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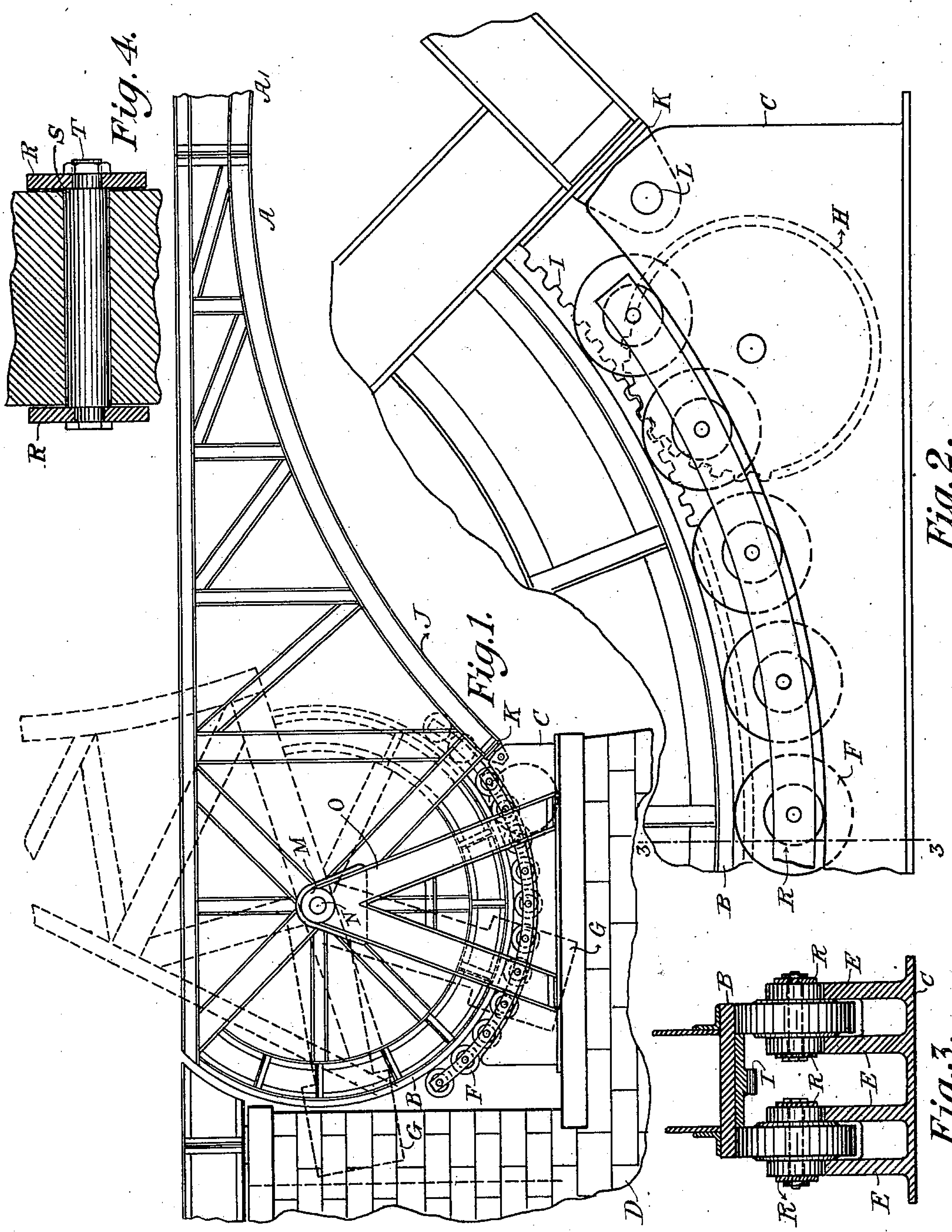
J. P. COWING.

BASCULE LIFT BRIDGE.

(Application filed Oct. 30, 1899.)

(No Model.)



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JOHN PHILO COWING, OF CLEVELAND, OHIO.

BASCULE LIFT-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 644,405, dated February 27, 1900.

Application filed October 30, 1899. Serial No. 735,336. (No model.)

To all whom it may concern:

Be it known that I, JOHN PHILO COWING, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and Improved Bascule Lift-Bridge, of which the following is a full description.

The object of the invention is to provide a new and improved bascule lift-bridge arranged to uniformly distribute the load on the bridge piers or abutments and to permit of conveniently opening and closing the bridge with comparatively little power, the bridge being at equilibrium at all angles of its throw and during the opening and closing of the bridge.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement arranged as an arched bridge. Fig. 2 is an enlarged sectional side elevation. Fig. 3 is an enlarged transverse section of the fulcrum end of the span and bearings therefor, the sections being on line 3 3 in Fig. 2. Fig. 4 is a sectional view of one of the rollers on line 3 3, showing pin T, with shoulder S.

The bascule-bridge illustrated in Fig. 1 is provided with two spans A and A′, meeting at the center and both alike in construction and forming an arch-bridge with two or more trusses, having a passage-way through or upon them, each span having its pier or fulcrum end formed with a segmental bearing-surface B, mounted in a cradle C, which is attached to the pier D. This cradle is provided with arc-shaped tracks or faces E, which are concentric with segmental bearing-surface B. Between the segmental bearing-surface B and the arc-shaped tracks E of the cradle C are interposed a series of antifriction-rollers F, constructed with two diameters, the greater bearing upon the bearing-surface B and the lesser bearing upon the cradle-tracks E. By means of the rollers having a large and small diameter the travel of the rollers in the cradle is short when the bridge is moved. The rollers are mounted between side bars R and roll freely upon pins T, having ends turned down, forming shoulders S, and provided with thread and nuts for firmly securing side bars to the pins, thus keeping the rollers the proper distance apart and supporting the said rollers when they roll past the ends of the cradle.

The fulcrum end of each span A and A′ is provided with a counterweight G, which is such as to substantially balance the span in any position, thus requiring only enough motive power to overcome friction, wind, and inertia.

In the cradle or at any other convenient place is a driving-pinion H, which is in mesh with a segmental gear-rack I, so that when the pinion H is rotated a rotary motion is imparted by the said pinions to the segmental gear-rack I to cause a swinging of the span either to an open or closed position, according to the direction in which the pinion H is turned. The pinion H is driven by a motive power preferably located on the pier D and under the control of the bridge-tender. Between the pinion H and the motive power suitable gears are used to regulate the time of opening and closing the bridge.

The construction of the mechanism for imparting a swinging motion to the span may be varied; but I prefer to use the rack and pinion.

In order to hold the segmental bearing-surface B in proper position on the rollers F, I provide a flange on the gear-rack I, which extends to the rollers to prevent lateral displacement of the bearing-surface on the rollers and to keep the span in proper alinement at all times.

The bottom chord J of the span A and A′ is adapted to rest at its shore end on a self-adjusting skewback K, attached to the cradle C. The adjustable skewback, being movable on the pin L, provides a means of giving an even bearing for the bottom chord J when the bridge is closed, thus transmitting the thrust of the same to the masonry through the cradle.

The fulcrum end of the span is preferably provided with an axle or trunnions N, turning in bearings M and located at the center of the segmental bearing-surface B. The bearings M are on frames O, attached to cradle E, or they may be attached to the pier D. These frames O are made very strong and take part of the live or moving load when the bridge is closed, thus relieving the rollers from any pounding which may be caused by sudden loading. When the bridge is open, the frames O serve as an anchorage to prevent the bridge from turning over from a wind or from inertia when the bridge is raised or lowered too fast and stopped suddenly.

It is expressly understood that in all cases the static or dead weight of the span is carried by the rollers in the cradle when the bridge is open; but when the bridge is closed the rollers carry only a small portion of the live load, as the principal strain incident to the live or moving load of the bridge is taken up by the skewbacks and transmitted to the piers, and the bridge is converted into a fixed bridge of arch, girder, or other type.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A revolving bascule-bridge, with a span having a segmental bearing-surface B, engaging a series of rollers F, resting in an arc-shaped cradle C, and supports for the ends of the span when the latter is closed, the supports being independent of the rollers, so that the latter is relieved of the strain from the live or moving load, and said strain is transmitted by said supports to the abutments or piers substantially as shown and described.

2. A revolving bascule-bridge, provided with two spans, each provided at its fulcrum end with a segmental bearing-surface, B, engaging a series of rollers, F, resting in a cradle, C; the free ends of the spans being adapted to abut one on the other when the bridge is closed, and a support for the fulcrum end of the span when the latter is closed, the support being independent of the said rollers substantially as shown and described.

3. A revolving bascule-bridge, provided with two spans, each having at its fulcrum end a segmental bearing-surface, B, engaging the rollers, F, resting in a cradle, C; the free ends of the span being adapted to abut one on the other, the spans forming an arch when the bridge is closed, and self-adjusting skewbacks, K, for the shore ends of the bottom chords or arch of the span substantially as shown and described.

4. A revolving bascule-bridge, provided with two spans, each having at its fulcrum end a segmental bearing-surface, B, engaging the rollers, F, resting in a cradle, C; the free ends of the spans being adapted to abut one on the other, the spans forming an arch when the bridge is closed, and self-adjusting skewbacks, K, for the shore ends of the bottom chords or arch of the span; said adjustable skewbacks forming a uniform bearing for the bottom chords, and also providing a stop for the span, to prevent the latter from assuming a position below the proper level when the bridge is closed, substantially as shown and described.

5. A revolving bascule-bridge, provided with a span having a segmental bearing-surface, B, in engagement with a series of antifriction-rollers, F, resting in a cradle, C, formed with arc-shaped tracks, E, a self-adjusting skewback for the end of the bottom chord of the span to rest on when the bridge is closed, and a foundation supporting both the said skewback and the said cradle, C, with rollers, F, and receiving the load of the bridge as well as the weight of the span, substantially as shown and described.

6. A revolving bascule-bridge provided with a span having a segmental bearing-surface, a series of antifriction-rollers, F, simultaneously engaged at their peripheral surfaces by the said segmental bearing-surface, B, a cradle, C, carrying the said rollers on arc-shaped tracks, E, and an adjustable skewback, K, attached to the said cradle, C, and adapted to be engaged by a part of the span when the bridge is closed, substantially as shown and described.

7. A revolving bascule-bridge provided with two spans, each having at its fulcrum end a segmental bearing-surface, B, a series of antifriction-rollers simultaneously engaged at their peripheral surfaces by the said segmental bearing-surface, B, a set of side bars, R, holding the rollers in position, a cradle, C, carrying said rollers on arc-shaped tracks, E, and an adjustable skewback, K, attached to the said cradle, C, and adapted to be engaged by the bottom chord, J, when the bridge is closed and forming an arch, substantially as shown and described.

8. A revolving bascule-bridge provided with a span having a segmental bearing-surface adapted to rest and roll on a series of antifriction-rollers in an arc-shaped cradle, and having a pin or trunnion through the axis of rotation resting on a frame O, which relieves the said rollers from any pounding which may be caused by the live or moving load; the pounding strain is transmitted by said frame to the abutments or piers, substantially as shown or described.

9. A revolving bascule-bridge provided with a span having a segmental bearing-surface, adapted to rest and roll on a series of antifriction-rollers in an arc-shaped cradle, and having a pin or trunnion through the axis of rotation resting on a frame, O, which anchors the span to the masonry, thus preventing the span being blown or otherwise turned over, substantially as shown and described.

10. A revolving bascule-bridge provided with two spans, each having at its fulcrum end a segmental bearing-surface, B, a series of antifriction-rollers simultaneously engaged at their peripheral surfaces by said segmental bearing-surface; a set of side bars, R, holding the rollers in position; a cradle, C, carrying said rollers on arc-shaped tracks, E;

a rack, I, engaging pinion, H, for opening and closing the span, and an adjustable skewback, K, attached to the said cradle, C, and adapted to be engaged by the bottom chord, J, when the bridge is closed and forming an arch, substantially as shown and described.

11. A revolving bascule-bridge having a span counterbalanced to be in equilibrium in any position, adapted to rest and roll on a series of antifriction-rollers, resting in a cradle carrying said rollers on arc-shaped tracks; the free ends of the span being adapted to abut one on the other, the spans forming an arch when the bridge is closed, and adjustable skewbacks for the shore ends of the bottom chord or arch of the span, substantially as shown and described.

12. A revolving bascule-bridge provided with a span having a segmental bearing-surface in engagement with a series of antifriction-rollers and having its fulcrum end provided with a counterweight to counterbalance the span at any angle of its throw, an adjustable skewback for the end of the bottom chord of the span to rest on when the bridge is closed, and forming an arch and an arc-shaped cradle supporting both the said skewback and the said rolling surface and receiving the load of the bridge as well as the weight of span and transmitting the same to the foundation, substantially as shown and described.

13. A revolving bascule-bridge having a span counterbalanced to be in equilibrium in any position, adapted to rest and roll on a series of antifriction-rollers, resting in a cradle carrying said rollers on arc-shaped tracks; the free ends of the span being adapted to abut one on the other, the spans forming an arch when the bridge is closed, and adjustable skewbacks for the shore ends of the bottom chords of the span, and a segmental gear-rack attached to the segmental bearing-surface, a pinion for imparting a swinging motion to span, substantially as shown and described.

14. A revolving bascule-bridge having a span counterbalanced to be in equilibrium in any position, having a segmental bearing-surface adapted to rest and roll on a series of antifriction-rollers, resting on arc-shaped tracks, a segmental gear-rack attached to the said segmental bearing-surface, said gear-rack having flanges bearing against the rollers preventing sidewise displacement; the free ends of the bridge being adapted to abut one on the other, the spans forming an arch when closed and adjustable skewbacks for the shore ends of the bottom chord or arch of the span, substantially as shown and described.

15. A revolving bascule-bridge having a span counterbalanced to be in equilibrium in any position, having at its fulcrum end a segmental bearing-surface, a series of antifriction-rollers, said rollers having two diameters, the larger diameter engaging the said segmental bearing-surface, and the smaller diameter engaging the arc-shaped tracks of the cradle; the rollers being provided with side bars holding the rollers in position, a cradle carrying said rollers on arc-shaped tracks, a gear-rack, I, engaging a pinion, H, which is geared to the motor for opening and closing the span, and an adjustable skewback, K, attached to the said cradle and adapted to be engaged by the bottom chord when the bridge is closed and forming an arch, substantially as shown and described.

16. A revolving bascule-bridge having a span counterweighted to be in equilibrium in any position and provided at its fulcrum end with a segmental bearing-surface, adapted to rest and roll on a series of antifriction-rollers, said rollers mounted to revolve freely on shouldered pins fastened to side bars which hold the rollers in position, a cradle having arc-shaped tracks for supporting said rollers, a rack attached to the said segmental bearing-surface, a pinion for imparting a swinging motion to the said span, a frame, O, for taking the live or moving load when the bridge is closed and forming an arch, substantially as shown and described.

17. A revolving bascule-bridge having a span counterbalanced to be in equilibrium in any position, adapted to rest and roll on a series of antifriction-rollers; said rollers having two diameters, the larger diameter engaging the said segmental bearing-surface, and the smaller diameter engaging the arc-shaped tracks of the cradle; the rollers mounted to revolve freely on pins, T, fastened to side bars, R, which hold the rollers in position; a cradle carrying said rollers on arc-shaped tracks; the free ends of the span being adapted to abut one on the other, the span forming an arch when the bridge is closed, and an adjustable skewback for the shore ends of the bottom chords of the span, and a segmental gear-rack attached to the segmental bearing-surface, a pinion for imparting a swinging motion to the span, substantially as shown and described.

18. A revolving bascule-bridge having a movable span provided at its fulcrum end with a segmental bearing-surface adapted to rest and roll on a series of antifriction-rollers in a cradle having arc-shaped tracks; a rack on said segmental bearing-surface, said rack being provided with a flange which bears against the rollers; a pinion for imparting a swinging motion to the span; a frame, O, for taking the live or moving load when the bridge is closed and forming an arch, substantially as shown and described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN PHILO COWING.

Witnesses:
A. H. PORTER,
F. M. SEDGWICK.