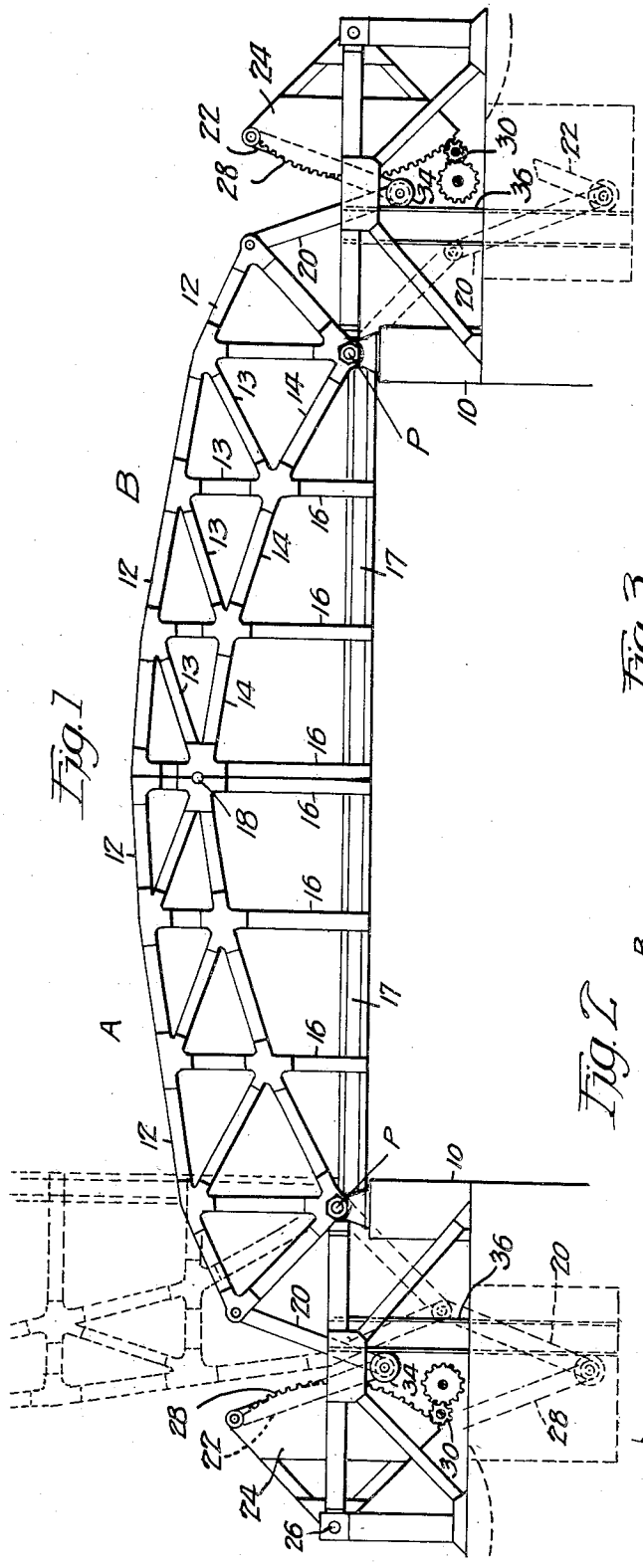
H. A. F. ABT.

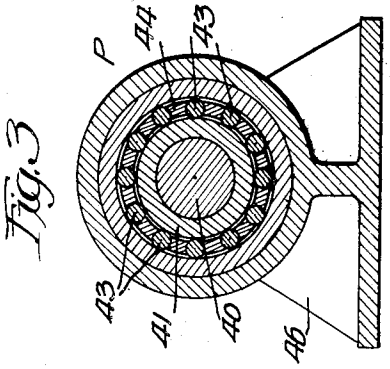
BASCULE BRIDGE.

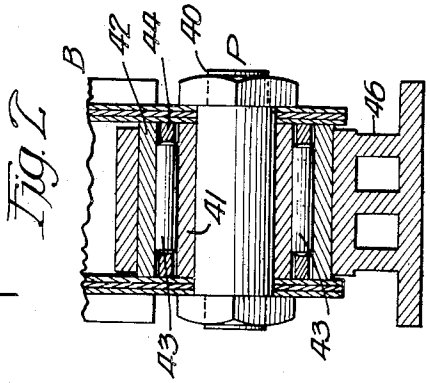
APPLICATION FILED DEC. 27, 1920.

1,412,327.

Patented Apr. 11, 1922.







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UNITED STATES PATENT OFFICE.

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BASCULE BRIDGE.

1,412,327. Specification of Letters Patent. Patented Apr. 11, 1922.

Application filed December 27, 1920. Serial No. 433,083.

To all whom it may concern:

Be it known that I, HUGO A. F. ABT, 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 Bascule Bridges, of which the following is a specification.

My invention relates to bascule bridges, and the object is to provide a counterweighted bridge in which the actuating mechanism will occupy such position and be so disposed as to be below and out of the way of the roadway and main parts of the structure. Another object is to accomplish the first object in such manner that the counterweight will counterbalance the bridge proper in all positions of the latter.

I obtain my objects by the construction illustrated in the accompanying drawings in which—

Figure 1 is an assembly view in side elevation of the complete structure.

Figure 2 is a longitudinal sectional view of the bearing which I employ.

Figure 3 is a cross sectional view of the bearing.

Like numerals denote like parts throughout the several views.

The bridge consists of two leaves indicated in general by A and B. These leaves are supported upon stationary pivots P, the detailed construction of which is shown in Figures 2 and 3. These pivots or bearings are supported upon piers 10.

The bridge operates upon the arch principle, and while the particular design may be varied, in the present case I have illustrated the arches in the form of trusses having upper members 12 and lower members 14 secured together by suitable braces 13. Depending from these trusses are suspension members 16 which support a roadway 17. The trusses are located chiefly above their supporting pivots and when the bridge is in acting position, with the leaves lowered, the forward ends of the trusses abut each other, each resisting the pressure exerted by the other, and thus operating after the manner of an arch. By preference the thrust instead of being distributed over the entire abutting surfaces is preferably concentrated upon a cylindrical boss or pin 18 located between the proximate ends of the leaves as shown in Figure 1.

The bridge leaves are operated by links 20 pivotally attached to the leaves at points located to the rear of the pivots P. These links are connected at their free lower ends to links 22 which are pivotally connected to counterweights 24 by which they are operated. These counterweights are mounted upon stationary pivots 26 and occupy a position between the two pivots 26, P. The counterweights are provided with circular racks or segmental gears 28 driven by pinions 30. These pinions are rotated by any suitable form of power device. The links 20, 22 are pivotally connected together at their lower ends where they are provided with antifriction rollers 34 adapted to travel upon tracks 36. These tracks are here shown in the form of vertical I beams.

By preference the pivots P and all of the other pivots in the structure having small angular motion are constructed in the manner shown in Figures 2 and 3. A pin 40 carries the weight of the bridge leaf and is encircled by a sleeve or inner roller race 41 enclosed within an outer sleeve or race 42. Between these two elements are interposed rollers 43 separated by spacers 44. The outer sleeve 42 is mounted in a pillow block 46 which rests upon the pier 10. The advantage of this roller bearing is that it permits complete and continuous lubrication of the bearings. In practice, the interstitial spaces of the bearing are packed with grease around the entire circumference of the bearing and hence the bearing is lubricated completely at all points. This is of great importance for it will be remembered that the leaf of a bascule bridge never rotates more than 90° or thereabouts. It will also be remembered that on account of the great weight of the ordinary bridge leaf and the necessarily small surface provided for carrying that weight, the pressure per square inch on the bearing is very great, and in ordinary bearings the lubricant is soon forced out of the bearing. Furthermore, there is not enough angular movement to distribute the lubricant even when it is first introduced. In my type of bearing, however, there are always interstitial spaces between the various parts of the bearing, especially around the rollers, and hence, the pressure no matter how great, cannot force all of the lubricant out of the bearing. Furthermore, the rollers pick up the lubricant and by adhesion bring it to the point where the load is carried.

In operation, when the bridge is in use with the leaves lowered, the forward ends

of the arched trusses will abut each other, thus mutually supporting each other about their pivots P. The counterweights are so adjusted as to accurately counterbalance the bridge leaf or what may be termed the "dead load" of the bridge. Thus when there is no live load on the bridge there will be no horizontal stresses on the supporting pivots P. The weight of the live load, however, will be absorbed by the abutting ends of the arch shaped trusses of the bridge leaves, thus relieving the power device of any strain. In other words, in my structure when the bridge leaves are lowered there is no need for the power device to exert any influence upon the structure for the latter will be supported by its own natural formation.

As the counterweights are located to the rear of the bridge leaf it follows that when the pinions 30 are rotated in a direction to lower the counterweights and attached links 22, the anti-friction roller 34 will be thrust against the guides 36 and hence keep in close contact with them at all times. The raising and lowering of the counterweights will raise and lower the bridge leaves although each counter weight will rotate in a counter direction to its companion bridge leaf. It will be noted that the links 20 and 22 always make equal angles with the line of travel of the axis of the roller 34. The result is that the effective moment of the counterweight bears a constant ratio to the effective moment of the bridge leaf and the latter is therefore uniformly counterbalanced in all positions.

In a copending application filed August 11, 1920, Serial No. 402,837 I have shown a bascule bridge having counterweights located above the roadway sufficiently to clear vehicular traffic at all times. In the present case, I present the solution of a problem in which the counterweights are distributed at the side of the roadway and the power device and operating elements are depressed below the level of the roadway. It will be observed that according to the illustrated design, the anti-friction rollers 34 are always below the level of the roadway and that the power device 30 is also depressed and hence out of the way.

It will also be noted that in my present case the power is applied to the counterweight and that the power is transmitted from the counterweight to the bridge leaf through the agency of two rigid links, the connected ends whereof exert a thrust in a horizontal direction against a vertical abutment along which they travel. It is this which makes possible the placing of the counterweight at a low level and the placing of the connecting links also at a low level and where they will be out of the way of the main structure.

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

1. A bascule bridge having a bridge leaf, a stationary pivot for supporting it, a link attached to the bridge leaf at a point to the rear of the pivot, an approximately vertical guide located to the rear of the pivot, the free end of the link being adapted to travel along said guide, and means for forcing the free end of the link downward along the guide to thereby raise the forward end of the bridge leaf.

2. A bascule bridge having a stationary pivot, a bridge leaf mounted thereon, a counterweight, a stationary pivot for supporting the counterweight at a point remote from the bridge supporting pivot, a linkwork connecting the counterweight and the bridge leaf to force them to rotate always in counter directions around the pivots, said linkwork being rigid whereby it is effective both in pushing and pulling, and a power device applied to the counterweight for rotating it and thereby rotating the bridge leaf.

3. A bascule bridge having a stationary pivot, a counterweight having a stationary pivot, the bridge leaf and counterweight being adapted to rotate in opposite directions about their respective pivots, a vertical track located between the two pivots, a roller adapted to travel vertically along the track, and two stiff links, one connecting the roller to the counterweight and the other connecting the roller to the bridge leaf, said links maintaining at all times equal angles with a vertical line drawn through the center of said roller, and means for actuating said links.

4. A bascule bridge having a stationary pivot, a counterweight having a stationary pivot, the bridge leaf and counterweight being adapted to rotate in opposite directions about their respective pivots, a vertical track located between the two pivots, a roller adapted to travel vertically along the track, and two stiff links, one connecting the roller to the counterweight and the other connecting the roller to the bridge leaf, said links maintaining at all times equal angles with a vertical line drawn through the center of said roller, and a power device applied to the counterweight for actuating it and the links.

In witness whereof, I have hereunto subscribed my name.

HUGO A. F. ABT.