(No Model.) 2 Sheets—Sheet 1.

R. A. SAWYIER.

DRAW BRIDGE.

No. 389,980. Patented Sept. 25, 1888.

FIG. 1

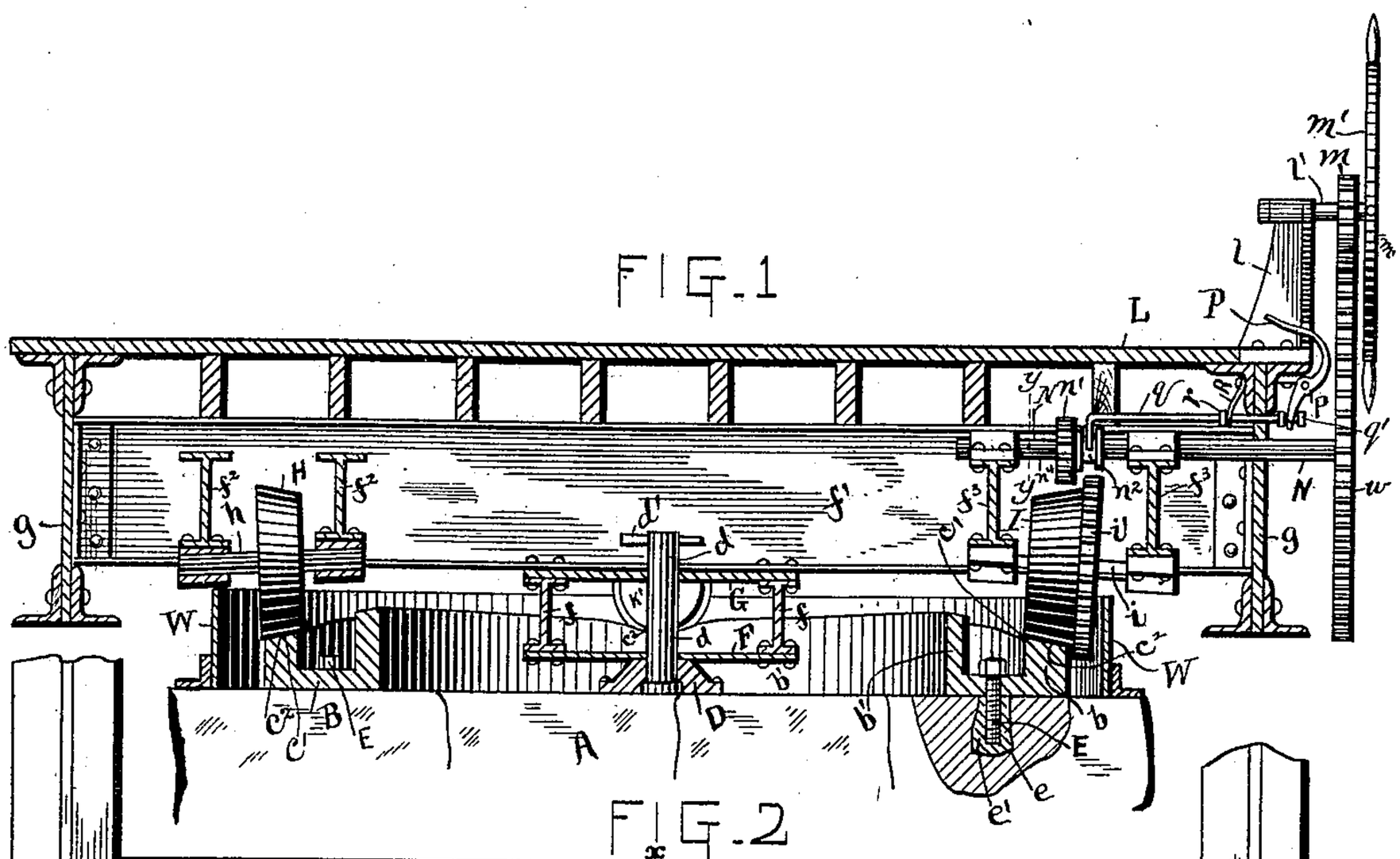

FIG. 2

FIG. 4

WITNESSES:

Geo. B. Fravel.

Ira S. Koehns.

INVENTOR

Reuben A. Sawyier

BY

C. C. Shepherd

HIS ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

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FIG. 3

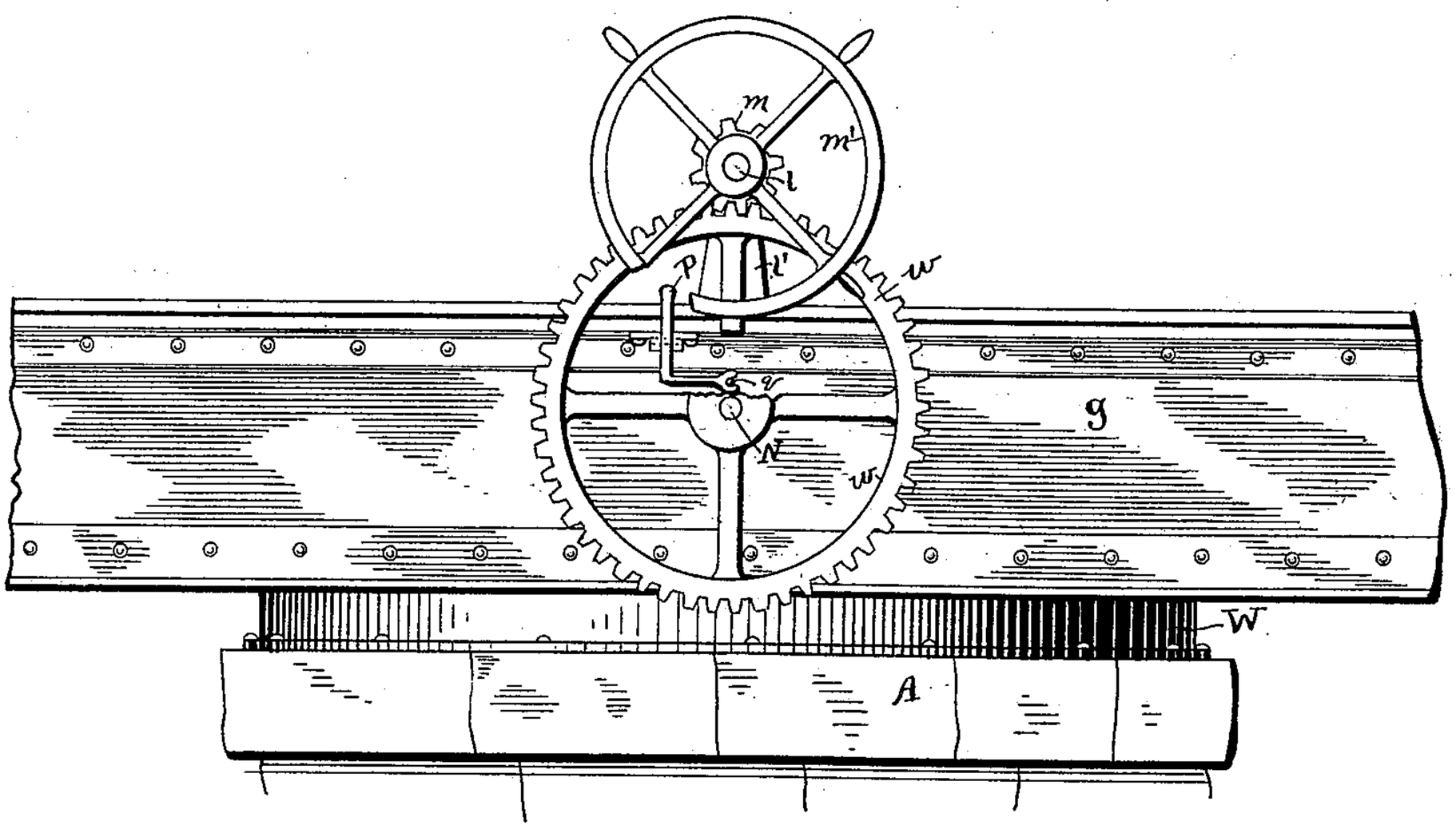


FIG. 4

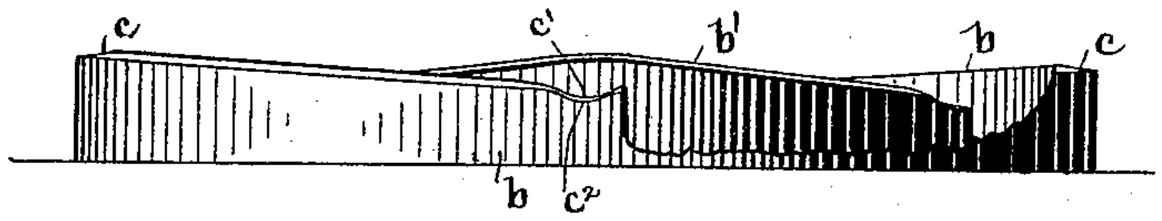
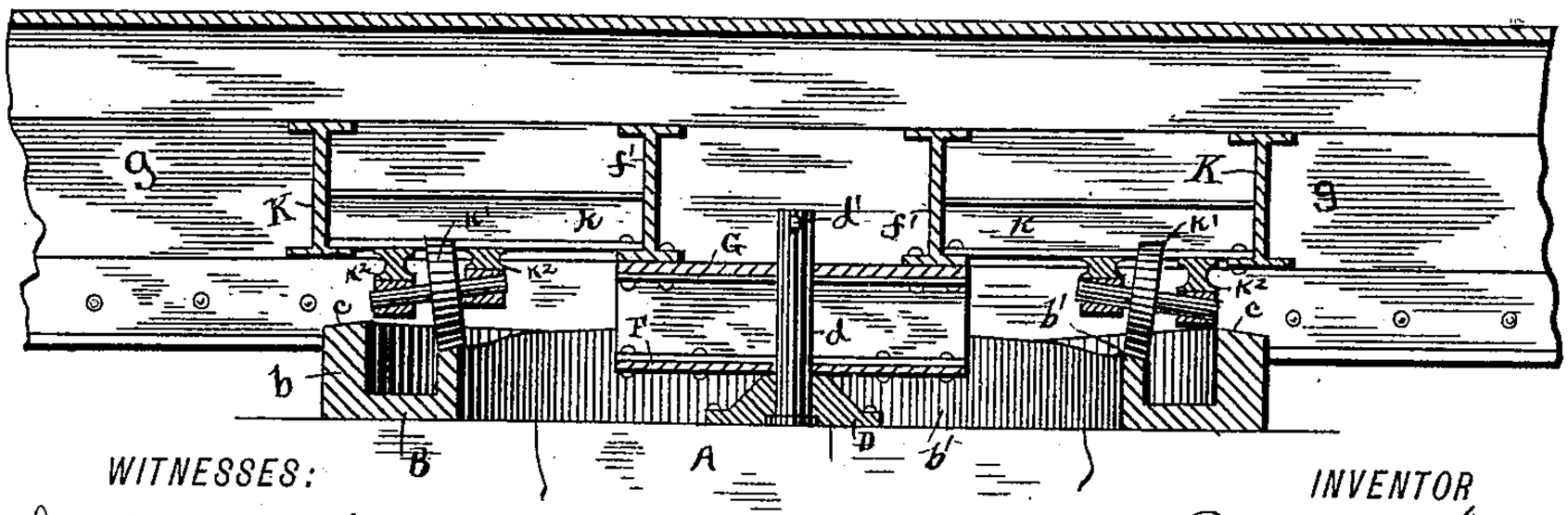


FIG. 5



WITNESSES:

Geo. B. Travel

Ira S. Kochns.

INVENTOR

Reuben A. Sawyier

BY

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UNITED STATES PATENT OFFICE.

REUBEN A. SAWYIER, OF COLUMBUS, OHIO.

DRAW-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 389,980, dated September 25, 1888.

Application filed April 16, 1888. Serial No. 270,831. (No model.)

To all whom it may concern:

Be it known that I, REUBEN A. SAWYIER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Bridges, of which the following is a specification.

My invention relates to swinging bridges, such as are adapted to be opened by hand or by contact therewith of a moving boat, and has particular relation to the improvement of that form of bridge shown and described in my patent, No. 381,584, dated April 24, 1888.

The objects of my present improvement are to provide a bridge of this class with a hand-operating mechanism so constructed and arranged as to obviate the necessity of using a detachable operating key or wrench, and to locate said operating mechanism away from the roadway of the bridge, and to so support said bridge as to admit of its being easily and readily turned, and to cause the same to return automatically to its normal position across the stream after the passage of the boat. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a transverse section of the bridge. Fig. 2 is a plan view of a portion of the bridge with the floor removed, taken above the supporting-pier. Fig. 3 is a side elevation of a portion of the bridge and hand-operating mechanism. Fig. 4 is a side elevation of the bearing-tracks, showing the outer track partly broken away. Fig. 5 is a sectional view taken on line *x x* of Fig. 2; and Fig. 6 is a transverse section of one of the operating-shafts, taken on line *y y* of Fig. 1.

Similar letters refer to similar parts throughout the several views.

A represents the supporting-pier of a bridge.

B represents a circular track-plate, having its sides flanged upwardly to form two circular tracks, *b b'*, one within the other, and having its central flattened portion secured, as hereinafter described, to the upper side of the pier A. The upper surface of the outer and larger track, *b*, is inclined downwardly in each direction from two oppositely-located points, *c*, to oppositely-located points, *c'*, in said track ninety degrees removed from said points *c*. At each of the low points, *c'*, is formed in the upper surface of the track a slight concave depression, c^2. The formation of the inner track, *b'*, is similar to that of the outer track, *b*, except that the position of the high and low points of its surface is reversed, the high points of the inner track being opposite the low points, *c'*, of the outer track.

In securing the track-plate B to the pier a number of cavities, *e*, are formed in the pier at points below the track-plate, into which are made to extend the lower portions of screws E, made to pass vertically downward through bolt-holes formed in the track-plate, and having heads upon their upper ends, as shown. The screws having thus been made to enter the cavities *e*, the latter are filled with molten metal which is allowed to harden within the cavities and about the screws.

Bolted to the upper side of the pier, in the center of the circle described by the inner track, *b'*, is a metallic bed-plate, D, having a central vertical hole therein, through which is made to pass and project upwardly, before said bed-plate is secured in its position on the pier, a pin, *d*, having an enlarged lower end, the latter being countersunk in a depression formed in the lower surface of the bed-plate about its central hole.

Resting upon the upper side of the bed-plate D is a metallic plate, F, the latter being bolted, as shown, to the under side of two parallel **I**-beams, *f*, which extend one on each side of the pin *d*, and have their ends secured, respectively, to the under sides of two parallel **I**-beams, *f'*, extending transversely between the side girders, *g*, of the bridge, one on each side of the center pin, *d*. Intervening between the upper sides of the **I**-beams *f* and the lower sides of the beams *f'* is a plate, G, corresponding with the plate F. The center pin, *d*, passes loosely through central oppositely-located holes formed in said plates F and G, and, extending upward a short distance above the latter, has near its upper end a stop-pin, *d'*, projecting outwardly from opposite points thereon. Extending transversely between the cross-girders *f'*, and secured to the under sides thereof, are two pairs of beams, f^2 f^3, located, respectively, near the ends of said cross-girders. Between the beams f^2, and pivoted in suitable bearings therein, is a short shaft, *h*, on which is mounted a track-wheel, H, bearing and adapted to run upon the track *b*. Between the

beams f^3 is pivoted a short shaft, i, on which is mounted a track-wheel, I, adapted to bear and be made to run upon the track b at a point diametrically opposite the bearing of the wheel H. The wheel I is provided on its outer side with a circular flange, having cog-teeth i' formed thereon, as shown. These track-wheels H and I normally rest, as shown, in the concave depressions c^2 of the track B.

Between each of the cross-beams f' and a parallel cross-beam, K, extending between the side girders, g, at a point near the outer edge of the track b, are made to extend two parallel beams, k, connected, as shown, by two parallel cross-beams, k^2, between which is pivoted a shaft carrying a small balance-wheel, k': These balance-wheels, as shown, are adapted to rest normally within the depressions at the low points of the inner track, b'.

L represents the bridge-floor, from which, adjoining one edge thereof, is made to extend upwardly a standard, l, the latter having pivoted in its upper end an outwardly-extending shaft, l', having mounted thereon a pinion-wheel, m, and having fixed on its outer end a hand-wheel, m'.

N represents a horizontal shaft extending inwardly through the side girder, g, at a point below the shaft l' and beneath the floor of the bridge. The inwardly-extending portion of this shaft is provided with suitable bearings, n, on the upper sides of the beams f^3.

Mounted loosely on the shaft N, at a point above the track-wheel I, is a pinion-wheel, n', having formed therewith, on one side, a clutch-extension, n^2, in the form of a flanged collar fitting loosely about the shaft. This pinion n' is provided on its inner bearing-surface with a horizontal slot, n^3, into which, as shown in Fig. 6 of the drawings, fits loosely a similarly-shaped lug or key, n^4, formed on the shaft N. The outer end of the shaft N is made to carry a gear-wheel, w, which gears with the pinion m.

P represents a foot-lever pivoted near its center in suitable bearings on the outer side of the frame-work on that side of the bridge occupied by the standard l. The upper portion of the foot-lever is bent outward and thence inward over the upper edge of the bridge-floor to form a treadle, while its lower portion extends downwardly and thence in the direction of the length of the bridge, terminating in a fork which fits loosely over a horizontal rod, q, between two nuts, q', fixed thereon. This rod q extends inward through the side girder of the bridge over the shaft N, and has an inner downwardly-forked end partially embracing the clutch n^2 between its end flange and the pinion n'.

R represents a metal spring-strip having its upper end secured to the inner side of the bridge side girders, and having its lower end provided with a slot or hole, through which passes the rod q, the latter having fixed thereon a nut, r, against the outer side of which the lower end of said spring-strip bears, as shown.

The operation of my improved bridge is as follows: When it is desired to turn the bridge to admit of the passage of a boat, the foot of the operator is first pressed upon the foot-lever P. This pressure will operate, through the connection of said lever and the rod q and the connection of the latter with the clutch-extension n^2 of the pinion, to draw said pinion outward on the shaft N sufficiently to cause the engagement of said pinion and the cogged flange i' of the track-wheel I. The hand-wheel m' is then grasped and turned, operating to revolve, through the shaft l' and pinion m, the gear-wheel w, which in turn revolves the shaft N and keyed pinion n'. The pinion n' being in engagement with the cogs of the track-wheel I, the latter will thus be made to turn and travel upon the track b, and through its connection with the bridge frame-work cause the bridge to turn, the wheels H and k' running, respectively, upon the tracks b and b'. The bridge having been turned sufficiently to admit of the passage of the boat, and the track-wheels I, H, and k' having thus traveled up the incline of their respective tracks, the grasp on the hand-wheel may be released, allowing said track-wheels to reverse and be carried by force of gravity down the incline of the tracks until again at the low points in said tracks, thus causing the bridge to assume its normal position across the stream. It will be seen that in case the track-wheels, by the force acquired in returning, should pass said low points in said tracks, they may travel a short distance up the inclines on the opposite sides of said points until said force is overcome, and again reverse and finally settle in the low-point depressions. The pressure of the foot being released from the lever P, it will be seen that the tension of the spring-strip R will force the rod q inward, operating to release the pinion n' from engagement with the cogs of the wheel I. Although the track-plate B is shown formed in one piece, it is obvious that each track may be formed of a separate plate. It will also be observed that the peculiar means herein described of securing the track-plate to the pier will serve to form a firm connection between said parts.

The herein-described bridge is so constructed as to bring the greater portion of the weight upon the track-wheels I and H, while the wheels k' and pin d facilitate the balancing of the bridge. The stop-pin d' of the pin d will operate to prevent the possibility of the bridge being from any cause elevated off said pin d.

By the construction herein described it will be seen that the use of springs, common in bridges of this class, is obviated, and that the operating mechanism is so arranged and located upon the bridge as to do away with a removable wrench and prevent the obstruction of the roadway of the bridge.

In order to prevent the entrance of snow and otherwise protect the bearing parts of the bridge, a circular plate, W, having its lower

edge resting upon the upper side of the pier, to which it is secured, is made to encircle the tracks *b b'*, as shown.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a swinging bridge, the combination, with the pier A and inclined tracks *b b'*, secured to said pier, of the bridge frame-work, supporting track-wheels H and I, and balance-wheels *k'*, substantially as specified.

2. In a swinging-bridge-operating mechanism, the combination of the frame-work and journaled shaft *l'*, carrying pinion *m* and hand-wheel *m'*, with the shaft N, its loosely-mounted and slotted pinion *n'*, key n^4, and gear-wheel *w*, gearing with pinion *m*, substantially as and for the purpose specified.

3. In a swinging bridge-operating mechanism, the combination of the frame-work, pivoted shaft *l'*, carrying pinion *m* and hand-wheel *m'*, shaft N, its loosely-mounted and slotted pinion *n'*, having clutch-extension n^2, key n^4, and gear-wheel *w*, gearing with pinion *m*, with the pivoted foot-lever P, rod *q*, connected with said lever, and spring-strip R, substantially as and for the purpose specified.

4. The combination of the bridge frame-work, pivoted shaft *l'*, carrying pinion *m* and hand-wheel *m'*, shaft N, its loosely-mounted and slotted pinion *n'*, having clutch-extension n^2, key n^4, and gear-wheel *w*, gearing with pinion *m*, the pivoted foot-lever P, rod *q*, connected with said lever, and spring-strip R, with the track-wheels H and I, the latter having cogs *i'*, balance-wheels *k'*, and inclined tracks *b b'*, substantially as and for the purpose specified.

5. The combination of the pier A, having cavities *e* therein, with the track-plate B and screws E, the latter extending through said plate into said cavities, where they are held by metallic filling *e'*, substantially as and for the purpose specified.

6. In a track for swinging bridges, the combination, with the pier of the bridge, of the herein-described circular tracks *b* and *b'*, each of said tracks having two oppositely-located depressions, from each side of which the upper surface of the track inclines upwardly to high points ninety degrees removed from said low points, the low points of the track *b* being, as described, opposite the high points of the tracks *b'*, substantially as and for the purpose specified.

REUBEN A. SAWYIER.

In presence of—
JOHN M. TIBBETTS,
C. C. SHEPHERD.