

(No Model.)

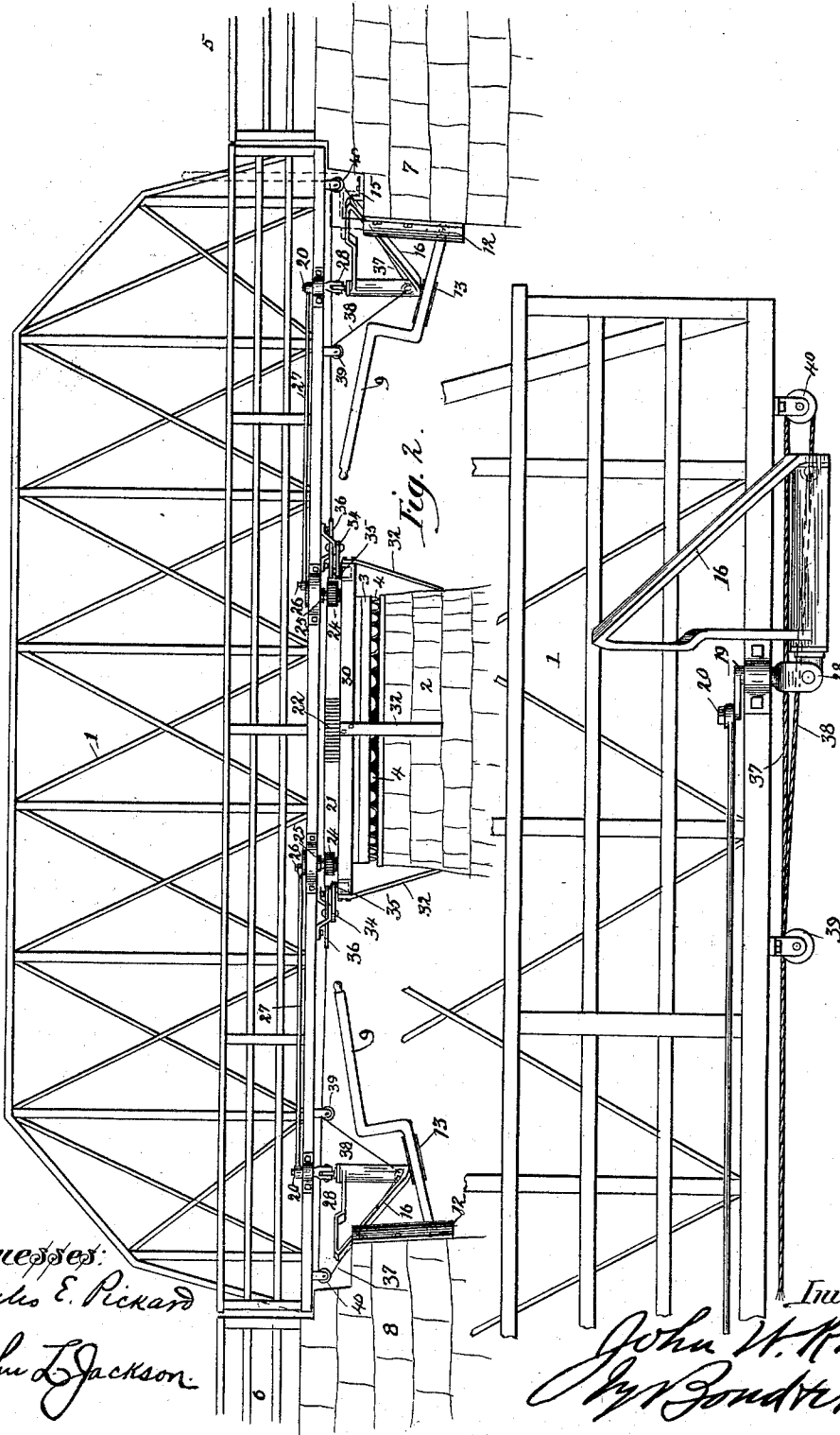
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J. W. RHODES.
BRIDGE GATE.

No. 477,700.

Patented June 28, 1892.

Fig. 1.



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(No Model.)

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Fig. 3.

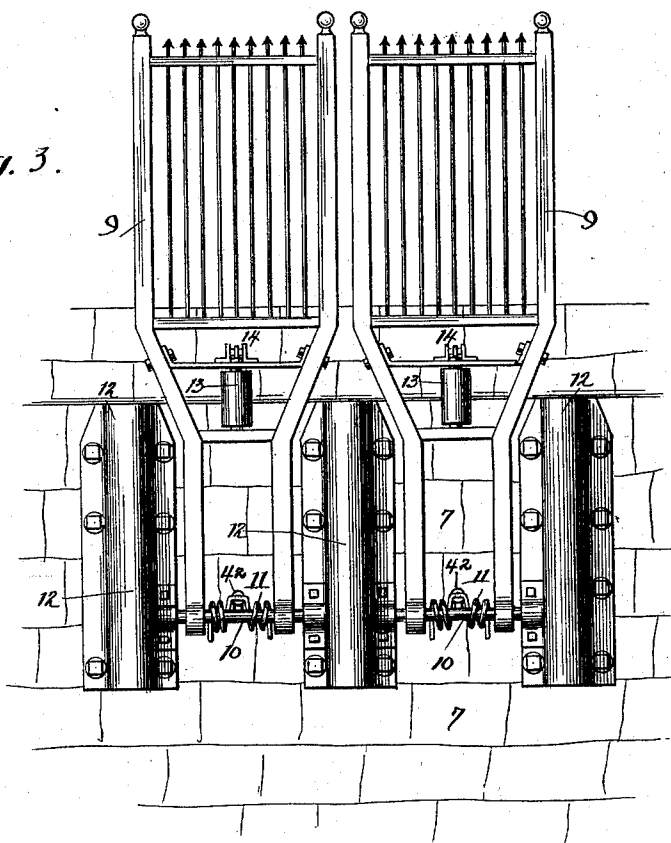


Fig. 4.

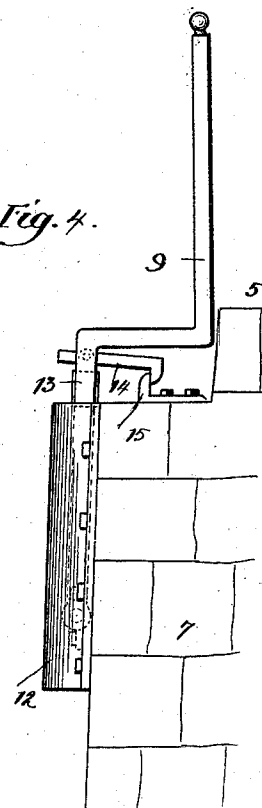
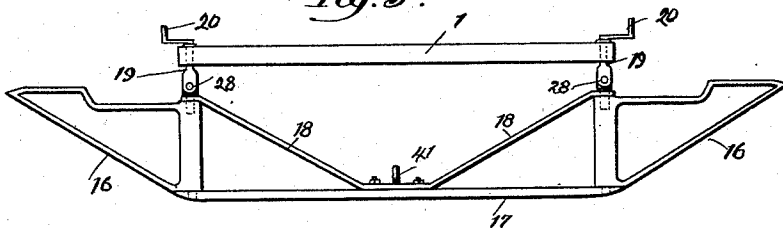


Fig. 5.



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Fig. 6.

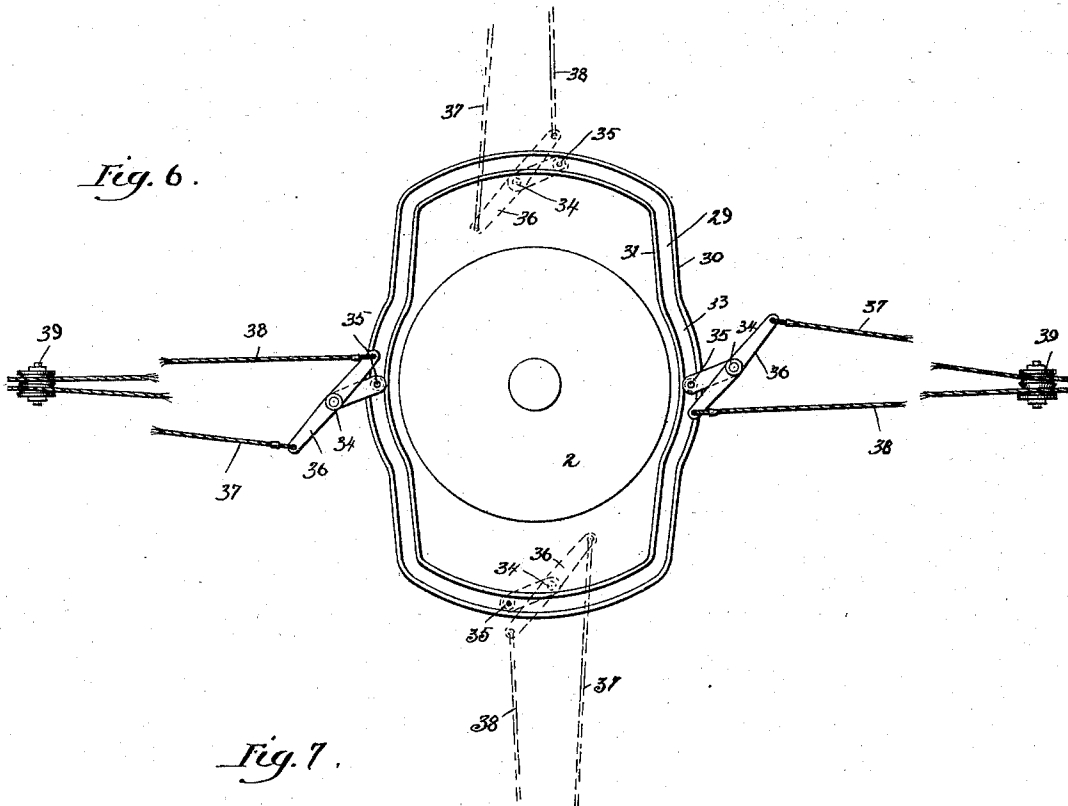
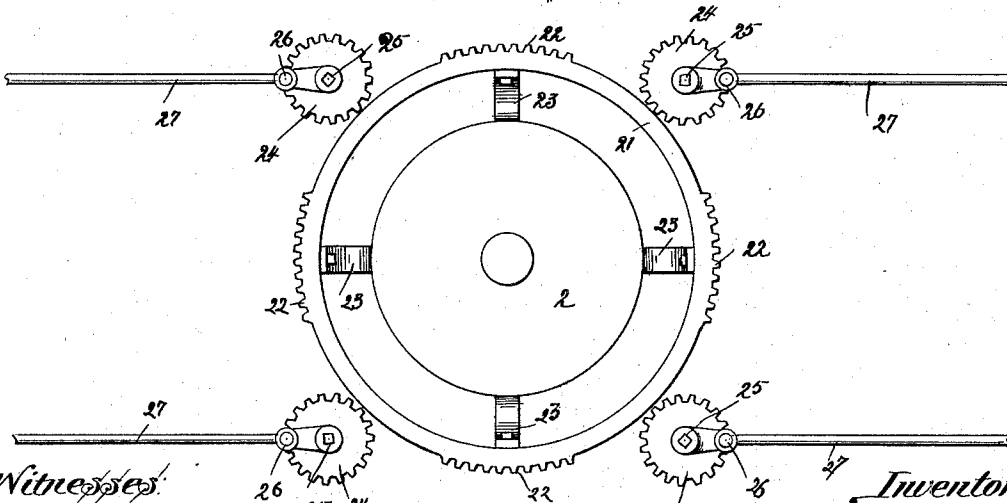


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN W. RHODES, OF HAVANA, ILLINOIS.

BRIDGE-GATE.

SPECIFICATION forming part of Letters Patent No. 477,700, dated June 28, 1892.

Application filed October 13, 1891. Serial No. 408,618. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. RHODES, a citizen of the United States, residing at Havana, in the county of Mason and State of Illinois, have invented certain new and useful Improvements in Bridge-Gates, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a detail, being a side elevation of one end of the bridge, showing the position of the opening devices when the bridge is open. Fig. 3 is a front elevation of one of the piers, showing the arrangement of the gates. Fig. 4 is a side view of the same. Fig. 5 is a detail, being an end view of a portion of the bridge. Fig. 6 is a top or plan view of the cam for lifting the opening devices, and Fig. 7 is a top or plan view of another portion of the mechanism for operating the gate-operating devices.

My invention relates to bridge-gates adapted for use in connection with swinging bridges and which are automatically operated by the opening or closing of the bridge to close or open the roadway leading to the bridge.

The object of my invention is to provide an improved bridge-gate of the above-described class; and it consists in the various parts and combinations of parts hereinafter claimed.

I accomplish my object as hereinafter specified and as illustrated in the drawings.

That which I regard as new will be pointed out in the claims.

In the drawings, 1 indicates the bridge, which is centrally mounted upon a pier 2, upon which it is adapted to swing. A suitable frame-work 3 is provided for supporting the bridge, which frame-work rests upon anti-friction rollers 4 in the usual manner.

5 and 6 indicate the approaches to the bridge, and 7 and 8 the usual piers upon which the ends of the bridge are supported when the bridge is closed. The bridge is adapted to be swung by any suitable mechanism.

9 9 indicate the bridge-gates, which are adapted to close the approaches to the bridge when the bridge is open. The gates 9 are preferably narrow, being about of the proportions shown in Fig. 3, and a sufficient number

is provided at each approach to close it. The gates 9 are hinged at their lower ends upon shafts 10, mounted horizontally upon the faces of the piers 7 and 8, as best shown in Fig. 3. The arrangement is such that the gates 9 may be turned downward over the water when not in use. Springs 11 are mounted upon the shafts 10 in such manner that by their tension they will raise the gates 9; but I do not confine myself to the use of springs for this purpose. Each spring 11 is provided with an adjusting-screw 42, so arranged that the tension of the spring may be regulated as desired. Instead of mounting the gates upon the faces of the piers or abutments, as shown, they may be mounted on top of them. The proportions of the gates should then be suitably altered.

12 indicates plates, which are secured in a perpendicular position upon the faces of the piers 7 and 8 and project therefrom in such manner that they will serve to protect the lower portions of the gates 9 from being damaged by passing vessels. Instead of the plates 12 pillars or other similar devices may be used.

At a suitable point upon each gate, preferably near the tops of the pillars or plates 12, is journaled a roller 13, the axis of which is in the plain of the gate, as best shown in Figs. 3 and 4. The rollers 13 are of such size that when the gates are closed they will extend beyond the tops of the plates 12, for purposes which will be hereinafter described.

14 indicates a hook, one of which is mounted upon each gate, which hook is adapted to engage a corresponding hook 15, suitably placed upon the pier 7 or 8. The hooks 14 and 15 are so arranged that when the gates are raised to the position shown in Figs. 3 and 4 they will engage each other, and thereby hold the gate in its raised position.

16 16 indicate arms or wings, which are carried by the bridge and which serve to operate the gates. The arms 16 are supported under the bridge, as best shown in Fig. 5, two being placed at each end of the bridge at opposite sides thereof. When the bridge is closed or nearly closed they project laterally from the bridge, the outer ends of the arms being inclined toward the adjacent end of the bridge. A bar 17 and braces 18 are provided between

each pair of arms to hold them securely in position. The bar 17 is on a level with the lower ends of the arms 16 and serves to hold the gates down after they have been lowered by the arms. The arms are of about the shape shown in Fig. 5, being somewhat wedge or triangular shaped, and they are adapted, when the bridge is closing, to raise the hook or latch 14, thereby releasing the gate 9, and then by pressing against the rollers 13 as the bridge continues to close the peculiar shape of the arms 16 will cause the gates 9 to be turned downward until they assume the position shown in Fig. 1, when the bridge is closed. The rollers 13 will then bear upon the bar 17. When the bridge opens, the rollers 13 will move up the inclined portions of the arms 16, and by the time the bridge has swung away from the approach the action of the springs 11 will have caused the gates to assume their upright position.

In order to prevent the arms 16 from interfering with navigation when the bridge is open, as they might do if the channel were narrow and they were permitted to remain in the position shown in Fig. 5, they are pivotally mounted under the bridge, their lower ends being pivoted in the ends of the bar 17 and their upper ends being secured to rods 19, journaled at the sides of the bridge, as best shown in Fig. 1. Each rod 19 is provided at its upper end with a crank-arm 20, as best shown in Fig. 5.

21 indicates a wheel, which is provided on its periphery with cogged sections 22, arranged at intervals of ninety degrees. The wheel 21 is horizontally mounted upon the central pier 2 by braces 23, suitably secured to the upper portion of the pier. Any other suitable method of securing the wheel 21 in place may be employed.

24 indicates spur-wheels, which are mounted upon shafts 25, journaled in suitable bearings on the bridge. The length of the shafts is such that the spur-wheels 24 will be held in position to engage the cogs 22 as the bridge is swung. Upon the upper end of each shaft 25 is a crank-arm 26, adapted to be rotated by the rotation of the wheel 24. The spur-wheels 24 are four in number, and they are so placed upon the bridge that as the bridge swings they will be moved into engagement with the sections 22 when the bridge has been almost completely opened.

27 indicates connecting-rods, which connect each crank 26 with the adjacent crank 20 at the end of the bridge. The arrangement is such that as the spur-wheel 24 is rotated by its engagement with one of the cogged sections 22 the crank 26 will be partially rotated, and by means of the connecting-rod 27 will partially rotate the crank 20, to which it is attached, in such direction as to fold the corresponding arm 16 toward the end of the bridge, causing it to lie parallel with the bridge. When the bridge begins to close, the

arms 16 will be moved again to the position shown in Fig. 5 by the reverse action of the spur-wheels 24. The operation of all the wheels 24 and arms 16 is the same.

In order to prevent the gate-opening arms from interfering with the rests usually provided for supporting the ends of the bridge when it is open for the passage of vessels, the following apparatus is provided for folding them upward to the position shown in Fig. 2:

The inner portion of each of the arms 16 is hinged at its upper end to the lower end of the rod 19, as shown at 28, in Figs. 2 and 5. The arrangement is such that when the arms are turned to lie parallel with the bridge they may be turned upward on the hinge. The bar 17 and braces 18 are secured to the inner portion or axis of the arms 16 to permit of this operation.

29 indicates a guide-cam, which consists of bars 30 and 31 of the shape shown, which are mounted upon the pier 2 in a horizontal position. The bars 30 and 31 are held in position by supports 32, secured to the pier in any suitable manner. The bars 30 and 31 together form a slot 33 of the shape shown.

34 34 indicate shafts, which are journaled in the bridge, each of which is provided with a crank-arm 35 and a cross-bar 36. The crank-arms 35 and cross-bars 36 are rigidly secured together at about the angle shown in Fig. 6. The crank is adapted to fit into the slot 33 and to move therein as the bridge swings.

37 and 38 indicate ropes or cables secured to the ends of the cross-bars 36, which ropes pass over pulleys 39 and 40, and are secured at their ends to a ring 41 or other suitable device secured upon the frame-work 17 between the arms 16. The pulley 39 is supported from the bridge between the pier and the arms 16 and the pulley 40 is supported from the bridge between the end of the bridge and the arms 16. One of the ropes, as 37, passes over the pulley 39 and is secured to the ring 41 and the other rope passes over the pulley 40 and is also secured to the ring 41. The devices at both ends of the bridge are similarly arranged.

When the bridge turns, the shafts 34 will move around in the arc of a circle and the cranks 35 will move in the slots 33. By reason of the peculiar shape of the slot when the bridge has reached a position at right angles to that from which it started the bars 36 will have assumed the position shown by dotted lines in Fig. 6. This will cause the ropes 37 to be drawn back and the ropes 38 to be extended. The arms 16 will thereby be either drawn up or down, depending upon the arrangement of the ropes 37 and 38 and the position of the cam-guide with relation to the bridge. These devices are so arranged with relation to each other and to the devices for turning the arms into a position parallel with the bridge that as the bridge opens the arms

16 will first be turned to a position parallel with the bridge, and the bars 36 will then be operated by the rotation of the bridge to raise the arms to the position shown in Fig. 2. By a reverse motion of the bridge or by its continuation beyond the central point of its rotation the arms 16 will first be lowered and will then be swung outward to the position shown in Fig. 5. By this construction the gate-opening arms are compactly folded when the bridge is open, so that they in no way interfere with the passage of vessels or with the rests usually provided for supporting the ends of the bridge when it is open for the passage of vessels.

It will be found necessary to provide the bridge with the mechanism for folding the gate-opening arms only in a comparatively few instances, such as when the channel is narrow or the bridge extra wide; but by providing such mechanism all danger of breaking such gate-closing arms will be avoided, and such construction is therefore very desirable, as accidents quite frequently occur on rivers where there is a large traffic, even though the channel is not very narrow.

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

1. The combination, with the piers 7 and 8 and a swing-bridge 1, of gates hinged or pivoted at their lower ends to the inner sides of the piers and swung downward away from the piers to a position over the water and beneath the ends of the swing-bridge by the closing of the latter, substantially as described.

2. The combination, with the piers 7 and 8 and a swing-bridge 1, of gates hinged or pivoted at their lower ends to the inner sides of the piers to swing downward away from the piers into a position over the water, and devices carried by the swing-bridge for swinging the gates downward to positions beneath the ends of the swing-bridge when the latter closes, substantially as described.

3. The combination, with a swing-bridge and piers, of gates hinged or pivoted at their lower ends to the piers to swing downward away from the piers into a position over the water, and arms carried by the bridge and projecting laterally therefrom to swing the gates downward away from the piers into a position under the bridge as the latter closes, substantially as described.

4. The combination, with a swing-bridge and arms 16 carried thereby, of piers 7 and 8 and gates 9, mounted upon said piers and adapted to be engaged by said arms and turned downward under the bridge as it closes, substantially as described.

5. The combination, with a swing-bridge and arms 16 carried thereby, of piers 7 and 8, gates 9, hinged at their lower ends upon said piers, springs 11 for lifting said gates, and rollers 13 on said gates, substantially as described.

6. The combination, with a swing-bridge and arms 16 carried thereby, of piers 7 and 8, gates 9, hinged at their lower ends upon said piers, springs 11 for lifting said gates, rollers 13, and devices for locking said gates in their upright position, said locking devices being adapted to be released by the operation of the arms 16, substantially as described.

7. The combination, with a swing-bridge and piers, of gates hinged or pivoted at their lower ends to the piers to swing downward away from the piers into a position over the water, laterally-projecting arms carried by the bridge for swinging the gates downward away from the piers when the bridge closes, and mechanism for turning said arms so that they will lie parallel to the bridge when it is open, substantially as described.

8. The combination, with a swing-bridge, of gates adapted to close the roadways leading to the bridge when it is open, laterally-projecting arms carried by the bridge, adapted to turn said gates down when the bridge closes, and automatically-operating mechanism for turning said arms so that they will lie parallel to the bridge when it is open, substantially as and for the purpose specified.

9. The combination, with a swing-bridge, of gates adapted to close the roadways leading to the bridge when it is open, laterally-projecting arms carried by the bridge, adapted to turn said gates down when the bridge closes, and mechanism for turning said arms to a vertical position, substantially as and for the purpose specified.

10. The combination, with a swing-bridge, of gates adapted to close the roadways leading to the bridge when it is open, laterally-projecting arms carried by the bridge, adapted to turn said gates down when the bridge closes, and automatically-operating mechanism for first turning said arms so that they will lie parallel to the bridge when it is open and then turning said arms to a vertical position, substantially as and for the purpose specified.

11. The combination, with the bridge 1, having spur-wheel 24, crank-shafts 25, connecting-rods 27, and arms 16, having rods 19 and cranks 20, of a pier 2, and wheel 21, supported thereupon, said wheel having cogged sections 22 on its periphery adapted to be engaged by the wheels 24, substantially as and for the purpose specified.

12. The combination, with the bridge 1, having crank-arms 35, cross-bars 36, arms 16, and ropes 37 and 38, adapted to raise or lower said arms 16, of a pier 2, and cam-groove 29, mounted thereupon, substantially as and for the purpose specified.

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