A. H. SCHERZER.

BASCULE BRIDGE.

APPLICATION FILED JULY 30, 1907.

1,021,488.

Patented Mar. 26, 1912.

2 SHEETS—SHEET 1.

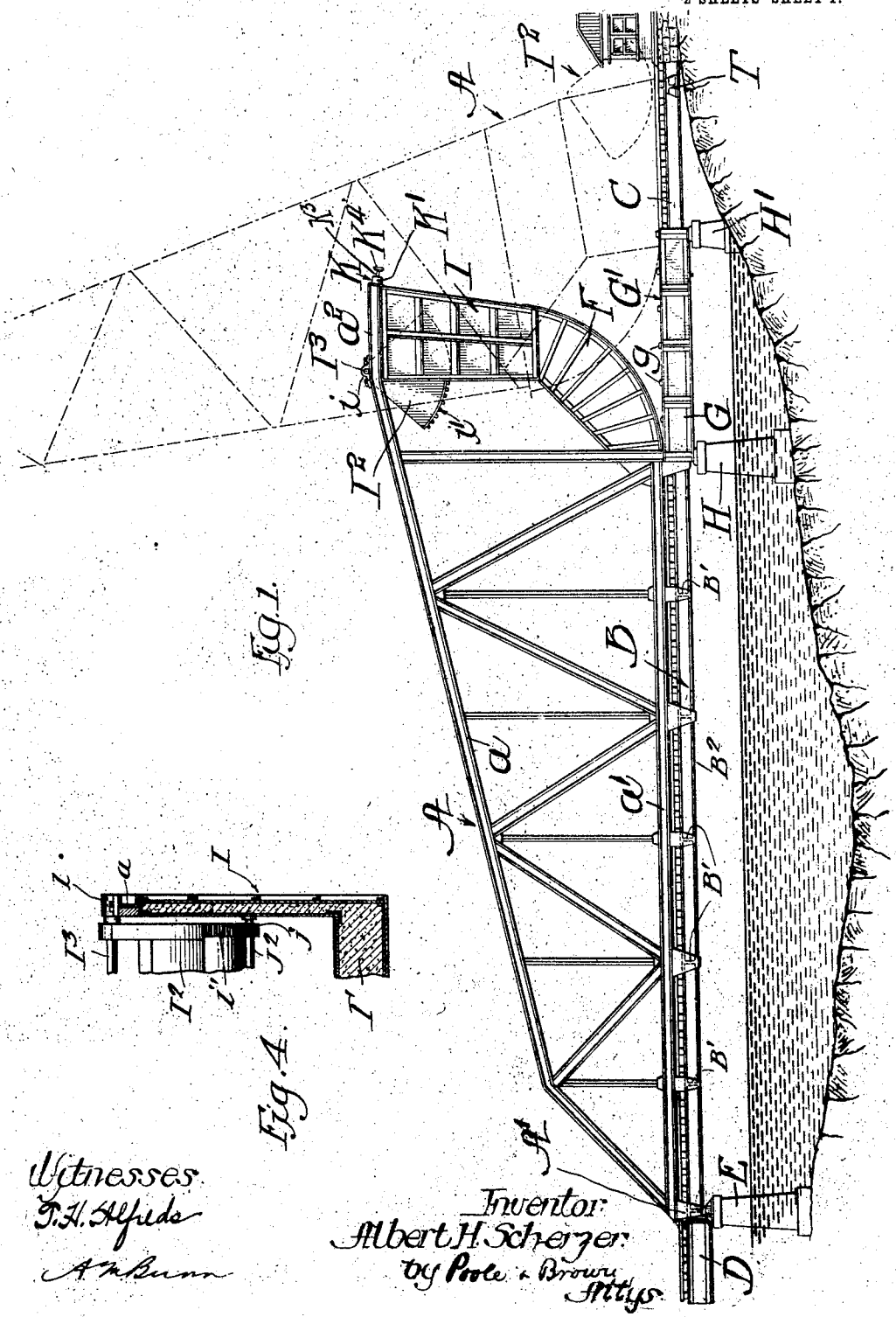

Fig. 1.

Fig. 4.

Witnesses.
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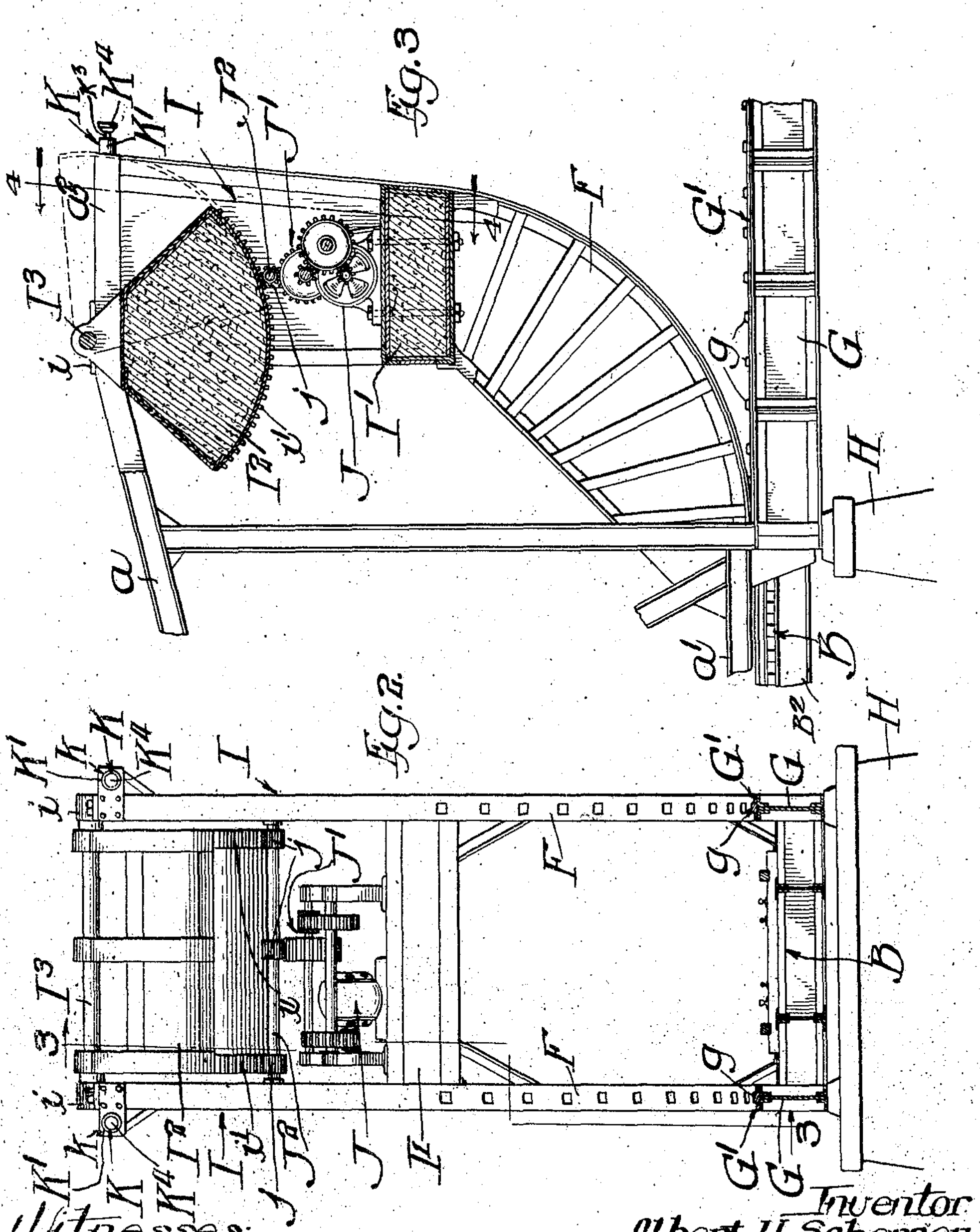

Fig. 3

Fig. 2

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UNITED STATES PATENT OFFICE.

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BASCULE-BRIDGE.

1,021,488. Specification of Letters Patent. Patented Mar. 26, 1912.

Application filed July 30, 1907. Serial No. 386,254.

To all whom it may concern:

Be it known that I, ALBERT H. SCHERZER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bascule-Bridges; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in bascule or lift bridges of that kind wherein the bridge is opened and closed by the swinging movement of a movable span or leaf in a vertical plane, and refers more specifically to an improved means for counterbalancing the movable bridge span and operating the said span to open and close the same.

My improvements are shown in the accompanying drawings as applied to that type of bascule bridge known in the art as a "rolling lift bridge," or one in which the swinging span is provided with rolling segments resting on stationary tracks or supports, but certain of the improvements may be adapted also to other types of bascule bridges. The bridge illustrated in said drawings is a single leaf bridge wherein the single leaf spans the space between the abutments or supporting piers, and while certain of my improvements are adapted to this type of bridge others may be as well applied to a double leaf bridge.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings: Figure 1 is a side elevation of a bascule bridge embodying my invention. Fig. 2 is a rear end view thereof, showing the span or supporting girders in section. Fig. 3 is a vertical section taken on line 3—3 of Fig. 2. Fig. 4 is a detail section taken on line 4—4 of Fig. 3.

As shown in the drawings, A designates, as a whole, the single span or leaf of the bridge, embracing longitudinal side trusses having upper and lower chords a, a^1, and a floor frame B located at or below the level of the lower chords of said trusses. The bridge illustrated is a railway bridge and the floor frame thereof embraces transverse beams B^1 and longitudinal stringers B^2 upon which are supported the ties of the railroad track.

C designates the bridge approach at the rear end of the bridge and D the track support at the front or lifting end of the bridge, which latter support may comprise a fixed or stationary bridge span. One end of said track support is shown as resting on a pier E which supports the front end of the leaf when the latter is in its closed position.

F, F designate rolling segments located at the rear or approach end of the leaf. Said segments are attached to or form parts of the trusses of the leaf and, as shown, are located in the planes of said trusses.

G, G designate horizontal girders which are supported on piers H, H^1 and form part of the approach C. Said girders support on their upper faces track plates indicated as a whole by G^1, upon which the segments F, F rest and upon which they roll when the bridge is opened and closed. Said girders G are hereinafter designated as track-girders. Said track-plates G^1 are provided with means for preventing the slipping or shifting of the segments F, F thereon, said means comprising teeth g, g, arranged at intervals along the track-plates and adapted to enter holes or recesses in the curved faces of the said segments as the said segments roll on the girders.

Attached to the rear end of the span or leaf is a fixed counterweight, which consists of two vertically arranged parts I, I, located in the planes of the trusses, and a horizontal part I^1 which is attached to and extends between the trusses. The vertical or lateral counterweight sections I, I are located between the upper ends of the rolling segments and rear extensions a^2, a^2 of the upper chords of the trusses, and the transverse counterweight section I^1 extends between said lateral sections. The said counterweight sections or counterweights I, I, I^1 operate, as is common in this class of bridges, to counterbalance the weight of the overhanging end of the swinging leaf so as to permit the same to be raised and lowered with the use of a small amount of power.

The horizontal or transverse counterweight section I^1 affords a transverse brace by which the trusses are rigidly connected

with each other. The bridge illustrated being a "through" bridge, the said counterweight section I^1 is located at a height above the bridge floor sufficient for the passage of traffic beneath it.

Both the lateral and transverse counterweight sections are shown as consisting of inclosures or box-like structures of metal, provided with fillings of concrete, as clearly shown in Fig. 4. This construction in a counterweight has the advantage of providing the necessary weight by the use of material much cheaper than metal, while at the same time the metal inclosure therefor may be adapted to form a part of the bridge structure. As illustrated, the inclosures for the lateral counterweight section I, I are attached to the truss members and serve to rigidly connect the upper ends of the rolling segments F, F with the upper chords *a*, *a* of the trusses, while the inclosure for the counterweight section I^1, serves as a cross brace for the trusses.

The bridge illustrated is provided, in accordance with one feature of my invention, with a shifting or movable counterweight I^2 so constructed and arranged as to operate the leaf to open and close the same. To this end I so construct and mount said movable counterweight, as to permit the same to be moved or shifted relatively to the center of gravity of the leaf, and thus overbalance the normally counterbalanced bridge structure in a manner to cause the bridge to open or close, depending upon which way the movable counterweight is shifted from its intermediate or neutral counterbalancing position. So far as this feature of my invention is concerned, the movable counterweight as a whole may be made of any preferred or approved form, and the movable counterweight may be variously mounted or sustained on the span or leaf, in a manner to effect the overbalancing of the span or leaf, for the purpose set forth. Moreover, the shifting counterweight may be employed as the sole counterbalancing weight for the span, or without the fixed counterweight illustrated and hereinafter referred to. As illustrated in the present instance, the shifting or movable counterweight I^2 is located between the fixed counterweight members I, I and is hung or suspended from a horizontal rock shaft I^3 that extends between and has bearing in suitable bearing boxes *i*, *i*, fixed to the upper chord extensions a^2, a^2. The said movable counterweight is thus adapted to be moved or shifted by turning or swinging the same about the axis of said rock-shaft. The said movable counterweight is, moreover, shown as being curved on its lower side, and as arranged with its apex directed upward and adjacent to the supporting rock-shaft I^3. The body of said counterweight I^2 is so disposed that when it hangs freely from the shaft I^3 the counterweight, as a whole, tends to maintain the span in an intermediate position, or neither fully open nor closed. The shifting counterweight I^2 illustrated consists of an inclosure or shell of sheet metal, provided with a filling of concrete, as hereinbefore described in connection with the fixed counterweight.

Means are provided for shifting said movable counterweight to overbalance the span, for effecting the opening or closing of the bridge. Actuating devices for so shifting the counterweight may in practice have a variety of forms, that shown in the accompanying drawings as a convenient and practicable one consisting of an electric motor J which is supported in the transverse part I^1 of the fixed counterweight, and a train of gears designated, as a whole, by J^1 which operates a shaft J^2 provided with pinions *j*, *j* engaging circular racks i^1, i^1 on the lower curved face of the sector shaped counterweight. The said motor J will be equipped with any suitable or well known form of brake mechanism, whereby when the movable portion of the counterweight has been shifted to the extent required for moving the bridge leaf to open or close the same, the operating machinery is locked so as to prevent said movable part of the counterweight from swinging farther than required to properly operate the bridge.

The swinging bridge span or leaf provided with the movable or shifting counterweight described, may be opened or closed with the use of less power than required under present practice, where the bridge leaf is operated throughout its opening and closing movement by machinery acting thereon for that purpose, it being obvious that less power is required to shift the counterweight to an unbalancing position than is required for operating the entire span as heretofore. A further and important advantage growing out of my new means for operating the span to open and close the same is that I am thereby enabled to dispense with stationary supports heretofore employed for sustaining the machinery used to operate the bridge. The cost of erecting the bridge is thereby materially reduced. It will be understood that the shifting counterweight may be movably supported and operated in a great variety of ways. In small bridges, the shifting counterweight may be practicably operated by hand power.

I have shown in the drawings, devices in the nature of buffers K, K for yieldingly arresting the movement of the bridge leaf when it reaches its open position, thereby avoiding objectionable shocks and jars on the bridge structure and the stationary bearers or stops by which the movement of the leaf is positively limited. As shown in

the drawings, two of said buffers are located at the rear end of the bridge in position to act on fixed stops T, (Fig. 1). Said buffers each embrace a cylinder K^1 arranged horizontally and attached to a bracket k extending laterally from the rear end of the upper chord extension a^2 (Fig. 2); a piston rod K^3, attached to a piston in the cylinder and extending through the head or end of said cylinder, and a head K^4 which is attached to the outer end of the piston rod and adapted for contact with the fixed stop T.

It will be observed that the bascule bridge illustrated is of the type known as a "through" bridge, the span floor being located adjacent to the lower chords of the span trusses and the track girders G, G, which support the rolling segments F, F, being located substantially at the level of the span floor or approach roadway. In the construction illustrated, moreover, the several counterweights or counterweight sections I, I, I^1, which are fixed to the trusses, as well as the movable or shifting counterweight I^2 are located above and forward of the upper or rear ends of the said rolling segments F, F. An important advantage is gained by the construction and arrangement of the parts here referred to, for the reason that when the leaf is lifted or thrown to the position shown in dotted lines in Fig. 1, the counterweight or weights are not carried below the level of the bridge floor, approach floor or roadway, as will be clearly seen by said dotted lines in Fig. 1.

The construction by which the counterweights are substantially above the level of the bridge floor when the bridge is open constitutes an important improvement in bridges of this class because enabling the floor frame of the swinging leaf and the track girders which support the rolling segments to be located closely adjacent to or only a short distance above the level of the water in a waterway, without the necessity of constructing pits or masonry inclosures to receive the counterweights when the bridge is open. Such pits have heretofore been employed in connection with counterweighted bascule bridges, in cases where the bridge floor is not greatly elevated above the water level, and their omission greatly lessens the cost of construction in bridges of this class.

I claim as my invention;

1. In a bascule bridge, the combination with a swinging leaf, of means for swinging the leaf to open and close the bridge, consisting of a shifting counterweight mounted on, and supported solely by, said leaf and movable on the leaf in a manner permitting the shifting of its center of gravity in a direction endwise of the leaf, said counterweight when shifted affording sufficient preponderance of weight at the inner or outer end of the leaf to produce opening and closing movement of the same, and actuating means mounted on the leaf and acting on the counterweight to move or shift the same on the leaf.

2. In a bascule bridge, a swinging leaf comprising longitudinal trusses, a fixed counterweight extending transversely between and rigidly connecting said trusses, and a shifting counterweight.

3. In a bascule bridge, a swinging leaf comprising longitudinal trusses, a fixed transverse counterweight extending between and rigidly connecting the trusses and a shifting counterweight located above said fixed counterweight.

4. In a bascule bridge, a swinging leaf comprising longitudinal trusses, fixed lateral counterweights arranged in the planes of the trusses, a fixed counterweight extending transversely between and rigidly connecting the trusses, and a shifting counterweight located between said fixed counterweights above said transverse counterweight.

5. In a bascule bridge, the combination with a swinging leaf, of means for swinging the leaf to open and close the bridge, consisting of a counterweight which is pivotally supported on and is sustained solely by said leaf, and which is adapted to be moved or swung about its pivotal axis in a manner to shift its center of gravity in a horizontal direction and endwise of the leaf, said counterweight when shifted affording sufficient preponderance of weight at the inner or outer end of the leaf to produce opening and closing movement of the same, and actuating means mounted on the leaf and acting on the counterweight to swing or move the same.

6. In a bascule bridge, the combination with a swinging leaf, of means for swinging the leaf to open and close the bridge, consisting of a shifting counterweight mounted on, and supported solely by, said leaf and movable on the leaf in a manner to shift its center of gravity in a horizontal direction and endwise of the leaf, said counterweight, when shifted, affording sufficient preponderance of weight at the inner or outer end of the leaf to produce opening or closing movement of the same, and a motor mounted on the leaf and acting on the said counterweight to move the same.

7. In a bascule bridge, the combination with a swinging leaf, of means for swinging said leaf to open and close the bridge, consisting of a counterweight which is pivotally supported on and is sustained solely by said leaf, and is adapted to be moved or swung about its pivotal axis in a manner to shift its center of gravity in a horizontal direction and endwise of the leaf, said counterweight, when shifted, affording sufficient preponderance of weight on the inner or

outer end of the leaf to produce opening or closing movement of the same, a motor mounted on the leaf and gearing adapted to transmit motion from said motor to the counterweight for shifting the position of the same.

8. In a bascule bridge, the combination with a swinging leaf embracing two longitudinal trusses, of means for swinging the leaf to open and close the bridge, consisting of a counterweight located between said trusses and a longitudinal shaft, affording pivotal support for said counterweight, mounted at its ends on and extending between said trusses, said counterweight being adapted to be swung on its pivotal axis in a manner to shift its center of gravity in a horizontal direction and being adapted to afford sufficient preponderance of weight on the inner or outer end of the leaf to produce opening or closing movement of said leaf.

9. In a bascule bridge, the combination with a swinging leaf, of a pivoted counterweight mounted thereon, a gear segment attached to the said counterweight, a gear pinion intermeshing with the said gear segment and means for actuating said pinion.

10. In a bascule bridge, the combination with a swinging leaf, of a sector-shaped counterweight pivotally mounted on said leaf, a gear segment secured to said counterweight concentrically with the pivot thereof, a gear pinion intermeshing with said gear segment and means for actuating said pinion.

11. In a bascule bridge, the combination with a swinging leaf, of a counterweight pivotally mounted thereon, a gear segment attached to the said counterweight, a gear pinion intermeshing with said gear segment and a motor mounted on the bridge leaf, for actuating said gear pinion.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 1st day of July A. D. 1907.

ALBERT H. SCHERZER.

Witnesses:
G. R. WILKINS,
T. H. ALFREDS.