F. J. BENNI.

BASCULE BRIDGE.

APPLICATION FILED FEB. 20, 1911.

1,048,440.

Patented Dec. 24, 1912.

3 SHEETS—SHEET 1.

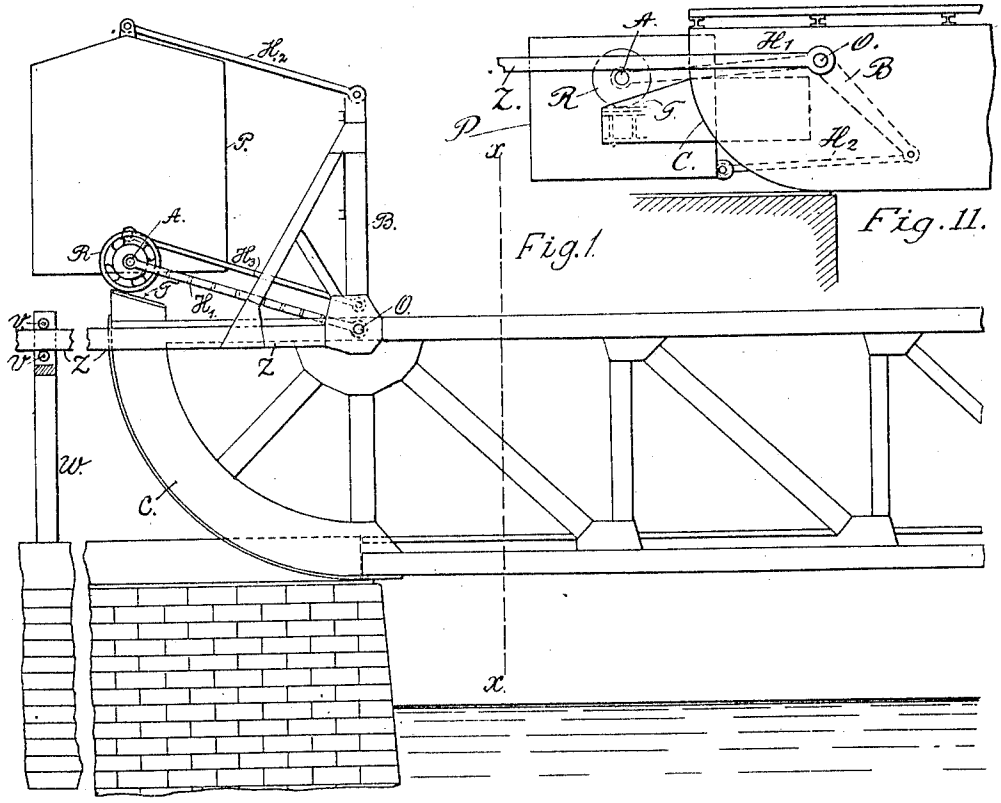
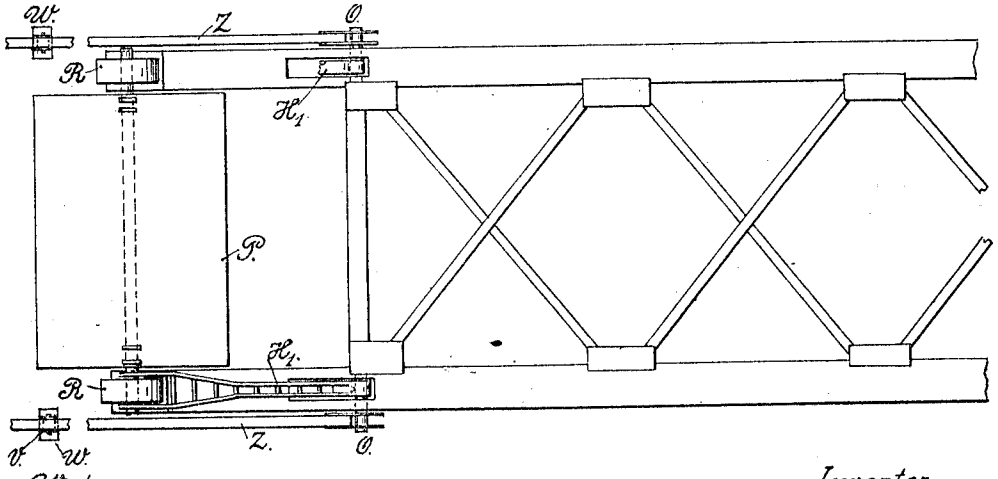


Fig. 1.

Fig. 11.

Fig. 2.



Witnesses:

Wacław Franicki

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3 SHEETS—SHEET 2.

Fig. 3.

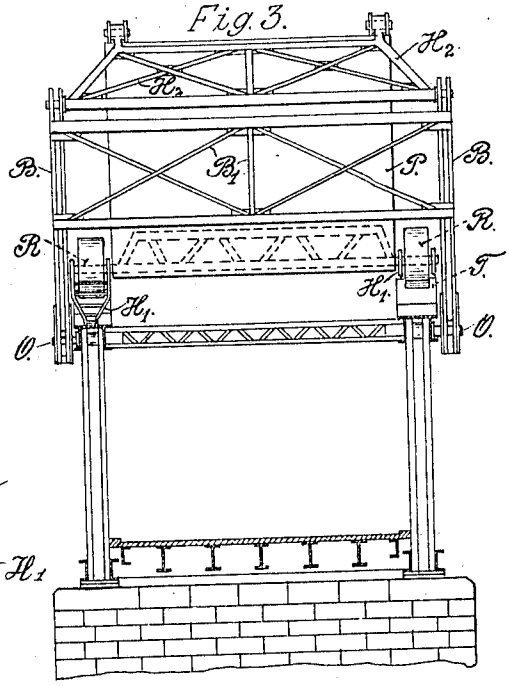

Fig. 10.

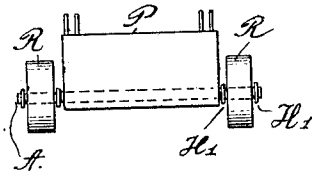

Fig. 12.

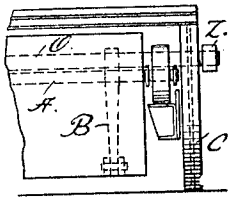

Fig. 4.

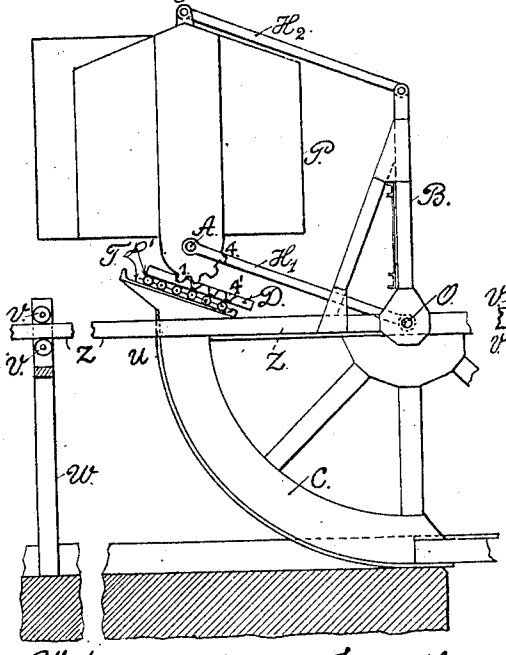

Fig. 5.

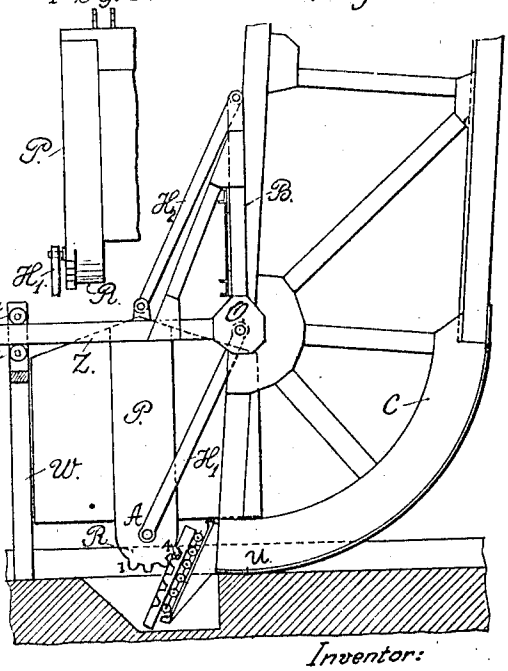

Fig. 6.

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3 SHEETS—SHEET 3.

Fig. 7

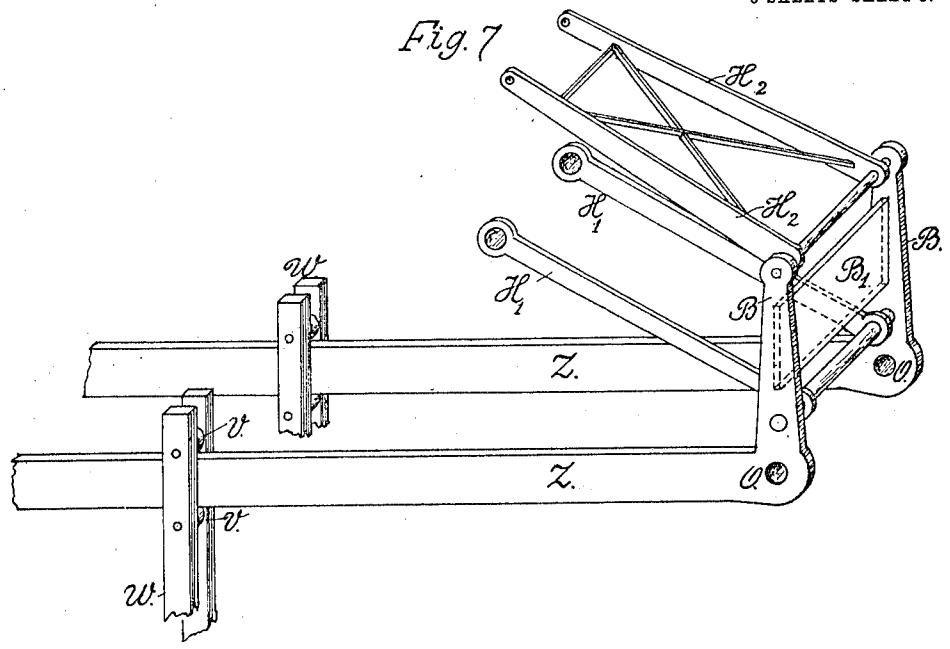
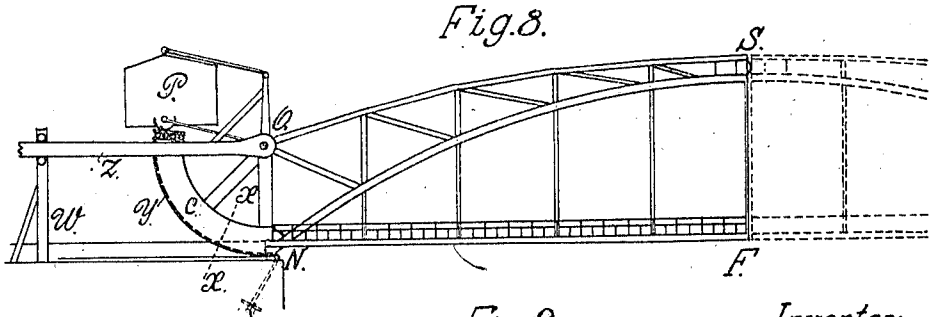


Fig. 8.

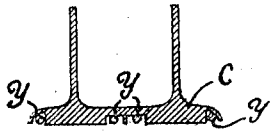


Witnesses:

Nastaw Iwanicki

Nastaw Frysztak

Fig. 9.



Inventor:

Felix John Benni

UNITED STATES PATENT OFFICE.

FELIX JOHN BENNI, OF ST. PETERSBURG, RUSSIA.

BASCULE-BRIDGE.

1,048,440. Specification of Letters Patent. Patented Dec. 24, 1912.

Application filed February 20, 1911. Serial No. 609,770.

To all whom it may concern:

Be it known that I, FELIX JOHN BENNI, a citizen of Russia, residing at St. Petersburg, Russia, have invented certain new and useful Improvements in Bascule-Bridges, of which the following is a specification.

My invention relates to improvements in lift bridges of that class known as "bascule-bridges", in which the bridge is opened and closed by a circular vertical movement of the span or spans and has to do more particularly with the structure and arrangement of their counter-weights.

The object of my invention is to provide a bridge of the class described in which each span can be easily and conveniently rotated from a horizontal to a vertical position and in which the counter-weight is supported and guided in such manner as to insure a perfect balance of the bridge throughout the operation.

To this end my invention consists in the features of construction, combination and arrangement of parts hereinafter described and claimed.

That the description may be more clearly understood reference may be had to the accompanying drawings in which like parts are indicated by similar letters of reference.

Figure 1 is a side elevation of a rolling bascule bridge with parts omitted. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a section taken on the line X—X through Fig. 1. Fig. 4 is a rolling bascule bridge with a counterweight of different form. Fig. 5 is a side view shown in part, of the counter-weight shown in Fig. 4. Fig. 6 is a view of the bridge in an open position. Fig. 7 shows the guiding structure to be used for guiding the counter-weight of a rolling bascule bridge. Fig. 8 shows a rolling bascule arch bridge. Fig. 9 shows a section on line X—X of Fig. 8. Fig. 10 is a side elevation of a modified form of the counter-weight with its rollers; Fig. 11 is a modified form of the invention shown in elevation, in which the counterweight is placed below the floor of the bridge; Fig. 12 is an end view of Fig. 11.

The bridge consists of a long part, spanning the water-way, and a short end formed with arc-shaped girders C which bear on the forward edge of the pier when the bridge is closed (see Fig. 1) in its normal position. Bearing on plates T provided at the ends of the girders C which are uppermost when the bridge is in a closed position is a counter-weight P. This counter-weight consists of a main body P and cylindrical rollers R mounted upon an axle running horizontally through P. It is held in position by two sets of parallel bars H_1 and H_2 which are pivotally secured to a frame work Z B formed of horizontal bars Z and their upright extensions B (Fig. 7). This guiding frame is in turn pivotally connected to the short end of the bridge as shown at O, which is the center of the curve of girders C (Fig. 1). The horizontal bars Z are guided in horizontal line between rollers V mounted on the uprights W secured to the pier. When a pulling force is exerted on the guiding-bar Z, the short end of the bridge rolls backwardly along the surface of the pier on the arc-shaped girders C and the spans assume a vertical position. During this operation the counter-weight provided with the antifrictional rollers R acts by its weight, bearing constantly on the plates T and is so guided by the two pairs of parallel bars H_1 and H_2 as to move always parallel to its original position, thus insuring a condition of absolute balance of the bridge and its parts. It is to be noted that during this operation the pivotal point O moves rearwardly in a horizontal line, while the counter-weight descends toward the surface of the pier.

The invention is not limited to the exact and simple form of counter-weight construction, but is intended to cover various modifications of an absolutely balanced bridge. The proportions, form or position of the counter-weight may vary according to the different conditions to meet the requirements of architecture or economy that go therewith. For example, the counter-weight might be placed more to one side of a vertical through the axis of the cylinder R. (See Fig. 4). The struts H_1 need not necessarily be mounted at O, but may be connected anywhere along the uprights B (Fig. 1) provided the counter-weight is maintained in a position parallel to the one herein described.

One modification of the structure of the counter-weight is shown in Figs. 4, 5 and 6. In this case the parts R are made in fixed connection with P, and plates D mounted on rollers or rockers D′ are used between the cylindrical parts R of the counter-weight

and the seat T. The plates D move by means of the rollers on the seat T, but only a rolling movement is allowed between cylinders R and the plates D; for this purpose teeth are arranged at the side of R and the upper face of D is provided with corresponding grooves or sockets. When the bridge is closed, tooth member I registers with the corresponding groove at the outer edge of the plate D, and when the bridge is open tooth 4 registers with the groove 4'. The operation otherwise is the same for this construction as in the preceding one.

Figs. 11 and 12 show a modification in which the seats T are not made in connection with the arc-shaped girders C but are placed on special cross-girders or shelves F secured to the short end of the bridge. In this case, however, the guiding arrangement is somewhat changed, struts B and Z being put in different planes.

Fig. 8 is still another modification in which a pair of flexible tension members Y are employed to take up the horizontal thrust of the arch when in a closed position, and the counter-weights have been removed from their seats. These tension members have one end anchored in the masonry, but at the point N they bend so as to be tightly drawn over the sector C fitting into grooves made therein and secured at their upper end. In this way the full horizontal thrust of the arch bridge is taken up by said tension members when the bridge is closed, and when the bridge opens said tension members lie flat on the horizontal girders in such a way as not to hinder the rolling motion of the girders C.

Having now fully described my invention what I claim is:

1. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight movably adapted to bear upon the short end of the bridge, a pair of parallel links pivotally connected to the top of said counterweight, a similar pair of parallel links pivotally connected to the bottom of said counterweight, and a guiding frame connected with the short end of the bridge, having two parallel uprights, to which said pairs of parallel links are connected, and having a pair of horizontal parallel bars guided by supports mounted on the bridge, as and for the purpose specified.

2. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight provided with antifrictional sliding means, seats provided on the rolling girders of the short end of the bridge upon which said sliding means bear and guiding means for same, as and for the purpose specified.

3. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight, movably adapted to bear upon the short end of the bridge, means for supporting same, means for guiding same, and means for taking up the horizontal thrust of the bridge when in a closed position consisting of a flexible tension member.

4. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight movably adapted to bear upon, yet not connected with the short end of the bridge, means for supporting and means for guiding same, and means for taking up the horizontal thrust of the bridge when in a closed position consisting of flexible tension members, connected at one end to the short end of the bridge and at the other permanently anchored in the masonry of the base, substantially as described.

5. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight movably adapted to bear upon the short end of the bridge, means for supporting and means for guiding said counterweight, and flexible tension members connected at one end to the rolling girders of the short end of the bridge and at the other permanently anchored in the masonry of the abutments, said flexible tension member lying in grooves provided in the roller girders, when the bridge is in closed position, substantially as described.

6. In combination with the rolling part of a bascule bridge of the type herein specified, a counterweight, means for supporting and guiding same, and flexible tension members fastened at one end to the roller girders of said bridge and at the other permanently secured to the masonry of the base, said members lying in grooves provided in the roller girders when the bridge is in closed position and designed to lie flat along the horizontal beam of the pier when the bridge is in open position, substantially as described.

7. A bascule bridge having an end formed on a curve struck from the point O as a center, and adapted to rest and turn on the pier, a pair of pull bars carrying posts, and pivoted to the bridge at the center of the curved end, a counterweight arranged to rest on the curved end of the bridge, and pivotal guiding connections between the said counterweight and the post, substantially as described.

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Witnesses:
WACTAW FRANICKI,
WACTAW PRYFKE.