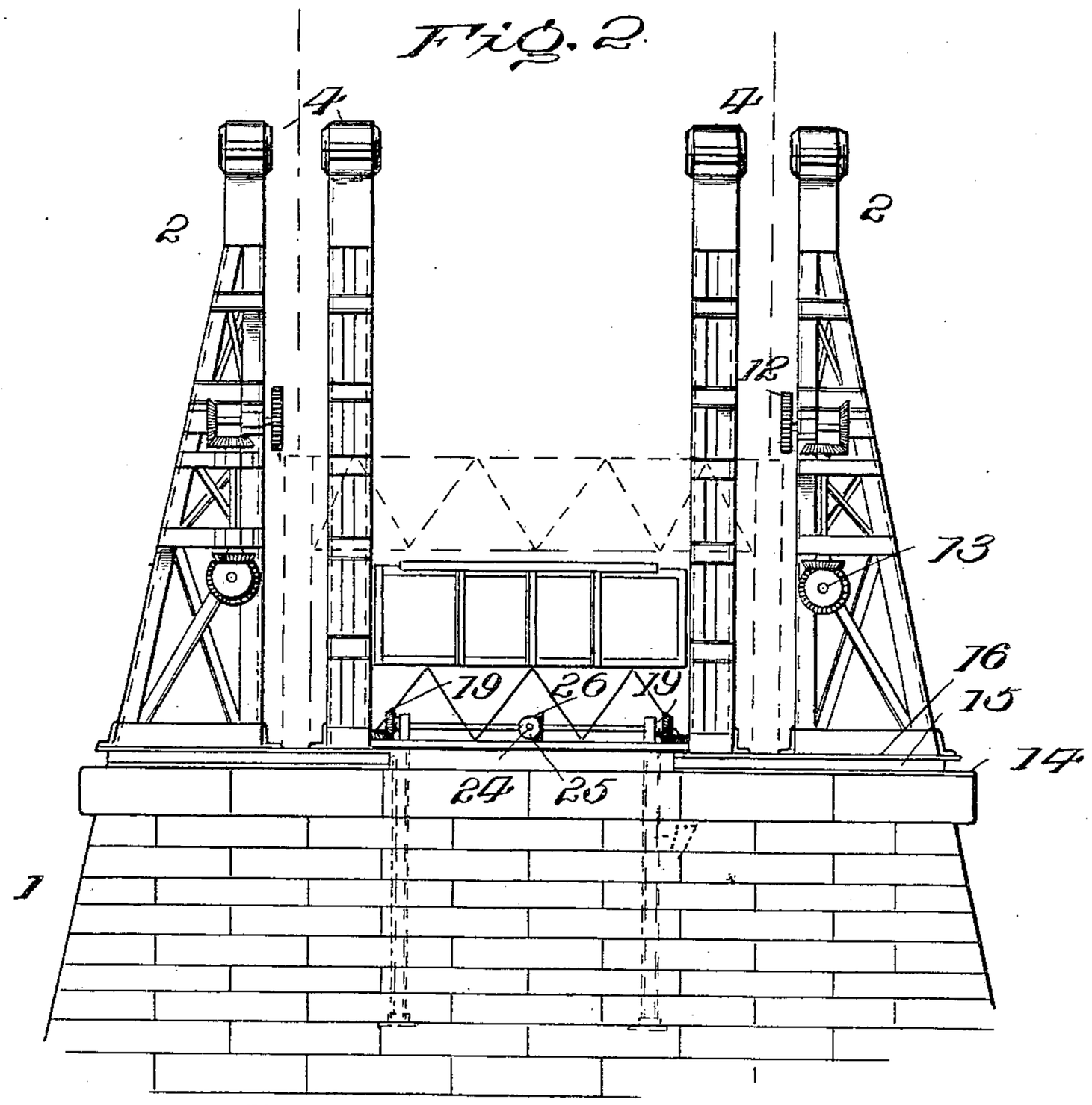



Fig. 3.

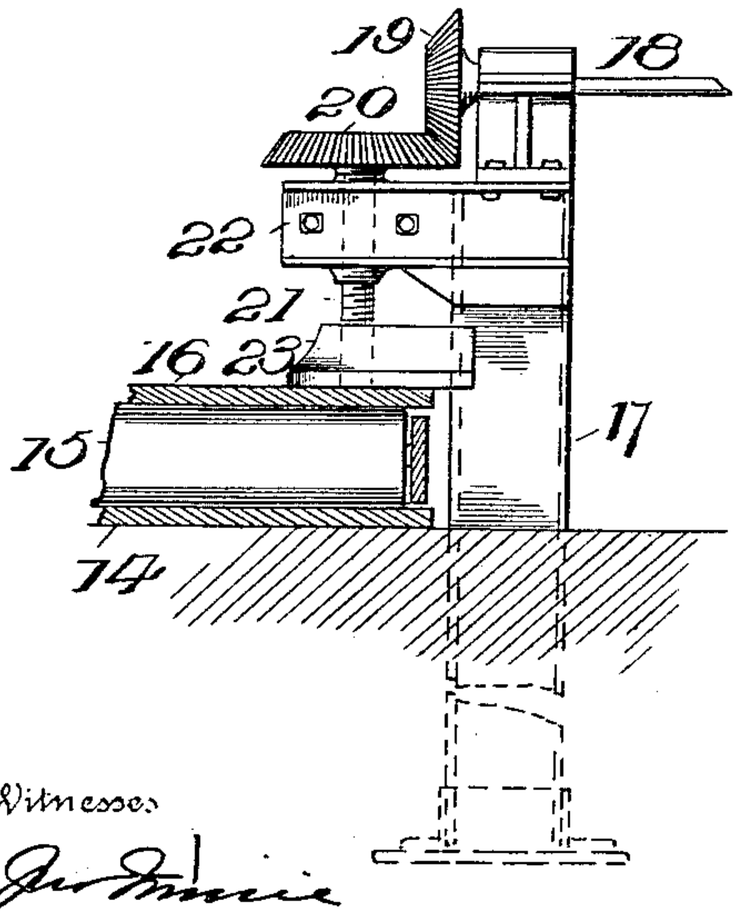
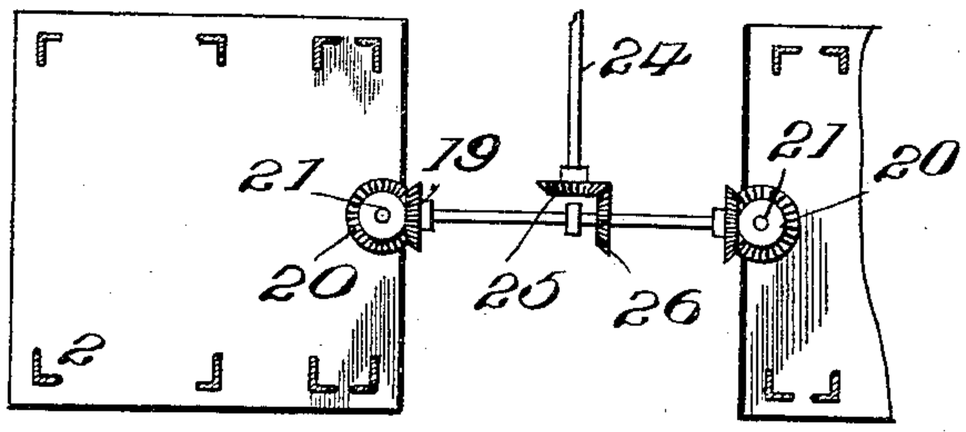



Fig. 4.

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No. 632,985. Patented Sept. 12, 1899.

# W. L. BRAYTON.

## BRIDGE.

(Application filed Mar. 21, 1899.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 5.

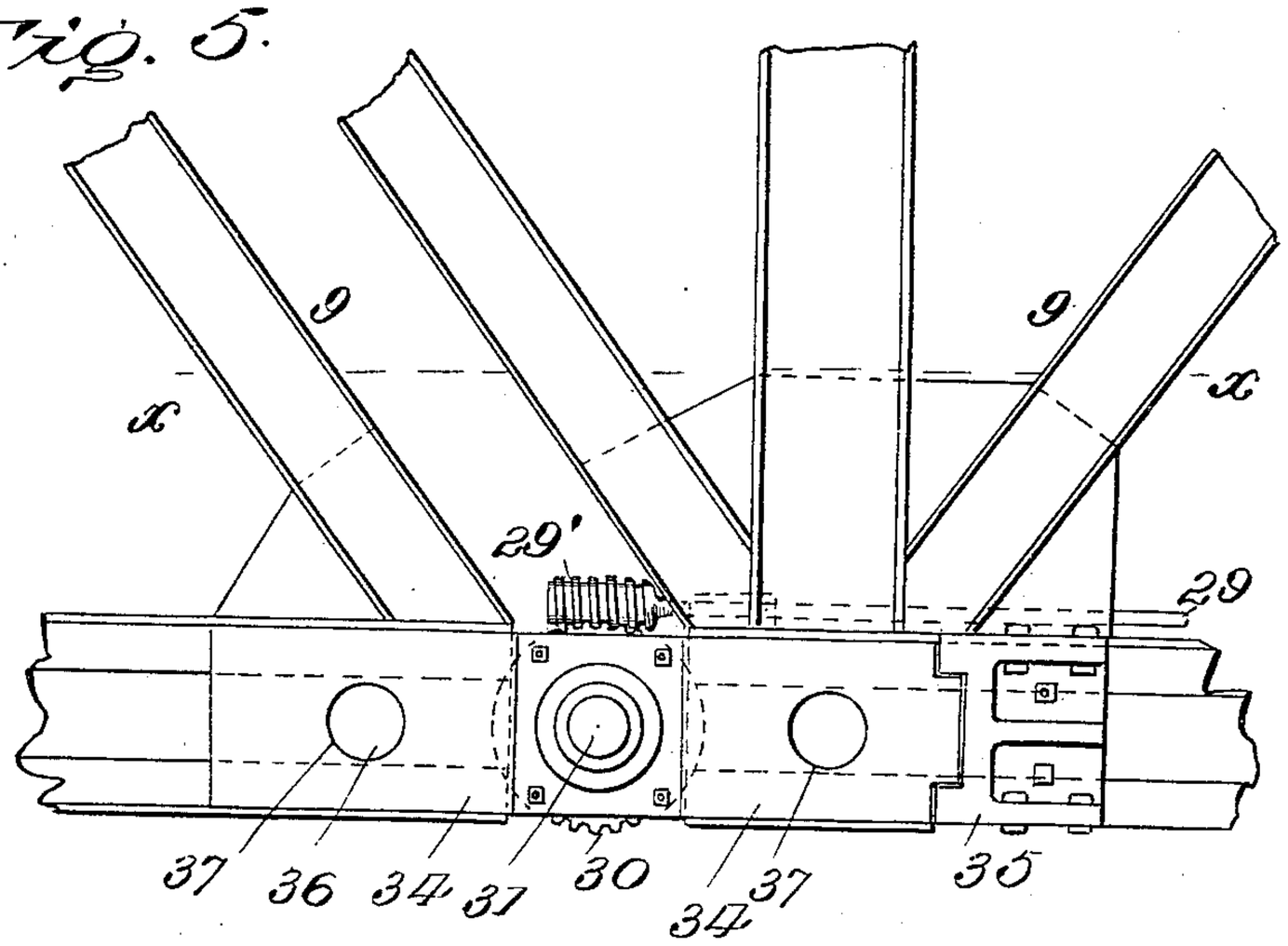



Fig. 6.

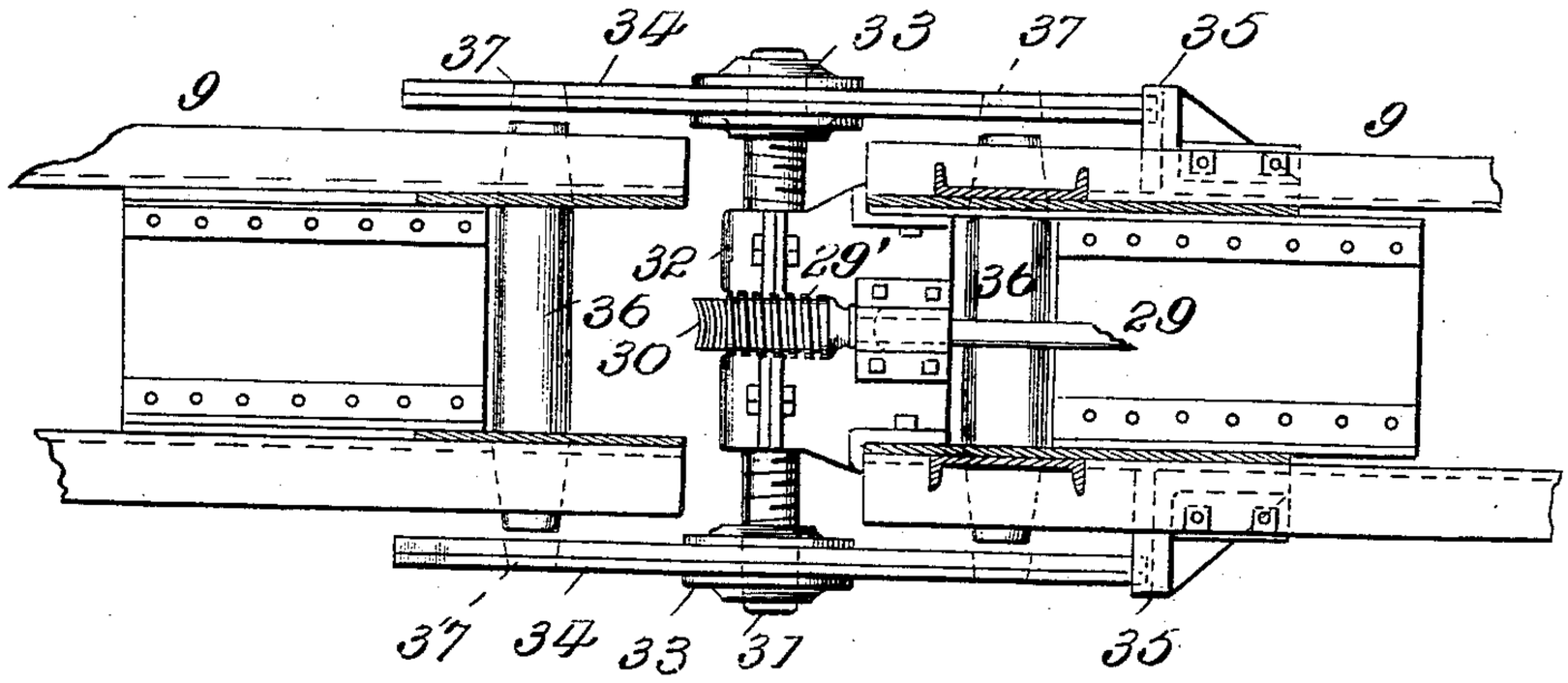
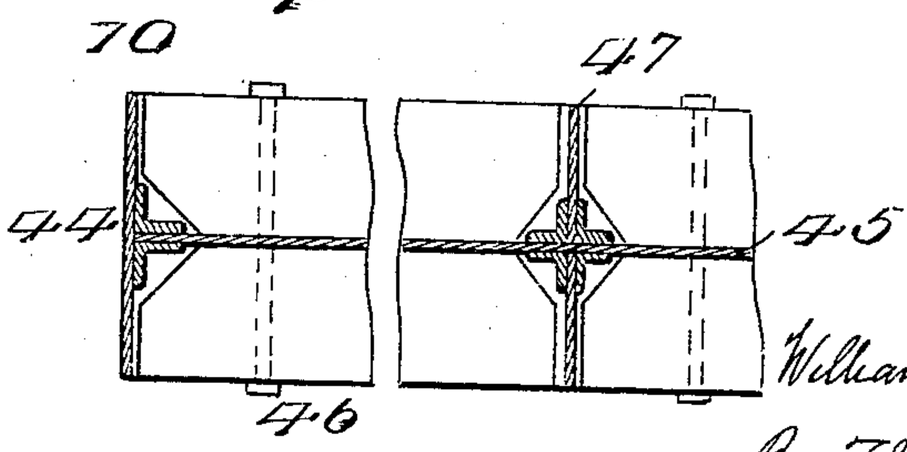



Fig. 8.

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# W. L. BRAYTON.

## BRIDGE.

(Application filed Mar. 21, 1899.

(No Model.)

4 Sheets—Sheet 4.

FIG. 9.

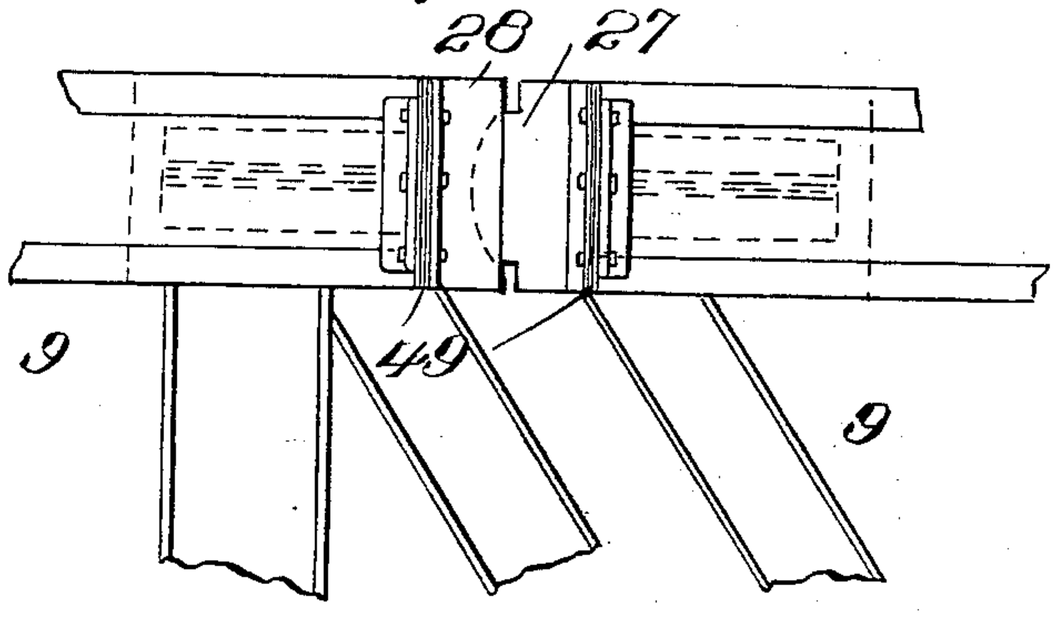


FIG. 10.

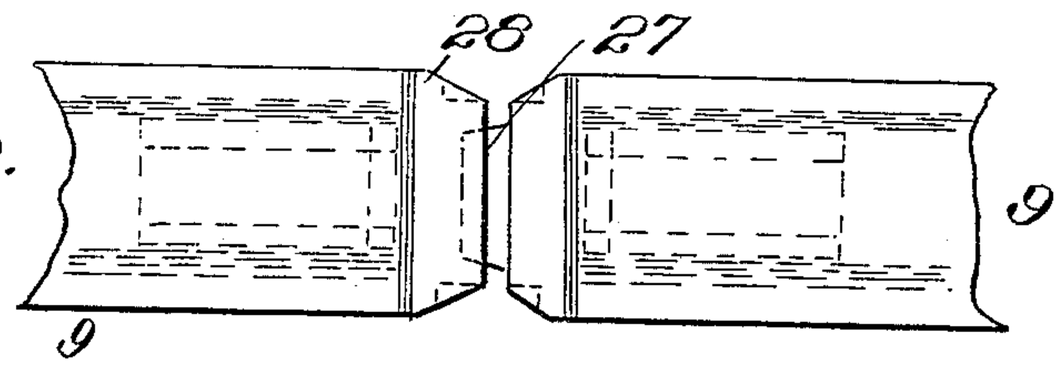


FIG. 11.



FIG. 12.




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# UNITED STATES PATENT OFFICE.

WILLIAM L. BRAYTON, OF HARRISBURG, PENNSYLVANIA.

## BRIDGE.

SPECIFICATION forming part of Letters Patent No. 632,985, dated September 12, 1899.

Application filed March 21, 1899. Serial No. 709,912. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. BRAYTON, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a certain new and useful Improvement in Bridges, of which the following is a specification, reference being had to the accompanying drawings.

This improvement is designed to provide a bridge of the bascule class that will be strong, easily operated, and not likely to get out of order; and to these ends the invention consists in the construction hereinafter more particularly described and then definitely claimed at the end hereof.

In the accompanying drawings, Figure 1 is an elevation of a bridge constructed according to my improvement. Fig. 2 is an end view of the towers in full lines, with part of the bridge in the open position shown in dotted lines. Fig. 3 is a detail, on a larger scale, showing part of the movable base supporting one set of towers and its attachment for locking the same stationary. Fig. 4 is a plan of the gearing for operating the base-locking device. Fig. 5 is an elevation of the device used for locking the two sections of the bridge. Fig. 6 is a horizontal section on the line $x\,x$, Fig. 5. Fig. 7 is a horizontal section on the line $y\,y$ of Fig. 1. Fig. 8 is a horizontal section on the line $z\,z$ of the same figure. Fig. 9 is an elevation of the castings connecting the top chord. Fig. 10 is a plan of the same. Fig. 11 is an elevation of a modification, showing the track on the top chord. Figs. 12, 13, and 14 are details which will be more fully referred to hereinafter.

My bridge may be briefly described as consisting of two sections of a truss divided diagonally near the center and swinging upward on pins turning in the tops of towers arranged in pairs on each side of the track, with each counterweight rigidly connected to its section on each side thereof and dropping down between the members of the pairs of towers, both section and weights moving as one member in a vertical plane, the pins on which each section turns being on or near a line joining the center of gravity of the truss and of the counterweight, by which means the section is balanced in all positions. The set of towers on one end of the bridge is fixed, while the other set is attached to a movable base set on rollers to allow for expansion and contraction.

Referring now to the details of the drawings by numerals, 1 represents the piers of masonry, to which, on the right-hand or fixed end of the bridge, the towers 2 (of which there are two pairs on each pier) are secured to the masonry by bolts 3. Each member of each pair of towers carries a pillow-block 4, in which is supported a short, preferably hollow, shaft 5, having strengthening-ribs 5′, which carries a cast-steel hub 6, firmly keyed thereto and having ribs 6′ set transversely between flanges 6″, to which latter are bolted the circular plates 7, carrying the radial arms 8, supporting the bridge-section 9 and counterweight 10. These arms also carry a segment of a circular rack 11, in which gears a pinion 12, connected by suitable gearing with the operating-shaft 13, running to the power-house, by which the section of the bridge can be swung or turned upon the shaft 5, as on a fulcrum, the weights descending between the members of each pair of towers, as indicated by dotted lines in Fig. 2. On the opposite end of the bridge, the base of which is made movable to allow for expansion and contraction, there is a subbase 14 (see Fig. 3) fixedly secured to the masonry, on which subbase rests a series of rollers 15, supporting the movable base 16, to which the towers are riveted. At 17 are shown anchors extending down into the masonry and carrying the shaft 18, on the ends of which are bevel-gears 19, (see Fig. 4,) meshing with other bevel-gears 20, each of which is fast on a screw 21, (see Fig. 3,) mounted in an arm 22, projecting from the anchor 17. The lower end of this screw works in a threaded hole in the clamp 23, whose longest end runs in a recess in the anchor 17 and is thus prevented from turning with the screw. From this description it will be seen that the clamp 23 can be forced down upon the base-plate 16 by means of the gearing, and thus the movable base can be firmly secured in a fixed position when desired. As shown in Fig. 4, both pairs of towers can be readily locked fast at once by means of a shaft 24, carrying bevel-wheel 25, which operates another bevel-wheel 26 on the shaft 18, carrying the bevel-wheels 19, before referred to.

At the extremities of the upper chord, on each side thereof, are male and female castings 27 and 28, (see Figs. 9 and 10,) that fit into each other, the reëntrant portion of the male casting being curved in elevation and conical in plan, so as to guide the two sections of the truss in place in case they should be slightly out of line.

The lower chord carries on each side a shaft 29, having on its outer end a worm 29', (see Figs. 5 and 6,) which operates a worm-wheel 30 on a screw-shaft 31 mounted in suitable bearings 32 on the end of the right-hand section of the bridge. This shaft is provided with right and left hand threads at its opposite ends and screws into nuts 33, either formed on or attached to the locking-plates 34, the right-hand ends of which work in guides 35, attached to the lower chord of the right-hand section to prevent the turning of said plates as the screw turns. Firmly secured in the lower chord by keys or otherwise are strong pins 36, having tapering ends which enter preferably tapering holes 37 in the plates 34. The shafts 29 are operated by the bevel-gears 38 and 39, (see Figs. 1 and 8), the latter being mounted on a transverse shaft 40, carrying a bevel-gear 41, which gears with another bevel-gear 42 on a shaft 43, running to the power-house, so that by operating said shaft 43 motion is given to the screw-shafts on both sides of the bridge and the locking-plates of each pair are caused to approach each other, so that the pins 36 will enter the holes 37 and thus lock both sections of the bridge firmly together. The pins and holes are made tapering in order that should the sections be slightly out of line the pins would be sure to enter the holes and as they are forced "home" bring the sections truly in line; but the taper of the holes is not actually necessary.

The counterweights may be of any suitable material or form; but I prefer to make them of blocks of concrete 44, arranged on the opposite sides of a central web 45, projecting from the arms 8. These blocks are secured by bolts 46 passing through them and the web between transverse plates 47, secured to the central web by angle-irons 48. By arranging the counterweights vertically they will readily pass between the towers, as indicated by dotted lines in Fig. 2, leaving a clear passage for the trains between them.

For convenience in adjustment I propose to use shimming-plates 49 between the ends of the chord-sections and the castings 27 and 28, so that by putting in more or less of the plates the desired adjustment may be readily made to obtain the proper camber.

Where it is necessary for the track to be on the upper chord, I construct my bridge as shown in Fig. 11, but with the gearing for operating arranged in substantially the same way as in the description hereinbefore given.

In operating my bridge the movable base is first clamped, so that no longitudinal motion may take place. Then the lower chords are unlocked and both spans raised just enough to free the male and female castings of the upper chord, after which the right-hand section is raised, and when this is clear the left-hand section is also raised.

The type of truss I show is a riveted Pratt truss, although I do not care to limit myself to this type.

The pins or journals may be placed anywhere between the top and bottom chords, and when the pins are so placed the two ends of the bottom chord will approach each other as the sections begin to rise, and in order to avoid this interference is the reason for cutting the truss on a diagonal line, as shown. My object in placing the pin near the top chord is to bring the track as near the surface of the water as practicable, at the same time allowing plenty of room to swing the counterweight between the masonry and the pin. I prefer to set the pins below the top chord in all cases in order that the two pins and the castings at the junctions of the sections may form an arch that will support the dead load until the lower chord is locked.

By the use of towers I avoid the wells usually employed, which are objectionable on account of filling with water, ice, &c.

It should be understood that the clamps on the movable towers are to be brought into use only when the bridge is to be opened and that as soon as the bridge is closed the clamps are released, and the tower is then free to move when expansion or contraction occurs.

What I claim as new is—

1. In a bascule-bridge, the combination of the supporting means thereof, with a truss divided transversely and diagonally into two sections, substantially as described.

2. In a bascule-bridge, the combination of the supporting means thereof, with a truss divided diagonally into two sections, and united at the top chord by male and female connections, substantially as described.

3. In a bascule-bridge, the combination of the supporting means thereof, with a truss divided diagonally into two sections, each section swinging on a pin set below the top chord, and male and female connections at the union of said chord arranged to coact with said pins to support the truss, substantially as described.

4. In a bascule-bridge, the combination of the supports thereof, with a truss divided diagonally into two sections, each section swinging on a pin set below the top chord, male and female connections on said top chord at the junction of the sections, and locking means on the lower chords, substantially as described.

5. In a bascule-bridge, the combination of two pairs of metal towers arranged above a solid pier, a swinging truss mounted on pins rocking on said towers, and arranged to swing between the members of each pair of towers and above the pier, substantially as described.

6. In a bascule-bridge, the combination with

the two sections of the truss, of a worm, a wheel operated by said worm, a right and left hand screw carrying said wheel, a pair of locking-plates having threaded holes in which said screw turns, and pins on the opposite ends of the truss-sections adapted to enter holes in said locking-plates, substantially as described.

7. In a bascule-bridge, the combination with the two sections of the truss, of the male and female connections on the top chord, the male section being curved in elevation and conical in plan, and shimming-plates at the back of the connections for obtaining the desired camber, substantially as described.

8. The combination in a bridge, of a fixed base, rollers resting thereon, and a movable base supported on said rollers, with a locking device mounted on the movable base, and acting on the fixed base, and arranged to rigidly secure said movable base at will, substantially as described.

9. The combination in a bridge, of the sub-base 14, the rollers 15, the movable base 16 supporting one end of the bridge, the clamp 23, the screw 21, and means for operating said screw, substantially as described.

10. In a bascule-bridge, the combination of a pin 5, a hub 6 mounted thereon, plates 7 bolted to the hub, and radial arms 8 carried by said plates and connected with the truss and counterweight, substantially as described.

11. In a bascule-bridge, the combination of a pin 5, a hub 6 mounted thereon, plates 7 bolted to said hub, radial arms 8 attached to said plates and connected with the truss and counterweight, a curved rack 11 attached to said arms, and gearing for operating on said rack, substantially as described.

12. The combination with the truss of a bridge, of a counterweight comprising a web extending back of the truss, a series of blocks on each side thereof, and supports for said blocks carried by said web, substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 13th day of March, 1899.

WILLIAM L. BRAYTON.

Witnesses:
EUGENE T. MORRISON,
JOHN H. SNAVELY.