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J. P. COWING.

BASCULE BRIDGE.

(Application filed Mar. 19, 1900.)

(No Model.)

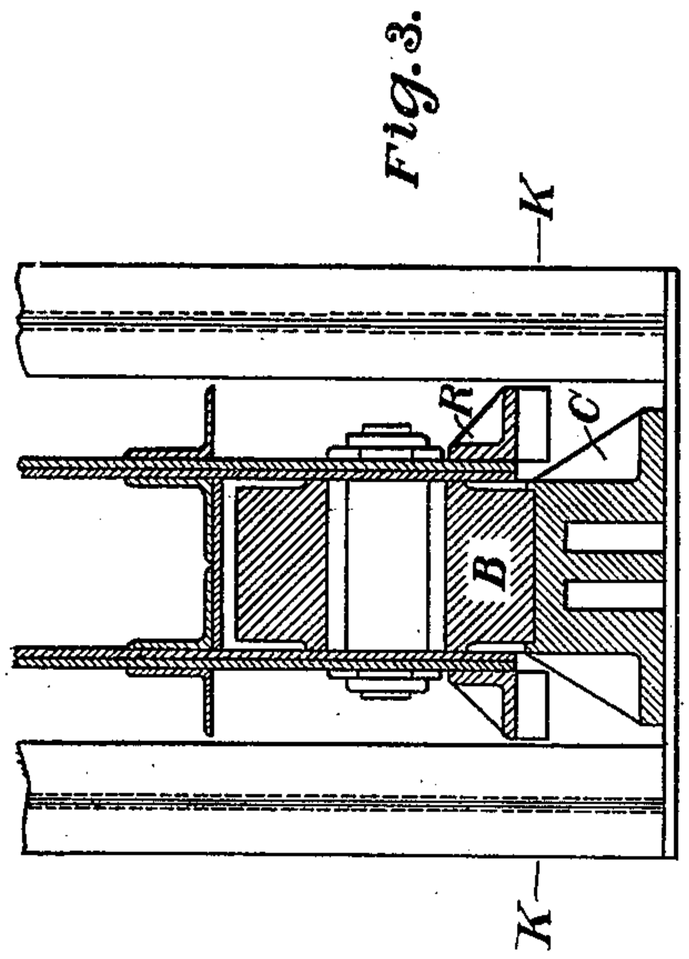

Fig. 3.

Fig. 1.

Fig. 2.

WITNESSES.

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JOHN PHILO COWING, OF CLEVELAND, OHIO.

BASCULE-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 665,405, dated January 8, 1901.

Application filed March 19, 1900. Serial No. 9,233. (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, clear, and exact description.

The object of the invention is to provide a new and improved bascule lift-bridge arranged to uniformly load the bridge piers or abutments and to permit of conveniently opening and closing the bridge with comparatively little power, the bridge being in 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 then 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 double-span bridge. Fig. 2 is an enlarged sectional side elevation, showing rollers, track, and rack. Fig. 3 is a section taken on line 2 2, showing rollers, track, and rack.

The bascule lift-bridge illustrated in Fig. 1 is provided with two spans A and A′, meeting in the center and both alike in construction, each span having its pier or fulcrum end formed by circular girders having a series of rollers mounted on journals, so as to form a circular roller-bearing surface which is adapted to roll and rest in a cradle C, having curved tracks or faces concentric with the axis of the span.

On a convenient part of the circular girders or fulcrum end is placed one or more segmental-gear racks. In this case I have shown one gear-rack R on either side fastened to the circular girder or fulcrum end. Pinion P, is in mesh with the rack R, so that when the pinion P is rotated a rotary or swinging motion is imparted by the said pinion to the segmental-gear racks R to cause a swinging of the span either into an open or closed position, according to the direction in which the pinions P are turned. Pinion P is in mesh with pinion P′, which is secured to a shaft and is rotated by a train of gears driven by a motor which is preferably located on the pier F and under the control of the bridge-tender. Any suitable gearing between pinions P and motor may be employed.

In order to hold the span in proper position and to prevent lateral displacement, the curved track of the cradle is provided with a flange which extends over the end faces of the rollers to keep the span at all times in proper alinement across the stream.

The fulcrum end of each span A and A′ is provided with a counterweight E. The counterweight is equally disposed above and below the line of the center of gravity, and the center of gravity of the counterweight mass is equidistant from any point on the circular roller-bearing surface.

By the construction described the span when unrestrained by a load will rest in equilibrium at any point of its throw and the center of gravity does not change position at any time during the opening and closing of the bridge, and consequently it requires but little power to open or close the bridge

For very long spans the counterweight is extended beyond the circular roller-bearing surface; but for short spans the counterweight is confined within the circular girders of the fulcrum end of the span. In order to extend the counterweight beyond the circular girders, it is necessary to properly extend some of the beams of the spans to carry the said weight between the trusses and the circular girders,so that the counterweight clears the curved tracks, sufficient space being provided on the pier or abutment for the free passage of the weight when it is swung into an open position or back into a closing position. This space may be provided by a well or recess in the pier or by using two spaced piers.

The bottom chord G of the span A or A′ is adapted to rest at its shore end on a skew-back H, which is formed by extending the cradle out and forming a rest for the end of the said bottom chord G. The fulcrum end of the span is preferably provided with an axle or trunnion I and located at the center of the circular roller-bearing surface and which is also the center of gravity of the span. This axle or trunnion I rests in bearings N,

which are attached to frames K, which are attached to the foundation, or they may be attached to the cradle. By the said frames being securely fastened to the foundation they form an anchorage for the span and prevent the span from being blown or otherwise turned over.

For single-span bridges used on canals and other narrow waterways the span when closed becomes substantially fixed by placing a shoe at M and providing a masonry support for same.

It is expressly understood that in all cases the static or dead weight of the span is carried by the circular roller-bearing surface when the bridge is open. The roller-bearing surface carries 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, shoes, or other supports and transmitted to the abutments or piers and the bridge is converted into a fixed bridge of arch, girder, or other type.

The motive power for opening and closing the bridge, as shown, is located on the piers supporting the spans, thus making the bridge self-contained and without requiring any approach-spans upon which to locate the motive power or to act as an anchorage to pull and push against when opening or closing the bridge. I do not limit myself to this peculiar form of driving-gear, as it is evident that a swinging motion may be given to each span by many different mechanisms. The skewback H further forms a stop for the span to prevent the same from dropping below a certain level and to insure a perfect level of both spans when the bridge is closed.

It is plainly evident that different types of bridges may be provided with the improvement and that it may be greatly varied according to the river, stream, or the like to be spanned.

The principal feature of my improvement lies in a bascule lift-bridge having its pivotal or fulcrum end bounded by a circular roller-bearing surface formed by mounting a series of rollers in the pivotal or fulcrum end of the span and the same being adapted to rest and roll in a cradle having arc-shaped tracks and being provided with a rack and pinion for giving a swinging motion to the bridge, and by having a skewback for arch-spans the load is distributed over the foundations.

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

1. A revolving bascule-bridge, the combination of the lifting-span having its fulcrum end formed by circular girders having a series of rollers mounted on journals fixed in said circular girders so as to form a circular roller-bearing surface, and an arc-shaped track or cradle concentric with the circular roller-bearing surface, in which the said circular roller-bearing surface rests and turns, substantially as shown and described.

2. A revolving bascule-bridge provided with two spans, each having the fulcrum ends formed by circular girders having a series of rollers mounted on journals fixed in said circular girders so as to form a circular roller-bearing surface and to rest and turn in a cradle, 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 skewbacks for the shore end of the bottom chord or arch of the span, substantially as shown and described.

3. A revolving bascule-bridge provided with two spans each provided at the fulcrum ends with circular girders having a series of rollers mounted on journals fixed in said circular girders so as to form a circular roller-bearing surface, resting in a cradle, the free ends of the span being adapted to abut one on the other when the bridge is closed, and a support for the fulcrum end of the span, substantially as shown and described.

4. A revolving bascule-bridge provided with two spans, each provided at its fulcrum end with circular girders having a series of rollers mounted on journals fixed in the said circular girders so as to form a circular roller-bearing surface, and resting in a cradle, 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 skewbacks for the shore ends of the bottom chords or arch of the span, said skewbacks forming 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 its fulcrum end formed by circular girders having a series of rollers mounted on journals fixed in the said circular girders so as to form a circular roller-bearing surface resting in a cradle formed with arc-shaped tracks, a 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 cradle, 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 its fulcrum end formed by circular girders having a series of rollers mounted on journals fixed in the said circular girders so as to form a circular roller-bearing surface, a cradle engaging the peripheral surfaces of said rollers on arc-shaped tracks, and skewbacks 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 a span having its fulcrum formed by circular girders having a series of rollers mounted on journals fixed in said circular girders so as to form a circular roller-bearing surface adapted to rest and roll in a cradle with arc-

shaped tracks, and having a rack or racks on said circular girders engaging a driving-pinion which imparts a swinging motion to the span, substantially as shown and described.

8. A revolving bascule-bridge provided with a span having a series of rollers mounted on journals fixed in the fulcrum end so as to form a circular roller-bearing surface adapted to rest and roll in a cradle with arc-shaped tracks and having a pin or trunnion through the axis of rotation resting in a frame which anchors the span to the foundation, preventing the span being blown over or otherwise overturned, substantially as shown and described.

9. A revolving bascule-bridge provided with a span having its fulcrum end formed by mounting a series of rollers on journals fixed in the said fulcrum end so as to form a circular roller-bearing surface, adapted to rest and roll in a cradle having arc-shaped tracks, and having its fulcrum end provided with a counterweight to counterbalance the span at any angle of its throw, and a skewback for the end of the bottom chord of the span to rest on when the bridge is closed, and forming an arch, and said cradle supporting both the skewback and the said circular roller-bearing surface, and receiving the load of the bridge as well as the weight of the span and transmitting the same to the foundation, substantially as shown and described.

10. A revolving bascule-bridge provided with a span having its fulcrum end formed by mounting a series of rollers on journals fixed in the said fulcrum end so as to form a circular roller-bearing surface, adapted to rest and roll in a cradle having arc-shaped tracks, the span being counterbalanced to be in equilibrium in any position, 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 skewbacks for the shore ends of the bottom chords of the span, and a segmental-gear rack attached to the fulcrum end of the span, a pinion for imparting a swinging motion to the span, substantially as shown and described.

11. A revolving bascule-bridge provided with a span having its fulcrum end formed by mounting a series of rollers on journals fixed in the said fulcrum end so as to form a circular roller-bearing surface, adapted to rest and roll in a cradle having arc-shaped tracks, the said cradle having flanges which bear against the sides of said rollers and thus prevent any lateral displacement, substantially as shown and described.

12. A revolving bascule-bridge provided with a span having its fulcrum end formed by mounting a series of rollers on journals fixed in the said fulcrum end so as to form a circular roller-bearing surface, adapted to rest and roll in a cradle having arc-shaped tracks, a counterweight to counterbalance the span in any position, a skewback for the shore end of the bottom chord to rest against when the bridge is closed and forming an arch, a frame for anchoring said span to the foundations, a rack attached to the fulcrum end of the span, and a pinion for imparting a swinging motion to the span, substantially as shown and described.

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Witnesses:
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