No. 648,447. Patented May 1, 1900.

F. G. VENT.

ROCKING BASCULE BRIDGE.

(Application filed Oct. 21, 1899.)

(No Model.) 2 Sheets—Sheet 1.

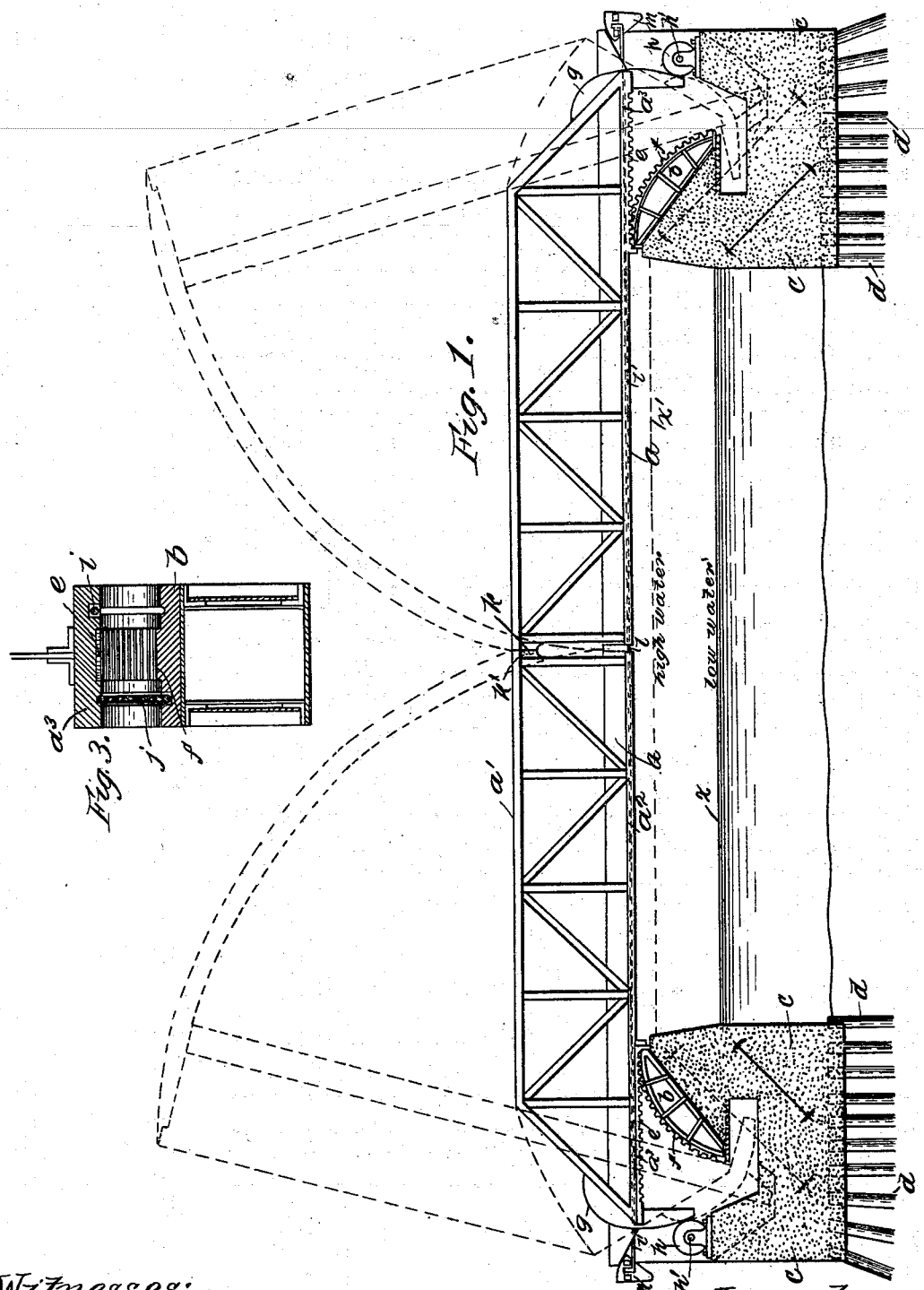

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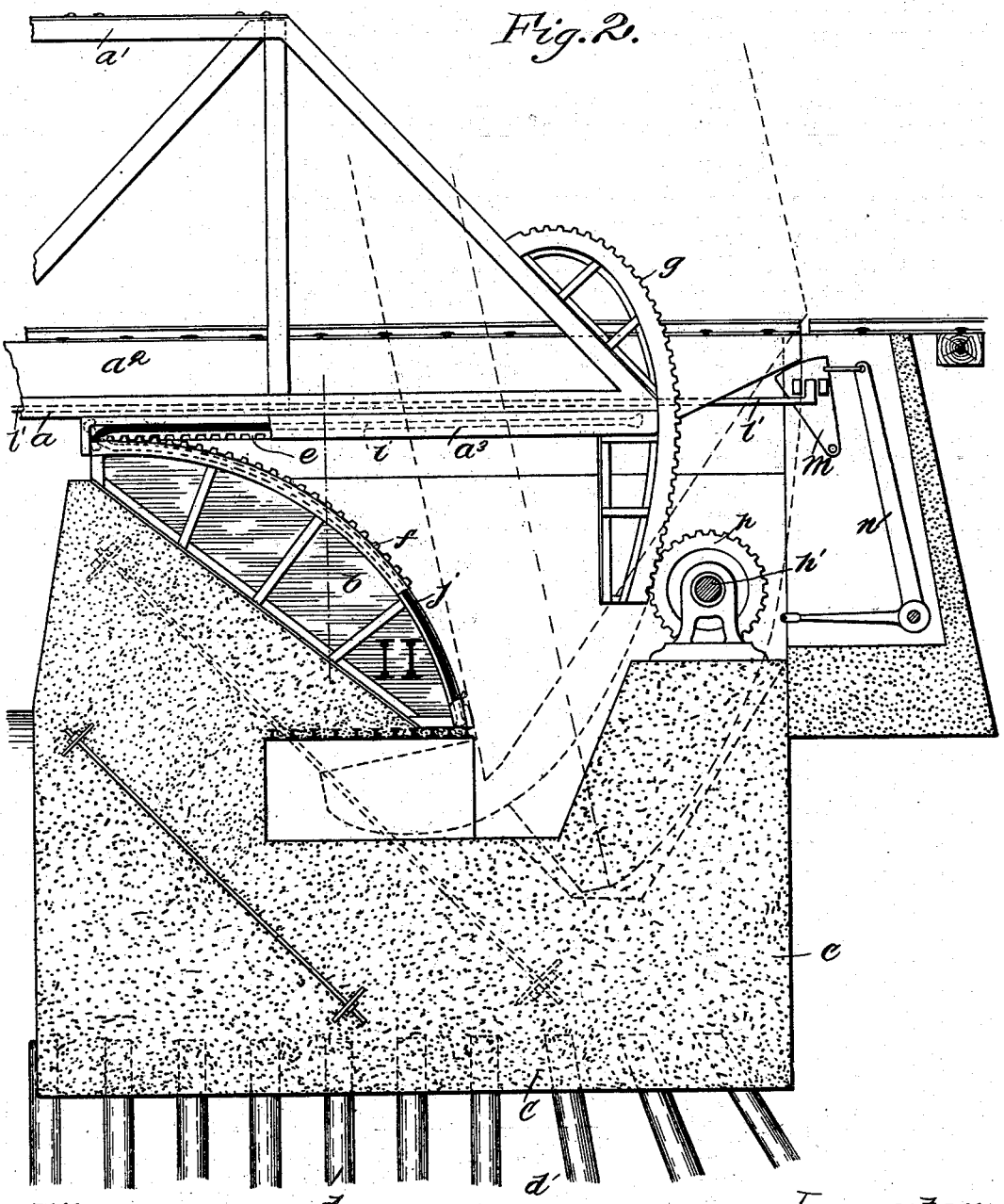
Fig. 2.



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UNITED STATES PATENT OFFICE.

FREDERICK G. VENT, OF CHICAGO, ILLINOIS.

ROCKING BASCULE-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 648,447, dated May 1, 1900.

Application filed October 21, 1899. Serial No. 734,388. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. VENT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rocking Bascule-Bridges, (Case No. 1,) of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in rocking bascule-bridges, and has for its object the provision of a bridge of this class of materially-simplified structure, great strength, and less cost than those hitherto known in the art, and which will in addition readily lend itself to various requirements and be found reliable in its operation. Bridges of this general type have hitherto been built wherein curved or angular trusses were required to form the moving or rocking spans of the bridge, the supporting shore ends of said trusses being constructed in the form of sectors which rocked on level or plane surfaces of the shore piers to open and close the bridge. By reason of the characteristics of this structure the roadway necessarily is carried at a considerable height above the water-level and the expense of constructing the curved or multiangular spans is considerable. In the bridge of my invention these undesirable features are not found, while various advantages result directly from my improved construction.

In brief, the bridge of my invention herein shown may be described as consisting of one or two straight trussed spans, which are adapted to rock in vertical planes upon shore piers or abutments having curved supporting-surfaces, whereby said span or spans may be actuated to swing over or clear the channel, as desired, suitable mechanism being provided for actuating the spans and for locking the same in position.

My invention will be more readily understood by reference to the accompanying drawings, illustrating a bridge constructed in accordance with said invention, in connection with which drawings I will describe the same more fully.

Figure 1 of the drawings represents the bridge in side elevation. Fig. 2 is a similar view, upon an enlarged scale, of one end of said bridge with a portion of its operating mechanism, some of the parts being broken away; and Fig. 3 is an end view of one of the abutments on the scale of Fig. 1, showing the curved supporting-surfaces and retaining-cables.

The same letters of reference are used to designate like parts in each of the several figures of the drawings.

The two spans a of the bridge are carried upon curved girders b, which are supported by concrete abutments c and piles d at either side of the channel. It will be noticed that the abutments are recessed to permit of the downward movement of the shoreward extremities of said spans with their connected parts, as shown by the full and dotted lines in Fig. 2. Suitable supporting-rails and lateral girders are employed in connection with such recessed portions to support the weight occurring above the same. The normal water-level may be at x, although it will be seen that the illustrated structure is capable of being used in positions where the water-level reaches the height of x'. Thus the level of the road-bed may be maintained as low as practicable, adapting my improved bridge to many positions wherein this feature is desirable or essential. Each of said spans preferably is constructed with straight top and bottom chords a' a^2 in the usual manner, the shore ends or supporting members a^3 of the latter, however, being reinforced or strengthened sufficiently to carry the weight of said spans, such portions being provided with racks e, which are adapted to engage the sector-shaped racks f, with which the curved girders b are faced.

Curvilinear actuating-racks g are provided upon either side of each span, which are adapted to be engaged by gear-wheels h. These actuating-racks are fixedly secured to the bridge-trusses and by reason of their rearward engagement with the gear-wheels assist in maintaining the spans in position.

For the sake of clearness I have omitted the illustration of operating mechanism; but it will be readily understood that any suitable form of motor device, such as a steam-engine

or electric motor, may be connected with and serve to rotate shaft h', upon which the gear-wheel h is mounted.

Cables i j are suitably anchored or connected, respectively, with the upper end of the curved girder and the shore extremity of the bottom chord a^2 and with the lower end of said curved girder and with the bottom chord of the span at or near the forward extremity of the rack e. These cables coact with the racks e, f, and g in maintaining each span in its plane of rotation and, moreover, assist the racks e f in supporting the weight of the bridge when in an open position. I have shown the coacting racks e f provided, respectively, upon the bottom chords of the span and the curved supporting-surfaces of the abutments. It will be seen that said racks may, if desirable or convenient, be omitted, since the cables may be made to serve alone, or, if deemed expedient, the rack may be used without the cable or cables.

In order to relieve the actuating machinery and its connected parts of unnecessary strain in opening and closing the bridge, I preferably provide sufficient counterweight, which may be mounted in the overhanging shoreward extremity of the truss or beneath the corresponding portion of the road-bed. Such counterweight preferably is adjusted with respect to each particular span, so as to maintain it in a partly-open position, thereby assisting the operating machinery materially at the times most required when the inertia of the span is to be overcome in moving said span either from its open or closed position. Obviously, however, this feature may be dispensed with by adopting the expedient of using more powerful operating machinery. Where the channel is narrow, of course but a single span is required; but usually double spans are employed, as shown in Fig. 1, which are provided with male and female castings k k' at their forward ends or meeting faces to insure the alinement of said spans when the bridge is closed. A central locking member or members l are also provided, operated from one or both ends of the bridge by means of connecting-rods l'. Supporting-sectors m are pivotally mounted in each abutment in an overweighted position to automatically swing beneath the shoreward extremities of the bottom chords of each span, whereby said extremities are rearwardly supported from beneath when the bridge is closed. To provide for the actuation of the supporting-sectors m and central locking members l, pivoted angular lever-arms n are mounted in position to actuate said sectors and locking members out of engagement with their coacting parts, thereby freeing the corresponding span and permitting it to rotate or rock upon its supporting-pier. The lower or angularly-extending end of the operating-lever may be manually actuated or connected with suitable operating machinery to procure its movement. Any suitable and well-known form of braking appliance may also be applied to shaft h' or its connected machinery to assist in maintaining the bridge in its closed position or in any other position which it may assume.

Upon actuating levers n and releasing the brake mechanism power is applied to both shafts h', which causes gear-wheels h to rotate and draw down the shoreward ends of the spans a through the medium of actuating members or racks g, which mesh with gear-wheels h. This operation is also materially augmented by the counterbalancing-weight until the spans have assumed positions part way between their fully-open positions (shown in dotted lines) and their closed positions. (Shown in full lines.) Beyond this point when the spans are moved in either direction the operating machinery acts in opposition to the counterweight, thereby storing energy for the purpose of starting these spans upon the succeeding movement. When the spans have reached their fully-open positions, the cables i will serve to relieve the racks of a large portion of the weight of said spans, while cables j will at all times assist in preventing the bridge from being accidentally swung out of its plane of rotation or rocking movement.

It is apparent, of course, that chains or other flexible members may take the place of the cables herein referred to. It will also be understood that the curved supporting-surfaces of girder b need not be segments of the form shown, since any suitable curved supporting-surface, coacting with the straight shoreward extremity of the truss may be employed instead.

Different mechanism from that herein shown may also be employed for actuating the span to rock upon its curved member; but I preferably employ the curvilinear actuating members g, which are rearwardly secured to the bridge-span and conform in outline to the irregularly-curved lines of engagement of said actuating members with their coacting gears h. By using the same it will be seen that all pivoted operating parts or similar devices are avoided, since such actuating member is built upon and forms a part of the span. The said actuating member preferably is disposed at the extreme shore end of the span beyond the supporting-pier, from which it is entirely distinct and independent, as shown in the drawings, in which position it is found most effective in operating the span and serves as a portion of the counterweight.

This construction, it will be seen, is extremely simple and is of moderate expense compared with similar structures of the prior art, while the use of pivotal mountings for the bridge-spans, which are in many respects undesirable, is entirely obviated.

Those skilled in the art will understand that numerous modifications in the precise structure herein shown and described may be made without departing from the spirit of

my invention, which I desire to claim, together with all such modifications.

I accordingly wish to secure by these Letters Patent the following:

1. In a bridge of the class described, the combination with a movable span having a substantially-straight carrying member, of a pier or abutment provided with a curved supporting member, means for maintaining the span in its position upon the curved supporting member and means for actuating the movable span, substantially as described.

2. In a bridge of the class described, the combination with a pier or abutment having a curved supporting-surface, of a bridge-span mounted thereon and adapted to swing or rock in a vertical plane, the said span having a substantially-straight carrying member a^3 in engagement with said curved supporting-surface, means for maintaining said span in its position upon the pier or abutment, and means for actuating the same, substantially as described.

3. In a rocking bascule-bridge, the combination with a non-pivoted rocking span, of a toothed actuating member g of irregular curvature rigidly secured thereto, a coacting gear h meshing therewith adapted to impart a rocking movement to the span, and means for operating said gear, substantially as described.

4. In a bascule-bridge, the combination with a shore abutment, of a curved supporting member provided thereon, a non-pivoted rocking bridge-span constructed with substantially-straight bottom chords, and means for maintaining the span in its plane of rotation upon said curved supporting member and for actuating the same to rock thereon, substantially as described.

5. In a rocking bascule-bridge, the combination with a straight-trussed bridge-span having a straight carrying member a^3, of an abutment provided with a curved supporting member b, both of said members being constructed with toothed engaging faces e f, and means for rocking the span upon its supporting member, substantially as described.

6. In a rocking bascule-bridge, the combination with a straight-trussed bridge-span having a straight carrying member a^3, of an abutment provided with a curved supporting member b, both of said members being constructed with toothed engaging faces e f, a toothed actuating member g rigidly secured to said span, a coacting gear h meshing therewith adapted to impart a rocking movement to the span, and means for operating said gear, substantially as described.

7. In a rocking bascule-bridge, the combination with a non-pivoted bridge-span having a curved surface upon which it is adapted to rock, of an actuating member g of irregular curvature secured to said span, and a coacting gear adapted to operate the same, said actuating member being shaped to secure its operative engagement with the gear in the different positions assumed by the rocking span, substantially as described.

8. In a rocking bascule-bridge, the combination with a non-pivoted bridge-span having a curved surface upon which it is adapted to rock, of an actuating member g independent of the supporting-surface whereon the span rocks, the said member being secured to the span, and a coacting gear adapted to operate the same, said actuating member being shaped to secure its operative engagement with the gear in the different positions assumed by the rocking span, substantially as described.

9. In a rocking bascule-bridge, the combination with a non-pivoted bridge-span, of a curved supporting part b upon which said span is adapted to be rocked, an actuating member g of irregular curvature secured to said span at its overhanging shore end beyond the curved supporting part b, and a coacting gear adapted to operate the same, said actuating member being shaped to secure its operative engagement with the gear in the different positions assumed by the rocking span, substantially as described.

10. In a rocking bascule-bridge, the combination with a non-pivoted bridge-span having a curved surface upon which it is adapted to be rocked, the supporting-surface for said span being fixed or stationary, of an actuating member g of irregular curvature secured to said span, and a coacting gear adapted to operate the same, said actuating member being shaped to secure its operative engagement with the gear in the different positions assumed by the rocking span, substantially as described.

In witness whereof I hereunto subscribe my name this 17th day of October, A. D. 1899.

FREDERICK G. VENT.

Witnesses:
C. F. VENT,
J. W. SKINKLE.