No. 672,848. Patented Apr. 23, 1901.

J. P. COWING.

REVOLVING LIFT BRIDGE.

(Application filed July 9, 1900.)

(No Model.)

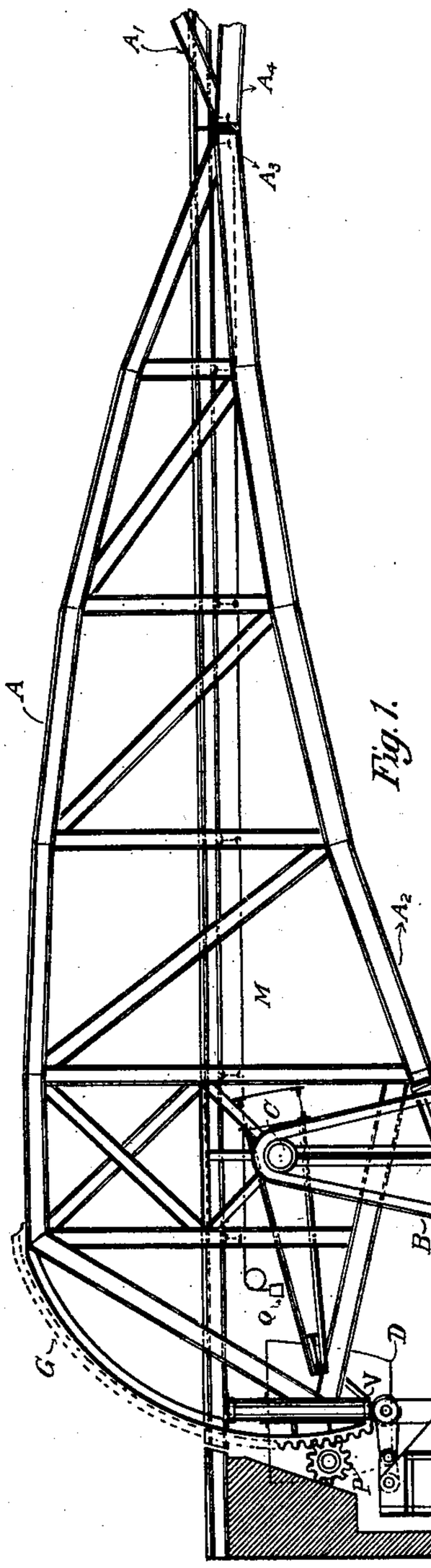

Fig. 1.

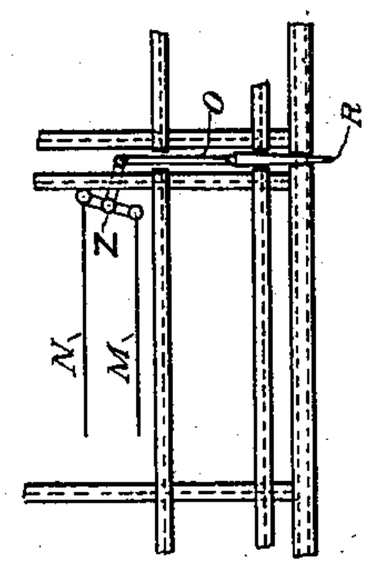

Fig. 2.

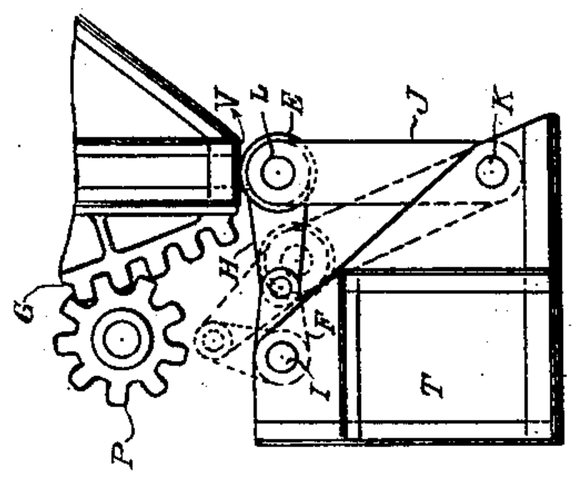

Fig. 3.

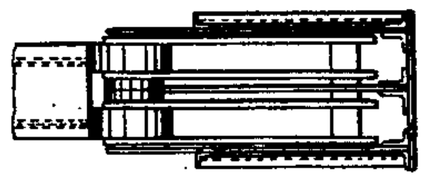

Fig. 4.

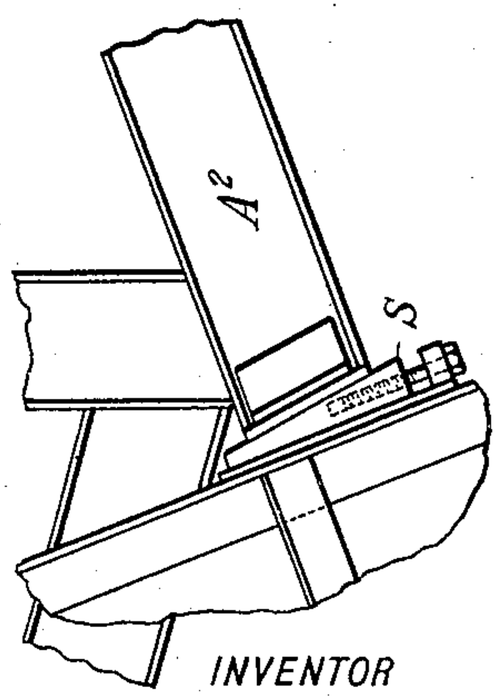

Fig. 5.

WITNESSES:

Rufus. f. Waidley.

F. C. Manchester

INVENTOR

John Phils Cowing

James. A. Joyce

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN PHILO COWING, OF CLEVELAND, OHIO.

REVOLVING LIFT-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 672,848, dated April 23, 1901.

Application filed July 9, 1900. Serial No. 22,974. (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 Revolving 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 lift-bridge arranged to rest on piers or abutments and to permit of conveniently opening and closing the bridge with comparatively little power and 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.

Figure 1 is a side elevation of the improvement arranged as an arched double-span bridge. Fig. 2 is a top view of ends at center of arch, showing automatic compensating wedge. Fig. 3 is an enlarged side elevation of end jack and operating pinion and rack. Fig. 4 is an end view of end jacks. Fig. 5 shows enlarged adjustable wedge for the shoe end of bottom chord.

The 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 pivotally supported in a frame B, which rests on a pier or abutment, and having pinion P meshing in gear-rack G to cause a swinging motion to the said span either into an open or closed position. The stop U is anchored to the pier and arranged to engage the fulcrum end of the span at V, which will prevent the span from opening too far when it is being revolved into an open position. Pinion P is secured to a line of shafting which is driven by a motor and suitable gears, the motor being placed on the pier and under the control of the operator or bridge-tender.

The construction of the mechanism for imparting a swinging motion to the span may be varied by using wire rope or chains fastened at two convenient points on the trusses and operated by a drum, or the rack may be placed at any other point on the truss to be concentric with the center pin C.

The fulcrum end of each span A and A′ is provided with a counterweight D, supported by beams and arranged so as to keep the span in equilibrium during the opening and closing of the span. The bottom chord A^2 of span A or A′ is adapted to rest on a skewback S, formed on the lower part of frame B. The bottom chords abut at center, and with the skewbacks for the lower ends of said bottom chord the two spans A and A′ form an arch. The fulcrum end of each span is provided with a toggle-jack, which is arranged to support the span and to bring the lower end of the bottom chord A^2 to a firm bearing on skewback S at lower part of frame B. By this means the fulcrum end of the span is held firmly in position and the wedges R at center are thrown into a bearing. This brings the center of the arch to a good bearing. These wedges R are provided with bell-cranks Z and link O, which are operated by rods or wire ropes M and N, Fig. 2. Rod or wire rope M is provided with a counterweight Q, which forces the wedges R in between the upper ends A^3 and A^4 of the bottom chord. The rod or wire rope M is carried to a pulley supported on the beams of the bridge and having counterweight Q fastened to its end, which keeps up a constant tension on the rod, and thereby keeping a constant thrust on the wedge at all times. When shortening of the span takes place, due to change of temperature, the wedges are forced in to compensate for this change of length. The wedges are arranged to be withdrawn by pulling on the end of wire rope or rod N. This rod or wire rope is connected up by bell-cranks and levers in connection with mechanism in the motor-room for operating the same.

The counterweight D is equally disposed above and below a line passing through the center of gravity. By this construction 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 or closing of the bridge. Consequently it requires but little power to open or close the bridge. The counterweight D is supported on beams which connect to the trusses. Some of the counterweight may be placed in the trusses at the fulcrum end. The counterweight D is ar-

ranged to swing in a pocket in the masonry between the pier-supports for the frame B.

The motive power for opening and closing the bridge 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 anchorages to pull and push against when opening or closing the bridge. The skewbacks S take the thrust at end of bottom chord and also form a stop for the span to prevent the same from dropping below a certain level when the bridge is closed. To insure a perfect level of both spans, the skewbacks are provided with adjusting-wedges by which the elevation of either span may be adjusted after erection, so as to insure a good joint where the floors join at the center.

The end-jacking-up mechanism is arranged to be withdrawn when it is desired to lift the bridge. Crank F is secured to shaft I, which is revolved by gearing and a clutch which is driven by the motor, which operates the gearing for opening the lift and is under the control of the bridge-tender. When the crank F is revolved, the links H and J are moved out from under the end of the said span, thus allowing the span to revolve and to clear the jacking-up mechanism. The link J is pivotally supported on pin K at its lower end, and at its upper end the links H and rollers E are supported on pin L. By the use of rollers at the upper end the friction due to jacking up the end is reduced to a minimum. The support T is arranged to support shaft I and pin K and to receive the links J and H when the jacking-up mechanism is removed from under the end of the span when it is desired to open the bridge.

This revolving lift-bridge admits of easily being made into a single-span bridge for short spans. By placing a support at point A^3 in bottom chord the arch becomes a single-span bridge with one revolving arm.

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

1. A revolving lift-bridge provided with two spans pivotally supported on frames, and 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 chord or arch of the spans, and a counterweight to counterbalance the span in any position, and mechanism for imparting a swinging motion to said span, and wedges arranged to be forced in place to compensate for the changes in length due to changes in temperature, substantially as shown and described.

2. A revolving lift-bridge provided with two spans pivotally supported on frames and 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, and an end-jacking-up mechanism for supporting and bringing the fulcrum end to a suitable bearing, and a counterweight to counterbalance the span in any position, and mechanism for imparting a swinging motion to said span, substantially as shown and described.

3. A revolving lift-bridge provided with two spans pivotally supported on frames and 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 with adjusting-wedges for the shoe ends of the bottom chords or arch of the span, to adjust the spans to the proper level when the bridge is closed, substantially as shown and described.

4. A revolving lift-bridge provided with two spans pivotally supported on frames and 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 shoe ends of the bottom chord or arch of the span, and a stop anchored to the said foundation arranged to engage a part of the span to prevent it from opening too far, substantially as shown and described.

5. A revolving lift-bridge provided with two spans pivotally supported on frames and the free ends of the spans being adapted to abut one on the other, and wedges arranged to be forced in place to compensate for the changes in length due to the changes in temperature, and skewbacks with adjusting-wedges for the shoe ends of the bottom chord or arch of the span and a gear-rack fastened to the fulcrum end of said span, and a pinion gearing into said rack and driven by a motor and suitable gears for imparting a swinging motion to said span, substantially as shown and described.

6. A revolving lift-bridge provided with two spans pivotally supported on frames and 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 shoe ends of the bottom chord or arch of the span, and end-jacking-up mechanism for supporting and bringing the fulcrum end to a suitable bearing, substantially as shown and described.

7. A revolving lift-bridge provided with two spans pivotally supported on frames and 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 shoe ends of the bottom chord or arch of the span, and wedges at the inner ends of bottom chord arranged to be forced between the ends of said bottom chord, substantially as shown and described.

8. A revolving lift-bridge provided with two spans pivotally supported on frames and 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 arch of the span, and wedges automatically forced in place by a counterweight and

mechanism for withdrawing the same, substantially as shown and described.

9. A revolving lift-bridge provided with two spans and supports for same, in combination with mechanism for imparting a swinging motion to the said spans, and wedges arranged to be forced in place to compensate for the changes in length of span due to changes of temperature, substantially as shown and described.

10. A revolving lift-bridge provided with two spans and supports for the same, and a counterweight to counterbalance the span in any position, and mechanism for imparting a swinging motion to said span, and wedges arranged to be forced in place to compensate for the changes in length due to changes in temperature, substantially as shown and described.

11. A revolving lift-bridge provided with two spans and supports for same, in combination with an end-jacking-up mechanism for supporting and bringing the fulcrum end to a suitable bearing, substantially as shown and described.

12. A revolving lift-bridge provided with two spans and supports for same, in combination with an end-jacking-up mechanism for supporting and bringing the fulcrum end to a suitable bearing, and a counterweight to counterbalance the span in any position, and mechanism for imparting a swinging motion to said span, substantially as shown and described.

JOHN PHILO COWING.

Witnesses:
W. O. HENDEVER,
A. H. PORTER.