No. 661,113. Patented Nov. 6, 1900.

M. WADDELL.

BASCULE BRIDGE.

(Application filed Nov. 16, 1899.)

(No Model.) 2 Sheets—Sheet 1.

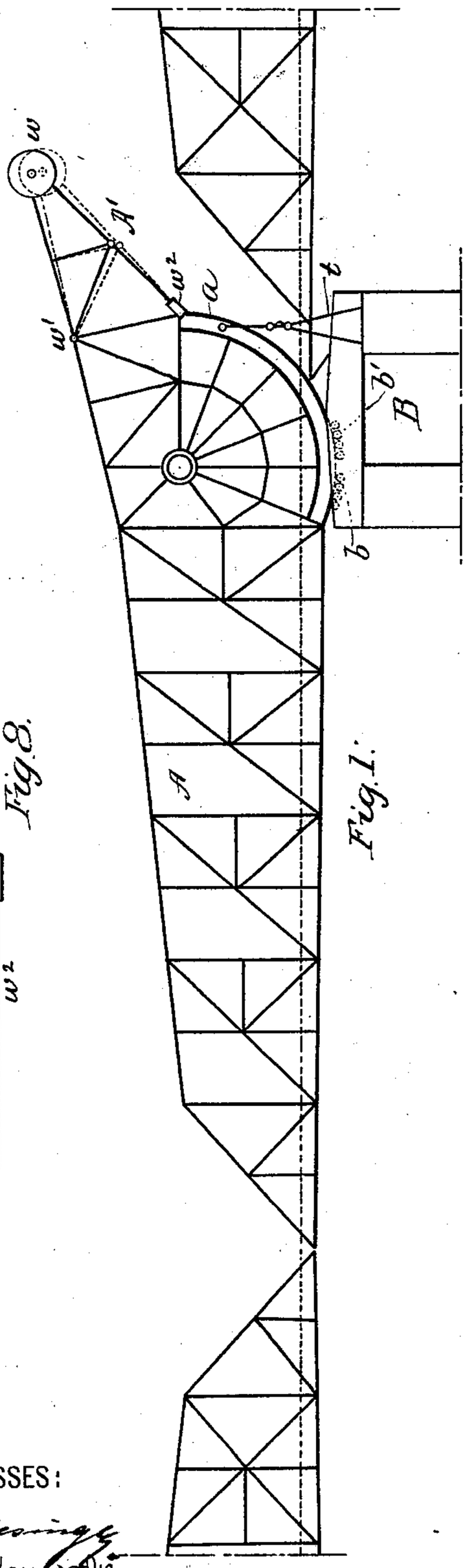

Fig. 1.

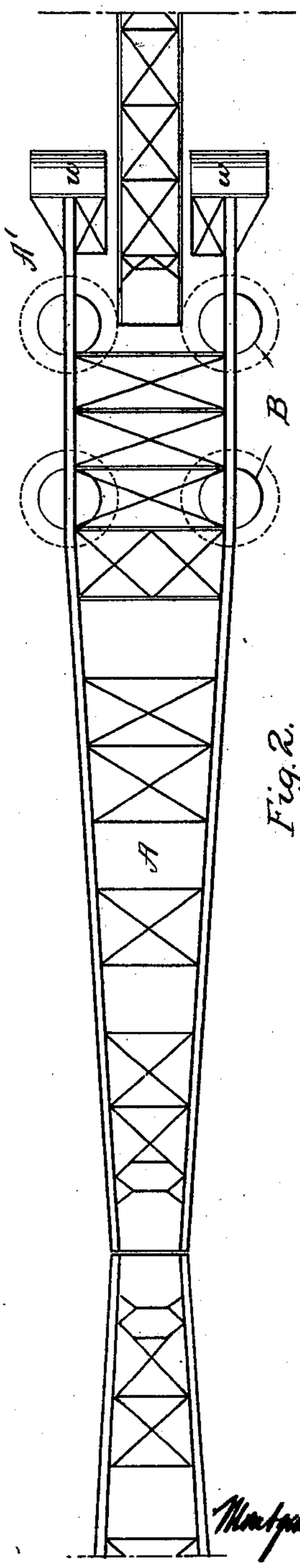

Fig. 2.

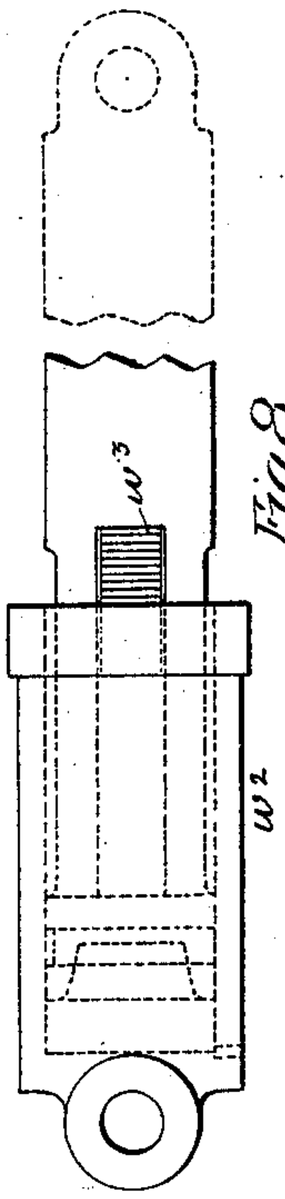

Fig. 8.

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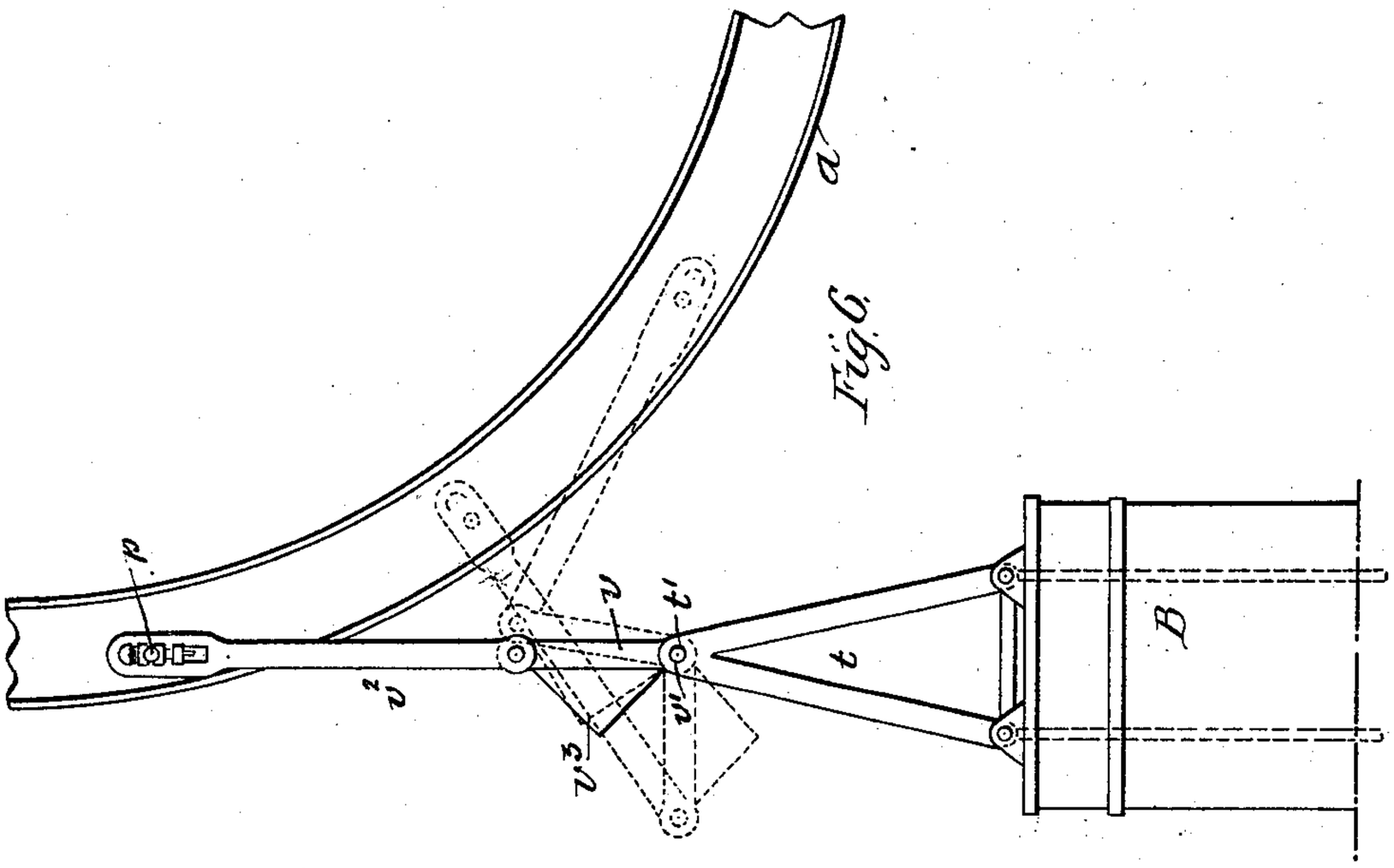

Fig. 6.

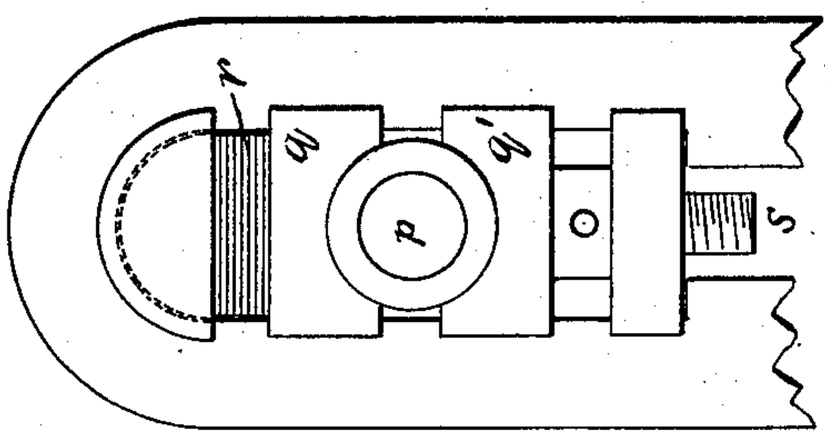

Fig. 7.

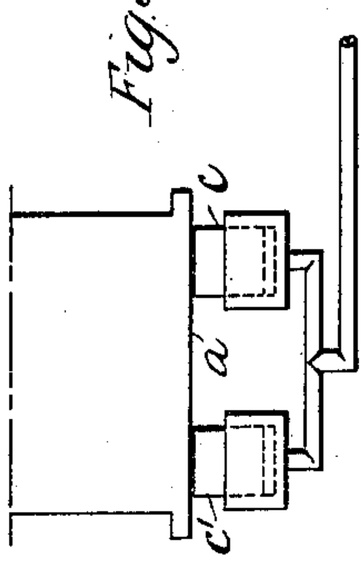

Fig. 5.

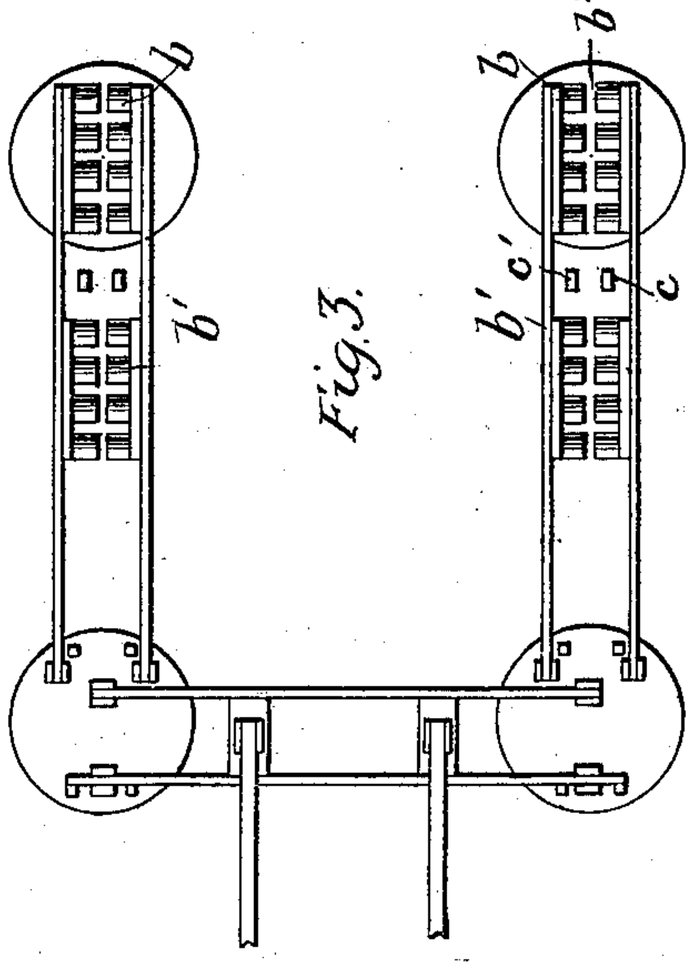

Fig. 3.

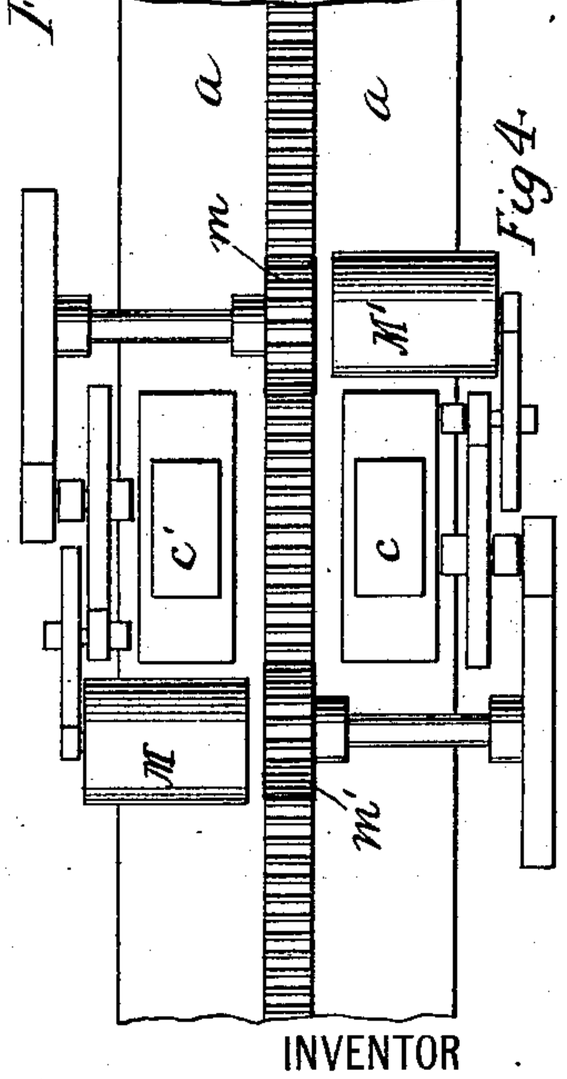

Fig. 4.

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MONTGOMERY WADDELL, OF NEW YORK, N. Y.

BASCULE-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 661,113, dated November 6 1900.

Application filed November 16, 1899. Serial No. 737,155. (No model.)

To all whom it may concern:

Be it known that I, MONTGOMERY WADDELL, a subject of the Queen of Great Britain, residing at the city of New York, borough of Manhattan, State of New York, have invented certain new and useful Improvements in Bascule-Bridges, of which the following is a full, clear, and exact description.

This invention relates to bascule-bridges; and it consists in general of improvements upon that type of bridge disclosed in United States Patent No. 621,466, issued March 21, 1899, to me. The important feature of the invention covered by said patent is the circular track of large diameter formed upon the bridge, which rests and turns in a cradle, the bridge being practically balanced in all positions.

The present improvement relates to the location and adjustment of the counterweight and to the construction of the trusses supporting it, with a view to providing large leverage for the action of the weight without interference with the stationary parts of the bridge or its approaches.

A further improvement relates to the location of the motive-power devices, the construction and location of a brake for retarding the motion of the bridge, and the construction of an anchor or detent for resisting the weight of the live load at the outer or swinging end of the bridge.

These improvements will all be described in detail with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the lifting span of a bascule-bridge with the abutting portions of the stationary parts of the bridge. Fig. 2 is a plan of the same. Fig. 3 is an enlarged plan of the pier. Fig. 4 is an enlarged plan showing the location of the motive-power devices and the brake. Fig. 5 is a detail of the brake. Fig. 6 is an enlarged view of an anchoring device. Fig. 7 is a detail of the anchor, and Fig. 8 is a detail of the adjusting devices for the counterweight.

My invention, as herein illustrated, is applied to a bridge in which the opening span is approached at both ends by stationary spans of the bridge; but it will be understood that the opening span may be at one end of the bridge or may constitute the entire bridge except the land approaches.

The moving span is indicated by A. It is provided with a circular track *a* of very large diameter as compared with an ordinary trunnion, which track serves as the bearing-surface of the moving bridge. It will be understood, of course, that there may be two or more of these tracks across the width of the bridge; but, as here shown, two tracks only are provided, one being in each of the said trusses. The tracks rest upon the top of a pier B, the pier being provided with a cradle or cradles for them.

The cradle consists of two nests of anti-friction-rollers under each track, the nests being respectively indicated by *b b'*. The rollers, while being free to turn to reduce the friction, are maintained in position by fixed bearings. The nests are located at equal distances from a vertical plane passing through the axis of rotation, so that the weight of the bridge is evenly divided between them and evenly distributed throughout the rollers; also, a convenient intermediate space is afforded for the motive-power devices. The circular track on the bridge is provided along the middle line of its face with a rack *a'*, which runs in the opening b^2 between the rows of rollers in the nests, and between the nests the rack is engaged by two pinions *m m'*, which are driven, through suitable trains, by the respective motors M M'. With the power applied in this position immediately below the axis of rotation, which, it should be mentioned here, is the center of gravity of the entire moving structure, it acts most advantageously, since in applying the power there can be no tendency to force the bridge out of its cradle and there can be no straining or uneven action. For the same reason brake-shoes *c c'*, which are used to retard the bridge at the end of each movement, are located at about the same place as the power devices. These brake-shoes act upon the smooth faces of the track on each side of the rack and may be operated hydraulically, as indicated in Fig. 5, or otherwise. They are placed vertically under the axis of rotation, where they will not exercise a tendency to unbalance the bridge. To counterweight a structure of this

character requires either a very large and heavy mass acting with small leverage or a comparatively small mass acting at greater leverage. The latter plan is preferable where it can be utilized, as it lessens the total weight and permits of lighter construction. Hence I extend the truss of the bridge rearward and upward, as indicated at A′, and mount the counterweight *w* at the end of the extension. When the bridge opens, however, this extension would ordinarily interfere with the abutting portion of the stationary bridge, because such portion must carry its roadway up to a point in line with the circular faces of the tracks, so that the roadway may be continuous through the bridge. To avoid this interference, therefore, I make the counterweight in two parts, as shown in Fig. 2, and make the extension of the truss which supports the parts in the form of a fork, which straddles the abutting portions of the stationary bridge and permits the movable bridge to swing upward to the desired angle.

In a counterweighted bascule-bridge the combined center of gravity is usually coincident with the axis of rotation; but the calculations for this are sometimes found to be incorrect when the bridge is constructed. Hence for any slight adjustment that may be desirable I have provided means for shifting the position of the counterweight to bring the combined center of gravity to the desired position. To shift the combined center of gravity in a substantially horizontal direction, it is only necessary to add to or subtract from the counterweight; but to shift it in a substantially vertical direction a convenient way is to raise or lower the counterweight. I provide for this by making a part of the truss which supports the counterweight movable, hinging it at w' and using a hydraulic cylinder and piston w^2 to raise the truss, the weight being then supported by adjustable plates w^3, inserted between the piston-rod and the head of the cylinder. (See Fig. 8.)

Another feature of the invention is the anchoring device for sustaining the live load at the outer end of the movable span. A low tower *t* is constructed at the two rearward corners of the pier, the framework thereof extending down through the pier and having a firm connection therewith. At the top of the tower is a pivot-pin t', passing through an eye v' in a link *v*. The upper end of the link is hinged to another link v^2, which engages with a pin *p*, projecting laterally from the track-frame of the movable span of the bridge. The pin *p* engages with the link by means of a device (shown in Fig. 7) whereby the length of the link can be adjusted. This consists of two blocks *q q′*, between which the pin is seated, the upper block being adjustable in its distance from the upper end of the link by means of a number of plates *r*, set in between the block and the extremity of the slot in the link, the number of plates used determines the position of the seat for the pin. The lower block is adjusted by means of the screw *s* to correspond with the adjustment of the upper block. As the bridge rises the two pivoted links fold outward and permit the pin *p* to pass below the top of the tower, and the lower link *v* is provided with a weight v^3, insuring the outward folding of the links. When the bridge is closed, any thrust due to the live load at the outer end of the span is resisted by the links and tower.

Having described my invention, I claim—

1. In a bascule-bridge, the combination with the movable span provided with a circular track upon which it turns, of two nests of rollers upon which the track rests and moves, said nests being located upon opposite sides of a vertical plane passing through the axis of rotation of the bridge, and power devices for moving the bridge located between said nests of rollers, substantially as described.

2. In a bascule-bridge, the combination with the movable span provided with a circular track upon which it turns, of two nests of rollers upon which the track rests and moves, said nests being located upon opposite sides of a vertical plane passing through the axis of rotation of the bridge, and power devices for moving the bridge located between said nests of rollers, and a braking device for retarding the bridge also located between said nests of rollers.

3. In a bascule-bridge, the combination with the movable span provided with circular tracks upon which it turns, said tracks provided along its middle with a rack, two nests of rollers upon which the track rests and moves, said nests being located upon opposite sides of a vertical plane passing through the axis of rotation of the bridge, a motor and gearing driven thereby and engaging with the rack at a point between the two nests of rollers, substantially as described.

4. In a bascule-bridge, the combination with the movable span provided with a circular track of large diameter as compared with an ordinary trunnion, said track forming the bearing-surface upon which the bridge turns, of a brake-shoe adapted to bear upon said track, substantially as described.

5. In a bascule-bridge, the combination with the movable span provided with a circular track of large diameter as compared with an ordinary trunnion, said track forming the bearing-surface upon which the bridge turns, of two roller-supports upon which the track rests and moves, said supports being located upon opposite sides of a vertical plane passing through the axis of rotation of the bridge, and a brake-shoe adapted to bear upon said track and located between said supports, substantially as described.

6. A bascule-bridge provided with a curved track upon which it turns, said track being of large dimensions as compared with an ordinary trunnion, said bridge being also provided with a forked rearward extension upon

the extremities of which the bridge-counterweight is secured, substantially as described.

7. The combination with a movable bridge of a counterweight therefor, a truss or frame supporting the counterweight and hinged to the bridge, substantially as described.

8. The combination with a vertically-moving bridge of a counterweight therefor, said bridge provided with an extension to the rear of its axis of rotation, said extension being pivoted to the main bridge and carrying a counterweight, and means for swinging said extension upon its pivot, for the purpose set forth.

9. In a bascule-bridge, the combination with a movable span of a friction-brake therefor.

10. A pivoted bridge-span provided with a surface concentric with its pivot, in combination with a brake-shoe and means for forcing it against said surface for the purpose set forth.

11. The combination with a vertically-swinging bridge of a flexible link pivoted to the bridge at a point back of the pivotal point of the bridge and anchored at a point substantially vertically below its connection with the bridge substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

MONTGOMERY WADDELL.

Witnesses:

WM. A. ROSENBAUM,

GEO. S. KENNEDY.